Board of Trustees Academics and Campus Environment Committee

Tuesday, May 14, 2019
11:15 a.m. – 12:45 p.m.
USF Student Marshall Center Ballroom

Trustees: Stephanie Goforth, Chair, Oscar Horton, Moneer Kheirddine, Deanna Michael, Byron Shinn
USF Foundation Liaison: Mike Griffin
USF St. Petersburg Campus Board Liaison: Lawrence Hamilton
Executive Vice President: Ralph Wilcox

A G E N D A

I.	Call to Order and Comments	Chair Stephanie Goforth
II.	Public Comments Subject to USF Procedure	Chair Goforth
III.	New Business – Action Items	
a.	Approval of April 8, 2019 Meeting Minutes	Chair Goforth
b.	Proposed Ph.D. Informatics and Big Data Analytics (USFT)	Dean Moez Limayem
c.	Proposed B.S. Supply Chain Management (USFT)	Dean Moez Limayem
d.	Proposed M.S. Supply Chain Management (USFT)	Dean Moez Limayem
e.	Proposed B.S. Environmental Chemistry (USFSP)	Regional Chancellor Martin Tadlock
f.	Faculty Nominations for Tenure (USFT)	Senior Vice Provost Dwayne Smith
g.	Tenure as a Condition of Employment (USFT)	Senior Vice Provost Dwayne Smith
h.	Faculty Nominations for Tenure (USFSP)	Regional Chancellor Martin Tadlock
i.	Tenure as a Condition of Employment (USFSP)	Regional Chancellor Martin Tadlock
j.	Faculty Nominations for Tenure (USFSM)	Regional Chancellor Karen Holbrook
k.	Tenure as a Condition of Employment (USFSM)	Regional Chancellor Karen Holbrook

IV. New Business – Information Items

a. Academic Performance of Student Athletes — Vice President Paul Dosal, Dean Paul Atchley

b. Youth Mental Health Awareness & Training Grant — Regional Chancellor Martin Tadlock

V. Adjournment — Chair Goforth

Next Scheduled Meeting: Tuesday, August 27, 2019, 11:15 a.m. – 12:45 p.m.

APPEARANCES BEFORE THE BOARD

Individuals or group representatives, who desire to appear before the Board to address a subject within the Board's jurisdiction may submit their requests in writing at least three (3) days in advance to the Corporate Secretary, c/o Office of Board of Trustees Operations, 4202 E. Fowler Avenue, CGS401, Tampa, FL 33620, specifying the agenda item on which the requestor(s) wishes to comment.

Comments shall generally be heard at Board Committees. However, the President in consultation with the Chair will determine whether the item will be heard and when the item will be heard. There will be a three minute time limit on any presentation. The total time allotted for all comments shall not exceed fifteen minutes, unless approved by the Board Chair.

As permitted by section 286.0114, F.S., the Board Chair may decline to hear any matter that: does not relate to a particular agenda item; is not practicable for a particular meeting; is outside the Board's jurisdiction; or was made available for public comment at a prior committee meeting before the Board takes action.

The Chair may recognize any individual or representative of groups to address the Board.

In order to proceed with the essential business of the Board in an orderly manner, any individual or group representative who attempts to disrupt a Board meeting will be subject to appropriate action pursuant to law.

BOT e-mail address is board@usf.edu.

Per BOT Operating Procedures, Article VI, 03.06.2018

NOTES
USF Board of Trustees
Academics and Campus Environment Committee
April 8, 2019, 2:00 PM – 4:30 PM
USF Marshall Student Center, MSC 3707

Committee Members Present: Stephanie Goforth, Trustee and Chair; Oscar Horton, Trustee; Moneer Kheirddine, Trustee; Deanna Michael, Trustee; Byron Shinn, Trustee; Judy Genshaft, President; Michael Griffin, USF Foundation Liaison; Gerard Solis, General Counsel; Ralph Wilcox, USF System Provost & Executive Vice President; Jordan Zimmerman, Trustee and BOT Chair

I. Call to Order and Comments

Chair Stephanie Goforth called the meeting to order at 2:02 PM. A quorum was confirmed by Assistant Corporate Secretary Cindy Visot, with the following Trustees present:

Trustee Stephanie Goforth
Trustee Oscar Horton
Trustee Moneer Kheirddine
Trustee Deanna Michael
Trustee Byron Shinn

II. Public Comments Subject to USF Procedure

Chair Goforth confirmed with General Counsel Gerard Solis that no requests for public comments had been received.

III. New Business – Action Items

a. Approval of Minutes – October 29, 2018

A motion was made and seconded. Approved by all committee members present.

b. Tenure as a Condition of Employment (USF)

Senior Associate Vice President Valerie Parisi proposed three candidates for USF Health for tenure as a condition of employment. Liwang Cui, from Penn State University, is known internationally for research on malaria; Lianchun Wang, from the University of Georgia, is an internationally recognized researcher and teacher, noted particularly for cardiovascular, cancer, and Alzheimer's research; and Ji Li, from the University of Mississippi, is also internationally recognized and recently served as President for the Chinese American Diabetes Association. All candidates bring new international visibility to USF, and this type of faculty recruitment is the ideal use for Preeminence funding, as noted by President Genshaft.

A motion was made and seconded. Approved by all committee members present.

c. Accountability Plans

Chair Goforth cited the latest issue of *Florida Trend* to emphasize USF's stature with the increase in national rankings, continued student success in a global environment, and the general positive impact of Judy Genshaft's presidency. System Provost Ralph Wilcox then introduced the Accountability Plans, beginning with USF Tampa, followed by USF St. Petersburg with Regional Chancellor Martin Tadlock, and USF Sarasota-Manatee with Regional Chancellor Karen Holbrook. Dr. Wilcox explained that the metric chosen by the BOT, Number of Postdoctoral Appointees, is expected to be replaced next year by Six-Year FTIC Graduation Rates.

The members asked questions and discussed the plans at length, including Academic Progress Rate and the "swirl" data of those graduating within the USF System versus staying at the same campus; graduate degrees awarded within programs of strategic emphasis; and distance learning disparities throughout the USF System with a targeted State University System goal of 40% FTE. It was noted that the BOG is revising the list of degree programs that are of strategic emphasis. Enrollment management was also discussed with a caution to hold growth in the "single digits," student/faculty ratio, and pathways to admission (i.e. FUSE program) other than as an FTIC. Trustee Horton posed the question "how much capacity is left?".

The Trustees asked for solutions to address unmet goals at USFSP, to which Dr. Tadlock explained that time is required to see the effects of new leadership over the last four years plus implementation of additional strategies such as Compass, a student success team, new student advocate program, online early alerts, and financial packages for retention and completion. The members commended USFSP on leading the USF System for Baccalaureate Degrees Awarded Without Excess Hours.

The review of USFSM's plan acknowledged lack of a traditional student base, the 63% FTE of Distance Learning as a method of instruction for undergraduates, the potential for housing, and the inordinate impact of small shifts within such a small student population as explanation for metrics in areas of concern including Bachelor's Graduates Enrolled or Employed, FTIC Four-Year Graduation Rate, and Percent of Baccalaureate Degrees Awarded Without Excess Hours. The Trustees identified the planned growth in FTE enrollment at USFSM as an area that must include assurances that quality of recruited students and programs offered would keep pace with growth.

Preeminence benchmarks and the USF System Accountability Plan were reviewed, including key elements of predictive analytics, case management, course scheduling, and a continued commitment to providing financial aid incentives in support of timely graduation (Finish in Four). Dr. Wilcox reported key initiatives and investments within three years to provide a Preeminent education while maintaining student success, to enhance research and academic program quality, and to increase partnerships and maximize efficiencies. Senior Vice President Paul Samberg commented regarding USF's elite status in patents and related grants. Senior Vice President Joel Momberg reported on endowment size with USF nearing the benchmark of $500 million. He also announced a $5 million donation over five years to the endowment fund by Monica Wooden to support the Muma College of Business's center for supply chain management and sustainability; the announcement was met with acclamation.

The Key Performance Indicator (KPI) metrics for Professional Licensure & Certification Exam First-time Pass Rates were reviewed with questions arising regarding the USF College of Pharmacy pass rate decreasing from the previous year and remaining lower than the U.S. average pass rate. Associate Dean of Pharmacy Amy Schwartz reported that the college was addressing the KPI by establishing stronger entrance requirements and beginning other initiatives aimed at improving performance on the pharmacy national exam.

Dr. Wilcox announced a request for late revisions to the USF System and Tampa plans for the KPIs in the Professional Licensure & Certification Exam First-time Pass Rates, specifically new 2019 goals for Calendar Year Nursing of 93% and Medicine of 98%, new 2018-19 Cross-Year goals for Medicine of 98%, and a new 2017-19 Multi-Year goal for Physical Therapy of 93% were recommended. The trustees questioned the timing of a substantive change to the Plans and asked that greater attention be given to following deadlines. Professor Javier Cuevas, Assistant Dean of Faculty and Academic Affairs from the Morsani College of Medicine, explained that the changes were necessary to set attainable goals consistent nationally with peer institutions.

A motion was made to consider each plan separately and seconded. The four plans were approved by all committee members present, after the changes were incorporated and accepted into the USF Tampa and the USF System Plans.

III. New Business – Information Items

a. Unified Admissions for a Consolidated USF

Vice President Paul Dosal introduced the Dean of Admissions Glen Besterfield to give a presentation on the admissions process after consolidation. Dr. Besterfield explained the rationale for a unified admissions including the recruitment of a diverse and high-ability student body, maintaining Preeminence, promotion of a single USF brand, standardizing applicant evaluations and admissions decisions, and protecting the integrity of the admissions process. He referenced a handout of Performance Expectations for the Office of Admissions that includes a commitment to one calendar, process, & set of scholarship criteria; the recruitment of students that will succeed and advance to graduation in four years for FTIC (first time in college) or two years for transfer students; optimize enrollment consistent with the distinctive value propositions at each campus; leverage the combined investment of resources and expertise across all USF locations; and maintain a student body consistent with the academic profile of a Preeminent State Research University. Dr. Besterfield briefly discussed the organizational structure, challenges, current progress and the future, and provided an update on admissions, emphasizing the importance of meeting a 90% retention rate for August 2020.

IV. Adjournment

Chair Goforth adjourned the meeting at 4:32 PM.

Agenda Item: III.b.

USF Board of Trustees

June 6, 2019

Issue: Ph.D. Informatics and Big Data Analytics – CIP 11.0104

Proposed action: Approval

Executive Summary:

The Ph.D. in Informatics and Big Data Analytics is a 72-credit hour, interdisciplinary program with a focus on scientific methods, processes and systems to extract knowledge and insight from large, diverse data sets with a holistic approach that includes human, statistical and computational perspectives. This interdisciplinary program comprises faculty and courses from the following colleges: Muma College of Business, College of Arts and Sciences, College of Engineering and the College of Public Health.

An increasing number of companies are looking for professionals with experience in Informatics and Big Data Analytics, and they are hard to find, especially at the expert/Ph.D. level. In addition, there is an increasing demand for faculty with Ph.D.s in this field. This program is also timely as we are seeing deep problems in society today (e.g. polarization of society, fake news, algorithmic bias) that need solutions driven by big data, but in a holistic environment comprising human, computational and statistical perspectives.

The program proposal received letters of support from leaders of industry from Google, AT&T Labs, Bank of America and Nielsen. On the academic side the proposal received support letters from Emory University, University of Texas at Austin, National Tsing Hua University and New York University. The external reviewer, who also strongly endorsed the proposal, is a leading academic with substantial interdisciplinary experience in research and program development at the University of Iowa.

Financial Impact:

The program involves courses currently being taught at the graduate level across all the four participating colleges and will not need new courses/sections. Hence, there is no impact on college budgets from this program. The faculty involved in this program will also be able to advise the 15 students in steady state in this program. We are anticipating supporting three students through assistantships from the Muma College of Business' auxiliary funds. We will also reach out to funding agencies and industry to explore funding opportunities for more Ph.D. students as well.

Strategic Goal(s) Item Supports:

- USF Tampa Strategic Plan Goal 1: Student Success
- USF Tampa Strategic Plan Goal 2: High Impact Research and Innovation

BOT Committee Review Date: ACE May 14, 2019
Supporting Documentation Online (*please circle*): **Yes** **No**
USF System or Institution specific: USF
Prepared by: Balaji Padmanabhan, Ph.D., Professor and Director, Center for Analytics and Creativity

Board of Governors, State University System of Florida

Request to Offer a New Degree Program
(Please do not revise this proposal format without prior approval from Board staff)

University of South Florida **University Submitting Proposal**	**Fall 2020** **Proposed Implementation Term**
Muma College of Business **Name of College(s) or School(s)**	**Information Systems & Decision Sciences** **Name of Department(s)/ Division(s)**
Informatics **Academic Specialty or Field**	**Ph.D. in Informatics and Big Data Analytics** **Complete Name of Degree**
11.0104 **Proposed CIP Code**	

The submission of this proposal constitutes a commitment by the university that, if the proposal is approved, the necessary financial resources and the criteria for establishing new programs have been met prior to the initiation of the program.

Date Approved by the University Board of Trustees		**President**	**Date**
Signature of Chair, Board of Trustees	**Date**	**Vice President for Academic Affairs**	**Date**

Provide headcount (HC) and full-time equivalent (FTE) student estimates of majors for Years 1 through 5. HC and FTE estimates should be identical to those in Table 1 in Appendix A. Indicate the program costs for the first and the fifth years of implementation as shown in the appropriate columns in Table 2 in Appendix A. Calculate an Educational and General (E&G) cost per FTE for Years 1 and 5 (Total E&G divided by FTE).

Implementation Timeframe	Projected Enrollment (From Table 1)		Projected Program Costs (From Table 2)				
	HC	FTE	E&G Cost per FTE	E&G Funds	Contract & Grants Funds	Auxiliary Funds	Total Cost
Year 1	4	4	$48,933	$195,731	0	$32,300	$228,031
Year 2	8	8					
Year 3	13	13					
Year 4	14	14					
Year 5	15	15	$16,726	$250,886	0	$96,900	$347,786

Note: This outline and the questions pertaining to each section must be reproduced within the body of the proposal to ensure that all sections have been satisfactorily addressed. Tables 1 through 4 are to be included as Appendix A and not reproduced within the body of the proposals because this often causes errors in the automatic calculations.

INTRODUCTION

I. Program Description and Relationship to System-Level Goals

A. Briefly describe within a few paragraphs the degree program under consideration, including (a) level; (b) emphases, including majors, concentrations, tracks, or specializations; (c) total number of credit hours; and (d) overall purpose, including examples of employment or education opportunities that may be available to program graduates.

a) Level: The level of the proposed program is a Doctor of Philosophy (Ph.D.).

b) Emphases: The program will be a Ph.D. in Informatics and Big Data Analytics, without any formal tracks, concentrations, or specializations. Informatics and Big Data Analytics is an interdisciplinary area of scientific methods, processes and systems to extract knowledge and insight from large, diverse data sets with a holistic approach that includes human, statistical and computational perspectives. This interdisciplinary major comprises faculty and courses from the Colleges of Arts & Sciences, Business, Engineering and Public Health.

c) Credit Hours: The minimum number of credit hours for the degree will be 72.

d) Purpose: The Ph.D. in Informatics and Big Data Analytics is a broad, interdisciplinary program exploring theoretical and applied dimensions of information, people, and technology. It is a field that creates technical, information-based solutions to the challenges arising from an increasingly complex digital world toward the betterment of human life and societal growth. To do so, Informatics and Big Data Analytics focuses on systems and technologies for processing data and information. Unlike existing pure data science programs, this proposed program includes the human and social implications of information and technology, bringing in critical components of cognition, ethics, biases and storytelling into a strong big data analytics curriculum. By doing so, this program will graduate advanced big data practitioners, researchers and scientists who can wrangle large data, write code, develop models, build systems, but doing so while acutely aware of issues such as potential biases and ethical uses. Students in the program will develop broad theoretical and applied skills, including how to design, implement, and evaluate information-focused big data technologies that support decision-making across social and organizational contexts.

The link between informatics and big data analytics is novel and important. Informatics addresses computer systems designed from a user or human centered perspective. Increasingly, big data analytics-driven systems are being designed and deployed worldwide in a variety of domains. These systems (and academic programs related to them) are being considered primarily from a technical perspective. This program is one of the first to develop a curriculum that integrates these so that these systems can be studied and understood from both the technical and human/user perspectives.

Why the focus on interdisciplinary? Existing Ph.D. programs (at USF and elsewhere) offer training in all of the stand-alone scientific fields such as Statistics, Mathematics, Computer Science, or Information Systems, but they do not attempt to merge or unify the fields. In that

sense, graduates become experts in a relatively narrow area in e.g. statistical modeling of data, but are entirely inexperienced and unaware of how to e.g. parse and store data, or how to code "apps" and develop solutions that automatically make decisions based on the data models, or how to evaluate the human and societal impact of the developed data solutions and systems. This degree program combines human and technical skills with analytic abilities required to support decision-making by today's leaders and innovators in various contexts. In that sense, an Informatics and Big Data Analytics Ph.D. will introduce USF students to a truly interdisciplinary program and diverse perspective to many important problems and opportunities for society today that are driven by the availability of big data.

Why now? Because an increasing number of companies are looking for professionals with experience in Informatics and Big Data Analytics, and they are hard to find, especially in the educational spectrum, i.e. at the expert/Ph.D. level. In addition, there is an increasing demand for faculty with Ph.D.s in this field. Academic positions are wide-ranging and include both general informatics-oriented positions, and domain specific ones in areas such as health, security and intelligence, and social informatics. This proposed program is also very timely as we are seeing deep problems in society today (e.g. polarization of society, fake news, algorithmic bias) where analytics-driven solutions alone struggle to be sufficient, that is, problems where the broader perspective of building intelligent systems by being aware of broader issues and *human* aspects becomes increasingly important as well. Programs that bring together curriculum and faculty expertise from multiple areas (such as Information Systems, Mathematics, Psychology, Computer Science, etc.) will play a critical role in this broader context.

To that end, we propose a new Ph.D. in Informatics and Big Data Analytics at USF. The program is designed to be interdisciplinary and its coursework will draw upon the faculty expertise from several different colleges. The core coursework for this program comprises several different areas crucial to this program. That is, the core coursework covers important technical knowledge from mathematics, statistics, computer science and engineering, but also equally important skills in informatics related areas such as interaction of systems and human decision-making, storytelling from data, communication, ethics and privacy. It is essential to cover a wide variety of areas in the core coursework as we anticipate that students in this program will have strong training in a single, stand-alone discipline (e.g. statistics) and as such will need to study the necessary foundation of core concepts from all of the remaining associated disciplines (such as computer science, psychology and business).

In fact, our external letter writers and evaluators all commented very positively on the proposed curriculum. For instance, Dr. Chris Volinsky, who is the head of the *Data Science and AI Research Organization* at AT&T Labs and leads a team of 50 Ph.D. data scientists, commented as follows on the demand and need of our proposed curriculum:

> "[…] *there is a gap in students coming out of traditional graduate schools for data science jobs. Students from statistical programs have great mathematical and theoretical skills but often lack skills with data management or detailed programming experience needed for real-world problems. Computer Science grads, on the other hand, might be great coders but either have focused on algorithmic theory or don't have practical experience with real world data. […] The best candidates are a hybrid, who have been taught in a multi-disciplinary manner, and can pull from the best of each discipline…As far as I can tell, the best of all worlds is reflected in the USF proposal. It requires statistical and mathematical depth alongside the more practical skills of database and large data management, analytic storytelling, and design of experiments. It will*

graduate students with a comprehensive "toolbox" of methods, including standard statistical modeling, machine learning, AI and deep learning methods, and optimization. Also importantly, it covers topics like ethics and privacy, an often overlooked but crucial element of analytics, especially in this age of increasing automation."

Another distinguishing component of this program is its focus and emphasis on practical application and implementation. Many Ph.D. programs (especially in technical disciplines such as statistics or computer science) are more theoretical in nature and do not focus on solving practical problems. This program will be different. All students will complete a practicum during their second year. During this practicum, students will complete and implement a real-world, big data analytics project, typically in conjunction with an industry partner, drawing upon all of the ideas and concepts from the core curriculum.

Our external letter writers also agree with the importance of such a practicum. For instance, Dr. V. Lakshmanan, Tech Lead of Big Data and Machine Learning at Google, commented:

"*I really appreciate the fact that the "comprehensive examination" for this program is practice-focused – even industry veterans truly understand a topic only when they have to apply it to a real problem.*"

B. Please provide the date when the pre-proposal was presented to CAVP (Council of Academic Vice Presidents) Academic Program Coordination review group. Identify any concerns that the CAVP review group raised with the pre-proposed program and provide a brief narrative explaining how each of these concerns has been or is being addressed.

Date of CAVP Academic Program Workgroup's Review: February 6, 2018.
No formal concerns were raised during their review.

C. If this is a doctoral level program please include the external consultant's report at the end of the proposal as Appendix D. Please provide a few highlights from the report and describe ways in which the report affected the approval process at the university.

We had one formal external evaluation conducted by Professor Nick Street (University of Iowa), who is an expert in the area and who has designed and run interdisciplinary programs himself. In addition to being a prolific researcher, Professor Street has been an administrator (Department Chair) at the University of Iowa and hence has significant practical experience as well.

Professor Street's evaluative report comments on the need and demand of the proposed program, its curricular structure as well as its administrative set up. In terms of need and demand, Professor Street strongly agrees with the timeliness of a Ph.D. in Informatics and Big Data Analytics and foresees a strong demand for its graduates. He writes:

"*In the era of "big data" the need for programs of this type should be evident, and the case is clearly made in the proposal*."

In fact, he believes that the need for this program as well as the demand for its graduates will be strong both in the academic environment as well as in the corporate environment. Based on his own experience, he foresees a strong demand for graduates of our proposed program in academic, tenure-earning positions:

> *"More and more departments across the academic spectrum are searching for graduates with these skills; this year alone, graduates from our department have received tenure-track offers from computer science, industrial engineering, information science/informatics, and information systems/management science departments."*

At the same time, he sees an even stronger demand in industry. He writes:

> *"Meanwhile, the need for highly-skilled applied data scientists in industry is practically infinite; as a DEO, I regularly received calls from industrial partners looking for graduates with exactly these qualifications, including at the Ph.D. level."*

Professor Street's report is very supportive regarding the curricular structure of our proposed program. With respect to its interdisciplinary set up, he writes:

> *"Despite the huge and growing need for talent, it is basically impossible for a single academic department to provide both the depth and breadth of training that students need to achieve a Ph.D. in this field; such departments simply don't exist yet."*

He also praises the curricular elements and some of its innovative components:

> *"The curriculum as proposed in this program is exemplary, covering all the necessary foundational work as well as incorporating some fairly novel components that really stand out to me."*

The core coursework for this proposed program comprises areas that are crucial to Informatics and Big Data Analytics. That is, the core coursework covers important technical knowledge from mathematics, statistics, computer science and engineering, but also equally important skills related to informatics-related areas, such as interaction between systems and human decision-making, communication, ethics and privacy. It is essential to cover a wide variety of areas in the core coursework as we anticipate that students in this program will have strong training in a single, stand-alone discipline coming into the program (e.g. statistics) and as such will need to study the necessary foundation of core concepts from all of the remaining areas and disciplines (such as computer science, psychology and business). Professor Street agrees; he writes:

> *"Any such program needs solid courses in large data management, data visualization, data mining/machine learning, statistics, and optimization, as included here. Topics such as artificial intelligence, linear algebra and causality give the program a strong data science flavor, comparable to what would be seen in a computer science department, and are also fairly standard."*

One of the innovative components that sets this proposed program apart is its inclusion of the human element and the societal impact of big data tools. That is, it is becoming increasingly important to build intelligent systems that are aware of the broader impact on society, its cognitive biases and their interaction with the human. Professor Street agrees and writes:

> *"One particularly progressive aspect of the curriculum is the inclusion of courses covering the social aspects of analytics: ethics/privacy, and cognitive biases. For better or worse, are all increasingly reliant on automated decision making in every aspect of our lives. The people who design the next generation of the systems making the decisions clearly need to do a much better job addressing the societal impacts of their work: data privacy, algorithmic transparency, reinforcement of social biases, etc. I am thrilled to see formal training in these areas included in the curriculum […]"*

In fact, Professor Street encourages us to emphasize the societal impact, not only during the core coursework, but throughout the entire program; he writes:

"[…] I hope that such issues will be weaved throughout the program."

We have taken these comments to heart. In fact, we have built a continuation of ethical thinking throughout the dissertation process. That is, the Dissertation Committee consists of at least four faculty members and should include faculty from at least two different colleges. In order to emphasize the impact of the ethical use of data and impact on policymaking we will encourage the student to have at least one member of the dissertation committee who can help the student think critically from these perspectives.

Another distinguishing and innovative component of this program is its focus and emphasis on practical application and implementation. Professor Street agrees with the importance of a practicum. In fact, he believes that it will give an advantage particularly to those who are seeking employment in industry. He writes:

"[…] the emphasis on practical applications is entirely appropriate. Many, if not most of the graduates of this program, will most likely be entering the corporate job market, and the additional applied requirements ensure that they will be ready to take on practical challenges faster and at a higher level than most of their Ph.D. peers."

In fact, the practicum will not only help our students apply their knowledge to solving practical problems, it will also allow them to integrate the knowledge obtained across the different core areas and as such connect the dots across the different disciplines.

In the same vein, one of the main challenges of any interdisciplinary program is the lack of a "home" department and the danger of students getting lost. This also reflected by Professor Street, who writes:

"However, every program needs a home […]"

We wholeheartedly agree and we have taken these comments to heart. Based on these comments we have added a few important aspects in the program that will help students clearly navigate through this program and obtain a sense of cohort with their peers. These are:

- Joint research seminars: students in this program will join research seminars as a cohort on a regular (biweekly) basis.
- Regular student advisory committee meetings: students will regularly meet with their advisory committee (comprised of interdisciplinary faculty across different colleges). We plan to also have one combined meeting every semester/year to bring all students together to share experiences and current research plans, so that the feeling of a cohort is strengthened while allowing students to learn from one another's experience in the program.

In addition, we plan on organizing informal get-togethers and social meetings, which will help students to bond with one another and also their faculty.

As pointed out earlier, our proposed program is comprehensive. Unlike existing pure data science programs, this proposed program includes the human and social implications of information and technology, adding critical components of cognition, ethics, biases and storytelling into a strong big data analytics curriculum. Professor Street (as well as our external experts) has commented very favorably on the comprehensiveness of the proposed program. However, comprehensiveness in our program does show up as an extensive core course curriculum, especially during the first two years of the program. Professor Street writes:

> *"My only real concern with the curriculum is the flip side of its comprehensiveness: there are a lot of required hours, and they come quickly. Fourteen courses in two years, along with a graduate research appointment, will not allow much time for research early on. Similarly, with a large number of required courses, students interested in picking up expertise in an application area (e.g., healthcare) will have little time to do so. As such, it feels more 'data science' than informatics.'"*

We anticipate interest for this program both from applicants who already hold a master's degree as well as from those with only undergraduate training. For a student with only undergraduate training, we do not believe that our comprehensive coursework is excessive. In fact, we believe that – for such a student – taking all of the required graduate core courses is essential in their preparation for their dissertation research. This is different for a student with a master's degree, for whom we allow some credits to transfer over (as noted further below). Also, as a point of comparison, UCF's Big Data Analytics Ph.D. program (with whom we have been in touch, as noted in Section II.C) requires fourteen (3 credit hour) courses, plus 15 hours of restricted electives in addition to 15 hours of dissertation. Our program in comparison requires slightly fewer credit hours of coursework, which could be even more reduced for someone coming in with a master's degree as we note below.

That said, based on Dr. Street's comment, we have made the following curricular changes:
1. To allow for more flexibility in the program we allow for up to 12 credit hours of transfer coursework from a previous master's degree program to count for required core courses, with the caveat that the transferred courses have to be equivalent to specific required courses in the program. Any such request will have to be made in the first semester of the program and will have to be approved by the Doctoral Program Committee. We believe that such an option can reduce the course load for those with master's degrees and addresses Dr. Street's comment in this regard.
2. We reduced the number of dissertation hours from 24 to 21, and increased the elective course credits from seven to ten, providing students with some more flexibility in choosing electives if they need to. However, this does not mean that students need to do any more courses necessarily. Since students will be attending joint biweekly research seminars we will allow them the option of also registering for independent study credits (to count for 3 hours of electives) if they wish to.
3. The 21 dissertation hours is a mechanism for students to pick up depth in an application area. In addition to using their electives to pick up depth in an application area (such as healthcare), using the dissertation hours for working closely with a carefully chosen committee on their dissertation over multiple semesters is a mechanism to develop the depth needed in the application area. The dissertation hour requirement here is consistent with the Ph.D. program in business administration at the Muma College of Business, where students also need 21 dissertation hours.
4. We have grouped the required courses into "computational", "statistical" and "human" categories to clearly bring out the distinction of this program that combines the human element with what might otherwise be done in a typical big data/data science program.

Professor Street also comments on the administrative set up of our proposed program. He is very supportive of a single college taking ownership of the program. He writes:

> *"Housing the program in the Muma College of Business, which has a solid history of operating successful graduate programs, rather than centrally, strikes me as being crucial to its success."*

It is important to note that the individual colleges that are part of this program are in the process of signing an internal agreement that ensures that students will have access to the courses they need as well as to faculty advisors from the different colleges.

Overall, Professor Street is very supportive of our proposed program:

> *"In summary, I find every reason to believe that the proposed program will be successful. The curriculum is rigorous, innovative and well-designed. The partnership across multiple departments will take careful coordination that may take a year or two to refine, but can work well if all parties are given a stake in the overall direction. The Muma Collage of Business is an ideal home for program administration."*

In addition to the formal external evaluation done by Professor Nick Street, we sought letters of support from leaders in both industry and academia who have spent most of their careers working in the informatics and big data areas. Eight such individuals from world-class institutions in both industry and academia wrote letters in support of this proposal. These letter writers were (initials are indicated as a reference to quotes that we highlight subsequently):

- Dr. Valliappa Lakshmanan (VL), **Google**
- Ms. Tracy Bell (TB), Senior Vice President, **Bank of America**
- Dr. Chris Volinsky (CV), **AT&T Labs**
- Mr. Brian Fuhrer (BF), Senior Vice President, **Nielsen**
- Dr. Ram Chellappa (RC), Associate Dean, **Emory University**
- Dr. Vasant Dhar (VD), Professor and Director of the Ph.D. in Data Science program at **New York University**
- Dr. Joydeep Ghosh (JG), Chaired Professor, Electrical & Computer Engineering, **University of Texas at Austin**
- Dr. Galit Shmueli (GS), Professor, **National Tsing Hua University, Taiwan**

Collectively these eight experts have nearly 200 years of combined experience either working in industry, or in academia, most of which in areas very closely related to this proposal (i.e. in the informatics and big data analytics area).

All of these letters are included in this proposal as Appendix C. Below are some specific quotes from each of the letter writers (initials are used to refer to each specific reviewer). We have grouped these into four categories: A) based on their views on the curriculum, B) need for a doctoral program in this area, C) need for an interdisciplinary program in this area and D) other comments.

A. On the curriculum

GS: "The structure and requirements seem appropriate for a Big Data Analytics Ph.D.-level program, and overall I believe with proper management such a program can be very successful."

JG: "The proposal is very well thought out and well rounded, including topics such as ethics and understanding cognitive biases."

VD: "I have reviewed the proposed program curriculum of USF. While somewhat different from NYU's approach, the small core followed by a careful selection of courses from twelve categories appears to be well-thought through and covers many of the foundational areas for the interdisciplinary degree."
RC: "I was particularly impressed by the 12 required categories from which the core courses are chosen."
CV: "As far as I can tell, the best of all worlds is reflected in the USF proposal. It requires statistical and mathematical depth alongside the more practical skills of database and large data management, analytic storytelling, and design of experiments. It will graduate students with a comprehensive "toolbox" of methods, including standard statistical modeling, machine learning, Al and deep learning methods, and optimization. Also, importantly, it covers topics like ethics and privacy, an often overlooked but crucial element of analytics, especially in this age of increasing automation. The options in each course category and the large set of electives will let the student tailor their education towards the type of job they would like to get, while ensuring a base level of knowledge."

B. Need for an interdisciplinary program:
GS: "The need for Ph.D. graduates with strong technical capabilities supplemented by an understanding of human and social needs and well-being is burning."
JG: "It leverages the considerable talent across multiple departments at USF, as well as external resources."
RC: "I was very pleasantly surprised to learn that the initiative is a multi-disciplinary effort as I do truly believe that Big Data Analytics cuts across a wide variety of disciplines."
TB: "I find the program to be very forward thinking. I was particularly pleased with the interdisciplinary approach in the curriculum as well as the advisors from the colleges of public health, psychology, business and engineering. I believe each one of these areas play an important role in the future of big data. If there are similar Ph.D. programs in this space, I have not seen them."
CV: "I have reviewed the curriculum with an eye towards whether a student with these courses would be competitive for the types of jobs offered in organizations like mine. The best candidates are a hybrid, who have been taught in a multi-disciplinary manner, and can pull from the best of each discipline."

C. Need for a Ph.D. program in this area:
GS: "I believe there is a strong need for such a Ph.D. program, given the enormous impact that data scientists have in the design and use of the many automated systems that now govern our everyday lives, including education, employment, financials, health, politics, social connectivity and even dating, to name just a few areas."
VD: "I have seen other schools emulating the NYU model. Many schools now have a master's program in Data Science or related area depending on the structure of the university. A few are eager to start Ph.D. programs."
BF: "Over the last few years we have hired extensively in the area of data management and big data analytics, and only expect the demand for expertise in this discipline to increase. With many of the jobs requiring a high degree of competence, typically at the advanced graduate level. Ph.D. programs like this will make it significantly easier for firms like Nielsen to source the kind of talent we need in today's world."
VL: "That is why I am so supportive of the program at USF – because of its potential to graduate advanced researchers in this field. While we at Google can build the frameworks and the tools it is academia that has to build the workforce."

D. Other Comments:
GS: "Students in interdisciplinary programs sometimes suffer from lack of a "home" and cohort. It is therefore useful to have a joint seminar course where all the Big Data Analytics Ph.D. students meet and interact."
JG: "This note is to enthusiastically support an interdisciplinary effort at USF (across Arts & Sciences, Engineering, Business and Public Health) to develop a new Ph.D. in Big Data Analytics."
VD: "I look forward to seeing this program approved by the State of Florida and will be glad to provide my inputs and advice to the team that will be in charge of getting this off the ground in due course."
RC: "I cannot be more enthusiastic about this effort."
BF: "From what I have seen there are certainly not many programs that are similar to this anywhere. This can help USF, and the state of Florida itself, establish itself as a significant thought leader in this very important area."
TB: "I have spent most of my career in the field of data science within Fortune 100 companies. This program directly addresses what I believe is the most critical need in this space, diversity of thought, which ultimately drives creativity and new paths to discovery."
CV: "The program will train students in the core elements of large scale data analytics, and will be one of the first Ph.D. programs in the field. That level of commitment will ensure employers like AT&T that these students are comprehensive learners and innovative thinkers. In summary, as I look through the syllabus, I would definitely say that a student coming out of this program would be competitive for the types of positions that I hire into in my organization."

D. Describe how the proposed program is consistent with the current State University System (SUS) Strategic Planning Goals. Identify which specific goals the program will directly support and which goals the program will indirectly support (see link to the SUS Strategic Plan on the resource page for new program proposal).

To remain competitive in the current information revolution, new, advanced skills and technological acumen are necessary to transform raw data into actionable information and knowledge. Computing and information sciences have shifted from a more traditional emphasis on issues of system design and global access, to deep analytics based on complex algorithms, with critical elements of human understanding and interpretation. We seek to capture these evolving realities in our interdisciplinary Ph.D. in Informatics and Big Data Analytics. This program aligns directly with the SUS Strategic Planning Goals and the Board of Governors' Areas of Programmatic Strategic Emphasis by supporting high-impact research and innovation, driving USF's role as a major economic engine, and mobilizing public-private partnerships to increase economic and employment opportunities.

The proposed program will *directly* support the following SUS goals.

(1) *SUS Strategic Goal "Teaching and Learning"*: Increase the Number of Degrees Awarded in STEM and Other Areas of Strategic Emphasis

As a STEM program this will increase the number of Ph.D.s produced in STEM.

(2) *SUS Strategic Goal "Scholarship, Research and Innovation"*: Increase Collaboration and External Support for Research Activity

The Informatics and Big Data Analytics Ph.D. will foster cross-disciplinary research at USF. Since it is a combined effort of several colleges and departments at USF, it will increase cross-campus collaboration and, as such, lead to an increase of grant-writing and external funding.

(3) *SUS Strategic Goal "Community & Business Engagement"*: Increase Levels of Community and Business Engagement

The Informatics and Big Data Analytics Ph.D. will allow USF to expand faculty and student engagement with community partners, including those in the security/defense, health, and information-intensive sectors. Since one of the program's goal is for students to tackle and solve real-world, large-scale analytics projects, ideally in collaboration with industry partners, it will offer more opportunities for student participation and facilitate collaborations that add value to the state and local economies. USF's increased productivity will help Florida's employers prosper and grow through knowledge transfer and a steady stream of qualified graduates to support Florida's knowledge economy.

The proposed program will *indirectly* support the following SUS goals.

(4) *SUS Strategic Goal "Teaching and Learning"*: Strengthen Quality and Reputation of Academic Programs and Universities;

Few universities in the country today offer any program similar to this, and excelling in such a key program can help further raise the profile of Florida's state university system.

(5) *SUS Strategic Goal "Scholarship, Research and Innovation"*: Strengthen Quality and Reputation of Scholarship, Research and Innovation;

This program will bring together faculty from multiple departments as part of interdisciplinary dissertation and advisory committees to work with doctoral students in this program. The doctoral students will therefore be the catalyst for many new interdisciplinary research initiatives in the analytics area. This will produce new research, and in some cases, it is also conceivable that some of this work might result in patents and other types of innovation as well.

E. If the program is to be included in a category within the Programs of Strategic Emphasis as described in the SUS Strategic Plan, please indicate the category and the justification for inclusion.

The Programs of Strategic Emphasis Categories:

1. Critical Workforce:
   - Health
   - Gap Analysis
2. Economic Development:
   - Global Competitiveness
   - Science, Technology, Engineering and Math (STEM)

Please see the Programs of Strategic Emphasis (PSE) methodology for additional explanations on program inclusion criteria at the resource page for new program proposal.

The Florida Board of Governors has identified CIP Code 11.0104 as a Program of Strategic Emphasis in the category of Economic Development – STEM.

F. Identify any established or planned educational sites at which the program is expected to be offered and indicate whether it will be offered only at sites other than the main campus.

The faculty and departments that worked together to design this program are from the USF Tampa campus. However, due to USF's ongoing consolidation there may be opportunities to involve faculty from USF St. Petersburg and USF Sarasota-Manatee. To this end we have reached out to the Deans of the Colleges of Business at USF St. Petersburg and USF Sarasota-Manatee, both of whom indicated strong support of this program and a desire to participate once it is approved. Post-consolidation this program will provide opportunities for faculty from both USF St. Petersburg and USF Sarasota-Manatee to participate in seminars or research projects related to this doctoral program.

INSTITUTIONAL AND STATE LEVEL ACCOUNTABILITY

II. Need and Demand

A. Need: Describe national, state, and/or local data that support the need for more people to be prepared in this program at this level. Reference national, state, and/or local plans or reports that support the need for this program and requests for the proposed program which have emanated from a perceived need by agencies or industries in your service area. Cite any specific need for research and service that the program would fulfill.

The types of knowledge and skills gained through a Ph.D. in Informatics and Big Data Analytics make this a high-demand career field, and one of the fastest growing. Integrated expertise in analysis, technology, domain knowledge, and leadership will make graduates attractive to government and private sector organizations, as well as academia. The proposed Ph.D. aims not just to produce data analysts, coders or other subject matter experts, but "boundary spanners" who can apply the right data, using the right analysis, to answer the right question, and effectively communicate results to the right user.

National Workforce Need and Projections

National Industry Trends
Informatics-related professions align closely with several of the Bureau of Labor Statistics' (BLS) categories including "Computer and Information Research Scientists" and "Operations Research Analysts." The entry-level qualifications for these positions often require an advanced degree and many leadership positions in this field specify that a Ph.D. is preferred. Many of the graduates of our proposed program will likely seek data science and analytics-related positions in industry and will be will prepared for all these positions.

While the BLS does not yet have a category for just "Big Data," there are important reports recently issued from the agency that emphasize the importance of preparing our workforce for

careers in this interdisciplinary area. A June 2018 report from BLS[1] notes that big data related jobs are currently among the 30 fastest growing occupations in the U.S. and will drive 11+ million new jobs in certain areas in a ten year period (2016-2026), while another BLS report[2] sub-titled "big data could be a big deal for jobseekers" compares the impact of big data with the impact of the Internet, noting that "…25 years from now we will have a hard time imagining life without big data."

National data broadly do indicate a strong need for the research and development work of Computer and Information Research Scientists in order to turn ideas into industry-leading technology. These data also suggest that, as demand for new and better technology grows, demand for computing and information scientists will grow as well. Rapid growth in data collection by businesses will lead to an increased need for data-mining, analytic, and information services. Computer and Information Research Scientists will be needed to develop algorithms that help businesses make sense of very large amounts of data. Businesses use this information to better understand their customers, making the work of Computer and Information Research Scientists increasingly vital.

National data also indicate a need for Operational Research Analysts because technological advances have made it faster and easier for organizations to collect data and improvements in analytical software have made operations research more affordable and more applicable to a wider range of areas. Thus, according to this national data, more companies are expected to employ Operations Research Analysts to help them turn data into valuable information that managers and executives can use to make better decisions in all aspects of their business. Operations Research Analysts manage and analyze these data to improve business operations, supply chains, pricing models, and marketing, and this field will be needed to help hospitals and physicians improve the delivery of healthcare. Furthermore, Operations Research Analysts will continue to be needed to provide support for the military and to develop and implement policies and programs in other areas of government.

According to BLS data, the overall job outlook for Computer and Information Research Scientists is predicted to grow 19% by 2026, much faster than average, and more than 6% higher than other computer-related occupations. In fact, the BLS's Occupational Outlook Handbook (OOH) states that "Computer and Information Research Scientists are likely to have excellent job prospects," [3] and the proposed Ph.D. in Informatics and Big Data Analytics would place USF graduates in the top-tier with regards to industry growth. Furthermore, in certain targeted industries such as finance, data project an even greater rate of 49% growth over the next 10 years.

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[1] Michael Rieley, "Big data adds up to opportunities in math careers," *Beyond the Numbers: Employment & Unemployment*, vol. 7, no. 8 (U.S. Bureau of Labor Statistics, June 2018),https://www.bls.gov/opub/btn/volume-7/big-data-adds-up.htm

[2] Katie Clark Sieben, "Labor markets in 2040: big data could be a big deal for jobseekers," Monthly Labor Review, U.S. Bureau of Labor Statistics, February 2016, https://doi.org/10.21916/mlr.2016.6.

[3] Bureau of Labor Statistics (2018), U.S. Department of Labor, *Occupational Outlook Handbook*, Computer and Information Research Scientists, retrieved from https://www.bls.gov/ooh/computer-and-information-technology/computer-and-information-research-scientists.htm

Job growth for Operations Research Analysts is higher, with an expected growth rate of 27%. BLS data also project a growing need for analytics professionals to improve business planning and decision-making, anticipating demand for over 31,000 new jobs in this field over the next 10 years.[4] Furthermore, as the healthcare industry explodes in growth, it is projected that Operational Research Analysts in the ambulatory healthcare field can expect 49% growth over the next 10 years.

A Ph.D. in Informatics and Big Data Analytics from USF would place graduates in a highly advantageous position for leadership roles and top-paying jobs. According to the BLS, the median annual salary in the United States is $50,620, while top earners as a Computer and Information Scientist, degrees such as a Ph.D. in Informatics and Big Data Analytics, have a median salary of $114,520 (as of May 2017), and can earn over $176,000, more than twice the amount expected for all other computer-related occupations. Similarly, top Operational Research Analysts with an advanced degree, such as a Ph.D. in Informatics and Big Data Analytics, can be expected to earn over $134,000.

The principal job tasks associated with a Ph.D. in Informatics and Big Data Analytics also fit within the OOH broader industry category of "Management, Scientific, and Technical Consulting Services," which the BLS says is projected to be the fastest growing industry over the next decade. Wage and salary employment "is expected to grow by 58 percent between 2010 and 2020," adding more than a million new jobs to the economy. Because the Ph.D. degree in Informatics and Big Data Analytics is designed to prepare "boundary spanners" (sometimes called "translators"), it will likely be in immediate demand according to at least one McKinsey projection[5],

> *"We estimate there could be demand for approximately two million to four million business translators in the United States alone over the next decade."*

The OOH uses a limited number of job titles. Listed in the Table 1 below are the job titles, 2016 median pay and job outlook for several positions that align closely with the proposed Ph.D. in Informatics and Big Data Analytics learning objectives.

Table 1: *OHH Job Titles*

BLS Title	Median Pay 2017	Job Outlook 2016-2026	Employment Change 2016-2026
Information Research Scientists	$114,520	+19%	5,400
Federal Operations Research Analyst	$84,060	+27	31,000
Management Analyst	$82,450	+14%	115,200
Market Research Analyst	$63,230	+23%	138,300
Information Security Analyst	$95,510	+28%	28,500
Database Administrator	$87,020	+11%	13,700

[4] Bureau of Labor Statistics (2018), U.S. Department of Labor, *Occupational Outlook Handbook*, Operations Research Analysts, retrieved from https://www.bls.gov/ooh/math/operations-research-analysts.htm

[5] McKinsey & Company (2016). *The Age of Analytics: Competing in a Data Driven World.* New York, NY: McKinsey Global Institute.

For the past 15 years, *InformationWeek* has conducted an annual *IT Salary Survey*. Based on results from the 2013 Survey, the median income for analytics/business intelligence analysts is $93,000; for analytics/business intelligence managers it is $132,000 (Murphy, 2013). Within that sector, the survey found that "the highest salaries among analytics pros go to 'difference makers' who can pull together the right data and make sense of it to meet a business need." By 2016, salaries had risen. Security Specialists were expected to begin at a base salary of $103,000 while other positions had seen over a 1.1% rise in the last fiscal year. Thus, as a growing field there is both demand for positions and rising compensation.

State and Local Needs and Projections

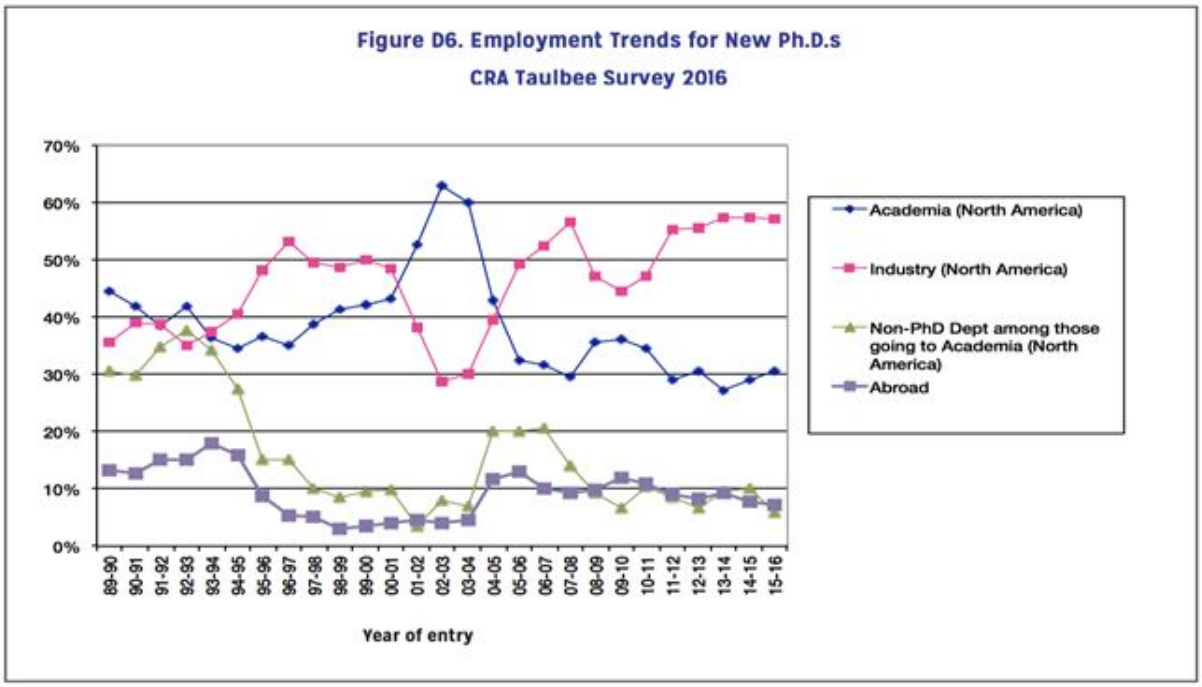
There are positive growth projections for Florida specifically over the next 10 years for graduates with a Ph.D. in Informatics and Big Data Analytics. The occupational employment projections are developed for all states by Labor Market Information (LMI) or individual states by Employment Projections offices. All state projections data are available at *Projections Central*. According to this data for Florida, there is a 32.6% projected rate of growth and a net gain of 2,120 positions for Operations Research Analysts, a 38.3% growth rate for Information Security Analysts, and a 13.1% growth rate for Computer and Information Research Scientists. Furthermore, because of our state's position as a leader in many areas of business, there is a 25.2% projected growth rate in this field, with a net gain of 13,300 positions for Management Analysts.

Academic

Some of the graduates of the proposed Ph.D. program will take positions in academia as faculty members. The Computing Research Association (CRA; www.cra.org) collaborates with a number of universities and academic departments in North America, primarily in computer science, information, as well as national laboratories and centers and professional organizations in industry and government. The annual Taulbee Survey (https://cra.org/resources/taulbee-survey/) released by CRA provides a range of data on the enrollment, production, and employment in computing fields, including informatics and information science. These trends do provide a broad overview, given that many of these graduates would be employable in informatics and big data analytics positions. The niche of big data analytics itself is not yet being comprehensively tracked in and of itself though.

Specifically, the most recent Taulbee Survey indicates an overall increase in graduate (master's and Ph.D.) degree production (up 6.1% from the previous year). Across the schools participating in the survey, there were 83 Ph.D.s granted, an 8.3% increase, with even more (95) graduates expected in the coming year. In the Informatics and Information Science, Information Systems, and Social Computing/Informatics specialties, sectors where some of our proposed graduates will seek employment, a large number were working in industry (56), and a number of others were in various academic, government, or other positions (see Figure 1 Employment of New Ph.D. Recipients).

Figure 1: *Employment of New Ph.D. Recipients*



Research in this field is growing with the rapid expansion and availability of information such as health-related data. For example, many colleges and universities are devoting more resources to the field of digital health including personal health informatics, health data analytics, precision medicine, remote care, and self-care. Northeastern University in Massachusetts has identified health as one of three major university-wide interdisciplinary strategic initiatives, and is investing heavily in interdisciplinary health research. Furthermore, Northeastern has made strategic faculty hires in the last few years in personal health informatics, data science and data visualization (with a health data emphasis), health systems, bioinformatics, health policy, urban health, population health, health equity, and health administration – all of which would be serviced by a Ph.D. in Informatics and Big Data Analytics from USF. Also, Georgia Tech's School of Interactive Computing works in a wide range of research areas relating to the interface of computing to the world, similar in scope to what we are proposing with the USF Ph.D. in Informatics and Big Data Analytics. Again, graduates from our proposed Ph.D. program would meet many of the qualifications for faculty positions in this and similar programs.

Federal research funding is also available to support research in this area. Given our areas of emphasis, likely agencies include: National Institutes of Health (NIH), National Science Foundation (NSF), Department of Defense (DoD), Intelligence Advanced Research Projects Activity (IARPA), Defense Advanced Research Projects Agency (DARPA), Department of Energy (DoE), as well as private industry or national laboratories. USF's reputation as a robust research university, combined with its close relationships with many government entities, makes the proposed Ph.D. program very competitive for grant funding. USF faculty also have a track record of being funded by these agencies. In addition, the interdisciplinary nature of the proposed Ph.D. program makes many grant requests more likely to be funded than those that focus on only one discipline. Thus this Ph.D. program would be uniquely positioned to obtain research funding.

B. Demand: Describe data that support the assumption that students will enroll in the proposed program. Include descriptions of surveys or other communications with prospective students.

Industry and Student Demand

Students seeking a Ph.D. in Informatics and Big Data Analytics will enter today's most dynamic and high demand career fields with a unique skillset that adds value to any organization/enterprise. Because contemporary organizations are growing in size, complexity and data-reliance, the job prospects are very encouraging. Most students pursuing a Ph.D. are looking to advance their careers. Informatics and Big Data Analytics is a field that is flexible, growing, and built on innovation.

The proposed Ph.D. should appeal not only to students seeking academic jobs, but also to aspiring industry innovators and leaders in the public and private sectors. More organizations are building their "digital" capabilities. Our graduates will be prepared to lead their teams and to develop programmatic strategies, beyond specific data analysis decisions. With a blend of data/information and sector-specific expertise, they will be prepared to connect and translate the information needs of executive decision makers with the data analyses produced by mathematicians and statisticians. They also will be well-positioned to develop the next generation of information tools. It is an ideal "career enhancement" path for data/information professionals.

Many doctoral programs have far more applicants than they can accommodate. University of Florida advised us that they receive well over 1,000 applicants annually to their three doctoral programs (Computer Science, Computer Engineering, and Human-Centered Computing), and accept only about 30. Their Human-Centered Computing (HCC) program (the only other program in Florida using the "Informatics" CIP code) is growing rapidly and currently has over 30 students (of the roughly 140 total doctoral students).

Recent focus group discussions conducted at various college-sponsored events have found high-levels of interest for a Ph.D. program in Informatics and Big Data Analytics. These focus groups found that many wanted to advance in their current occupation. For example, at one state-wide event, there were 16 different inquiries about the proposed Ph.D. program by those holding a degree in Information Science, with a quarter of the respondents being current students. At a recruitment event in September, a majority of those questioned about the possibility of enrolling in the proposed Ph.D. program answered positively. During another event in Orlando, recruitment and outreach interviews revealed substantial interest in an Informatics and Big Data Analytics Ph.D. program. In a Spring 2019 survey of 47 students enrolled in USF's M.S. in Business Analytics & Information Systems program, 24 of the surveyed students indicated a strong interest in pursuing this proposed doctoral program, if offered. Many of the students who chose the M.S. in Business Analytics and Information Systems program are seeking careers in the big data and analytics areas and would be candidates to recruit for a Ph.D. program such as this.

The proposed Ph.D. program is likely to be a platform for advancement and career development among professionals already working in related positions. Recent studies show that people with graduate degrees have higher earnings, in fact more than a third

higher, and better prospects for employment than those with bachelor's degrees. In conclusion, data suggests that there is a high level of interest in both our current student body and industry in general for a program that can deliver the skills necessary to succeed at a high level in all sectors of the economy.

C. If substantially similar programs (generally at the four-digit CIP Code or 60 percent similar in core courses), either private or public exist in the state, identify the institution(s) and geographic location(s). Summarize the outcome(s) of communication with such programs with regard to the potential impact on their enrollment and opportunities for possible collaboration (instruction and research). In Appendix C, provide data that support the need for an additional program.

There are no other Ph.D. in Informatics and Big Data Analytics programs in the State of Florida in either public or private institutions. There is a doctoral program in Human-Centered Computing (HCC) at the University of Florida that uses the same CIP code 11.0104. That program is in the College of Engineering, Department of Computing & Information Science & Engineering. We have reached out to the director of that program to discuss the differences between the HCC program and our proposed Ph.D. in Informatics and Big Data Analytics. It was determined that the programs do not replicate one another in any way. The HCC program has a focus on human-computer interaction and design of user-centered technologies and innovations. Its core has a stronger focus on software and computer engineering, even though the program was designed to meet the need for specialized expertise that has not traditionally been found in computer science and engineering programs.

While our Ph.D. in Informatics and Big Data Analytics is certainly human-oriented, it focuses more on the human-information/data interaction and supporting human decision-making, innovation, and knowledge discovery. There is certainly a technical emphasis in our program, but we do not presume to approach these at the same level as the HCC program and likely will emphasize other research methodologies, frameworks, and epistemological assumptions.

There is another doctoral program in the state of Florida with a similar name. The University of Central Florida (UCF) has recently implemented a Ph.D. in Big Data Analytics. It is important to note that that program is being offered in a different CIP code (CIP Code 27.0501). UCF's program is housed in the Department of Statistics and draws almost exclusively upon courses and faculty from the statistics department and appears to be well designed with a strong emphasis on statistical computing, sharing the CIP code with two other existing Ph.D. in Statistics (CIP 27.0501), offered by UF and FSU. In contrast, our proposed Ph.D. program is interdisciplinary in its design and it blends skills and expertise from many different departments and colleges, such as Mathematics and Statistics, Computer Science and Engineering, Psychology, Health and Business and integrates the human/informatics component with big data analytics. We reached out to the Chair of the Department of Statistics at UCF and shared our program structure. The Chair responded indicating that they will be happy to work with us on any collaboration opportunities related to this program.

D. Use Table 1 in Appendix A (1-A for undergraduate and 1-B for graduate) to categorize projected student headcount (HC) and Full Time Equivalents (FTE) according to primary sources. Generally undergraduate FTE will be calculated as 30 credit hours per year and graduate FTE will be calculated as 24 credit hours per year. Describe the rationale underlying enrollment projections. If students within the institution are expected to

change majors to enroll in the proposed program at its inception, describe the shifts from disciplines that will likely occur.

Initially, our goal is to admit 4 students annually in the first two years, and then 5 students annually from year three onward. Assuming a three-year completion for the 72 credits hours required this will amount to, from year five onward, 15 students enrolled in the program, graduating at the rate of 5 students per year. These students will be actively working with faculty across colleges on interdisciplinary research papers and grants and we are, therefore, intentionally limiting the program size to ensure early success. Once the program is well-established the university will look to expand the program based on demand and resource availability.

We are initially targeting four categories of applicants: those who have completed a degree program at USF, students who have completed a degree program at any other state university, out of state students and international students. We are doing so because we have many related undergraduate and master's programs at USF and other state universities in STEM areas that have students who will be trained well to enter our program. Hence across STEM undergraduate and STEM graduate programs we will have a talented pool of in-state students to whom we can market this program. In addition, our current STEM graduate programs receive over a thousand applications from international students today and some of them will certainly be good fits for a Ph.D. We are therefore confident that out of state and international students will also find this attractive and we expect to recruit from those pools as well. We are also looking to recruit potentially from those in the workforce who are looking for a Ph.D. to advance their careers. In the Muma College of Business it is common for departments such as Accountancy and Information Systems to recruit such doctoral students and the college therefore has the experience to seek students looking for doctoral degrees to advance their professional careers.

The unique nature of the degree program means we do not expect students to shift from one major to the new program. We do feel the program will attract those with master's level degrees looking for a doctorate that will enable them to move into high-demand big data analytics positions in industry or in academia.

E. Indicate what steps will be taken to achieve a diverse student body in this program. If the proposed program substantially duplicates a program at FAMU or FIU, provide, (in consultation with the affected university), an analysis of how the program might have an impact upon that university's ability to attract students of races different from that which is predominant on their campus in the subject program. <u>The university's Equal Opportunity Officer shall review this section of the proposal and then sign and date Appendix B to indicate that the analysis required by this subsection has been completed</u>.

We will work with our graduate applications personnel and doctoral committee to ensure that we advertise our program in a way that reaches a broad and diverse audience. USF and the Muma College of Business have a long tradition of developing diversity within their programs' content, structure, student body, and faculty. This is evident in our involvement in diversity across the professions and disciplines, and is articulated explicitly within the Muma College of Business's diversity policy and strategic plan (www.usf.edu/business/about/policies.aspx). We do not consider this goal solely in terms of the number of students or faculty representing certain racial or ethnic backgrounds or gender identities, but as a matter of principle manifested

in our commitment to enhancing the workforce and fostering understanding within the diverse communities of information professionals served.

For example, the Corporate Mentors program strives to recruit and support students who are the first in their families to attend college. The Ph.D. Project, the McKnight Doctoral Fellowship Program and other similar organizations are utilized to increase doctoral student diversity. MCOB seeks to include diversity in faculty recruitment because of the enrichment a diverse faculty brings to the curriculum and the experience that all students obtain by being exposed to faculty with diverse backgrounds and viewpoints.

The College recognizes that diversity functions best in a climate of tolerance and respect for all and strives to foster such an environment.

MCOB promotes diversity of ideas through a variety of classes that are required of all students. For both undergraduate and MBA students, the core curricula, supplemented by major and elective courses, will ensure that diversity concepts, divergent viewpoints and global issues are addressed and lead to a rich learning experience. Diversity of ideas is also enhanced by a variety of faculty and student backgrounds.

MCOB is committed to the presentation of diverse concepts and ideas in the classroom and to increasing the accessibility of international experiences for students. This will be achieved through a variety of efforts. These efforts include: 1) enriching our curriculum with specific content and courses on global issues; 2) increasing study-abroad participation, international scholarships and internships that afford students an opportunity to learn and work in organizations around the world; 3) encouraging faculty to conduct research on globalization and be globally engaged; and 4) creating a welcoming environment for international students and scholars as well as focused exchange of ideas with professionals in the business community. The College is committed to increasing its own visibility and the visibility of its students to local and national organizations that promote global business.

III. Budget

A. Use Table 2 in Appendix A to display projected costs and associated funding sources for Year 1 and Year 5 of program operation. Use Table 3 in Appendix A to show how existing Education & General funds will be shifted to support the new program in Year 1. In narrative form, summarize the contents of both tables, identifying the source of both current and new resources to be devoted to the proposed program. (Data for Year 1 and Year 5 reflect snapshots in time rather than cumulative costs.)

We are expecting an interdisciplinary faculty team of eight faculty (listed in Table 4) spanning the Colleges of Business, Arts & Sciences, Engineering and Public Health to be closely involved with the program and to work with the students in research and advising. All the faculty costs listed in Table 4 are based on the FTEs of these specific faculty. We are expecting a small amount of staff support in terms of supporting applications and other logistical issues for a total of approximately 100 hours per year, which is shown in the A&P salaries component. All the coursework for this program are from our existing Ph.D. and graduate programs at USF and we do not envision any new classes being created to support the program, which will make this an efficient program to launch. We have an extensive offering of doctoral and other graduate courses across all four of our colleges and are putting in place an internal agreement that will

ensure that there will be capacity in those classes to support the Ph.D. students in this program. (It should be noted that the "newly proposed" courses mentioned in VIII. Curriculum, Section E. below topics faculty have been teaching for a few semesters but will be requesting dedicated course numbers.)

We are anticipating supporting three students through assistantships from the Muma College of Business' auxiliary funds. Currently we have an active Center for Analytics and Creativity that offers non-degree programs and a Doctor of Business Administration program that both bring in steady revenues that can support the three assistantships in steady state. In addition, we expect that there will be grant-supported students based on the research active faculty from the different colleges that are part of this program (many of whom have NSF/NIH funding for research). We also have several programs that require teaching assistants who are highly skilled in big data, and Ph.D. students in this program will be excellent candidates for such assistantships. For example, the Department of Computer Science and Engineering, College of Engineering, currently has several teaching assistant positions available due to program growth. The Chair has indicated that the Department will consider students in this program for these positions. Because we do not have a specific number yet from these sources, we have not included these in the budget tables, but do want to bring this up in the narrative here so that reviewers will be aware of a much broader potential base of support for these doctoral students.

B. Please explain whether the university intends to operate the program through continuing education, seek approval for market tuition rate, or establish a differentiated graduate-level tuition. Provide a rationale for doing so and a timeline for seeking Board of Governors' approval, if appropriate. Please include the expected rate of tuition that the university plans to charge for this program and use this amount when calculating cost entries in Table 2.

The university does not intend to operate the program through continuing education on a cost-recovery basis, nor will it seek approval for a market-based tuition rate or establish differentiated graduate-level tuition.

C. If other programs will be impacted by a reallocation of resources for the proposed program, identify the impacted programs and provide a justification for reallocating resources. Specifically address the potential negative impacts that implementation of the proposed program will have on related undergraduate programs (i.e., shift in faculty effort, reallocation of instructional resources, reduced enrollment rates, greater use of adjunct faculty and teaching assistants). Explain what steps will be taken to mitigate any such impacts. Also, discuss the potential positive impacts that the proposed program might have on related undergraduate programs (i.e., increased undergraduate research opportunities, improved quality of instruction associated with cutting-edge research, improved labs and library resources).

The budget in Table 2 reflects the effort from the eight primary faculty involved in this program. However, there should be no impact on other programs because this program reuses existing courses in our graduate programs and does not take these faculty away from any of the current courses that they are teaching. (It should be noted that the "newly proposed" courses mentioned in VIII. Curriculum, Section E. below topics faculty have been teaching for a few semesters but will be requesting dedicated course numbers.) The faculty involved in this program are also able to take on advising roles for Ph.D. students in this program without

compromising their current research supervisory roles, given the size of this program (12 students) in steady state.

D. Describe other potential impacts on related programs or departments (e.g., increased need for general education or common prerequisite courses, or increased need for required or elective courses outside of the proposed major).

None noted.

E. Describe what steps have been taken to obtain information regarding resources (financial and in-kind) available outside the institution (businesses, industrial organizations, governmental entities, etc.). Describe the external resources that appear to be available to support the proposed program.

The proposed program can be run based on the Muma College of Business' current operating budget. In the proposal we have also highlighted various agencies (NSF, NIH, DoE, DoD etc.) that provide research funding. The Muma College of Business also has an extensive network of companies that are currently funding student projects through practice centers. In the last eight years we have had over thirty companies fund over a hundred such projects involving undergraduate and master's students. We will reach out to these companies to explore funding opportunities for Ph.D. students as well.

IV. Projected Benefit of the Program to the University, Local Community, and State

Use information from Tables 1 and 2 in Appendix A, and the supporting narrative for "Need and Demand" to prepare a concise statement that describes the projected benefit to the university, local community, and the state if the program is implemented. The projected benefits can be both quantitative and qualitative in nature, but there needs to be a clear distinction made between the two in the narrative.

The Ph.D. in Informatics and Big Data Analytics will significantly benefit the University, the Tampa Bay region and the State of Florida in a number of ways.

<u>Quantitative Benefits</u>

- Placement: Ph.D. in Informatics and Big Data Analytics graduates will be successfully employed in industrial leadership and research positions, national laboratories, government agencies and academic positions.

- Increased Doctoral Degrees Granted: A targeted performance-based metric at USF and within the SUS is to in increase STEM graduate degrees. By Year 5, we estimate that the program will produce a net increase in new doctoral degrees, and should continue to grow each year.

- Increase the Research Funding: To be successful and compete for the best students, the Ph.D. in Informatics and Big Data Analytics must be built on a robust research infrastructure that provides funding and research opportunities. The Muma College of Business has significantly increased its application for external funding in the past five

years. A research-active doctoral program will greatly enhance our ability to seek and secure external funding from key agencies and organizations.

Qualitative Benefits

- Meeting a Critical Workforce Need: The proposed doctoral program is designed to help meet market needs and student demand for graduate training that prepares people for well-paying jobs in the Tampa Bay area, the I-4 Technology Corridor, and throughout Florida's knowledge economy. The program not only prepares future academics for positions at major universities, but we have assessed and targeted the skill sets that Florida's employers want, increasing USF's intellectual capital in the community.

- Graduate Education Track for STEM Students: The program is interdisciplinary and well-suited to attracting a wide variety of interdisciplinary STEM graduates, as well as others from social sciences and humanities.

- Enhance Interdisciplinarity: The proposed program fosters collaboration across several USF colleges (Arts & Sciences, Business, Engineering; and Public Health). This program is, therefore, very timely given the emphasis on breaking down boundaries to enable cross functional collaboration that is being stressed nationwide.

V. Access and Articulation – Bachelor's Degrees Only

A. If the total number of credit hours to earn a degree exceeds 120, provide a justification for an exception to the policy of a 120 maximum and submit a separate request to the Board of Governors for an exception along with notification of the program's approval. (See criteria in Board of Governors Regulation 6C-8.014)

Not Applicable.

B. List program prerequisites and provide assurance that they are the same as the approved common prerequisites for other such degree programs within the SUS (see link to the Common Prerequisite Manual on the resource page for new program proposal). The courses in the Common Prerequisite Counseling Manual are intended to be those that are required of both native and transfer students prior to entrance to the major program, not simply lower-level courses that are required prior to graduation. The common prerequisites and substitute courses are mandatory for all institution programs listed, and must be approved by the Articulation Coordinating Committee (ACC). This requirement includes those programs designated as "limited access."

If the proposed prerequisites are not listed in the Manual, provide a rationale for a request for exception to the policy of common prerequisites. NOTE: Typically, all lower-division courses required for admission into the major will be considered prerequisites. The curriculum can require lower-division courses that are not prerequisites for admission into the major, as long as those courses are built into the curriculum for the upper-level 60 credit hours. If there are already common prerequisites for other degree programs with the same proposed CIP, every effort must be made to utilize the previously approved prerequisites instead of recommending an additional "track" of prerequisites for that CIP. Additional

tracks may not be approved by the ACC, thereby holding up the full approval of the degree program. Programs will not be entered into the State University System Inventory until any exceptions to the approved common prerequisites are approved by the ACC.

Not Applicable.

C. If the university intends to seek formal Limited Access status for the proposed program, provide a rationale that includes an analysis of diversity issues with respect to such a designation. Explain how the university will ensure that Florida College System transfer students are not disadvantaged by the Limited Access status. NOTE: The policy and criteria for Limited Access are identified in Board of Governors Regulation 6C-8.013. Submit the Limited Access Program Request form along with this document.

Not Applicable.

D. If the proposed program is an AS-to-BS capstone, ensure that it adheres to the guidelines approved by the Articulation Coordinating Committee for such programs, as set forth in Rule 6A-10.024 (see link to the Statewide Articulation Manual on the resource page for new program proposal). List the prerequisites, if any, including the specific AS degrees which may transfer into the program.

Not Applicable.

INSTITUTIONAL READINESS

VI. Related Institutional Mission and Strength

A. Describe how the goals of the proposed program relate to the institutional mission statement as contained in the SUS Strategic Plan and the University Strategic Plan (see link to the SUS Strategic Plan on the resource page for new program proposal).

USF's mission is to "deliver competitive undergraduate, graduate, and professional programs, to generate knowledge, foster intellectual development, and ensure student success in a global environment."

The Informatics and Big Data Analytics Ph.D. will align very closely with the following USF mission goals:

- "Student access, learning, and success through a vibrant, interdisciplinary, and learner-centered research environment incorporating a global curriculum."

  The Informatics and Big Data Analytics Ph.D. is highly interdisciplinary in nature and it will allow students to span learning and research across campus.

- "Research and scientific discovery to strengthen the economy, promote civic culture and the arts, and design and build sustainable communities through the generation, dissemination, and translation of new knowledge across all academic and health-related disciplines."

With its interdisciplinary design of several academic and health-related disciplines, our proposed program will bring together faculty from multiple departments as part of interdisciplinary dissertation and advisory committees to work with doctoral students in this program. The doctoral students will, therefore, be the catalyst for many new interdisciplinary research initiatives in the big data analytics area. This will result in the generation, dissemination and translation of new research, and it is conceivable that some of this work could result in patents and other types of innovation as well.

- "Partnerships to build significant locally- and globally-integrated university-community collaborations through sound scholarly and artistic activities and technological innovation."

  The Informatics and Big Data Analytics Ph.D. will allow USF to expand faculty and student engagement with community partners. Since one of the program's goal is for students to tackle and solve real-world, large-scale analytics projects, ideally in collaboration with industry partners, it will offer more opportunities for student participation and facilitate collaborations that add value to the state and local economies. USF's increased productivity will help Florida's employers prosper and grow through knowledge transfer and a steady stream of qualified graduates to support Florida's knowledge economy.

- "A sustainable economic base to support USF's continued academic advancement."

  As pointed out in Section III, this program is designed to be very lean and sustainable in steady-state.

  While this program is an interdisciplinary effort across several different colleges at USF, it will be housed inside the Muma College of Business. The mission of the Muma College of Business is to "*emphasize creativity and analytics to promote student success, produce scholarship with impact, and engage with all stakeholders in a diverse global environment.*"

  The proposed program aligns very strongly with the mission of the Muma College of Business with its emphasis on analytics and creativity. In fact, the proposed program on Big Data Analytics and Informatics has at its core the creation and dissemination of analytical thought; but it also aligns very strongly with creativity in that bringing together ideas and thoughts from different disciplines allows for innovation and new ideas to bridge across formerly stand-alone disciplines.

B. Describe how the proposed program specifically relates to existing institutional strengths, such as programs of emphasis, other academic programs, and/or institutes and centers.

The proposed Informatics and Big Data Analytics Ph.D. relates very closely to existing strengths both at the university level as well as at the level of the participating colleges.

At the university level, USF's strategic plan (www.usf.edu/research-innovation/documents/about-usfri/research-strategic-plan.pdf) identifies six specific areas of focus and strength. Among those six areas, data science, including data analytics, financial data analysis, pattern recognition in big data, digital visualization, electronic health records, health informatics and digital humanities is one specific area of institutional strength. For instance, data science is already transforming a multitude of fields at USF such as health diagnosis,

energy, sustainable health, environment (including marine) and cybersecurity. The USF Health Informatics Institute is the data and technology coordinating hub for nearly every major Type 1 diabetes clinical trial worldwide, and it is the epicenter for global juvenile diabetes research. USF is also applying advanced visualization technologies to address such problems in the humanities as the worldwide preservation of cultural heritage.

At the college level, the Muma College of Business (MCOB) also has core strengths in analytics and big data. Many existing programs in the MCOB are driven by analytics. At the graduate level, these are:

- A new online M.B.A. with a Data Analytics concentration that was launched in 2017
- M.S. in Business Analytics and Information Systems, a program that now offers *eight* advanced graduate level courses in analytics
- A new "weekend" M.S. in Business Analytics and Information Systems program targeted a working professionals where each course is offered in a hybrid manner with 50% online and the other 50% over three (full day) Saturday sessions in a 6 week period. The very first cohort started in Fall 2017 (with 24 students enrolled).
- A 12-credit graduate certificate in Analytics and Business Intelligence which also provides students a SAS Approved USF Certificate in Analytics & Business Intelligence
- A 12-credit graduate certificate in Compliance, Risk and Anti-Money Laundering (AML) that combines principles from analytics, accounting and risk for the AML context.
- A unique "Citizen Data Science" program delivered at Jabil Inc. for its employees where nine different faculty teach 1 or 2 Fridays. The unique aspect of the program is that all Jabil employees come in with real projects from their company which they carry through with them as they participate in this program.

The Muma College of Business also houses the Center for Analytics and Creativity. The Center organizes major events each year to help our business community stay at the forefront of big data and analytics.

The Center organized the inaugural Florida Business Analytics Forum in April 2016. This event brought over 250 industry participants from over 100 organizations to USF for half a day featuring three expert presentations and a panel discussing and presenting cutting edge ideas. The Florida Business Analytics Forum also showcased research in analytics at USF. Following the presentations and panel, 19 research posters were presented as part of a poster session for the attendees. The research posters were from a variety of colleges at USF including Business, Engineering and Arts & Sciences. In addition to educating our Florida business executives on the latest trends in analytics, this event also helped educate our business community on the latest research in this area from USF.

The Center also helped organize two "Big Data Days" at USF in Fall 2016 and Fall 2017. This is an event aimed at helping Hillsborough Country K-12 students understand big data and explore the opportunities for pursuing education and careers related to this. The Center Director presented to over four hundred students from nine area high schools. The presentation focused on helping the students understand analytics and big data along with the many ways in which analytics and big data can be used by companies. Students also got to participate in some interesting hands-on exercises that illustrated the power of analytics (such as designing a movie recommender system based on films that their classmates like).

Recently, the Center partnered with the Tampa Bay Partnership and organized the first "State of the Region" event, in which the USF team presented a novel approach using big data and

visualization to characterize the region's economy. There were over 200 attendees from leading businesses in the area who participated in this event. Plans are underway to make this an annual event.

Hence the program fits well with significant strengths in related areas at USF.

C. Provide a narrative of the planning process leading up to submission of this proposal. Include a chronology in table format of the activities, listing both university personnel directly involved and external individuals who participated in planning. Provide a timetable of events necessary for the implementation of the proposed program.

Growing demand for graduate training in Informatics and Big Data Analytics has led to this interdisciplinary effort led by faculty across four different USF colleges: the College of Arts and Sciences, the College of Engineering, the College of Public Health and the Muma College of Business. A pre-proposal which originated within the College of Arts and Sciences expanded in its scope to a fully interdisciplinary effort with faculty from the Department of Mathematics and Statistics, the Department of Psychology, the Department of Computer Science and Engineering, the Department of Industrial and Management Systems Engineering, the Department of Epidemiology and Biostatistics, and the Department of Information Systems and Decision Sciences. The steering committee consisting of Drs. Beckstead, Das, Jank, Padmanabhan, Sarkar, Skrzypek and Stark was formed in the Fall of 2018 by the Provost's Office and met on a weekly basis during the Spring of 2019 in order to discuss curricular and administrative aspects of the proposed program.

Planning Process and Events Leading to Implementation

Date	Participants	Planning Activity
Fall 2017	USF System Representatives	Initial discussion on creating a Ph.D. in Informatics
Fall 2017	Department Faculty	iSchool faculty approved the pre-proposal
October 2017	College Faculty	College of Arts and Sciences Curriculum Committee approved the pre-proposal
November 2017	University Graduate Council (GC)	GC approves the pre-proposal
January 2018J	USF System Academic Program Advisory Council (APAC)	Pre-proposal approved
February 2018	Council of Academic Vice Presidents (CAVP)	No concerns expressed
Fall 2018/ Spring 2019	USF Faculty	Full proposal developed
February 2019	MCOB Doctoral program committee	Full proposal approved
February 2019	MCOB Faculty	Full proposal approved
April 2019	University Graduate Council	New degree proposal approved
April 2019	APAC	New degree proposal approved
May 2019	Academics & Campus Environment (ACE) Committee	Submitted the new degree proposal for approval

June 2019	Board of Trustees	Submitted the new degree proposal for approval
July 219	BOG Staff	Proposal submitted for inclusion on a BOG agenda
	Florida Board of Governors	Submitted the new degree proposal for approval
After addition to BOG Academic Program Inventory	Various	Advertise program
After addition to BOG Academic Program Inventory	USF Office of Graduate Studies	Insertion into catalog
Spring 2020		Start degree program

VII. Program Quality Indicators - Reviews and Accreditation

Identify program reviews, accreditation visits, or internal reviews for any university degree programs related to the proposed program, especially any within the same academic unit. List all recommendations and summarize the institution's progress in implementing the recommendations.

At this point in time, there are no organizations that accredit Ph.D. programs in Informatics and Big Data Analytics.

The Muma College of Business is an AACSB accredited program that had an accreditation visit in 2018. The college was reaccredited with no actionable recommendations listed in the reaccreditation report.

However, we plan on performing regular internal reviews and assessments on the proposed program. The MCOB performs regular annual reviews of all its degree programs. We anticipate that the assessment items will include metrics for:

- assurance of learning outcomes;
- research productivity and research with impact;
- grant funding;
- student success, including placement;
- business and community engagement.

VIII. Curriculum

A. Describe the specific expected student learning outcomes associated with the proposed program. If a bachelor's degree program, include a web link to the Academic Learning Compact or include the document itself as an appendix.

The Ph.D. in Informatics and Big Data Analytics is built on an interdisciplinary infrastructure that draws from expertise across USF. Students entering the program will take core courses during the first two years of study. These core courses reach across several different colleges and include coursework in Mathematics and Statistics, Computer Science and Engineering, Psychology, Public Health and Business. During these core courses, the foundations for a true

interdisciplinary "boundary-spanner" expert are obtained. In addition to core courses, students will also have the ability to take elective courses depending on their specific areas of interest. After the second year of study, students will complete their qualifying exam. During this exam, students will report on the results of a real-world, large-scale data analytics project in the form of a research paper. The paper is submitted and reviewed by a committee of interdisciplinary faculty members. These faculty will report back with a set of comments and concerns which the student subsequently will defend in the form of an oral presentation. After successful completion of the qualifying exam, the student will be admitted to candidacy, select a dissertation committee and eventually defend the dissertation in front of that committee. Thus, the program is designed around a series of core principles for developing new scholars. First, research theory and practice are central to the program and highlighted in the evaluation of students. Also, students are expected to develop, via their program of study, expertise that builds on an informatics and big data analytics foundation but that will allow them to be impactful in particular areas. This suggests developing the skills necessary to being able to collaborate with scholars from other disciplines. We also believe strongly in the need to build scholars who can not only thrive in academic settings, but who are equally adept at interacting in productive ways with those in outside organizations, public and private.

By completing the proposed Ph.D. in Informatics and Big Data Analytics, graduates will achieve the following learning outcomes:

1. Develop a mastery of theory and knowledge in the content areas of the field of informatics and big data analytics;
2. Contribute to the discipline by producing original, rigorous scholarship that contributes new knowledge, processes, and strategies to address key problems in society and specific domains;
3. Demonstrate the ability to address real-world big data analytics problems using state of the art methodologies and tools;

B. Describe the admission standards and graduation requirements for the program.

Students admitted to the Ph.D. in Informatics and Big Data Analytics should hold a bachelor's degree from a regionally accredited institution. We expect that most students will have a master's degree, as well, in an area relevant to the focus they anticipate pursuing within the Ph.D. program. While a mathematics, statistics, computer science or related degree is not required for admission, students must have had some level of training and/or experience in technology, including areas such as computer programming through data structures, database management systems, linear algebra, and networking and graph theory. Each student's application will be reviewed to determine their level of technical qualifications to pursue the Ph.D. in Informatics and Big Data Analytics. If deficiencies are noted, then additional suggested coursework may be required prior to admission.

<u>Minimum Admission Standards</u>

- GRE scores are to be strong and competitive and will be reviewed holistically in the context of the overall application package
- TOEFL scores or other applicable English language skills as put forward by USF graduate school
- Personal statement of purpose/interest
- 3 Letters of recommendation

- Current curriculum vitae
- Virtual interviews

Graduation Requirements

- 41-42 hours of core coursework (*This can be broken down into 6 credits of a common core and 35 or 36 credits from specific categories noted below. One category (Ethics) has both a two credit and three credit course option, which is why the total adds up to either 35 or 36 credits, plus the 6 credits from the common two courses.*)
- Minimum of 21 dissertation hours
- Minimum of 10 hours from the independent study/practicum and electives.
- Minimum of 72 semester hours total
- Pass a qualifying examination
- Produce an acceptable research portfolio
- Defend dissertation proposal
- Defend the final dissertation

C. Describe the curricular framework for the proposed program, including number of credit hours and composition of required core courses, restricted electives, unrestricted electives, thesis requirements, and dissertation requirements. Identify the total numbers of semester credit hours for the degree.

Ph.D. in Informatics and Big Data Analytics Curricular Framework

A minimum of 72 credit hours post-bachelor's degree
A minimum of 72 semester hours beyond the bachelor's degree is required. This includes 21 hours of dissertation. A minimum of 60 credit hours must be completed at the University of South Florida.

Foundation Courses
Students are expected to have completed coursework in the foundation areas of data structures, linear algebra and graph theory prior to entering the program. Students who have not completed some or all of these foundation courses need to demonstrate proficiency in these areas by either completing related coursework at USF such as

COP 4530 — Data Structures
MAS 3105 — Linear Algebra
MAD 4301 — Introduction to Graph Theory

or equivalent (such as a Coursera Certificate) pre-approved by the program director before registration in the program's core courses.

Core Courses
The core courses are designed to provide a strong and multidisciplinary background in informatics and big data analytics and are required of all students. A maximum of 12 credit hours of coursework from any previous master's degree can count for required core courses below as long as those previous courses are equivalent to specific courses that are required in this program and the student has earned a grade of B (3.0) or better in each course. Any such request will have to be made in the first semester of the program and will have to be approved by the Doctoral Program Committee of this program.

Every student is required to take the following **two common core** courses:

- COT 6405 Intro to Theory of Algorithms
- QMB 7565 Intro to Research Methods

The curriculum is divided into three different perspective areas from which students are required to gain competency. Within each perspective there are **required course categories** identified that help students attain the required competency for the perspective. Students are provided with course selections in each category that are to be used in developing their program of study.

Perspective	*Course Category*	*Core Courses (choose one from each course category)*
Human	Ethics & Privacy	GEB 6445 Social, Ethical, Legal Systems GEB 6457 Ethics, Law and Sustainable Business Practices
	Cognitive Biases & Impact on Modeling, Decision Making	EXP 7099 Graduate Seminar in Experimental Psychology EXP 6608 Cognitive Psychology
	Data Communication and Storytelling	*ISM 6402 Data Visualization for Storytelling *CIS XXX Data Visualization *CIS XXX Affective Computing
	Causality and Experimentation (**2 courses required from this category**)	EDF 7474 Applied Multilevel Modeling in Education ESI 6247 Statistical Design Models *STA 6205 Design of Experiments INP 6935 Topics in Industrial-Organizational Psychology (Organizational Research Methods) PSY 6217 Research Methods and Measurement (Psychometrics) PHC 6020 Clinical Trials: Design, Conduct and Analysis
Computational	Data Mining	CAP 5771 Data Mining ISM 6136 Data Mining ESI 6635 Advanced Analytics I
	Machine Learning	*ISM 6543 Data Science Programming *EIN XXXX Predictive Analytics *CIS XXXX Machine Learning
	Artificial Intelligence & Deep Learning	CAP 5625 Introduction to AI *CIS XXXX Neural Networks/Deep Learning *EIN 6691 Deep Learning Analytics
	Databases/Big Data	ISM 6218 Advanced Database Management ISM 6562 Big Data for Business Applications *CIS XXXX Advanced Databases

		*CIS XXXX Intro to Hadoop & Big Data
Statistical	Mathematics/Linear Algebra	MAS 5145 Advanced Linear Algebra STA 6746 Multivariate Analysis
	Probability/Statistics	STA 5166 – Statistical Methods I STA 5446 – Probability Theory I STA 5326 – Mathematical Statistics I
	Optimization	MAP 6205 Control Theory and Optimization ESI 6491 Linear Programming and Network Optimization ESI 6448 Integer Programming *EIN XXXX Nonlinear Optimization and Game Theory *EIN 6493 Multi-Objective Optimization

*Newly proposed course.

The "human perspective" brings in ethical use of data, critical thinking, communication and decision-making aspects to this curriculum. Within this the category of causality and experimentation category requires students to both understand the distinction between causal models and predictive models, as well as appreciate the importance of the use of experimentation to evaluate if systems are working as intended. Hence, we require students to take two courses from this category to ensure that they have adequate depth to understand both these aspects. The "computational perspective" brings in data, algorithmic and computational thinking that collectively drive many of the computational methodologies for big data analytics. The "statistical perspective" brings in important mathematical, statistical and optimization foundations that drive many of the statistical methodologies used for big data analytics.

In all, students are expected to complete all 14 core courses (=2 common core + 12 required courses within the categories noted above) during their first 4 semesters. While students are expected to take at least one ethics course (from the list of available ethics and privacy core courses above), they are also expected to apply these ethics principles throughout their entire study and in particular to their dissertation work.

Elective Courses and Independent Study/Practicum

In addition to the core courses students are also expected to take elective courses. The doctoral advisory committee will assist the student in identifying a suitable list of elective courses. Students are expected to take elective courses, and one independent study/practicum course for a total of 10 credit hours. In the practicum course (where students register for an independent study), students will solve a real-world big data analytics project. This real-world big data analytics project could be done jointly with an industry partner as part of an internship.

Cohort-Based Activities

Given that this is an interdisciplinary program where doctoral students may branch out in different directions (both in terms of course choices they make as well as in terms of the domain of their research), the program includes activities required of all students that help foster, maintain and leverage a strong sense of community as a "cohort." These include:

- Joint research seminars. Doctoral students in this program will participate actively in not-for-credit research seminars as a cohort on a regular (biweekly) basis. Attendance and

participation in such seminars will be included in the student's progress toward degree annual evaluation. Students will be permitted to register for a three credit independent study course to obtain credit for attending these joint research seminars should they wish to (this option will be useful for those who need the flexibility this affords to complete course work sooner).

- Advisory committee meetings. Students will meet with their advisory committee (comprised of interdisciplinary faculty across different colleges) every semester. There will also be one combined meeting every year to bring all students together to share experiences and current research plans, so that the feeling of a cohort is strengthened while allowing students to learn from each other's experience in the program.

Teaching Component
We strongly encourage our students to obtain teaching expertise during their course of study, especially those who intend to apply for an academic position. Applicants for aim for academic positions will be encouraged to apply for assistantships where teaching is a component.

Qualifying Examination
The exam will be based on a completed research paper and accompanying code written by the student on a big data analytics project. The paper and accompanying code for the analysis should be submitted to the committee on the date specified by the program director. The committee will review the work and provide a list of questions for the student to answer in written form. An oral examination will then be scheduled, where the student presents the paper and answers questions from the committee. The committee will evaluate the entire portfolio (paper, written responses, and the oral presentation) and make a determination of whether the student passes or fails the qualifying examination.

Dissertation
The Doctoral Program Committee will advise the student in selecting the dissertation committee to ensure that the committee is comprised of research active faculty who collectively have the balance of disciplinary and interdisciplinary expertise to guide the student in the chosen area of work. The Dissertation Committee consists of at least four faculty members and should include faculty from at least two different colleges. In order to emphasize the impact of the ethical use of data and impact on policy making we encourage the student to have at least one member of the dissertation committee who can help the student think critically from these perspectives. The dissertation committee will also assist students navigate through the interdisciplinary area of Big Data Analytics and help identify their appropriate academic community, publication outlets, or conferences.

D. Provide a sequenced course of study for all majors, concentrations, or areas of emphasis within the proposed program.

(**Note:** Since applicants who come in with a specialized master's degree can transfer up to 12 credits of coursework, those students are likely to need four courses less than what is shown below in the table. Also, the table lists course categories, students can pick any course within the category as shown above in Section VIII.C.).

	Year 1	Year 2	Year 3
Fall	**1. QMB 7565 Intro to Research Methods** 2. Mathematics/Linear Algebra 3. Probability/ Statistics 4. Data Mining	1. Artificial Intelligence & Deep Learning 2. Databases/ Big Data 3. Causality & Experimentation *4.* Optimization	Dissertation (9 hours)
Spring	**1. COT 6405 Theory of Algorithms** 2. Data Communication & Storytelling 3. Ethics & Privacy 4. Machine Learning	1. Causality & Experimentation 2. Cognitive Biases & Decision Making *3. Elective Course* *4. Elective Course*	Dissertation (9 hours)
Summer	Practicum	Research/Elective Course	Dissertation (3 hours)

E. Provide a one- or two-sentence description of each required or elective course.

GEB 6445 Social, Ethical, Legal Systems:
A study of the influence of social, cultural, legal, and political environment of institutional behavior, including the changing nature of the business system, the public policy process, corporate power, legitimacy and managerial autonomy, and organizational reactions to environmental forces.

GEB 6457 Ethics, Law and Sustainable Business Practices
Examines ethical and legal responsibilities of business for triple bottom line performance of prosperity, social justice, and concern for the natural environment.

CAP 5771 Data Mining
An introductory course to mining information from data. Scalable supervised and unsupervised machine learning methods are discussed. Methods to visualize and extract heuristic rules from large databases with minimal supervision is discussed.

CAP 5625 Introduction to AI
Basic concepts, tools, and techniques used to produce and study intelligent behavior. Organizing knowledge, exploiting constraints, searching spaces, understanding natural languages, and problem solving strategies.

ISM 6136 Data Mining
This course is designed for the MS in Information Systems graduate student and interested MBA students. The course covers the rapidly evolving data mining techniques that are becoming critical for customer relationship management and other applications.

ISM 6218 Advanced Database Management

This course covers core business database technologies. Topics include database design, transaction processing, parallelism, and distributed databases. Emerging business intelligence technologies are covered. A database system is used for projects.

ISM 6562 Big Data for Business Applications
The course will cover web application development for Business using various big data technologies such as No-SQL database, distributed file system, Map-Reduce, distributed caching, message handlers and big data search system.

ISM 6402 Data Visualization for Storytelling (newly proposed)
This course provides students an in-depth experience with storytelling and visualization. In the analytics journey, we start with the chaos of data and conclude with insights to produce better decisions. Data/Information visualization is widely used in several industries, including business, engineering, and media disciplines to help people analyze and understand what the data is telling us. The visualization field has grown exponentially over the last few years, and thus there are more tools available to help us quickly and efficiently create compelling ways to understand data."

ISM 6543 Data Science programming (newly proposed)
Data analytics techniques, tools and applications have become mainstream in variety of business, scientific, social and policy applications. This course will provide students an in-depth overview of machine learning techniques for analytics using Python as the programming language and students will learn to apply advanced machine learning techniques using Python. Students are expected to be familiar with at least one programming language and will be expected to learn Python independently in the course, as the focus will be on applying machine learning ideas in this platform, and not the language itself.

INP 6935 Topics in I-O Psychology (Organizational Research Methods)
Overview of problems in conducting organizational research. Topics include causality, designs, research ethics, research strategies, and threats to validity.

PSY 6217 Research Methods and Measurement (Psychometrics)
Covers principles and applications in measurement with emphasis on classical test theory and confirmatory factor analysis methods of scale design and evaluation. Also introduces item response theory (IRT) and some advanced statistical methods for analyzing data collected in various research contexts.

EXP 6608 Cognitive Psychology
A survey of the research dealing with higher memory, language, and the higher mental processes, including processes related to attention, perception, and decision-making.

EXP 7099 Graduate Seminar in Experimental Psychology (Cognitive Modeling)
Introduction to Cognitive Modeling and programming in the R language. Covers the basics of R (reading in data, manipulating, dataframes, plotting data, and some basic inferential tests), modeling (maximum likelihood estimation, goodness-of-fit statistics, and models selection metrics), and applications of frequently encountered models of response choice and reaction time, including Signal Detection Theory, the Ex-Gaussian model, the Linear Ballistic Accumulator, Bayesian memory models, and Neural Network models.

ESI 6635 Advanced Analytics I

This is an intermediate course to data science and analytics with specific topics on statistical inference and learning. This course will introduce concepts, techniques and derivation procedures of statistical inference and utilize them to assist understanding of statistical learning problems, e.g., classification, regression, clustering, etc.

ESI 6491 Linear Programming and Network Optimization
This course will be an intensive study of Linear Programming (LP) and Network Optimization problems. Both the general theory and characteristics of LP optimization problems as well as effective solution algorithms and applications are addressed.

ESI 6448 Integer Programming
Integer Programming problems are a subset of mathematical optimization problems in which some or all variables can only take integer values. The focus of this course is on Integer Linear Programs. The connection between Linear Programming and Integer Programming is explored. The major part of the course is designated for covering theoretical and algorithmic developments on solving (Mixed) Integer Programs.

ESI 6247 Statistical Design Models
Design of experimental mathematical models. Application of advanced analysis of variance techniques as applied to industrial problems.

EIN 6691 Deep Learning Analytics (newly proposed)
The purpose of this course is to enable the student to gain an in-depth understanding of the processes and dynamics of New Venture Creation. It is further designed to examine the various components necessary to create, launch and grow a successful venture.

EIN XXXX Predictive Analytics (newly proposed)
This course provides an opportunity for students to gain a deeper understanding of data mining and predictive analytics. The concepts introduced in the course are accompanied by hands-on data analytics exercises using SAS. The course material is presented in a modular format and is structured around the Cross-Industry Standard Process Model for Data Mining (CRISP-DM).

EIN XXXX Nonlinear Optimization and Game Theory (newly proposed)
The first part will focus on theory and algorithms of nonlinear optimization. Topics include convex analysis, optimality conditions, Lagrangian duality, and numerical methods for unconstrained and constrained optimization problems. The second part will apply theory and algorithms of nonlinear optimization to equilibrium problems that arise in management science, transportation science, regional science, and economics. Theory and algorithms of variational inequalities and complementarity problems are used to analyze and compute equilibria in connection with nonlinear optimization. Topics include Nash equilibrium and leader-follower games.

EIN 6493 Multi-Objective Optimization (newly proposed)
The focus on the course will be more on an important subclass of multi-objective optimization problems, so-called multi-objective (mixed) integer linear programs. The course is mainly designed for covering recent theoretical and algorithmic developments on solving multi-objective (mixed) integer linear programs.

MAP 6205 Control Theory and Optimization

Projection theorems and minimum norm problems, convex analysis, duality principle, constrained optimization, finite dimensional linear systems, controllability, optimal control and pontryagin maximum principle.

MAS 5145 Advanced Linear Algebra
Finite-dimensional vector spaces over arbitrary fields, dual spaces, canonical forms for linear transformations, inner product spaces, orthogonal, unitary, and self-ad joint operators and quadratic forms.

STA 6205 Design of Experiments (newly proposed)
An introduction to the areas of statistical design of experiments and response surface methodology that integrate statistical experimental design fundamentals, regression modeling techniques, and elementary optimization methods. Basic design principles, various classical and modern experimental designs, and analysis techniques and their implementation in statistical software such as JMP and R will be taught.

STA 6746 Multivariate Analysis
Multivariate normal distribution; its properties and inference; matrix random variables; multiple and partial correlation; discriminant analysis, principle components and factor analysis; multivariate ANOVA; analysis of covariance; applications using computers.

STA 5166 Statistical Methods 1
Statistical analysis of data by means of statistics package programs. Regression, ANOVA, discriminant analysis, and analysis of categorical data. Emphasis is on inter-relation between statistical theory, numerical methods, and analysis of real life data.

STA 5446 Probability Theory I
Axioms of probability, random variables in Euclidean spaces, moments and moment generating functions, modes of convergence, limit theory for sums of independent random variables.

STA 5326 Mathematical Statistics
Sample distribution theory, point & interval estimation, optimality theory, statistical decision theory, and hypothesis testing.

CIS XXXX Machine Learning (newly proposed)
Understand supervised machine learning methods and their application. Understand how to compare machine learning algorithms. Understand the trade-offs between algorithms and potential performance and time. Be able to read current literature on machine learning. Understand clustering unlabeled data.

CIS XXXX Advanced Databases (newly proposed)
This course covers the principles and practice of database systems, with a focus on the fundamentals of modern database management systems. Implementation projects will be based on C/C++ languages.

CIS XXXX Intro to Hadoop and Big Data (newly proposed)
This is a comprehensive course covering the Hadoop file system, Hadoop cluster architecture, MapReduce, Spark and the Hadoop ecosystems."

CIS XXXX Data Visualization (newly proposed)

This course will introduce students to the principles and algorithms necessary for effective visual analysis of data. The course begins with an overview of principles from perception and design, continues with skills for critiquing visualizations, and then focuses on visualization techniques and algorithms for a broad range of data types. Students will acquire hands-on experience using state-of-the-art visualization systems as well as programming interactive visual analysis tools."

CAP 5627 Affective Computing
The study of systems that can recognize, interpret, process, and simulate human affect. Topics may include physiology of emotion, lie detection, wearable devices, music, gaming, and ethical concerns associated with affective computing.

CIS XXXX Neural Networks/ Deep Learning (newly proposed)
Students will know how to design and implement shallow and deep neural networks. The students will know how to properly train deep neural networks with apply the trained networks to applications.

EDF 7474 Applied Multilevel Modeling in Education
Helps students develop skills in defining, estimating, testing, and reporting the results of multilevel models. Design issues, model specification, estimation, statistical software, and model evaluation will be discussed.

PHC 6020 Clinical Trials: Design, Conduct and Analysis
The course will familiarize students with the issues in the design, conduct, and analysis of clinical trials. Factors involved in randomization, sample size and power, missing data, RCT data analysis, reporting and interpreting RCT findings.

F. For degree programs in the science and technology disciplines, discuss how industry-driven competencies were identified and incorporated into the curriculum and indicate whether any industry advisory council exists to provide input for curriculum development and student assessment.

While no industry advisory council exists at this time, we plan on establishing an executive advisory council from industries that are related to and have an interest in big data analytics. Such an advisory council is likely to span both companies local to the Tampa Bay Area (such as Nielsen) as well as national and international companies such as Google or AT&T.

G. For all programs, list the specialized accreditation agencies and learned societies that would be concerned with the proposed program. Will the university seek accreditation for the program if it is available? If not, why? Provide a brief timeline for seeking accreditation, if appropriate.

No current plans to seek special accreditation exist at this time.

H. For doctoral programs, list the accreditation agencies and learned societies that would be concerned with corresponding bachelor's or master's programs associated with the proposed program. Are the programs accredited? If not, why?

There are no organizations that accredit specific programs in Informatics and Big Data Analytics. However, the program will be housed in the Muma College of Business and part of the accreditation process of the College.

I. Briefly describe the anticipated delivery system for the proposed program (e.g., traditional delivery on main campus; traditional delivery at branch campuses or centers; or nontraditional delivery such as distance or distributed learning, self-paced instruction, or external degree programs). If the proposed delivery system will require specialized services or greater than normal financial support, include projected costs in Table 2 in Appendix A. Provide a narrative describing the feasibility of delivering the proposed program through collaboration with other universities, both public and private. Cite specific queries made of other institutions with respect to shared courses, distance/distributed learning technologies, and joint-use facilities for research or internships.

The Ph.D. in Informatics and Big Data Analytics will be delivered using a traditional classroom mode of instruction.

IX. Faculty Participation

A. Use Table 4 in Appendix A to identify existing and anticipated full-time (not visiting or adjunct) faculty who will participate in the proposed program through Year 5. Include (a) faculty code associated with the source of funding for the position; (b) name; (c) highest degree held; (d) academic discipline or specialization; (e) contract status (tenure, tenure-earning, or multi-year annual [MYA]); (f) contract length in months; and (g) percent of annual effort that will be directed toward the proposed program (instruction, advising, supervising internships and practica, and supervising thesis or dissertation hours).

Table 4, Appendix A lists the faculty, their percent of effort and areas of specialization.

B. Use Table 2 in Appendix A to display the costs and associated funding resources for existing and anticipated full-time faculty (as identified in Table 4 in Appendix A). Costs for visiting and adjunct faculty should be included in the category of Other Personnel Services (OPS). Provide a narrative summarizing projected costs and funding sources.

Table 2, Appendix A specifies the salary and benefit costs based on the percent of effort anticipated from each of the eight faculty who will be actively associated with the new degree program. This will be accomplished through the re-allocation of existing funds. In year one we anticipate lesser effort due to the program having fewer students. This will gradually increase until year 3 after which it will remain steady.

C. Provide in the appendices the abbreviated curriculum vitae (CV) for each existing faculty member (do not include information for visiting or adjunct faculty).

See CVs in Appendix E.

D. Provide evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service. Such evidence may include trends over time for average course load, FTE productivity, student HC in major or service courses, degrees granted, external funding attracted, as well as qualitative indicators of excellence.

USF and all of its associated faculty have been very productive in terms of teaching, research and service. The strongest evidence for this is USF's recent recognition as a "Preeminent State Research University," recognizing the institution's high performance and strong trajectory toward national excellence.

We will focus here particularly on university-wide trends as well as trends for the Muma College of Business, which will be housing the proposed degree program. Student headcounts have steadily been increasing both USF-wide (Figure 2) as well as at the Muma College of Business (Figure 3). Degrees awarded have also seen an increase in recent years, both USF-wide (Figure 4) as well as at the Muma College of Business (Figure 5), where particularly doctoral degrees awarded have increased significantly in recent years.

Figure 2: *Student Headcount USF-wide*

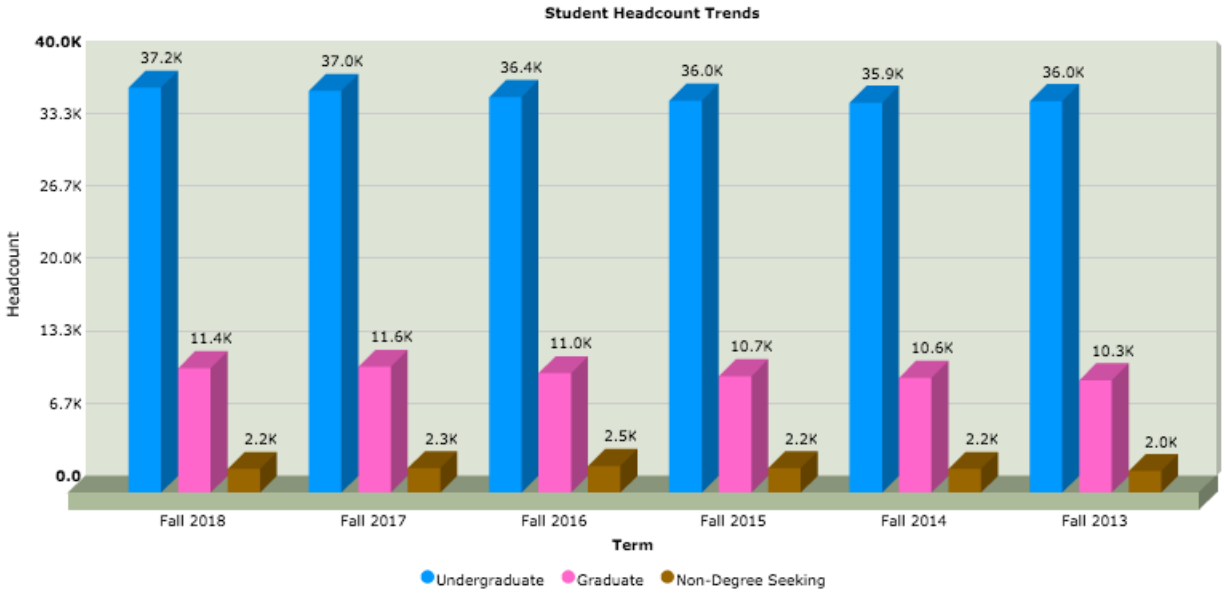


Figure 3: *Student Headcount Muma College of Business*

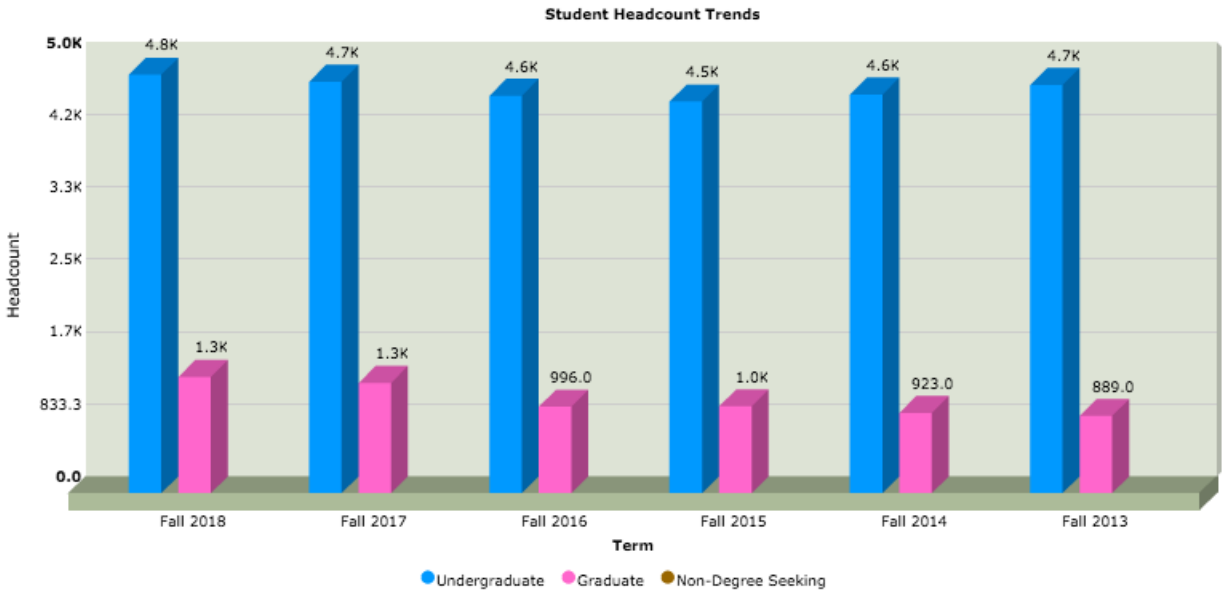


Figure 4: *Degrees Awarded USF-wide*

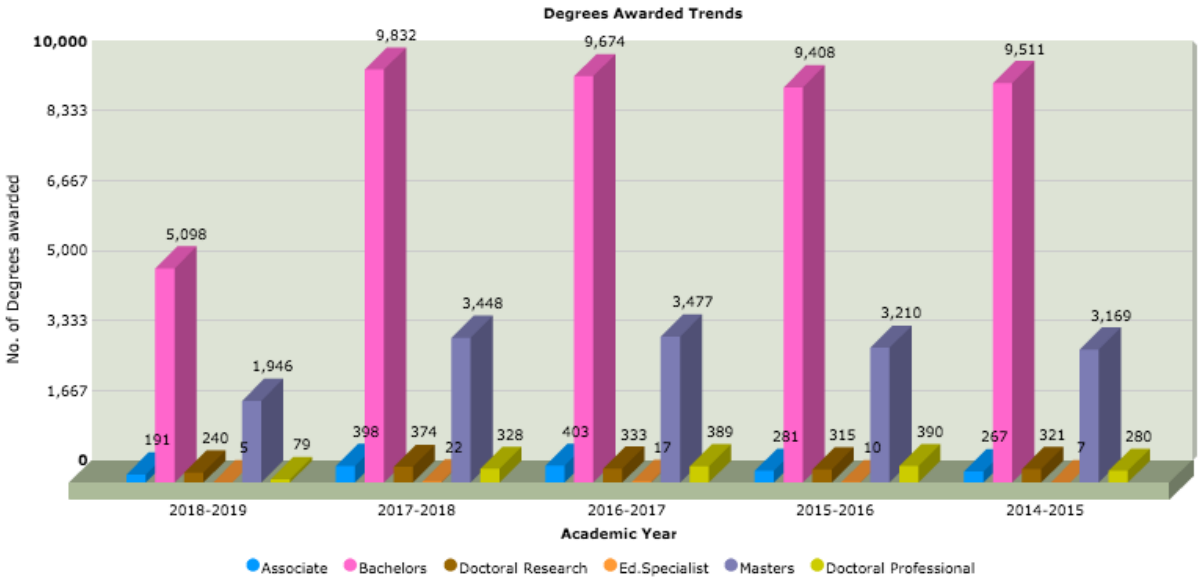
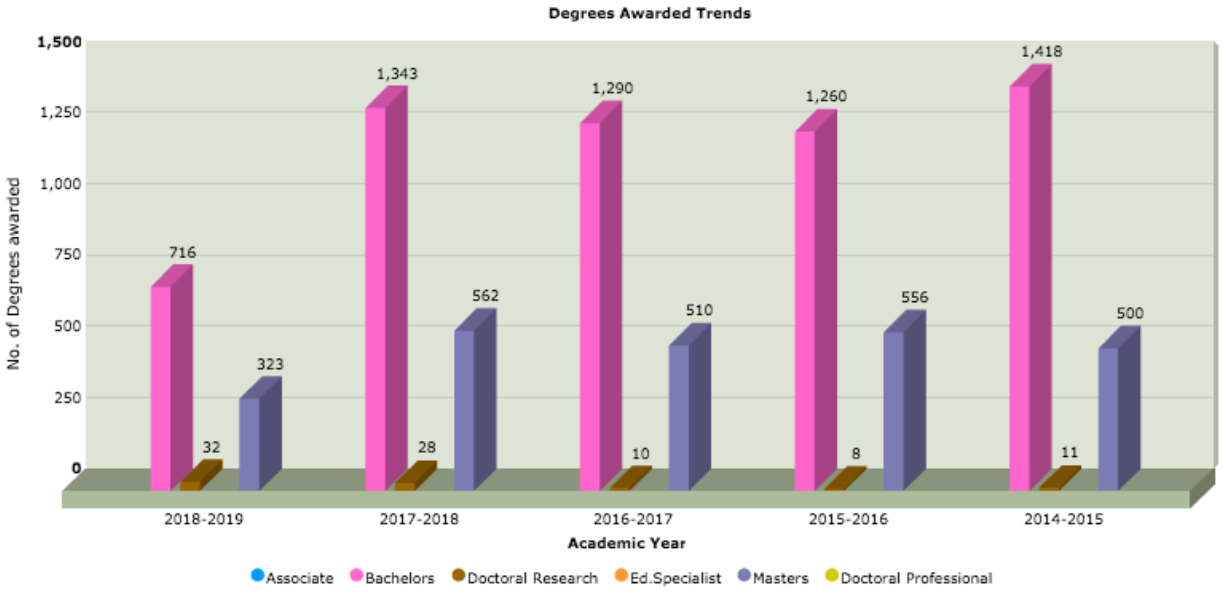


Figure 5: *Degrees Awarded Muma College of Business*



USF is engaged in an ambitious effort to become one of the nation's top research universities and to position itself for membership in the American Association of Universities (AAU). An important step toward that goal was the classification of USF by the Carnegie Foundation for the Advancement of Teaching in its highest tier: a Research University with Very High Research (RU/VHR).

Consistent with the University's research focus, the Muma College of Business emphasizes critical inquiry and research as fundamental to its educational mission. One key element is fostering research that is interdisciplinary and that has high impact. Between 2017 and 2018, Muma faculty have produced the following:

- 11 premier journal publications
- 29 top-tier publications
- 23 interdisciplinary publications
- 21 media citations
- 21 journal publications related to creativity and/or analytics

Additional qualitative indicators of excellence can be found in the Muma College of Business recent rankings:

- The Best Schools ranking of the 50 best online MBA programs in the nation put the University of South Florida's Muma College of Business program at No. 29. In a list released in July 2018, the publication said the online MBA program offered here "develops key knowledge and skills for success in administrative positions."

- The USF Vinik Sport & Entertainment Management Program was ranked No. 4 in the world by SportBusiness International which sifted through 1,000 survey responses from alumni and course leaders of programs around the world to rank the top 40 institutions in 2018.

- The Information Systems and Decision Sciences Department was ranked No. 30 in business school research rankings compiled by the University of Texas at Dallas. The rankings are based on scores of more than 300 business schools and colleges across North America and include data collected from the three top research journal publications between Jan. 1, 2014 and Dec. 31, 2016. USF scored higher than all other public universities in the state except the University of Florida.

- The part-time MBA program ranked No. 58 among public schools in the March Best Graduate Schools issue of the U.S. News and World Report. In addition, according to the CEO Magazine, the Executive MBA program was ranked No.44 globally.

- USF Muma College of Business has the highest business job placement rate among state schools with 66.4 percent of graduates starting out in positions making at least $40K.

- The USF Muma College of Business's full-time MBA program was ranked among the top 100 MBA programs by QS in a survey released in 2019.

X. Non-Faculty Resources

A. Describe library resources currently available to implement and/or sustain the proposed program through Year 5. Provide the total number of volumes and serials available in this discipline and related fields. List major journals that are available to the university's students. Include a signed statement from the Library Director that this subsection and subsection B have been reviewed and approved.

Part I – Overview of USF Libraries, Mission, and Program/Discipline Strengths
The University of South Florida (USF) is accredited by the Southern Association of Colleges and Schools' Commission on Colleges to award associate, baccalaureate, master, specialist and doctorate degrees. The institution was initially accredited in 1965 and was last reviewed and reaffirmed in 2015.

The University of South Florida Libraries consist of USF's main research library and the Hinks and Elaine Shimberg Health Sciences Library, both located on the Tampa Campus; the Nelson Poynter Memorial Library, USF St. Petersburg campus; and an Information Commons at the USF Sarasota-Manatee campus.

The USF Libraries inspire research, creativity, and learning by connecting the USF community to relevant and high-quality information. Our vision is to become the center of a highly engaged university community, driven to produce high-impact research and to nourish creativity. Together, the USF Libraries provide access to more than 2 million volumes and an extensive collection of electronic resources including approximately 64,928 e-journal subscriptions and over 900 aggregator databases containing another 92,855 unique e-journal titles, 693,313 e-books, and 826,000 digital images. In addition, students have access to over 83,000 audio/visual materials including electronic media, music scores, audiobooks, CDs, and DVDs.

The USF Libraries endeavor to develop and maintain a research collection that satisfies the resource needs of the undergraduate curriculums in the Muma College of Business Information Systems Decision Sciences Department and also meets the specialized needs of the graduate students and faculty for advanced research materials

Part II - USF Libraries' Collections
MONOGRAPHS (Print and Ebooks)
The USF Library contains extensive holdings of books in both print and e-book format that support student and faculty instructional and research needs in the new program. To identify the scope of relevant books, titles were derived from searching the library's catalog by Library of Congress Subject Headings relevant to Informatics and Big Data Analysis studies.

MONOGRAPHIC COUNTS Library of Congress Subject Headings for Big Data			
LC Subject Headings	**Call Number**	**Print**	**Electronic**
Artificial intelligence	Q335.A7857	1,135	5,995
Big data	QA76.73P98	193	391
Cloud computing	TK5105.88813	24	557
Database management	QA76.9 D3 B666	551	2,172
Digital communications	TK5103.7 B377	145	352
Electronic commerce	HF5548.32 F64	360	1,602
Geographic information systems	G70.2 C37- G70.212	324	675
Human-computer interaction	QA76.9H85 C37	273	1,506
Management information systems	HD30.213 F49-HD31.B7818	583	2,617
Mobile communication systems	TK6570.M6 I36	212	1,088
Multimedia systems	QA76.575.C73 2005	277	1,261
Probability Statistics	HA29.F64, QA273 M592	235	1,115
Semantic Web	TK5105.88815	34	375
System analysis	T57.6.H366 –N49	895	1,649
Totals		**2,236**	**21,355**

Total Number of Monographs

- Print = 2,236
- Electronic = 21,355

Ebooks and Ebook Collections

- APA Handbook of Industrial and Organizational Psychology
- Knovel Handbook of Mathematical Functions with Formulas, Graphs, and Mathematical Tables
- ProQuest Ebook Central
- Springer eBook Collection in Computer Science
- Springer eBook Collection in Mathematics
- Springer Ebook Collection in Professional Computing and Web Design
- Springer Lecture Notes in Computer Science
- Springer Lecture Notes in Mathematics
- Springer Lecture Notes in Statistics

- Synthesis Digital Library of Engineering and Computer Science
- Taylor & Francis and CRCNetBase eBooks
- Oxford Scholarship Online and University Press Scholarship Online

MAJOR SERIAL TITLES (JOURNALS)
The USF Libraries subscribe to several scholarly and professional journals that have an editorial scope and content which support research activities at the doctoral level in Informatics and Big Data Analysis. A majority of the titles are in electronic format thereby enhancing accessibility. Journal titles were derived by searching the library's online catalog and identifying titles possessing relevant Library of Congress Subject Headings (LCSH) to research and curriculum topics in Informatics and Big Data Analysis. Additionally, the journal title list includes significant journals selected by the faculty of the Information Systems and Decision Sciences Department of the Muma College of Business.
Serial Title Subscriptions

- 93 Journal Titles (electronic format)

MAJOR SERIAL TITLES			
Title	**Selected Core Journals**	**Highly Cited (Impact Factor)**	**Library Holdings (Online)**
ACM Computing Surveys		5.550	03/01/1969 – present
ACM Transactions on Information Systems			01/01/1983 - present
ACM Transactions on Intelligent Systems and Technology TIST	X	2.973	10/01/2010 - present
ACM Transactions on Knowledge Discovery from Data			03/01/2007 - present
ACM Transactions on Management Information Systems			12/01/2010 - 1/30/2018
Advances in Data Analysis and Classification			01/01/2007 - present
American Statistician		4.302	01/01/1997 - present
Annals of Probability	X	2.118	01/01/1973 - present
Annals of Statistics	X	2.522	01/01/1973 - present
Applied Stochastic Models in Business and Industry			01/01/1999 - present
ASLIB Journal of Information Management			11/01/1998 - present
Behavior and Information Technology			01/01/1996 - present
Big Data Analytics			01/01/2016 - present
Big Data and Society			07/01/2014 - present
Big Data Quarterly			06/01/2015 - present
Big Data Research			08/01/2014 - present
Biometrika	X	1.669	01/01/1996 - present
CIO			01/01/2007 - present

MAJOR SERIAL TITLES			
Title	**Selected Core Journals**	**Highly Cited (Impact Factor)**	**Library Holdings (Online)**
Communication Research			01/01/1974-12/31/1998; 02/01/1999 - present
Communications of the ACM		3.063	01/01/1958 - present
Computational Statistics & Data Analysis		1.181	01/01/1995 - present
Computers and Operations Research			01/01/1995 - present
Computers in Human Behavior			12/01/1994 - present
Computing and Visualization in Science			01/01/1997 - present
Data & Knowledge Engineering			02/01/1995 - present
Data Mining and Knowledge Discovery	X	2.481	01/01/1997 - present
Decision Support Systems		3.565	01/01/1995 - present
European Journal of Operational Research			01/05/1995 - present
Expert Systems with Applications			01/01/1990 - present
Foresight : The Journal of Futures Studies, Strategic Thinking and Policy			02/01/1999 - present
Fuzzy Sets and Systems		2.675	01/01/1978 - present
Human-Computer Interaction			01/01/1997 - present
IBM Journal of Research and Development		0.962	01/01/1957 - present
IEEE Communications Surveys and Tutorials		20.230	01/01/2000 - present
IEEE Transactions on computers			01/01/1968 - present
IEEE Transactions on Knowledge and Data Engineering	X	2.775	01/01/1989 - present
IEEE Transactions on Neural Networks		7.982	01/011990 - present
Industrial Management & Data Systems			02/15/1992 - present
INFOR			01/01/1997 - present
Information & Management		3.890	01/01/1977 - 12/31/1994 ; 01/01/1995 - present
Information and Organization			01/01/2001 - present
Information Systems Journal			01/01/1997 - present
Information Systems Management			01/01/1997 - present
Information Systems Research	X	2.301	03/01/1990 - present
Information Technology & People			02/01/1990 - present
INFORMS Journal on Computing	X	1.392	01/01/1998 - present
Intelligent Data Analysis			02/01/2000 - present

MAJOR SERIAL TITLES			
Title	**Selected Core Journals**	**Highly Cited (Impact Factor)**	**Library Holdings (Online)**
Interfaces INFORMS			06/01/1971 - present
International Journal of Electronic Commerce : IJEC			01/01/1997 - present
International Journal of Information Management			02/01/1995 - present
International Journal of Intelligent Systems			01/01/1996 - present
International Journal of Production Research			01/01/1997 - present
Int'l Journal of Human-Computer Studies			01/01/1995 - present
IUP Journal of Operations Management			08/01/2009 - present
Journal of Behavioral Decision Making	X	1.788	01/01/1996 - present
Journal of Big Data			01/01/2014 - present
Journal of Business & Economic Statistics			01/01/1997 - present
Journal of Business Ethics	X	2.917	11/01/1987 - present
Journal of Computer Info. Systems			01/01/1997 - present
Journal of Data Science Open Access			01/01/2003 - present
Journal of Forecasting			01/01/1996 - present
Journal of Information Science			02/01/1999 - present
Journal of Information Technology & Economic Development			01/01/2013 - present
Journal of Management Information Systems			01/01/1997 - present
Journal of Network and Systems Management			03/01/1993 - present
Journal of Strategic Information Systems			03/01/1995 - present
Journal of Supply Chain Management			01/01/1999 - present
Journal of the American Medical Association JAMA	X	47.661	01/01/1993 - present
Journal of the American Medical Informatics Association JAMIA	X	4.270	01/01/1996 - present
Journal of the ACM		1.744	01/01/1954 - present
Journal of the American Statistical Association JASA	X	2.297	01/01/1997 - present
Journal of the Association for Information Systems Alt. title: Journal of the AIS		2.839	01/01/2003 - present

MAJOR SERIAL TITLES			
Title	**Selected Core Journals**	**Highly Cited (Impact Factor)**	**Library Holdings (Online)**
Journal of the Operational Research Society			01/01/1997 - present
Journal of the Royal Statistical Society Series A. Statistics in society	X	2.473	01/01/1997 – present
Journal of the Royal Statistical Society Series B. Statistical Methodology		2.894	01/01/1997 – present
Journal of the Royal Statistical Society Series C. Applied Statistics	X	1.750	01/01/1997 – present
Judgment and Decision Making	X	2.525	01/01/2006 - present
Knowledge and Information Systems			01/01/1999 - present
Knowledge Based Systems			02/01/1995 - present
Knowledge Management Research and Practice			01/01/2003 - present
Machine Learning			01/01/1986 - present
Management science	X	3.544	01/01/1998 - present
MIS Quarterly: management information systems	X	5.430	03/01/1977 - present
Mobile Networks and Applications			04/01/2008 - present
NETNOMICS			01/01/1999 - present
Omega			02/01/1995 - present
Operations Research			02/01/1956 - present
Organizational Behavior and Human Decision			02/01/1985 - present
Organizational Research Methods	X	4.918	01/01/1998 - 10/31/1998; 01/01/1999 - present
Production and Operations Management			01/01/1997 - present
Simulation			01/01/1999 - present
Statistical Analysis and Data Mining			01/01/2008 - present
Structural Equation Modeling	X	3.531	01/01/1994 - 12/31/1996; 01/01/1997 - present

DIGITAL LIBRARIES and DATABASES

Scholarly, research and instructional activities associated with Informatics and Big Data Analytics program endeavors are supported by a number of both specialized and general business, statistics, and computer science databases which provide access to journal articles, conference proceedings, monographs, statistical data, company profiles, statistics and reports.

Specialized Digital Libraries

	Journals	Proceedings
ACM Digital Library The ACM Digital Library is the full-text repository of papers from ACM journals, conference proceedings, and newsletter articles that have been published, co-published, or co-marketed by the Association for Computing Machinery and other publishers. Includes International Conference on Machine Learning (ICML), International Conference on Machine Learning (KDD), ACM Conference on Recommender Systems (RECSYS), ACM International Conference on Web Search and Data Mining and (WSDM),	**80**	**994**
IEEE Xplore Digital Library Institute of Electrical and Electronics Engineers IEEE/Institution of Electrical Engineers IEE. Provides full-text access to IEEE transactions, IEEE and IEE journals, magazines, and conference proceedings published since 1988, and all current IEEE standards; brings additional search and access features to IEEE/IEE electronic library users nearly all available from Volume 1, Issue 1. Includes IEEE International Conference on Big Data (ICBD), International Conference on Data Mining (ICDM).	**535**	**31749**
INFORMS PubsOnline INFORMS offers a wide array of content and information about Operations Research and Analytics to meet the needs and interests of researchers, practitioners, students, business leaders, policy-makers, and the public.	**10**	

Other Digital Libraries

- Cambridge Core
- Elsevier's ScienceDirect
- Springer Nature's SpringerLInk
- Wiley Online Library
- **Publishers Online Journal Access**
- American Mathematical Society Journals
- Emerald Insight
- Oxford Academic Journals
- SAGE Journals Online
- SIAM Journals Online
- Taylor & Francis Online

Aggregated Business and Computer Science Journal Databases

- ABI/INFORM Collection
- Academic Search Premier
- Applied Science & Technology Source

- Business Source Premier
- Expanded Academic ASAP
- ProQuest Computer Science Database
- ProQuest Science Database
- ProQuest Dissertations & Theses

Business & Computer Engineering Information Databases

- IBISWorld
- Mergent Online, Intellect, Key Business Ratios, and Archives
- Continuum Economics [RGE Monitor]
- MarketLine Advantage
- Mintel Academic
- Morningstar Investment Research Center
- Standard & Poor's NetAdvantage
- Compendex [1884-]
- Inspec [1898-]
- MathSciNet
- PsycINFO

Statistical Datasets and Tools

- Wharton Research Data Services (WRDS)
    - AuditAnalytics
    - Compustat ExecuComp
    - CRSP
    - I/B/E/S
    - Compustat North America
    - MSCI ESG KLD STATS
    - Data-Planet Statistical Datasets
    - EASI Market Planner
    - China Data Center
- Data-Planet Statistical Ready Reference
- CSRHub
- Gartner
- ICPSR Data Access and Analysis
- iPOLL [Roper Center Archive]
- MSCI ESG Direct
- NBER Working Papers
- OECD Education Statistics--Education Database
- OECD iLibrary
- SimplyAnalytics
- SRDS Online
- WDI Online

Citation Analytics Tools and Indices

- Web of Science
  - Data Citation Index [1900 - Present]
  - Current Contents Connect [1998 - Present]
  - Century of Science
  - Conference Proceedings Citation Index [1990 Present]
  - MEDLINE [1950 - Present]
  - Emerging Sources Citation Index (ESCI) [2005 - Present]
- InCites
- InCites Journal Citation Reports
- InCites Essential Science Indicators
- SciVal
- Scopus

B. Describe additional library resources that are needed to implement and/or sustain the program through Year 5. Include projected costs of additional library resources in Table 2 in Appendix A. Please include the signature of the Library Director in Appendix B.

As of April 17, 2019, the collections of the USF Tampa Library and affiliates are sufficient to support the Ph.D. program in Informatics and Big Data Analysis at the Muma College of Business. The Libraries maintain an exceptionally strong collection of resources and services needed to support USF as a Preeminent Research University. The librarians and Dean of the Libraries work closely with the Muma College of Business to ensure all curricular and research needs are more than adequately supported. No new resources are required to support this new Ph.D. program at this time.

C. Describe classroom, teaching laboratory, research laboratory, office, and other types of space that are necessary and currently available to implement the proposed program through Year 5.

Students will participate in existing courses and will use existing office spaces and existing research labs at the Muma College of Business and other participating colleges. No new resources are required to support this new Ph.D. program.

D. Describe additional classroom, teaching laboratory, research laboratory, office, and other space needed to implement and/or maintain the proposed program through Year 5. Include any projected Instruction and Research (I&R) costs of additional space in Table 2 in Appendix A. Do not include costs for new construction because that information should be provided in response to X (E) below.

No additional classroom, teaching lab, research lab, office and other spaces are required to support this new Ph.D. program.

E. If a new capital expenditure for instructional or research space is required, indicate where this item appears on the university's fixed capital outlay priority list. Table 2 in Appendix A includes only Instruction and Research (I&R) costs. If non-I&R costs, such as indirect costs affecting libraries and student services, are expected to increase as a result of the program, describe and estimate those expenses in narrative form below. It is expected that

high enrollment programs in particular would necessitate increased costs in non-I&R activities.

No new capital expenditures are required to support this new Ph.D. program.

F. Describe specialized equipment that is currently available to implement the proposed program through Year 5. Focus primarily on instructional and research requirements.

Research and teaching will conducted with the help of existing computing resources (across offices and classrooms at the Muma College of Business and other participating colleges) and existing software licenses (currently supported by USF IT). No new specialized equipment is required to support this new Ph.D. program.

G. Describe additional specialized equipment that will be needed to implement and/or sustain the proposed program through Year 5. Include projected costs of additional equipment in Table 2 in Appendix A.

No new specialized equipment is required to support this new Ph.D. program.

H. Describe any additional special categories of resources needed to implement the program through Year 5 (access to proprietary research facilities, specialized services, extended travel, etc.). Include projected costs of special resources in Table 2 in Appendix A.

No new additional special categories of resources are required to support this new Ph.D. program

I. Describe fellowships, scholarships, and graduate assistantships to be allocated to the proposed program through Year 5. Include the projected costs in Table 2 in Appendix A.

We are anticipating supporting three students in steady state through assistantships that will be supported by the Muma College of Business' auxiliary funds. Currently we have an active Center for Analytics and Creativity that offers non-degree programs and a Doctor of Business Administration program that both bring in steady revenues that can support the three assistantships in steady state. In addition, we expect that there may be also grant-supported students based on the research active faculty from the different colleges that are part of this program (many of whom have NSF/NIH funding for research). We also have several programs that require teaching assistants who are highly skilled in big data and Ph.D. students in this program will be excellent candidates for such assistantships. Since we do not have a specific number yet from these sources we have not included these in the budget tables, but do want to bring this up in the narrative so that reviewers will be aware of a much broader potential base of support for these doctoral students.

J. Describe currently available sites for internship and practicum experiences, if appropriate to the program. Describe plans to seek additional sites in Years 1 through 5.

Currently, sites for internship and practicum experiences are available at many of USF's corporate partners and friends. Local partners who have expressed interest in supporting such practicum include Jabil and Nielsen, but we have also received initial interest from national partners such as Google and AT&T.

APPENDIX A

TABLE 1-B
PROJECTED HEADCOUNT FROM POTENTIAL SOURCES
(Graduate Degree Program)

Source of Students (Non-duplicated headcount in any given year)*	Year 1		Year 2		Year 3		Year 4		Year 5	
	HC	FTE	HC	FTE	HC	FTE	HC	FTE	HC	FTE
Individuals drawn from agencies/industries in your service area (e.g., older returning students)	0	0	0	0	0	0	0	0	0	0
Students who transfer from other graduate programs within the university**	0	0	0	0	0	0	0	0	0	0
Individuals who have recently graduated from preceding degree programs at this university	1	1	2	2	3	3	3	3	3	3
Individuals who graduated from preceding degree programs at other Florida public universities	1	1	2	2	4	4	5	5	6	6
Individuals who graduated from preceding degree programs at non-public Florida institutions	0	0	0	0	0	0	0	0	0	0
Additional in-state residents***	0	0	0	0	0	0	0	0	0	0
Additional out-of-state residents***	1	1	2	2	3	3	3	3	3	3
Additional foreign residents***	1	1	2	2	3	3	3	3	3	3
Other (Explain)***	0	0	0	0	0	0	0	0	0	0
Totals	**4**	**4**	**8**	**8**	**13**	**13**	**14**	**14**	**15**	**15**

* List projected annual headcount of students enrolled in the degree program. List projected yearly cumulative ENROLLMENTS instead of admissions.
** If numbers appear in this category, they should go DOWN in later years.
*** Do not include individuals counted in any PRIOR category in a given COLUMN.

APPENDIX A

TABLE 2
PROJECTED COSTS AND FUNDING SOURCES

Instruction & Research Costs (non-cumulative)	Year 1							Year 5					
	Funding Source							Funding Source					
	Reallocated Base* (E&G)	Enrollment Growth (E&G)	Other New Recurring (E&G)	New Non-Recurring (E&G)	Contracts & Grants (C&G)	Auxiliary Funds	**Subtotal E&G, Auxiliary, and C&G**	Continuing Base** (E&G)	New Enrollment Growth (E&G)	Other*** (E&G)	Contracts & Grants (C&G)	Auxiliary Funds	**Subtotal E&G, Auxiliary, and C&G**
Faculty Salaries and Benefits	192,838	0	0	0	0	0	**$192,838**	244,767	0	0	0	0	**$244,767**
A & P Salaries and Benefits	2,893	0	0	0	0	0	**$2,893**	6,119	0	0	0	0	**$6,119**
USPS Salaries and Benefits	0	0	0	0	0	0	**$0**	0	0	0	0	0	**$0**
Other Personal Services	0	0	0	0	0	0	**$0**	0	0	0	0	0	**$0**
Assistantships & Fellowships	0	0	0	0	0	32,300	**$32,300**	0	0	0	0	96,900	**$96,900**
Library	0	0	0	0	0	0	**$0**	0	0	0	0	0	**$0**
Expenses	0	0	0	0	0	0	**$0**	0	0	0	0	0	**$0**
Operating Capital Outlay	0	0	0	0	0	0	**$0**	0	0	0	0	0	**$0**
Special Categories	0	0	0	0	0	0	**$0**	0	0	0	0	0	**$0**
Total Costs	**$195,731**	**$0**	**$0**	**$0**	**$0**	**$32,300**	**$228,031**	**$250,886**	**$0**	**$0**	**$0**	**$96,900**	**$347,786**

*Identify reallocation sources in Table 3.

**Includes recurring E&G funded costs ("reallocated base," "enrollment growth," and "other new recurring") from Years 1-4 that continue into Year 5.

***Identify if non-recurring.

Faculty and Staff Summary

Total Positions	Year 1	Year 5
Faculty (person-years)	0.77	0.97
A & P (FTE)	2,893	6,119
USPS (FTE)	0	0

From Table 4

Calculated Cost per Student FTE

From Table 1 or 2

	Year 1	Year 5
Total E&G Funding	$195,731	$250,886
Annual Student FTE	4	15
E&G Cost per FTE	$48,933	$16,726

APPENDIX A

TABLE 3
ANTICIPATED REALLOCATION OF EDUCATION & GENERAL FUNDS*

Program and/or E&G account from which current funds will be reallocated during Year 1	Base before reallocation	Amount to be reallocated	Base after reallocation
Example: 555-555 World exploration fund (example)	0	0	**$0**
Muma College of Business	27,379,103	120,132	**$27,258,971**
College of Engineering	0	44,283	
College of Arts and Sciences	0	31,316	
Note: Many of the courses in the curriculum already exist and are taught by faculty, therefore, professors will be increasing enrollments in existing courses that are already part of the budget			
Totals	$27,379,103	$195,731	**$27,258,971**

*** If not reallocating funds, please submit a zeroed Table 3**

APPENDIX A

TABLE 4
ANTICIPATED FACULTY PARTICIPATION

Faculty Code	Faculty Name or "New Hire" Highest Degree Held Academic Discipline or Speciality	Rank	Contract Status	Initial Date for Participation in Program	Mos. Contract Year 1	FTE Year 1	% Effort for Prg. Year 1	PY Year 1	Mos. Contract Year 5	FTE Year 5	% Effort for Prg. Year 5	PY Year 5
A	Jank, Wolfgang Statistics	Professor	Tenure	Fall 2020	9	0.75	0.20	0.15	9	0.75	0.25	0.19
A	Padmanabhan, Balaji Physics	Professor	Tenure	Fall 2020	9	0.75	0.20	0.15	9	0.75	0.25	0.19
A	Sarkar, Sudeep Electrical Engineering	Professor	Tenure	Fall 2020	9	0.75	0.10	0.08	9	0.75	0.13	0.10
A	Das, Tapas Industrical Engineering	Professor	Tenure	Fall 2020	9	0.75	0.10	0.08	9	0.75	0.13	0.10
A	Beckstead, Jason Experimental Psychology	Associate Professor	Tenure	Fall 2020	12	1.00	0.08	0.08	12	1.00	0.10	0.10
A	Stark, Stephen Psychology	Professor	Tenure	Fall 2020	9	1.00	0.08	0.08	9	1.00	0.10	0.10
A	Skrzypek, Leslaw Mathematics	Associate Professor	Tenure	Fall 2020	12	1.00	0.08	0.08	12	1.00	0.10	0.10
A	Mithas, Sunil Business	Professor	Tenure	Fall 2020	9	0.75	0.10	0.08	9	0.75	0.13	0.10
	Total Person-Years (PY)							**0.77**				**0.97**

Faculty Code		Source of Funding	PY Workload by Budget Classsification Year 1	Year 5
A	Existing faculty on a regular line	Current Education & General Revenue	0.77	0.97
B	New faculty to be hired on a vacant line	Current Education & General Revenue	0.00	0.00
C	New faculty to be hired on a new line	New Education & General Revenue	0.00	0.00
D	Existing faculty hired on contracts/grants	Contracts/Grants	0.00	0.00
E	New faculty to be hired on contracts/grants	Contracts/Grants	0.00	0.00
		Overall Totals for	**Year 1** **0.77**	**Year 5** **0.97**

APPENDIX B

Please include the signature of the Equal Opportunity Officer and the Library Director.

Signature of Equal Opportunity Officer — Date: 4/22/19

Signature of Library Director — Date: 4/16/19

This appendix was created to facilitate the collection of signatures in support of the proposal. Signatures in this section illustrate that the Equal Opportunity Officer has reviewed section II.E of the proposal and the Library Director has reviewed sections X.A and X.B.

Appendix C – Letters of Support

Google LLC
747 6th Street South
Kirkland, WA 98033

google.com

Feb 14, 2019

From:
Valliappa Lakshmanan
Tech Lead, Big Data and Machine Learning
Google Cloud
Seattle, WA

To:
Florida Board of Governors
State University System of Florida
325 West Gaines Street
Tallahassee, FL 32399

Dear Member of the Board,

I am writing this letter to lend my support to the proposal from USF for a new Ph.D. program in Informatics and Big Data Analytics. I am Tech Lead for Google Cloud's Big Data and Machine Learning Professional Services, and in this role, my team has worked with hundreds of companies and thousands of individuals who are embarking on a journey to take advantage of the insights that can be derived from large, streaming, and heterogeneous datasets. I have been at Google in this role for three years; prior to that I built a Data Science team at a startup company (Climate Corporation) focused on precision agriculture and that was acquired and is now part of Bayer. Prior to that, I was a Research Scientist at a federal government research laboratory working on real-time pattern recognition algorithms for severe weather forecasting. I am also on the board of advisors for the Data Analytics program at Washington State University. I have a Ph.D. from the University of Oklahoma in Electrical Engineering (in 2002) and have been working in the big data and machine learning areas for over two decades.

Extracting timely insights at scale is an extremely important task for industry, and it is one that very few companies are good at today. The reason has to do with the paucity of talent. That is why I am so supportive of the program at USF -- because of its potential to graduate advanced researchers in this field. While we at Google, Microsoft, Amazon, Nvidia etc. can build the frameworks and tools that enable large-scale data processing and machine learning, it is academia that has to build a workforce that is capable of applying these techniques in different

Google

domains. For example, while Google might be able to build and open-source BERT, a natural language transfer learning tool, it requires capable researchers in finance to apply this to the task of analyzing remarks in the press by company officers to find compliance issues. These researchers have to adept at several different things -- computer science (to handle large, streaming datasets), statistics (to draw valid inferences), and the domain (e.g. finance). This requires a cross-disciplinary program such as the one proposed at USF.

I have reviewed the program curriculum and perused the profiles of faculty who are likely to be teaching and advising doctoral students in this program. Based on my knowledge of the area and prior experience in academia, I believe that the structure of the program will enable students to complete a PhD within three years (particularly if some of them have a Masters coming in). I really appreciate the fact that the "comprehensive examination" for this program is practice-focused -- even industry veterans truly understand a topic only when they have to apply it to a real problem. One of our largest customers in a very traditional industry, whose workforce we are helping to upskill in precisely this area, remarked that his employees were able to pick up book knowledge but lacked "scar tissue". It is that scar tissue that students will develop when they have to complete a realistic big data analytics project.

A PhD program can not be purely a matter of regurgitating existing knowledge or applying known techniques to simple problems. Especially when it comes to extracting data insights, there is a strong dose of creativity required. This is why I like that the program has a strong research paper component, where students also need to demonstrate that they can make novel and fundamental (new) contributions to the area.

As I mentioned, the key gap in industry is the ability to apply the advances in computer science to other domains, and to use those insights to make fundamental breakthroughs in those fields as well. I am therefore quite supportive of the idea of pulling committee members from many different departments (business, information systems, computer science, mathematics etc.). The hope is that the committee will be involved in the dissertation throughout and create some great opportunities for important interdisciplinary ideas in this area. I trust the ability of USF to hire great faculty who are leading experts in their respective fields. Certainly, the pedigree of the current faculty and their publication record seems to indicate this. I am confident that this group can mentor, advise and chair a wide range of dissertations in this field.

My only major suggestion (and this might already have been considered by the curriculum designers) is that ethics not be a standalone component of the course. At Google, we have published a list of AI principles that we adhere to, and we find ourselves working through the ramifications of even very technical decisions. Therefore, I'd suggest that ethics be woven throughout the curriculum and the current ethics-focused courses serve as a reaffirmation of the principles and concerns that are addressed in all the other courses.

A minor suggestion is that I do not see in the curriculum any option for the students to do internships in industry. Building a strong internship program in the career office would be very

Google

helpful for students to "try" out a company and area before making a career-defining move after their PhD. Google, for example, has a strong internship program, and many of our competitors and enterprise customers do as well. We would love it if USF would encourage their PhD students to consider doing an internship in industry during the course of their PhD.

Thank you

Valliappa Lakshmanan

February 18, 2019

Balaji Padmanabhan
Professor, Information Systems & Decision Sciences
Director, Center for Analytics & Creativity
Muma College of Business
University of South Florida
4202 E Fowler Ave
Tampa, FL 33620

Dear Balaji:

I appreciate the opportunity to review the draft curriculum and approach for USF's potential new PhD program in Big Data Analytics. I find the program to be very forward thinking. I was particularly pleased with the interdisciplinary approach in the curriculum as well as the advisors from the colleges of public health, psychology, business and engineering. I believe each one of these areas play an important role in the future of big data. If there are similar PhD programs in this space, I have not seen them.

The mechanics of capturing and processing massive amounts of data at speed and scale has long been solved from a business perspective and gains will continue to be made.

The current challenges are not found in the volume alone but in the disparate sources of structured and unstructured data in a large variety of formats. The skills needed to interpret language, images and emotions next to other sources with pure numeric value requires more than an engineering perspective. Data is becoming more complex and more human every day.

The future of data science will blend skill sets as diverse as the data we capture and turn it into a cohesive view from which we can draw valid conclusions. As you know, I have spent most of my career in the field of data science within fortune 100 companies. This program directly addresses what I believe is the most critical need in this space, diversity of thought, which ultimately drives creativity and new paths to discovery.

Sincerely,

Tracy L. Bell
Senior Vice President
Media Monitoring and Analytics Executive

Bank of America

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To Whom it May Concern,

I am writing this letter in order to provide comments on the proposed Doctoral program in Big Data Analytics at the University of South Florida. To provide some background, I currently run The Data Science and AI Research organization at AT&T Labs – a team of about 50 data scientists, mostly PhDs, whose mission is to solve the business problems of AT&T through development of new and innovative technologies in data science fields. I believe that organizations like mine – PhD-level industrial research programs - would be one of the intended targets for students coming out of the program you are creating .

I have reviewed the curriculum with an eye towards whether a student with these courses would be competitive for the types of jobs offered in organizations like mine. Currently, I feel there is a gap in students coming out of traditional graduate schools for data science jobs. Students from statistical programs have great mathematical and theoretical skills but often lack skills with data management or detailed programming experience needed for real-world problems. Computer Science grads, on the other hand, might be great coders but either have focused on algorithmic theory or don't have practical experience with real world data. They also typically don't appreciate the concepts of significance and uncertainty that are so important in data analytics. The best candidates are a hybrid, who have been taught in a multi-disciplinary manner, and can pull from the best of each discipline.

Recently, many Masters-level programs have popped up to train data scientists. These programs are quite variable – can be anywhere from 4 weeks to 2 years – and focus on practical data science issues not typically taught in the "hard" disciplines – e.g. data management, data wrangling, data visualization, exploratory techniques, parsing data, and especially communication of results. These programs are flooding the market with graduates who have relevant but shallow knowledge.

As far as I can tell, the best of all worlds is reflected in the USF proposal. It requires statistical and mathematical depth alongside the more practical skills of database and large data management, analytic storytelling, and design of experiments. It will graduate students with a comprehensive "toolbox" of methods, including standard statistical modeling, machine learning, AI and deep learning methods, and optimization. Also importantly, it covers topics like ethics and privacy, an often overlooked but crucial element of analytics, especially in this age of increasing automation. The options in each course category and the large set of electives will let the student tailor their education towards the type of job they would like to get, while ensuring a base level of knowledge.

The program will train students in the core elements of large scale data analytics, and will be one of the first PhD program in the field. That level of commitment will ensure employers like AT&T that these students are comprehensive learners and innovative thinkers. In summary, as I look through the syllabus, I would definitely say that a student coming out of this program would be competitive for the types of positions that I hire into in my organization.

Sincerely,

Chris Volinsky

Proud Sponsor of the U.S. Olympic Team

nielsen

February 14, 2019

To Whom It May Concern:

I am writing in strong support of the proposed Ph.D. program in Informatics & Big Data Analytics. USF has an extraordinary team of faculty across many of its departments and colleges with deep expertise in the area. My company, Nielsen, for instance has hired many USF students and over the years and they have made significant contributions. It is a terrific opportunity to have a program like this, literally in our own backyard, where we can potentially source highly advanced Ph.D. level talent from in the areas of data science and big data analytics.

Nielsen is a global measurement and data analytics company that provides the most complete and trusted view available of consumers and markets worldwide. Our approach marries proprietary Nielsen data with other data sources to help clients around the world understand what's happening now, what's happening next, and how to best act on this knowledge.

For more than 90 years Nielsen has provided data and analytics based on scientific rigor and innovation, continually developing new ways to answer the most important questions facing the media, advertising, retail and fast-moving consumer goods industries. An S&P 500 company, Nielsen has operations in over 100 countries, covering more than 90% of the world's population.

Over the last few years we have hired extensively in the area of data management and big data analytics, and only expect the demand for expertise in this discipline to increase. With many of the jobs requiring a high degree of competence, typically at the advanced graduate level. Ph.D. programs like this will make it significantly easier for firms like Nielsen to source the kind of talent we need in today's world.

From what I have seen there are certainly not many programs that are similar to this anywhere. This can help USF, and the state of Florida itself, establish itself as a significant thought leader in this very important area.

I look forward to seeing this in our system soon and appreciate the opportunity to comment.

Sincerely,

Brian Fuhrer
SVP Product Leadership
National Television Audience Measurement

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501 Brooker Creek Blvd.
Oldsmar, FL 34677
www.nielsen.com

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Ramnath K. Chellappa, PhD

Associate Dean and Academic Director
Master of Science in Business Analytics (MSBA)

Associate Professor
Goizueta Foundation Term Professor
Information Systems and Operations Management (ISOM)

February 18, 2019

Dear committee:

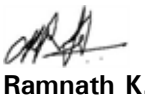
I am writing this letter in support of the initiative to create a **Doctoral Program in Big Data Analytics** at the University of South Florida. I was very pleasantly surprised to learn that the initiative is a multi-disciplinary effort as I do truly believe that 'Big Data Analytics' cuts across a wide variety of disciplines. From my home in a business school, we do ask our doctoral students to often take courses in Social Sciences, Economics, Statistics and Computer Sciences and therefore I have an appreciation for the different perspectives these disciplines can offer.

Data can be generated in any context and can be analyzed in any number of ways from machine learning methods, to traditional statistical approaches to econometric methods. Therefore, I was particularly impressed by the 12 required categories from which the core courses are chosen. Exposing a student to all approaches in data analytics is critical and is often not feasible in a traditional doctoral program. I am familiar with the impressive research tradition of this taskforce and the faculty they have assembled – I have no doubt that this would be a stellar doctoral program.

As the dean of our Master of Science in Business Analytics program, I can say that we struggle to identify faculty who have a command over a wide variety of data analytics perspectives and I can see how graduates of such a program can help fill that gap. Perhaps, the only suggestion I might have is that it will still be critical to have a strong 'home department' to guide a student through the PhD – after all job markets and tenure processes are still somewhat parochial and advising students through these still remain critical.

I cannot be more enthusiastic about this effort. Please do not hesitate to reach out to me in case you have any questions.

Sincerely yours,



Ramnath K. Chellappa

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VASANT DHAR
Professor, Center for data Science and Stern School of Business
Director of Graduate Studies, PhD Program,
Center for Data Science

February 15, 2019

Florida Board of Governors
State University System of Florida
Tallahassee
Florida

Dear Sir/Madam,

I was asked to comment on a proposal from USF for a new Ph.D. program in Informatics and Big Data Analytics.

I am a Professor at the Stern School of Business and the Center for Data Science at New York University. I am currently the Director of Graduate Studies for the PhD program in Data Science. The Center for Data Science was created in 2012 and is a separate unit within NYU that doesn't belong to any school. The Masters Program in Data Science started in 2015, and admitted its fourth cohort last year. The PhD program is currently in its third year. I headed the committee that designed the program, and I have overseen the first two plus years of its operation.

I have worked in the data science and related fields for almost four decades now since my Ph.D. in Artificial Intelligence from the University of Pittsburgh. This is an area with which I am very familiar, and I have watched its popularity grow from almost nothing to what it is now, which I would describe in one word: frenzy. People can't get enough of it fast enough.

I have seen other schools emulating the NYU model. Many schools now have a Masters program in Data Science or related area depending on the structure of the university. A few are eager to start PhD programs.

At the outset I would like to emphasize how important it is for industry and academia to have programs like ours and the one under consideration at your university that can graduate advanced researchers in this field. What makes these programs singularly appealing is their broad interdisciplinary nature. I view Data Science in terms of a matrix where domains are columns (health, vision, law, business, etc.) and rows are methods (linear methods, neural networks,

visualization methods, etc.). If you view the world in this way, you realize that much of the innovation these days is happening at the intersection of domains and methods. Domains often motivate new methods, which are in turn generalized for application to other domains. Indeed, I would argue that much of the innovation in domains such a health, physical sciences, perception, and business, is being done by data scientists in collaboration with domain experts.

I have reviewed the proposed program curriculum of USF. While somewhat different from NYU's approach, the small core followed by a careful selection of courses from twelve categories appears to be well-thought through and covers many of the foundational areas for the interdisciplinary degree. There's a plethora of electives to choose from. If anything, you may want to cull down this list since it looks overly broad to me.

The faculty leading this program have their own PhDs in this or a related area from strong institutions in the country and appear to be well published in leading journals and conferences in the data science and big data areas. Several have grants from industry and leading federal agencies like NSF/NIH as well. I am confident that this group can mentor, advise and chair a wide range of dissertations in this field.

I look forward to seeing this program approved by the State of Florida and will be glad to provide my inputs and advice to the team that will be in charge of getting this off the ground in due course.

Sincerely

Vasant Dhar

COCKRELL SCHOOL OF ENGINEERING
THE UNIVERSITY OF TEXAS AT AUSTIN
Department of Electrical and Computer Engineering
1 University Station C0803 • Austin, Texas 78712-0240

Feb 17, 2019

To:
Florida Board of Governors,
State University System of Florida,
Tallahassee, Florida

Dear Sir/Madam,

This note is to enthusiastically support an interdisciplinary effort at USF (across Arts & Sciences, Engineering, Business and Public Health) to develop a new PhD in Big Data Analytics. The proposal is very well thought out and well rounded, including topics such as ethics and understanding cognitive biases that will become increasingly critical as AI-oriented decision-making systems based on big data analytics directly affect humans when get deployed. It leverages the considerable talent across multiple departments at USF, as well as external resources such as online education (Coursera). I have been involved in education and research in this area for over two decades at UT, Austin. In the very recent past, this area has really rocketed in terms of both industry relevance and student interest. In fact, much of the recent progress in AI is founded on intelligent big data analytics. Also, along with software engineering, AI and machine learning is attracting by far the most interest from students at both undergraduate and graduate levels. A business analytics program that I co-created recently within the business school at UT, now attracts well over a thousand applicants for 50-60 seats. The stars are aligned for the proposed program to be a tremendous success for the State of Florida, and hence I endorse it most strongly.

Please contact me at (512)-471-8980 or at jghosh@utexas.edu about any additional information that you might wish to know about this note.

Sincerely yours

Joydeep Ghosh

Joydeep Ghosh
Schlumberger Centennial Chaired Professor
Electrical and Computer Engineering,
The Univ. of Texas, Austin

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30013 新竹市光復路二段101號

Feb 9, 2019

Subject: Evaluation of New Big Data Analytics PhD Program at USF

Dear Professor Jank and committee members,

Thank you for inviting me to provide my feedback on the proposed new PhD program in Big Data Analytics at University of South Florida. First, I believe there is a strong need for such a PhD program, given the enormous impact that data scientists have the design and use of the many automated systems that now govern our everyday lives, including education, employment, financials, health, politics, social connectivity and even dating, to name just a few areas. The data scientists and engineers who have been leading the largest companies and managing important groups there typically have not had an interdisciplinary education or background. Such a lack is now strongly being reflected in the current data privacy crisis. The need for PhD graduates with strong technical capabilities supplemented by an understanding of human and social needs and well-being is burning.

The proposed Big Data Analytics PhD program at USF contains several important elements: First, it requires taking at least one course from each of 12 categories that span a variety of technical areas as well as a category on Ethics & Privacy (nicely set as category #1) and one on causal reasoning. The list of elective courses includes a variety of more advanced technical areas (statistics, probability, data mining, operations, computer science).

Second, students are expected to take 4 courses per semester in their first 4 semesters. After completing the course requirements, students proceed to the qualifying examination stage, where they are required to write a research paper and submit it along with computer code to the committee. The committee not only reviews the work, but also further provides questions the student must answer in writing. Finally, the student presents his/her answers in an oral examination.

The structure and requirements seem appropriate for a Big Data Analytics PhD-level program, and overall I believe with proper management such a program can be very successful. Below I list several suggestions, based on my experience with interdisciplinary PhD programs (such as the one in our Institute):

1. The 12 categories of courses cover many technical groups and departments at USF. I would have liked to see more involvement from areas that focus on policy making, such as economics and public policy. Because Data Scientists in industry can have a strong impact on decisions and designs that affect large communities,

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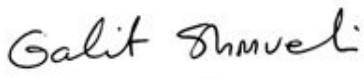
it is important to expose them to ways of thinking that are aligned with Western democratic social and political values.

2. Students in interdisciplinary programs sometimes suffer from lack of a "home" and cohort. It is therefore useful to have a joint seminar course where all the Big Data Analytics PhD students meet and interact. Moreover, having a dedicated joint space and facilities (e.g. computing) for this group can help create cohesion and collaborations.
3. Since the program is also intended to produce PhD graduates that will go into academia, there is currently a very strong requirement by many schools for teaching expertise. I therefore suggest including a teaching requirement.
4. In most universities, there is not (yet) a department Data Science or Big Data Analytics in the interdisciplinary sense of the proposed program. The use of "Data Science" or "Big Data Analytics" in a department name is often a change of name for a Statistics department, an OR/OM group, or a department that has subgroups from different areas. But each faculty member typically has a background in a single area. Similarly, and importantly, currently top journals in most technical fields are still not geared to interdisciplinary papers. As a Department Editor at Decision Sciences, where we are trying to promote such work, we face many challenges including lack of reviewers with interdisciplinary expertise. Hence, it would be useful to help students in the new Big Data Analytics program who intend to go to academia identify their appropriate academic community, publication outlets, conferences, etc.

Congratulation on being one of the earlier to offer a PhD program in Big Data Analytics! While the number of MS programs is mushrooming, I believe there is a dire need for a PhD-level program, and commend USF for charging with one.

Sincerely,



Galit Shmueli, PhD
Tsing Hua Distinguished Professor
Institute of Service Science
College of Technology Management
National Tsing Hua University
Hsinchu 30013, Taiwan
galit.shmueli@iss.nthu.edu.tw

Appendix D – External Reviewer Report

THE UNIVERSITY OF IOWA

TIPPIE COLLEGE OF BUSINESS
Department of Management Sciences
W252 John Pappajohn Business Building
Iowa City, Iowa 52242-1994
319-335-0858 *Fax* 319-335-1956
tippie.uiowa.edu

March 23, 2019

To whom it may concern:

It is my pleasure to provide this evaluation letter for the proposed PhD program in Informatics and Big Data Analytics, being proposed by the Muma College of Business (along with a broadly multi-disciplinary set of academic units) at the University of South Florida. In preparation for this evaluation, I reviewed the official proposal, and met with multiple stakeholders on the USF campus on Monday March 18.

I have a significant history of relevant experience that informs my evaluation. I served for nine years as the Director of Graduate Studies (in essence, PhD director) in the Management Sciences Department at Iowa, and another six years as Departmental Executive Officer (department head). While our program is housed in the Tippie College of Business, it is very interdisciplinary in scope, with a strong computational data science group. In addition, I helped develop our Interdisciplinary Graduate Program in Informatics, a program that has significant academic and structural similarities to the proposed program. I have served in several leadership positions in the Informatics program, including director of the Health Informatics subprogram for 11 years and the Information Science subprogram for three years.

In the era of “big data” the need for programs of this type should be evident, and the case is clearly made in the proposal. More and more departments across the academic spectrum are searching for graduates with these skills; this year alone, graduates from our department have received tenure-track offers from computer science, industrial engineering, information science / informatics, and information systems / management science departments. Meanwhile, the need for highly-skilled applied data scientists in industry is practically infinite; as a DEO, I regularly received calls from industrial partners looking for graduates with exactly these qualifications, including at the PhD level. Despite the huge and growing need for talent, it is *basically impossible* for a single academic department to provide both the depth and breadth of training that students need to reach a PhD level in this field; such departments simply don’t exist yet. One must either require graduate level courses in other departments to fill in the gaps (as we do in computer science and statistics), or design an interdisciplinary program from scratch. Despite the administrative coordination issues involved, I believe the latter approach to be definitely feasible and probably preferably.

The curriculum as proposed in this program is exemplary, covering all the necessary foundational work as well as incorporating some fairly novel components that really stand out to me. Any such program needs solid courses in large data management, data visualization, data mining / machine

learning, statistics, and optimization, as included here. Topics such as artificial intelligence, linear algebra and causality give the program a strong data science flavor, comparable to what would be seen in a computer science department, and are also fairly standard. While I have limited knowledge of the quality of the various cooperating departments, I have great confidence in the group from the ISDS Department to deliver high-quality courses (as well as to provide excellent student mentoring).

One particularly progressive aspect of the curriculum is the inclusion of courses covering the social aspects of analytics: ethics / privacy, and cognitive biases. For better or worse, are all increasingly reliant on automated decision making in every aspect of our lives. The people who design the next generation of the systems making the decisions clearly need to do a much better job addressing the societal impacts of their work: data privacy, algorithmic transparency, reinforcement of social biases, etc. I am thrilled to see formal training in these areas included in the curriculum, and I hope that such issues will be weaved throughout the program. Second, the emphasis on practical applications is entirely appropriate. Many if not most of the graduates of this program will most likely be entering the corporate job market, and the additional applied requirements ensure that they will be ready to take on practical challenges faster and at a higher level than most of their PhD peers.

My only real concern with the curriculum is the flip side of its comprehensiveness: there are a lot of required hours, and they come quickly. Fourteen courses in two years, along with a graduate research appointment, will not allow much time for research early on. Similarly, with a large number of required courses, students interested in picking up expertise in an application area (e.g., healthcare) will have little time to do so. As such, it feels more ‘data science’ than ‘informatics.’

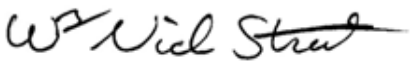
The administrative structure of an interdisciplinary program is crucial for its success, and this proposal gets the two biggest issues right. To have ongoing buy-in from all of the participating units, they will need a real say in the ongoing administration of the program. The executive committee consisting of representatives from every participating department might be a little unwieldy but is crucial for maintaining the sense of ownership across the partners. However, every program needs a home; recruiting, student services, appointments, and other administrative issues, down to guaranteeing students an office, all need to be handled by people with expertise in program administration. Housing the program in the Muma College of Business, which has a solid history of operating successful graduate programs, rather than centrally, strikes me as being crucial to its success. Based on my experience, they have hit the sweet spot here with an interdisciplinary team designing the curriculum of a program administered by an academic college.

The internal articulation agreement that has been signed to assure space for the students in courses offered by the various departments is an excellent start towards ensuring long-term successful cooperation among the departments. I would encourage the group to work out similar agreements for student support during the next year. Ideally, units other than Muma could allocate a slot or two for teaching assistant positions for students not supported on research funds. Secondary issues, such as specific procedures for handling course substitutions (for which I predict there will be many requests) could also be handled during this time period.

In summary, I find every reason to believe that the proposed program will be successful. The curriculum is rigorous, innovative and well-designed. The partnership across multiple departments will take careful coordination that may take a year or two to refine, but can work well if all parties

are given a stake in the overall direction. The Muma Collage of Business is an ideal home for program administration. I would be happy to answer any further questions, and I look forward to enthusiastically encouraging my better students to apply.

Sincerely,



Nick Street
Henry B. Tippie Research Professor in Management Sciences

Appendix E – CVs

Curriculum Vitae

Wolfgang S. Jank

February 19, 2019

Current Position:

Anderson Professor of Global Management
Department of Information Systems and Decision Sciences
Muma College of Business
University of South Florida

1 Education

1996-2001 **Doctor of Philosophy in Statistics**
Department of Statistics, University of Florida, Gainesville

1990-1996 **Bachelor & Masters in Mathematics**
Department of Mathematics, Technical University of Aachen, Germany

1994 **European Community Fellow**
Ecole Nationale Superieure Agronomique, Universite de Montpellier, France

1992 **European Community Fellow**
Department of Mathematics, University of York, United Kingdom

2 Academic Experience

2011–present **Professor**
Muma College of Business, University of South Florida, Tampa

2007-2011 **Associate Professor**
Robert H. Smith School of Business, University of Maryland, College Park

2001-2007 **Assistant Professor**
Robert H. Smith School of Business, University of Maryland, College Park

3 Visiting Positions

2009 **Visiting Professor**
Otto-Beilsheim School of Management (WHU)

2008 **Visiting Professor**
Chair for eCommerce, Department of Marketing, University of Frankfurt/Main

2008 **Visiting Professor**
Department of Statistics, Vienna Business School

4 Most Significant Publications since 2008

4.1 Books

1. Jank W (2011) "Business Analytics for Managers," Springer, ISBN 978-1-4614-0405-7.

2. Jank W and Shmueli G (2010) "Modeling Online Auctions," John Wiley & Sons, ISBN 978-0-470-47565-2.

3. Jank W and Shmueli G (2008) "Statistical Methods in eCommerce Research," John Wiley & Sons, ISBN 978-0-470-12012-5.

4.2 Peer-Reviewed Journal Papers

4. Fan-Osuala, O, Zantedeschi, D, and Jank, W (2018) "Using past contribution patterns to forecast fundraising outcomes in crowdfunding." *International Journal of Forecasting*, 34(1), pp.30-44.

5. Tafti A, Zotti R, and Jank, W (2016) "Real-time Diffusion of Information on Twitter and the Financial Markets" *PLOS One*, 11(8): e0159226

6. Elmaghraby, W, Jank, W, Karaesmen, I, and Zhang S (2015) "Sales Force Behavior, Pricing Information and Pricing Decisions." *Manufacturing & Service Operations Management*, 17(4), pp. 495-510.

7. Ozpolat, Koray, and Jank, W (2015) "Getting the Most out of Third Party Trust Seals: A Randomized Field Study" *Decision Support Systems*, 73, pp. 47–56.

8. Fan, Y, Foutz, N, James, G and Jank W (2014) "Functional Response Additive Model Estimation with Online Virtual Stock Markets." *Annals of Applied Statistics*, 8(4), pp. 2435–2460.

9. Di, Chongzhi, Crainiceanu, C. M. and Jank, W. (2014) "Multilevel Sparse Functional Principal Component Analysis." *Stat*, 3(1), pp. 126–143.

10. Rusch, T, Lee, I, Hornik, K, Jank, W, Zeileis, A, (2013) "Influencing Presidential Elections with Statistics: Targeting Voters with Logistic Regression Trees." *Annals of Applied Statistics*, 7(3), pp.1612–1639.

11. Ozpolat, K, Gao, G, Jank, W. and Viswanathan, S (2013) "The Value of Trust Seals in Online Commerce: An Empirical Investigation." *Information Systems Research*, 24(4). Awarded *Best Working Paper* by the Dingman Center for Entrepreneurship.

12. Elmaghraby, W, Jank, W, Karaesmen, I, and Zhang S (2012) "An Exploratory Analysis of B2B Price Changes." *Journal of Revenue and Pricing Management* 11(6) 607-624.

13. Anderson, D, Golden, B, Jank, W and Wasil, E (2012) "The Impact of Hospital Utilization on Patient Readmission Rate." *Health Care Management Science*, 15(1), pp. 29–36.

14. Slamka, C, Jank W and Skiera, B (2012) "Second-Generation Prediction Markets for Information Aggregation: A Comparison of Payoff Mechanisms." *Journal of Forecasting*, 31(6), pp. 469–489.

15. Anderson, D, Price, C, Golden, B, Harrington, M, Jank, W and Wasil, E (2011) "Examining the Discharge Practices of Surgeons at a Large Medical Center." *Health Care Management Science*, 14(4), pp. 338–47.

16. Dass M, Jank W and Shmueli G (2011) "Maximizing Bidder Surplus in Simultaneous Online Art Auctions via Dynamic Forecasting." *International Journal of Forecasting*, Volume 27, Issue 4, October-December 2011, pp. 1259–1270.

17. Jank W and Zhang S (2011) "An Automated and Data-Driven Bidding Strategy for Online Auctions." *INFORMS Journal of Computing*, **23** (2), p. 238–253.

18. Jank W, Shmueli G, and Zhang S (2010) "A Flexible Model for Price Dynamics in Online Auctions." *Journal of the Royal Statistical Society - Series C*, **59** (5), p. 781-804.

19. Jank W and Yahav I (2010) "E-Loyalty Networks in Online Auctions." *Annals of Applied Statistics*, **4** (1), p. 151–178.

20. Foutz N and Jank W (2010) "Pre-Release Demand Forecasting for Motion Pictures Using Functional Shape Analysis of Virtual Stock Markets." *Marketing Science*, **29** (3), p. 568–579.

21. Zhang S, Jank W and Shmueli G (2010) "Real-Time Forecasting of Online Auctions via Functional K-Nearest Neighbors." *International Journal of Forecasting*, **26** (4), p. 666–683.

22. Heath J, Fu M and Jank W (2009) "New Global Optimization Algorithms for Model-Based Clustering." *Computational Statistics and Data Analysis*, **53** (12), p. 3999–4017.

23. Jank W, Shmueli G, Dass M, Yahav, I and Zhang S (2008) "Statistical Challenges in eCommerce: Modeling Dynamic and Networked Data." *INFORMS Tutorials in Operations Research*, 2008 edition, p. 31–54.

24. Wang S, Jank W, Shmueli G and Smith P (2008) "Modeling Price Dynamics in eBay Auctions Using Principal Differential Analysis." *Journal of the American Statistical Association*, **103** (483), p. 1100–1118.

25. Haruvy E, Popkowski Leszczyc P, Carare O, Cox J, Greenleaf E, Jank W, Jap S, Park Y-H, and Rothkopf M (2008) "Competition between Auctions." *Marketing Letters*, **19** (3-4), p. 431–448.

26. Bapna R, Jank W and Shmueli G (2008) "Price Formation and its Dynamics in Online Auctions." *Decision Support Systems*, **44** (3), p. 641–656.

27. Bapna R, Jank W and Shmueli G (2008) "Consumer Surplus in Online Auctions." *Information Systems Research*, **19** (4), December Issue. **Awarded Best Information Systems Publication of 2008.**

28. Reithinger F, Jank W, Tutz G and Shmueli G (2008) "Smoothing Sparse and Unevenly Sampled Curves using Semiparametric Mixed Models: An Application to Online Auctions." *Journal of the Royal Statistical Society - Series C*, **57** (2) p. 127–148.

29. Wang S, Jank W and Shmueli G (2008) "Explaining and Forecasting Online Auction Prices and their Dynamics using Functional Data Analysis." *Journal of Business and Economic Statistics*, **26** (2), p. 144–160.

30. Shmueli G, Jank W and Hyde V (2008) "Transformations for Semi-Continuous Data." *Computational Statistics and Data Analysis*, **52** (8), p. 4000–4020.

31. Tu Y, Ball M and Jank W (2008) "Estimating Flight Departure Delay Distributions A Statistical Approach with Long-Term Trend and Short-Term Pattern." *Journal of the American Statistical Association*, **103** (481), p. 112–125.

4.3 Peer-Reviewed Book Chapters

32. Jank W and Shmueli G (2010) "Forecasting Online Auctions using Dynamic Models." In Soares and Ghani (Eds.) *Proceedings of the 2010 conference on Data Mining for Business Applications*, pp. 137–148, IOS Press, ISBN 978-1-60750-632-4.

33. Shmueli G, Russo R, Jank W and Shyamalkumar N (2010) "Models For Bid Arrivals and Bidder Arrivals in Online Auctions." In Balakrishnan (Ed.) *Methods and Applications of Statistics in Business, Finance, and Management Science*, John Wiley & Sons, Newark, NJ.

34. Foutz N and Jank W (2010) "Mining Functional Data in Prediction Markets." In Balakrishnan (Ed.) *Methods and Applications of Statistics in Business, Finance, and Management Science*, John Wiley & Sons, Newark, NJ.

35. Dass M, Jank W and Shmueli G (2010) "Dynamic Price Forecasting In Simultaneous Online Art Auctions." In Casillas and Martnez-Lopez (Eds.) *Marketing Intelligent Systems using Soft Computing*, Springer, NY.

36. Shmueli G and Jank W (2008) "Modeling the Dynamics of Online Auctions: A Modern Statistical Approach." In Kauffman and Tallon (Eds.) *Economics, Information Systems, and Electronic Commerce: Empirical Research*, M.E. Sharpe Publishers, Armonk, NY.

37. Jank W and Kannan PK (2008) "Dynamic Spatial Models in Online Markets." In Jank and Shmueli (Eds.) *Statistical Methods in eCommerce Research*, Wiley & Sons, p. 341–362.

38. Jank W, Shmueli G & Wang, S (2008) "Differential Equation Trees to Model Price Dynamics in Online Auctions." In Jank and Shmueli (Eds.) *Statistical Methods in eCommerce Research*, Wiley & Sons, p. 363–382.

39. Hyde V, Jank W, & Shmueli G (2008) "A Family of Growth Models for Representing the Price Process in Online Auctions." In Jank and Shmueli (Eds.) *Statistical Methods in eCommerce Research*, Wiley & Sons, p. 291–324.

40. Jank W and Shmueli G (2008) "Studying Heterogeneity of Price Evolution in eBay Auctions via Functional Clustering." In Adomavicius and Gupta (Eds.) *Handbook of Information Systems Series: Business Computing*, Elsevier.

4.4 Peer-Reviewed Conference Papers & Proceedings

41. Fan-Osuala, O, Zantedeschi, D, and Jank, W (2018): "Talk your way to serial success: Creator post-campaign interaction in crowdfunding." *Americas Conference on Information Systems (AMCIS) 2018*, August 16–18, New Orleans.

42. Onuchowska, A, Chakraborty, S, Shrivastava, U, and Jank, W (2018): "Detection and Classification of Attacks on IoT Networks." *Americas Conference on Information Systems (AMCIS) 2018*, August 16–18, New Orleans.

43. Shrivastava, U, Zantedeschi, D, Jank, W, and Heilman, C (2017): "Using Consumer Spending Paths to Predict Response to Mass and Customized Retailer Promotions: A Two Stage Functional Data Approach." *14th Marketing Dynamics Conference. Hong Kong, August 17 - 19, 2017.*

44. Shrivastava, U, Zantedeschi, D, Jank, W, and Stern, P (2017): "Does Internet Threaten Prescription Loyalty? A Longitudinal Investigation using Prescriber-Prescription Network." *12TH INFORMS Workshop on Data Mining & Decision Analytics DMDA.*

45. Shrivastava, U, Zantedeschi, D, Jank, W, and Heilman, C (2017): "Using Consumer Spending Paths to Predict Response to Mass and Customized Retailer Promotions: A Two Stage Functional Data Approach." *2017 Winter Conference on Business Analytics.*

46. Fan-Osuala O, Zantedeschi, Z, and Jank, W (2017) "Product Design Decisions and Financial Slack in Crowdfunding" *14th annual Product and Service Innovation Conference*, University of Utah, David Eccles School of Business, February 2017.

47. Shrivastava, U, Zantedeschi, D, Stern, P, and Jank W (2016) "Moderating Effects of ICT Penetration on Direct Marketing Communications: A Longitudinal Analysis of Physicians Prescription Behavior in the UK." *2016 Conference on Information Systems and Technology (CIST) - INFORMS Annual Meeting*, Nashville, TN, November 13–16, 2016.

48. Fan-Osuala O, Zantedeschi, Z, and Jank, W (2016) " Add the cool factor: An empirical investigation of the effect of positivity and pictorial images on review coolness" *2016 Americas Conference on Information Systems (AMCIS)*, August 11–14, 2016, San Diego, CA.

49. Fan-Osuala O, Zantedeschi, Z, and Jank, W (2016) " How Does Campaign Strategy And Structure Affect Post-Funding Performance Of Crowdfunded Ventures? A Case Of Private Goods On Kickstarter" *The 2016 Winter Conference on Business Intelligence*, March 3 - March 5, 2016.

50. Shrivastava U, and Jank, W (2015) "A data driven framework for early prediction of customer response to promotions" *2015 Americas Conference on Information Systems (AMCIS)*, Puerto Rico, August 13-15, 2015.

51. Fan-Osuala O, and Jank W (2015) "Forecasting fundraising outcomes in crowdfunding campaigns using contribution dynamics" *The 2015 Winter Conference on Business Intelligence*, March 12 - March 14, 2015.

BALAJI PADMANABHAN

Information Systems & Decision Sciences
Muma College of Business, University of South Florida
bp@usf.edu

EDUCATION

Stern School of Business, New York University (NYU)
Ph.D. (Information Systems), 1999
Indian Institute of Technology (IIT), Madras (Chennai), India
B.Tech. (Computer Science), 1993

ACADEMIC EXPERIENCE

University of South Florida
August 2007 – present: Professor of Information Systems & Decision Sciences (2015+)
Anderson Professor of Global Management (2007+), Associate Professor (2007-2015)
August 2016 – present: Director, Center for Analytics & Creativity
July 2013 – August 2016: Department Chair, Information Systems & Decision Sciences
The Wharton School, University of Pennsylvania
July 1998 – June 2007: Assistant Professor, Operations and Information Management Department

BUSINESS ENGAGEMENT IN ANALYTICS

Consulted and/or worked on data analytics projects with many firms, some include:

- Working with Understory Inc., a learning analytics firm on video analytics (2017-current).
- Built models to investigate the relationship between television viewership and presidential election outcomes in the US with data from Nielsen (2015-current)
- Built analytics and predictive models for loan decisions for Grow Financial (2015-2018)
- Advised Bank of America on social media analytics in the banking industry (2013-2018)
- Working with Suncoast Credit Union on analytics and predictive modeling (2018-current)
- Designed analytics-based valuation models for Turing Points, a homeless charity (2015)
- Advised Urban4M, now Spatially, in designing location-based intelligence (2012-2014).
- Jointly developed an industry-first *Citizen Data Science* program customized for Jabil Inc. (launched 2016) with a six month program and a two day *Executive Data Science* program.
- Designed news personalization algorithms which outperformed various leading alternatives in a major financial news site for DailyMe Inc (2009-2011)
- Built psychology/behavior-based retention/churn management models with FedEx Corp (2010-2012).
- Advised Ultramatics Inc in the design of systems related to human resource analytics (2013-2014)
- Advised Fintech Inc. in the process of designing a novel BI/analytics platform for the industry leading alcoholic beverage payments processing & invoicing provider (2010-2011)
- Built models for 3M on root cause analysis in the context of machine generated data (2012)
- Custom designed and delivered data mining / analytics education for Infosys Inc. & Fintech Inc. (2010)
- Worked with Pfizer Inc. to test pattern discovery algorithms in data (2003-2004)
- Worked with Omnichoice Inc. to evaluate an online decision tool (2004-2005)
- Worked with eWinWin Inc. on data-based strategies for social commerce (2009-2010)
- Advised numerous non-profits and small businesses on effective use of data for online marketing strategies as part of Google's Online Marketing Challenge competitions (2008-2012)
- Implemented classification algorithms at Morgan Stanley Inc. (1996)
- Worked as research assistant on one of the first data analytics efforts in a business school at NYU on analytics for Nielsen's scanner data in 1994.

RESEARCH & TEACHING INTERESTS

- Analytics Algorithms & Applications
- Artificial Intelligence and Machine Learning (ML) in Business
- Applications of AI/ML in media, politics, healthcare, operations and social media
- Combining Psychology/Behavioral Economics with Analytics/Machine Learning
- Computational Thinking and Algorithms in Business
- Data-driven Decision Making & Citizen Data Science
- Managing Analytics & Governance

RESEARCH (JOURNAL PUBLICATIONS)

1. Taming Complexity in Search Matching: Two-Sided Recommender Systems on Digital Platforms. O. Malgonde, H. Zhang, B. Padmanabhan and M.Limayem. Forthcoming in *MIS Quarterly*, 2019.
2. Audit Policies under the Sentinel Effect: Deterrence-Driven Algorithms. L. Bouayad, Padmanabhan, B. and Chari, K. Forthcoming in *Information Systems Research*, 2019.
3. Machine Learning for Psychiatric Patient Triaging: An Investigation of Cascading Classifiers. V. Singh, Shrivastava, U., Bouayad, L., Padmanabhan, B., Ialynytchev, A. and Schultz, S. In *Journal of the American Medical Informatics Association (JAMIA)*, Volume 25, Issue 11, 1 November 2018, Pages 1481–1487
4. Patient Health Record Systems' Scope and Functionalities: A Literature Review and Future Directions. L. Bouayad, A. Ialynytchev and B. Padmanabhan. In *Journal of Medical Internet Research*, Nov 15 2017, 19(11): e388. doi: 10.2196/jmir.8073.
5. Applying Behavioral Economics in Predictive Analytics for B2B Churn: Findings from Fine-Grained Service Quality Data. A. Barfar, B. Padmanabhan and A. Hevner. In *Decision Support Systems*, Volume 101, September 2017, pp. 115-127.
6. Predicting Presidential Election Outcomes from What People Watch. A. Barfar and Padmanabhan, B. In *Big Data*, 5(1): 32-41, 2017.
7. Does Television Viewership Predict Presidential Election Outcomes, A. Barfar and Padmanabhan, B. In *Big Data*, 3(3): 138-147, 2015.
8. A Process Model for Information Retrieval Context Learning and Knowledge Discovery, H.Hyman, T.Sincich, R.Will, M.Agrawal, B.Padmanabhan, and W.Fridy. In *Artificial Intelligence and Law* 23,2,103-132, June 2015.
9. The "Most Popular News" Recommender: Count Amplification and Manipulation Resistance. In *Information Systems Research*, September 2014 Vol 25(3):569-589, Prawesh, S. and Padmanabhan, B.
10. Goal Attainment in Long Tail Websites: An Information Foraging Approach, McCart, J., Padmanabhan, B. and Berndt,D. In *Decision Support Systems*, Volume 55, Issue 1, April 2013, Pages 235-246.
11. Discovery of Periodic Patterns in Sequence Data: A Variance Based Approach, Y. Yang, B. Padmanabhan, H. Liu, X. Wang. In *INFORMS Journal on Computing*, Volume 24, pp. 372-386, Summer 2012.
12. From Business Intelligence to Competitive Intelligence: Inferring Competitive Measures Using Augmented Site-Centric Data, Zheng, E., Fader, P. and Padmanabhan, B. In *Information Systems Research*, September 2012 23:698-720.
13. From Information to Operations: Service Quality and Customer Retention, Padmanabhan, B., Hevner A., Cuenco, M., and Shi, C. In *ACM Transactions on Management Information Systems*, 2, 4, December 2011.

14. Toward User Patterns for Online Security: Observation Time and Online User Identification, Y. Yang and B. Padmanabhan. In *Decision Support Systems,* Volume 48, Issue 4, March 2010, Pages 548-558.
15. Constructing Ensembles from Data Envelopment Analysis, Z. Zheng and B. Padmanabhan. In *INFORMS Journal on Computing* 2007 19: 486-496.
16. Selectively Acquiring Customer Information: A New Data Acquisition Problem and an Active Learning Based Solution, Z. Zheng and B. Padmanabhan. In *Management Science*, 52(5), pp. 697-712, 2006.
17. An Empirical Analysis of the Value of Complete Information for eCRM Models, B. Padmanabhan, Z. Zheng and S. Kimbrough. In *MIS Quarterly*, 30(2), pp. 247-267, 2006.
18. On Characterization and Discovery of Minimal Unexpected Patterns in Rule Discovery, B. Padmanabhan and A. Tuzhilin. In *IEEE Transactions on Knowledge and Data Engineering*, 18(2), pp.202-216, 2006.
19. GHIC: A Hierarchical Pattern Based Clustering Algorithm for Grouping Web Transactions, Y. Yang and B. Padmanabhan. In *IEEE Transactions on Knowledge and Data Engineering*, 17(9), pp.1300-1304, 2005.
20. Evaluation of Online Personalization Systems: A Survey of Evaluation Schemes and A Knowledge-Based Approach, Y. Yang and B. Padmanabhan. In *Journal of Electronic Commerce Research* 6(2), pp.112-122, 2005.
21. The Interestingness Paradox in Pattern Discovery, B. Padmanabhan. In *Journal of Applied Statistics*, 31(8), pp. 1019-1035, 2004.
22. On the Use of Optimization for Data Mining: Theoretical Interactions and eCRM Opportunities, B. Padmanabhan and A. Tuzhilin. In *Management Science*, 49(10), pp. 1327-1343, 2003.
23. On the Existence and Significance of Data Preprocessing Biases in Web Usage Mining, Z. Zheng, B. Padmanabhan and S. Kimbrough. In *INFORMS Journal on Computing*, 15(2), pp. 148-170, 2003.
24. Knowledge Refinement Based on the Discovery of Unexpected Patterns in Data Mining, B. Padmanabhan and A. Tuzhilin. In *Decision Support Systems*, 33(3), pp. 309-321, 2002.
25. The Identification and Satisfaction of Customer Analysis Driven Information Needs of Marketers on the WWW, S. Sen, B. Padmanabhan, A. Tuzhilin, N. White and R. Stein. In *European Journal of Marketing*, 32(7/8), pp. 688-702, 1998.
26. Unexpectedness as a Measure of Interestingness in Knowledge Discovery, B. Padmanabhan and A. Tuzhilin. In *Decision Support Systems*, 27(3), pp. 303-318, 1999.

EDITORIAL SERVICE

- Associate Editor for ACM Transactions on MIS (2013 onward), Big Data (2016-2019), Information Systems Research (2008-2011), INFORMS Journal on Computing (2009 onward), Journal of Business Analytics (2017 onward), MIS Quarterly (2016 onward), Served as ad-hoc AE for several Management Science and MIS Quarterly manuscripts, ICIS 2009, 2012 and Editorial Review Board Member, Journal of Database Management.
- Program Committee Member for Workshop on Information Technologies and Systems (WITS) 2000, 2003 through 2018, Advisory Board Member, SIG-DSS Workshop, ICIS, ACM KDD 2001, 2007, 2008, 2009, ACM Recsys 2014, ACM SIGMOD Workshop on Data Mining and Knowledge Discovery 2002, IEEE Conference on Data Mining 2003, 2006, 2007, ECML/PKDD 2006, 2008, SIAM Conference on Data Mining, 2006, 2007, 2008 and Information Integration and Web-based Applications & Services (IIWAS) 2001

INVITED TALKS

- University of California at Davis, December 2017
- University of Minnesota, February 2017

- University of Utah, April 2016
- University of Texas at Austin, April 2016
- University of Maryland, May 2013
- New York University, April 2013
- Georgia State University, March 2013
- Tsinghua University, Beijing, China, December 2011
- University of Texas at Dallas, 2010
- Future of BI/Web 2.0 Panel, Salt Lake City, 2009
- University of Washington, Seattle, May 2007.
- Microsoft Research / Microsoft Live Labs, March 2007.
- Carlson School of Management, Univ. of Minnesota, March 2007.
- University of South Florida, February 2007.
- IBM T.J. Watson Research Center, Sep. 2006.
- University of Maryland, Sep. 2006.
- Villanova University, March 2006.
- Yahoo!, Sunnyvale, CA, Nov. 2005.
- McCombs School of Business, University of Texas at Austin, Nov. 2005.
- The Wharton School, University of Pennsylvania, Nov 1 2005.
- Winter Information Systems Conference at University of Utah, March 2005.
- Carlson School of Management, Univ. of Minnesota, March 2005.
- New York University, March 2004.
- INSEAD, France, Nov. 2004.
- PhD Research Seminar, Information Systems Department, NYU, May 2003
- Rutgers E-Commerce Association (RECA) Distinguished Guest Lectures, Rutgers, April 2003.
- Univ. of Maryland, April 2002.
- Stern School NYU, Nov. 2001.
- Statistics Dept., The Wharton School, October 2001.
- The Wharton School, April 2001.
- Merck , New Jersey, June 1999.
- Salomon Smith Barney, New York, September 1997.
- University of Florida, January 1998.
- Boston University, School of Management, January 1998.
- University of Maryland at College Park, February 1998.
- Purdue University, Krannert School of Mgmt, January 1998.
- The Wharton School, University of Pennsylvania, March 1998.
- University of Texas at Austin School of Business, February 1998.
- University of Michigan Business School, February 1998.

DOCTORAL ADVISING

Dissertations Supervised as Chair

• **Lina Bouayad** (Co-chair, 2015), University of South Florida.
Dissertation title: “Reducing Healthcare Costs from Analytics”.
Currently Assistant Professor at Florida International University in Miami.

• **Arash Barfar (Co-chair, 2015), University of South Florida.**
Dissertation title: “Rationality and Organizational Decision Making”.
Currently Assistant Professor at University of Nevada at Reno.

• **Shankar Prawesh (Co-chair, 2012), University of South Florida.**
Dissertation title: “Agent-Based Models in Business”.
First job: Post-Doc, University of Maryland. Currently Assistant Professor at IIT Kanpur, India.

- **James McCart (Co-chair, 2009), University of South Florida.**

Dissertation title: "Goal Attainment on Long Tail Web Sites: An Information Foraging Perspective".
First Job: PhD Investigator in a healthcare data/text mining group at the Department of Veterans Affairs.

- **Zhiqiang Zheng (2003).**

Dissertation title: "On an Incomplete Data Problem in Modeling: Evidence from Web Usage Mining and a General Purpose Solution".
Currently Full Professor at University of Texas at Dallas.

- **Yinghui Yang (2004).**

Dissertation Title: "New Data Mining and Marketing Approaches for Segmentation and Promotion Planning on the Internet".
Currently Associate Professor at University of California, Davis.
Also served as a Doctoral Dissertation Committee Member for numerous students at USF and the University of Pennsylvania.

GRANTS & HONORS

- $175,000 Grant from OnQ Inc., an Atlanta based elearning firm (2017-2019).
- $150,000 Bank of America practice center grants for social media monitoring (2013-2018)
- $125,000 Grow Financial practice center grants for predictive analytics in banking (2015-2018)
- $100,000 grant from the Florida High Tech Corridor to study online social shopping (2010)
- $30,000 practice center projects from Fintech Inc (2011)
- $15,000 Trader Planet practice center grant (2014)
- $15,000 practice center project from 3M (2012)
- Part of the USF team that wrote the TEAm grant submission to the state of Florida. TEAm grant was funded for $4.9 million, USF portion $1.4 million (2013)
- $20,000 Pfizer Inc grant, 2002.
- $15,000 Wharton eBusiness Initiative grant, Summer 2001, Summer 2002 and Summer 2004.
- USF College of Business Award for Outstanding Faculty Research, 2012
- Excellence in Teaching Award, Wharton Undergraduate Division, 2003.
- Nominated for the University of Pennsylvania's most distinguished teaching (Lindback) award, 2003.
- NJ Society of Information Management, Best Dissertation Paper award, 2nd place, 1998.
- ICIS Doctoral Consortium, 1997.
- Dean's Fellowship, New York University, 1997.
- Fellowship, New York University, 1993-1996.
- AAAI Scholarship to present at KDD 1996.
- National Talent Scholarship, University Grants Commission, Government of India 1987-93.

OMB No. 0925-0001 and 0925-0002 (Rev. 10/15 Approved Through 10/31/2018)

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES**.

NAME: Sudeep Sarkar

eRA COMMONS USER NAME (credential, e.g., agency login): sudeep

POSITION TITLE: Professor, Computer Science & Engineering
Associate Vice President for I-Corps Programs, USF Research & Innovation

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date	FIELD OF STUDY
Indian Institute of Technology, Kanpur	B.Tech	05/1988	Electrical Engineering
The Ohio State University, Columbus	M.S.	05/1990	Electrical Engineering
The Ohio State University, Columbus	Ph.D.	05/1993	Electrical Engineering

A. Personal Statement

Sudeep Sarkar has more than 25 years of experience in conducting and directing both fundamental and applied research in computer vision, image processing, pattern recognition, and related topics. His research topics have ranged from video image processing to biometrics and medical image analysis of burn scars. He has published more than 200 scientific articles and his Google h-index is 44. To date he has mentored, as major or co-major professor, 21 PhD students and 23 Master students. They are placed in top industries, such as Samsung, Google, Amazon, Raytheon, etc. or at well known government research labs such as Jet Propulsion Labs and Lawrence Livermore Labs. In his administrative capacity, he started and leads the faculty external awards, honors, and prizes initiative. He coordinates and writes trans-disciplinary, university-wide, grants and contract opportunities related to innovation. He is currently is the Co-PI on a US Department of Commerce's i6 Innovation grant and is the director for the NSF I-Corps Site program at USF. He also manages the Florida Center for Cybersecurity inter-university research grant program.

On this project, he would assist with the computational aspects. He has wide experience with generative machine learning methods and has high performance computing platforms in his laboratory, which will be made available for this project.

B. Positions and Honors

Positions and Employment

1993—1999: Assistant Professor, Computer Science & Engineering, University of South Florida
1999—2004, Associate Professor, Computer Science & Engineering, University of South Florida
2009—2012: Research Administration Faculty Fellow, Office of Research & Innovation, USF
2004—current: Professor and Chair, Computer Science & Engineering, University of South Florida
2012—current: Associate Vice President for I-Corps Programs

Other Experience and Professional Memberships

1995—current IAPR Member
1995—current IEEE Member
1999—2001 Associate Editor for Pattern Analysis and Applications
2004—2010 Associate Editor for IEEE Trans. on Systems, Man, and Cybernetics, Part B
2006—2010 Associate Editor for Pattern Recognition Journal
2008—2012 Associate Editor for IET Computer Vision
2008—2010 Associate Editor for Image and Vision Computing
2010—2012 Chair of IEEE-CS Technical Committee on Pattern Analysis and Machine Intelligence

2010—2012 IEEE Computer Society Distinguished Speaker
2010—2012 Member of Governing Board of the International Association of Pattern Recognition
2009—current AAAS Member
2010—current Charter Member of National Academy of Inventors
2011—current 1999—2003, Associate Editor for IEEE Trans. on Pattern Analysis and Machine Intelligence
2011—current Editor-in-Chief, Pattern Recognition Letters
2012—current Vice-president for Conferences, IEEE Biometrics Council
2013—current Board of Trustees Member of Southeastern Universities Research Association (SURA)
2013—current Board of Directors, National Academy of Inventors.
2016—current Member, Sigma Xi: The Scientific Research Society

Honors

1995 CAREER Award, National Science Foundation
1996 Teaching Incentive Program Award, University of South Florida
1998 Outstanding Undergraduate Teaching Award, University of South Florida
2004 Ashford Distinguished Scholar Award, University of South Florida
2008 Fellow of the International Association of Pattern Recognition (IAPR)
2013 Fellow of the Institute of Electrical and Electronics Engineers (IEEE)
2014 Fellow of the American Association for the Advancement of Science (AAAS)
2016 Fellow of the American Institute for Medical & Biological Engineering (AIMBE)
2017 Fellow of the National Academy of Inventors (NAI)

C. Contribution to Science

1. High-level scene interpretation from images and video

The main challenges of event recognition are threefold. First, it is difficult to handle the enormous variety of interactions present in different instances of a complex event. The second problem involves rejecting clutter of extraneous objects so that only the participating ones are considered. The third problem stems from errors in classification of objects and actions. How do we leverage the success of deep-learning/machine learning based labeling methods into building a detailed semantic description of a complex event? We explored the combinatorial approach based on Grenander's canonical pattern theory (CPT) framework and representations. We have formulated a comprehensive and elegant formulation that can handle all these three kinds of challenges, without the need for an extensive training dataset. We have demonstrated a pattern theory approach that can (i) handle the structural variability of complex events without requiring extensive training data but exploiting readily available ontological informationor exploiting pairwise semantic weights existing in knowledge bases such as ConceptNet; (ii) overcome classification errors of machine learning classifiers of actions and objects, from multiple modalities such as sound and vision; (iii) able to handle scene clutter, i.e. extraneous objects that do not participate in the activity present in the scene and missed detection of objects and actions; and (iv) able to handle sequences of elementary events, all without retraining. Key results are presented in the following sections. **Funding Source: National Science Foundation**

- S. N Aakur, F. de Souza and S. Sarkar, “Canonical Pattern Theory as a Language for Open World Video Activity Description and Inference,” *The Quarterly of Applied Mathematics*, accepted, Sept. 2018.
- F. de Souza, **S. Sarkar**, A. Srivastava, J. Su, “Spatially Coherent Interpretations of Videos Using Pattern Theory,” *International Journal of Computer Vision* , vol. 121, no. 1, pp: 5—25, 2017.
- F. de Souza; **S. Sarkar**; A. Srivastava; J. Su, “Pattern Theory for Representation and Inference of Semantic Structures in Videos,” *Pattern Recognition Letters*, Special Issue on Award Winning Papers at International Conference on Pattern Recognition, vol 72, no. 1, pp. 41—51, March 2016 (handled by EiC G. Sanniti di Baja).
- S. Aakur, F. de Souza, S. Sarkar, “Going Deeper with Semantics: Video Activity Interpretation using Semantic Contextualization,” *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2019.
- S. Aakur, F. DM de Souza, and S. Sarkar, “An Inherently Explainable Model for Video Activity Interpretation,” *AAAI Workshop On Reasoning and Learning for Human-Machine Dialogues (DEEP-DIAL18)*, February 2018. (oral)

2. Human Skin Color and Elasticity from Images

The goal of this work was to develop a non-invasive imaging device based on regular 2-dimensional color images and 3-dimensional (3D) range images that can be used to collect data about the physical characteristics of human skin in terms of its color, texture, and elasticity. The applications for such measures

are in domains where objective evaluation of skin condition is critical, such as in evaluating burn scars and in diagnosing skin melanoma. We used physics based computer vision methods to correct for image distortions due to incident illumination, location of light source, shading due to shape changes, and camera response non-linearities. In this regards we have developed a novel scheme to calibrate light sources with respect to the camera. Statistical image-based measures, defined on the color and the range image, capture the severity of the skin abnormality in terms of its color and tactile texture. We used Finite Element Model, which captures non-rigid behavior of the skin, to estimate scar elasticity. These models are driven from the captured image data and estimate changes in skin elasticity, such as that in a burn scar, using an iterative gradient descent minimization procedure. In future, these objective image-based measures against the histological state of the skin, captured using measures defined on the underlying collagen fiber density & organization, blood vessel density, melanin & melanocyte density, elastin density, and dermis & epidermis thickness. **Funding Sources:** The Whitaker Foundation, NSF, and by the US Army.

- Y. Zhang, D. B. Goldgof, S. Sarkar and L. V. Tsap, "A Sensitivity Analysis Method and Its Application in Physics-Based Nonrigid Motion Modeling,", *Image and Vision Computing*, vol. 25, no. 25, pp. 262– 273, March 2007.
- M. Powell, S. Sarkar, D. B. Goldgof, and K. Ivanov, "A Methodology for Extracting Objective Color From Images," *IEEE Transactions on Systems, Man, and Cybernetics-Part B*, vol. 34, no. 5, pp. 1964– 1978, Oct. 2004.
- M. W. Powell, S. Sarkar, and D. B. Goldgof, "A simple strategy for calibrating the geometry of light sources," in *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 23, no. 9, pp. 1022–1027, Sept. 2001.
- L. V. Tsap, D. B. Goldgof, S. Sarkar, and P. S. Powers, "A method for increasing precision and reliability of elasticity analysis in complicated burn scar cases," in *International Journal of Pattern Recognition and Artificial Intelligence*, vol. 14, no. 2, pp. 189–210, March 2000.

3. Biometrics: Far, Outdoors, Security, and Privacy Issues

The ability of being to identify humans from a distance in a passive manner has obvious applications in surveillance and threat assessment. However, there are other possible innovative uses, such as in smart rooms, designing environmentally aware electronic devices, and next generation computer games. In this general context, we are (i) researching modalities to recognize persons from a distance using image and video data, and (ii) looking into privacy and security related issues. We have developed the HumanID Gait Challenge Problem that has become the defacto standing in evaluating gait recognition algorithms. We have been conducting extensive research in the combination of multiple biometric modalities such as combination of ear and face, face and gait, and face and voice. Our experiments all use real multiple biometric data from the same subject pool and are focused toward outdoor situations. We have formulated a novel scheme to reconstruct face images from match scores, exposing a potential source for security breach in the face recognition systems. **Funding Sources:** DARPA HumanID at a Distance program, US Army and STS Intl., SOCOM (via USF-NSF I/UCRC Center), Unisys Corporation, CIA, Raytheon Inc..

- P. Mohanty, S. Sarkar, R. Kasturi, "From Scores to Face Template: A Model-based Approach," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 29, no. 12, Dec. 2007.
- Z. Liu and S. Sarkar, "Improved Gait Recognition by Gait Dynamics Normalization," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 28, no. 6, pp. 863–876, June 2006. **(>100 Google Scholar citations)**
- S. Sarkar, P. Jonathon Phillips, Z. Liu, I. Robledo, P. Grother, K. Bowyer, "The Human ID Gait Challenge Problem: Data Sets, Performance, and Analysis," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 27, no. 2, pp. 162–177, Feb. 2005. **(>500 Google scholar citations)**
- K. Chang, K. W. Bowyer, S. Sarkar, and B. Victor, "Comparison and Combination of Ear and Face Images In Appearance-Based Biometrics," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 25, no. 9, pp. 1160–1165, Sept. 2003. **(> 300 Google Scholar citations)**

4. Automated Sign Language Recognition

Sign languages are complex, abstract linguistic systems, with their own grammars. Our contribution were in formulating automated algorithms that can take sign language video of and recognize the signs performed. This would be useful in facilitating the communication between Deaf and hearing persons. We went beyond the recognition of isolated signs to the detection and recognition of continuous signs in short sentences based on video, without the use of special equipment such as data gloves or magnetic markers. Our contributions were in scalable formalisms for representation, model learning, and matching methods that are robust to image segmentation errors. **Funding Source**: National Science Foundation.

- R. Yang and S. Sarkar, "Coupled Grouping and Matching for Sign and Gesture Recognition," *Computer Vision and Image Understanding*, vol.113, vo. 6, pp. 663—681, June 2009.
- S. Nayak, S. Sarkar, B. Loeding, "Distribution-based dimensionality reduction applied to articulated motion recognition", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 31, no. 5, pp. 795—810, May 2009.
- R. Yang and S. Sarkar, "Handling Movement Epenthesis and Hand Segmentation Ambiguities in Continuous Sign Language Recognition using Nested Dynamic Programming," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 21, no. 3, pp. 462—477, March 2010.
- S. Nayak, K. Duncan, B. Loeding, and S. Sarkar, "Finding Recurrent Patterns from Continuous Sign Language Sentences for Automated Extraction of Signs," *Journal of Machine Learning Research*,, vol. 13, pp. 2589—2615, Sept. 2012.

5. Perceptual Organization of Images and Video

Establishing object identity by matching object models, be they in the form of templates or graphs, to images is a computationally expensive process. One way to reduce the complexity is to identify groups (subsets) of image features or image regions that most likely belong to one object. This grouping process should be a generic one and should not depend on the object identity in a strong manner. Gestalt psychologists realized the integral role of perceptual organization in the human vision system in the early 1920's. The perceptual organization process imparts robustness, efficiency, and a qualitative and holistic nature to vision. Our contributions spanning 15 years are in the formulation of (i) probabilistic Bayesian networks to organize features into highly plausible sets of higher-level geometric features; (ii) analytical modeling and empirical evaluation of graph spectra based framework to form large perceptual groups from relations defined over small number of image primitives; (iii) a learning framework, based on game theory and learning automata, to adapt the perceptual grouping process to an image domain; (iv) extension of the use of perceptual organizational principles to the domain of dynamic scene analysis, to track geometric groups and to segment moving object in a manner that is robust with respect to noise, background noise clutter, and illumination changes. **Funding Source:** Multiple National Science Foundation grants, Neilsen Media Research, USF.

- P. Soundararajan and S. Sarkar, "An In-Depth Study of Graph Partitioning Measures for Perceptual Organization," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 25, no. 6, pp. 642–660, June 2003.
- S. Sarkar, D. Majchrzak, and K. Korimilli, "Perceptual Organization based Computational Model for Robust Segmentation of Moving Objects," *Computer Vision and Image Understanding*, vol. 86, no. 3, pp. 141–170, June 2002.
- S. Sarkar and P. Soundararajan, "Supervised Learning of Large Perceptual Organization: Graph Spectral Partitioning and Learning Automata," in *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 22, no. 5, pp. 504–525, May 2000. **(> 100 Google Scholar citations)**
- S. Sarkar and K. L. Boyer, "Quantitative Measures of Change based on Feature Organization: Eigenvalues and Eigenvectors" in *Computer Vision and Image Understanding*, vol. 71, no. 1, pp. 110-136, July 1998. **(> 200 Google Scholar citations)**

Complete List of Published Work in MyBibliography:

- https://scholar.google.com/citations?user=xX2D9FQAAAAJ&hl=en&oi=ao
- http://dblp.uni-trier.de/pers/hd/s/Sarkar:Sudeep
- http://www.ncbi.nlm.nih.gov/sites/myncbi/1l5G2LRDixb5z/bibliography/48202674/public/?sort=date&direction=ascending

D. Research Support

Ongoing Research Support

National Science Foundation Dubey (PI) 9/1/2018-8/30/2021
M3X: Achieving Autonomy by Learning from Sensor-Assisted Control in a Wheelchair-Based Human-Robot Collaborative System, National Science Foundation.
The assistive context can be leveraged to build data and test of abductive reasoning to infer the user intent from sensory data.
Role: Co-PI

DoD/VA Goldgof (PI) 9/1/2016-8/30/2019
An Automated Pressure Ulcer Monitoring System to Improve Pressure Ulcer Healing Outcomes for Veterans with SCI, DoD/Veterans Administration.
This project has no overlap with current proposed project.
Role: Co-PI

An Automated Pressure Ulcer Monitoring System to Improve Pressure Ulcer Healing Outcomes for Veterans with SCI, DoD**/Veterans Administration**, 2016-2019, (Goldgof, Sarkar, Yu), $177,248

National Science Foundation Tu (PI) 9/1/2015-8/30/2019
II-New: A Research Platform for Heterogeneous, Massively Parallel Computing, National Science Foundation.
The GPU/CPU high-end computing platform constructed with this grant would be leveraged to run the developed codes.
Role: Co-PI

National Science Foundation Sanberg (PI) 4/30/2015-3/30/2020
I-Corps Site: University of South Florida: Catalyzing Research Translation, National Science Foundation
This grant for delivering the I-Corps Lean Launchpad curriculum to help student/faculty teams to translate STEM research breakthroughs into viable commercial product designs.
Role: Co-PI and Director

National Science Foundation Dubey (PI) 8/1/2012-8/31/2019
MRI: Acquisition of a CAREN Virtual Reality System for Collaborative Research in Assistive and Rehabilitation Technologies
The goal is to purchase, install, and conduct research using the state of the art virtual reality system.

Role: PI Completed Research Support (last 3 years)

National Science Foundation: I-Corps Sarkar (PI) 8/15/2016-7/31/2017
I-Corps: Semantic Video—From Video to Descriptions.
This I-Corps project involves computer vision analysis of video, using both visual and auditory cues, to create descriptions of the content. The technology has a large variety of potential applications from law enforcement to surveillance to consumer applications.
Role: PI

Lemelson Foundation Sarkar (PI) 10/1/2013-4/30/2017
Support for National Academy of Inventors Annual Meeting.
Role: PI

National Science Foundation Sarkar (PI) 9/1/2012-9/30/2016
Ontology based Perceptual Organization of Audio-Video Events using Pattern Theory
The project is about formulating a pattern theoretic framework for the analysis and deep understanding of event and activities as captured by audio & video sensors in an automated manner using computer algorithms.
Role: PI

Role: Co-PI Completed Research Support (last 3 years)

US Department of Commerce Sanberg (PI) 4/31/2015-3/31/2018
i6 Challenge Grant Tampa Bay FirstWave Venture Center Expansion
In co-operation with Tampa-Bay Wave, to expand the innovation accelerator, for a broad range of technologies. The business contacts from this project could be leveraged for the current proposal.
Role: Co-PI

Tapas K. Das
Professor and Chair, Department of Industrial and Management Systems Engineering
University of South Florida, Tampa, Florida 33620
Ph. (813) 974-5585, email: das@usf.edu

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Education

National Institute of Technology, Durgapur, India	*Mechanical Engineering*	**B.S.**	*1979*
Birla Institute of Science & Technology, Pilani, India	*Project Engineering*	**M.S.**	*1982*
University of South Florida, Tampa, FL	*Industrial Engineering*	**M.S.**	*1986*
Texas A&M University, College Station, TX	*Industrial Engineering*	**Ph.D.**	*1989*

Professional Experience

2012-	*Chair*, Department of Industrial & Management System Engineering, University of South Florida, Tampa, Florida.
2008-2010	*Associate Provost*, Policy Analysis, Planning, and Performance, University of South Florida, Tampa, Florida.
2001-	*Professor*, Department of Industrial & Management System Engineering, University of South Florida, Tampa, Florida.
1996- 2001	*Associate Professor*, Department of Industrial & Management Systems Engineering, University of South Florida, Tampa, Florida
1992-1996	Assistant Professor and Graduate Program Coordinator (‘94-‘96), Department of Industrial & Management Systems Engineering. University of South Florida, Tampa, Florida.
1989-1992	Assistant Professor, Department of Industrial Engineering, Southern Illinois University at Edwardsville.
1986-1989	Research/Teaching Assistant, Department of Industrial Engineering, Texas A&M University, College Station, Texas.
1985-1986	Teaching Assistant, Department of Industrial and Management Systems Engineering, University of South Florida, Tampa, Florida.
1979-1985	Senior Design Engineer, Development Consultants Pvt. Ltd., Calcutta, India.

Selected Products

U.S. Patents Received

• Ganesan, R., Das, T. K., Sikder, A. K., and Kumar, A. Title: Method of Identifying Defects in Chemical Mechanical Planarization. U.S. Patent # US 7,377,170, Issue Date: May 27, 2008

• Das, T. K., Ganesan, R., Sikder, A. K., and Kumar, A. “End Point Detection Strategy using Sequential Testing of Wavelet Decomposed Coefficient-of-Friction Sensor Data.” U.S. Patent # US 7,406,396, Issue Date: July 29, 2008

• Ganesan, R., Das, T. K., and Ramachandran, K. “System for multiresolution analysis assisted reinforcement learning approach to run-by-run control.” U.S. Patent # US 7,672,739, Issue Date: March 2, 2010

Publications (*Ph.D. advisee)

*Subramanian, V., and Das, T. K., 2019. A two-layer model for dynamic pricing of electricity and optimal charging of electric vehicles under price spikes. Energy 167 (2019): 1266-1277. https://doi.org/10.1016/j.energy.2018.10.171

Charkhgard, H., *Subramanian, V., Silva, W., and Das, T. K., 2018. An integer linear programming formulation for removing nodes in a network to minimize the spread of influenza virus infections. *Discrete Optimization*, Volume 30, November 2018, pages 144-167. https://doi.org/10.1016/j.disopt.2018.06.005

*Silva Sotillo W., Das, T. K., and Izurieta, R., 2017.Estimating disease burden of a potential A(H7N9) pandemic influenza outbreak in the United States. *BMC Public Health*. 2017 Nov 25;17(1):898. doi: 10.1186/s12889-017-4884-5.

*Ghalebani, A. and Das, T. K. 2017. Design of Financial Incentive Programs to Promote Net Zero Energy Buildings. *IEEE Transactions on Power Systems*, **32**, 1, 2017, DOI: 10.1109/TPWRS.2016.2531090

*Feijoo, F., *Silva Sotillo, W., and Das, T. K. 2016. A Computationally Efficient Electricity Price Forecasting Model for Real time Energy Markets. *Energy Conversion and Management 113 (2016) 27–35*. DOI:10.1016/j.enconman.2016.01.043

*Prieto, D. and Das, T. K., 2016. An operational epidemiological model for calibrating simulations of pandemic influenza outbreaks, Health Care Management Sci, Volume 19, Issue 1, pp 1–19 DOI: 10.1007/s10729-014-9273-3

*Abdollahian, M. and Das, T. K. 2015. A MDP model for breast and ovarian cancer intervention strategies for BRCA1/2 mutation carriers. *IEEE Journal of Biomedical and Health Informatics*, Vol 19, Issue 2, pp 720-727. DOI 10.1109/JBHI.2014.2319246

*Feijoo, F. and Das, T. K. 2015 Emissions control via carbon policies and microgrid generation: A bilevel model and Pareto analysis. *Energy*, Vol. 90, Part 2, pg. 1545–1555. doi:10.1016/j.energy.2015.06.110

*Rocha, P., Das, T. K., *Nanduri, V., and Botterud, A. 2015. Impact of CO_2 cap-and-trade programs on restructured power markets with generation capacity investments. *Electric Power and Energy Systems*, 71 (2015) 195-208.

Synergistic Activities

- I have been engaged since 2003 in developing and testing models and solution algorithms to guide the policy makers in instituting sustainable market rules for emissions control, green penetration, generation expansion strategies, and incentive policies to promote net zero energy buildings. Some of the above work has been partially supported by an NSF grant ECS-0400268 and a grant from the FESC (Florida Energy Systems Consortium).

- I have served as director (and PI) of a National Science Foundation funded GK-12 project directed towards training graduate (mostly doctoral) Fellows to attain skills for pedagogy, communication, leadership, and team work. The project mentored over 25 graduate (Ph.D. and M.S.) Fellows. The Fellows and PIs together developed a number of innovative summer camps titled Water Splash (2004), Space (2005), Light Photons and Beyond (2006), Interstellar Nano Adventure (2007), and Green Scientists (2008). This project also developed a number of science lessons and hands-on activities that are published in the peer reviewed website TeachEngineering.org. The project reached nearly 700 K-5 students each year with science lessons and hands on activities in elementary schools in Tampa Bay area, and increased science content knowledge for over 60 teachers each year through Saturday Mentor Teacher Seminars.

OMB No. 0925-0001 and 0925-0002 (Rev. 10/15 Approved Through 10/31/2018)

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Beckstead, Jason

eRA COMMONS USER NAME (credential, e.g., agency login): jbeckste

POSITION TITLE: Associate Professor, College of Public Health, University of South Florida

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Oklahoma	B.S.	1983	Psychology
State University of New York at Albany	Ph.D.	1990	Experimental Psychology
Rensselaer Polytechnic Institute, Troy, NY	Post-Doc	1993	Specialized in applied experimental design in psychology of lighting & human factors research

A. Personal Statement

As a quantitative methodologist, my expertise in measurement theory and data analysis. I am also an experimental psychologist with expertise in judgment and decision making. My skills will augment the content expertise held by the PI and other members of the research team. I will contribute significantly to the research design, analyses, and interpretation of the results that serve as an integral part of the proposed work.

B. Positions and Honors

Positions and Employment

1998- Associate Professor; Quantitative Methodologist, University of South Florida, Tampa, FL
2008 Grant Review Panelist: Human Dynamics Program, National Science Foundation
2012 Grant Review Panelist: Decision Risk & Management Sciences, National Science Foundation
2007- Statistical Editor, International Journal of Nursing Studies

Honors

2008 Hammond-Brunswik New Investigator Award, Brunswik Society

C. Contribution to Science

Statistics and measurement for applied researchers. Educating future generations of health science researchers to use quantitative methods is fundamental to ensuring evidence-based practice. In my role as Statistical Editor for the International Journal of Nursing Studies I have written a short series on key topics. These have been cited frequently and have been part of assigned readings in various graduate courses in health and social sciences.

a. **Beckstead, J.W.** (2009). Content validity is naught. *International Journal of Nursing Studies, 46*, 1274-1283.
b. **Beckstead, J.W.**, & Beckie, T. (2011). How much information can the metabolic syndrome provide? An application of Information Theory. *Medical Decision-Making, 31*(1), 79-92.
c. **Beckstead, J.W.** (2012). Isolating and examining sources of suppression and multicollinearity in multiple linear regression. *Multivariate Behavioral Research, 47*, 224-246.

d. **Beckstead, J.W**. (2013). On measurements and their quality: Paper 1. Reliability - history, issues and procedures. *International Journal of Nursing Studies, 50* (7), 968-973.
e. **Beckstead, J.W**. (2013). On measurements and their quality: Paper 2. Random measurement error and the power of statistical tests. *International Journal of Nursing Studies, 50* (10), 1416-1422.
f. **Beckstead, J.W**. (2014). On measurements and their quality: Paper 3. Post-hoc pooling and errors of discreteness. *International Journal of Nursing Studies, 51*, 488-494.
g. **Beckstead, J.W**. (2014). On measurements and their quality: Paper 4. Verbal anchors and the number of response options in rating scales. International Journal of Nursing Studies, 51, 807-814.

Sequential context effects in clinical judgment and decision making. Contrast and assimilation have been studied in psychophysical experiments for decades. In 2008 I was the first to show that such effects manifest in multi-attribute stimuli (e.g., patient profiles) as used in judgment analysis studies. The impact of these effects on learning strategies for online medical education tasks is currently underway with colleagues.

a. **Beckstead, J.W.** (2008). Modeling sequential context effects in judgment analysis: A time series approach. *Judgment and Decision Making, 3*(7), 570-584.
b. **Beckstead, J.W**. Boutis, K., Pecaric, M.R., & Pusic, M.V. (2013). Sequential features influence physicians' response tendencies in radiological image interpretation. *Applied Cognitive Psychology*, DOI:10.1002/acp.2941.
c. **Beckstead, J.W.** Boutis, K., Pecaric, M.R., & Pusic, M.V. (2017). Sequential dependencies in categorical judgments of radiographic images. *Advances in Health Science Education*. 22(1), 97-207 DOI 10.1007/s10459-016-9692-7.

Clinical Decision-Making. I have applied Brunswik's Lens Model to various aspects of clinical judgment and decision making.

a. **Beckstead, J.W**., & Stamp, K.D. (2007). Understanding how nurse practitioners estimate patients' risk for coronary heart disease: A judgment analysis. *Journal of Advanced Nursing, 60*(4), 436-446.
b. **Beckstead, J.W.** (2007). A note on determining the number of cues used in judgment analysis studies: The issue of type II error. *Judgment and Decision Making, 2*(5), 317-325.
c. **Beckstead, J.W**., Pezzo, M.V., Beckie, T., Shahraki, F., Kentner, A.C., and Grace, S.L. (2013). Individual differences in physician's judgments of patient benefit from cardiac rehabilitation. *Psychosomatic Medicine*, 75(3), A135.
d. **Beckstead, J.W.**, Pezzo, M.V., Beckie, T.M., Shahraki, F., Kentner, A.C., & Grace, S.L. (2014). Physicians' tacit and stated policies for determining patient benefit and referral to cardiac rehabilitation. *Medical Decision Making*, 34(1), 63-74.
e. **Beckstead, J.W**. (2017).The Bifocal Lens Model and Equation: Examining the linkage between clinical judgments and decisions. *Medical Decision Making, 37*(1), 35-45.

D. Research Support. Current, Pending, and Completed.

a. R21 NR013094-01A1., (Groer, PI) Project Period: 2012 –2014 National Institute of Nursing Research, The Association Between Pre-term Milk Immunobiology and Infant Health. Role: Co-Investigator. (10% effort)
b. R01 5DK108522-02 (Colemen, PI), Project Period: 2015-2020, NIDDK Predictors of Weight Loss Failure and Regain in Bariatric Surgery Patients. Role: Co-Investigator. (5% effort)
c. R01 HS024917-01 (Djulbegovic, PI), Project Period: 2016 - 2018, AHRQ, Evaluation of the Group Decision-making Process of Clinical Guidelines Panels Role: Co-investigator (15% effort)

STEPHEN E. STARK
Professor of Industrial-Organizational (I-O) Psychology & Quantitative Methods
Department of Psychology, University of South Florida, Tampa, FL 33620
Phone: (813) 974-8015, Email: sestark@usf.edu

a. Professional Preparation

University of New Orleans	Physics	B.S., 1991
University of Illinois, Urbana-Champaign	Psychology	M.A. 1999
University of Illinois, Urbana-Champaign	Psychology	Ph.D., 2002

b. Appointments

April 2015 – Present	Professor, Psychology, University of South Florida • I-O Psychology Area Director (August 2018 – Present) • Associate Chair (April 2013 – August 2018)
May 2008 – April 2015	Associate Professor, Psychology, University of South Florida • Graduate Program Coordinator (August 2012-13)
May 2003 – May 2008	Assistant Professor, Psychology, University of South Florida
July 2002 – May 2003	Assistant Professor, Psychology, Georgia Institute of Technology

c. Publications

(i) Five Publications Most Related to the Proposed Program

Lee, P., Joo, S.H., Stark, S., & Chernyshenko, O.S. (2018, in press). GGUM-RANK statement and person parameter estimation with multidimensional forced choice triplets. *Applied Psychological Measurement*.

Joo, S.H., Lee, P., & Stark, S. (2018). Development of information functions and information indices for the GGUM-RANK multidimensional forced choice model. *Journal of Educational Measurement, 55*, 357-372.

Stark, S., Chernyshenko, O.S., & Drasgow, F. (2017). Modern psychometric theory to support personnel assessment and selection. In J.L. Farr & N.T. Tippins (Eds.) *Handbook of Employee Selection* (pp. 931-948). NY: Routledge.

Stark, S., Martin, J., & Chernyshenko, O.S. (2016). Technology and testing: Developments in education, work, and healthcare. In F. T. L. Leong, D. Bartram, F. Cheung, K. F. Geisinger, and D. Iliescu (Eds.) *The ITC International Handbook of Testing and Assessment* (pp. 395 – 407). New York, NY: Oxford University Press.

Stark, S., Chernyshenko, O.S., Drasgow, F., & White, L.A. (2012). Adaptive testing with multidimensional pairwise preference items: Improving the efficiency of personality and other noncognitive assessments. *Organizational Research Methods, 15*, 463 – 487.

(ii) Five Other Significant Publications

Nye, C.D., Joo, S.H., Zhang, B., & Stark, S. (2019, in press). A comparison of model-data fit methods for IRT models. *Organizational Research Methods*.

Stark, S., Chernyshenko, O.S., Drasgow, F., White, L.A., Heffner, T., Nye, C.D., & Farmer, W.L. (2014). From ABLE to TAPAS: A new generation of personality tests to support military selection and classification decisions. *Military Psychology, 26*, 153 – 164.

Stark, S., Chernyshenko, O.S., Drasgow, F., & Williams, B.A. (2006). Examining Assumptions about item responding in personality assessment: Should ideal point methods be considered for scale development and scoring? *Journal of Applied Psychology, 91*, 25 – 39.

Stark, S., Chernyshenko, O.S., & Drasgow, F. (2006). Detecting DIF with CFA and IRT: Toward a unified strategy. *Journal of Applied Psychology, 91*, 1292 – 1306.

Stark, S., Chernyshenko, O.S., & Drasgow, F. (2004). Examining the effects of differential item/test functioning (DIF/DTF) on selection decisions: When are statistically significant effects practically important*?* *Journal of Applied Psychology, 89*, 497 – 508.

d. Synergistic Activities

1. Currently serving on the American Psychological Association (APA) Council of Representatives (COR), representing the Society of Industrial and Organizational Psychology (SIOP; APA div.14). This elected position carries a concurrent role on the SIOP Executive Board. In SIOP, I also serve on the Workshops Committee, which organizes sessions for continuing education sessions at annual conferences, and the External Relations Committee, which liaises with and helps to recruit members for committee and board positions in other professional societies. Prior to that, I chaired the SIOP Scientific Affairs Committee, which promotes scientific rigor in research and practice, highlights activities of SIOP members that positively impact organizations and society and assists leadership with science funding advocacy activities.

2. Currently serving on the International Test Commission (ITC) Council, recently served six years on the GRE Technical Advisory Committee, and recently served as Co-Chair for the American Educational Research Association (AERA) conference program for Div. D (Statistics).

3. Previously served on a National Research Council study panel, commissioned by the U.S. Army Research Institute Foundational Sciences Unit, which surveyed methodological and substantive issues that could profoundly impact military selection, classification, training, and performance. The committee wrote and released a 2015 book entitled, *Measuring Human Capabilities: An Agenda for Research on the Assessment of Individual and Group Performance Potential for Military Accession*.

4. Editor: *International Journal of Testing*; Editorial Boards: *Applied Psychological Measurement*, *Journal of Educational Measurement*, *Journal of Business and Psychology*, *Personnel Assessment and Decisions, European Journal of Psychological Assessment*; *International Journal of Selection and Assessment*; Ad Hoc Reviewer: *Psychometrika, Psychological Methods*, *Multivariate Behavioral Researc*h, Psychological Assessment, *Journal of Personality, Military Psychology*.

5. Currently working with the U.S. Army Research Institute (ARI) to improve high-stakes noncognitive testing methodology and examine the use of assessments, personality, in particular, for the selection of Soldiers.

Leslaw Skrzypek

Associate Professor

Department of Mathematics and Statistics

University of South Florida

PROFESSIONAL PREPARATION

• Jagiellonian University, Kraków, Poland	Mathematics	M.S.,	1998
• Jagiellonian University, Kraków, Poland	Mathematics	Ph.D.,	2001
• University of California, Riverside, CA,	Postdoctoral NATO Advanced Fellowship		2003

APPOINTMENTS

• 2014-present	Chair, Mathematics & Statistics	University of South Florida
• 2009-2014	Assoc. Chair, Mathematics & Statistics	University of South Florida
• 2010-present	Associate Professor of Mathematics	University of South Florida
• 2003-2009	Assistant Professor of Mathematics	University of South Florida
• 2001-2003	Assistant Professor of Mathematics	Jagiellonian University

PRODUCTS

Five Relevant Publications:

1. Sears, R., Hopf, F., Torres, A., Casey, W., **Skrzypek, L.** *Plan-Do-Study-Act (PSDA) Cycles and Interdisciplinary Conversations to Transform College Algebra*, Published online (2018) PRIMUS (Problems, Resources, and Issues in Mathematics Undergraduate Studies) https://doi.org/10.1080/10511970.2018.1532938

2. Deregowska, B., Foucart, S., Lewandowska, B., and **Skrzypek, L.** *On the norms and minimal properties of de la Vallée Poussin's type operators*, Monatshefte für Mathematik **185**, (2018), 601–619

3. Lewicki, G., and **Skrzypek, L.** *Minimal Projections onto Hyperplanes in* R^n, J. Approx. Theory, **202**, (2016), 42-63.

4. Shekhtman, B., and **Skrzypek, L.** *On a Characterization of Hilbert Spaces through Minimality of Orthogonal Projections and Related Topics*, J. Concr. Appl. Math., **13**, (2015), No. 3-4, 322-329.

5. Shekhtman, B., and **Skrzypek, L.** *Minimal Versus Orthogonal Projections onto Hyperplans in R^n and R^n*, Approximation Theory XIV: San Antonio, (2013), Editor: Neamtu, M., and Schumaker, L., Springer Proceedings in Mathematics.

Five Other Publications:

1. Foucart, S., and **Skrzypek, L.** *On Maximal Relative Projection Constants*, J. Math. Anal. Appl., **447**, (2017), No. 1, 309-328
2. **Skrzypek, L.** *On the L_p Norm of the Rademacher Projection and Related In-equalities*, Proc. Amer. Math. Soc., **137**, (2009), 2661-2669.
3. **Skrzypek, L.** *On the Non-Uniqueness of Minimal Projections in L_1 and Discrete Walsh Projections*, Nonlinear Anal., **71,** (2009), No. 12, e2431 – e2436.
4. Lewicki, G., and **Skrzypek, L.** *Chalmers-Metcalf Operator and Uniqueness of Minimal Projections*, Journal of Approximation Theory, **148**, (2007), 71-91.
5. Shekhtman, B., and **Skrzypek, L.** *Uniqueness of Minimal Projections onto Two-Dimensional Subspaces*, Studia Mathematica, **168**, (2005), 273-284.

SYNERGETIC ACTIVITIES:

1. Chair, Mathematics and Statistics Department, University of South Florida, 2014-current.
2. Associate Chair, Mathematics and Statistics Department, University of South Florida, 2009-2014.
3. Director of CAS Complex Data Center, Mathematics and Statistics Department, University of South Florida, 2014-current. The goal of the center is to provide an integrated, interdisciplinary, synergistic response to mathematical based computational challenges and opportunities stemming from basic research in natural science and cognitive and social sciences. One of the priorities is to attract and train graduate students to prepare them for the new challenges of the modern workforce, by combining fundamental research with industry-oriented project development.
4. Member of the Planning Team for NSF WIDER grant titled, *Transforming STEM Teaching in a Large Urban-Serving University* (Award No. 1347753, 2014-current) and member of the TILT Team for NSF STEER grant titled, *Systemic Transformation of Evidence-based Education Reform* (Award No. 1525574, 2015-current).
5. Fulbright Grant in United States (2000-2001). The Fulbright program is the Florida International Education Exchange Program sponsored by the U.S. government. It is designed to increase mutual understanding between the people of the United States and people from other countries.

SUNIL MITHAS

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1. PERSONAL INFORMATION

a. Education

- *PhD (Business Administration)*, Ross School of Business, University of Michigan, USA, 2005.
- *PGDM (equivalent to MBA)*, Management Development Institute (MDI), Gurgaon, Haryana, India, 1998.
- *Bachelor of Engineering (Honors)*, University of Roorkee (now known as Indian Institute of Technology, Roorkee), Uttarakhand, India, 1990.

b. Professional Experience

Muma College of Business, University of South Florida, USA

- World Class Scholar and Professor, Aug 2018--Present

Robert H. Smith School of Business, University of Maryland, USA (August 2005-Present; On Leave 2018-2019)

- Ralph J. Tyser Professor of Information Systems, Fall 2017-- Present
- Professor (Decision, Operations and Information Technologies), Fall 2014-- Present
- Associate Department Chair (Decision, Operations and Information Technologies), Aug 2010-Summer 2014
- Associate Professor (Decision, Operations and Information Technologies), Aug 2010-Summer 2014
- Assistant Professor (Decision, Operations and Information Technologies), Fall 2005-Summer 2010

Hong Kong University of Science and Technology (HKUST), Hong Kong

- Visiting Professor; Instructor for "Research Opportunities at Disciplinary Interfaces" class (July 2018)

Muma College of Business, University of South Florida, USA

- Visiting Professor (June-Aug 2018)

University of Mannheim, Germany

- Visiting Professor; Instructor for "IT Management in the Digital Age" class (May-June 2017)

Graduate School of Management, University of California Davis, USA

- Visiting Professor; Instructor for "Management Information Systems" class (July-August 2012)

Ross School of Business, University of Michigan, USA (Sep 2000-August 2005)

- Research and Teaching Assistant (Sep 2000-August 2005); Instructor for "Introduction to Information Systems" class for undergraduates (May 2003-June 2003)

Tata Ryerson, India (Nov 1997- August 2000) [Tata Ryerson is now Tata Steel Processing And Distribution Ltd]

- Regional Manager, North India (Dec 1999-Aug 2000); Executive Assistant to CEO (Nov 1997-Nov 1999)

Tata Steel, India (July 1990- Oct 1997)

- Assistant Manager (Jan 1994-Oct 1997, study leave from July 1996 to June 1997); Senior Officer (July 1990-Dec 1993)

c. Engagement with Professional Associations

- Association for Information Systems (AIS)
- The Institute for Operations Research and the Management Sciences (INFORMS)
- Advanced Practices Council (APC) of the Society for Information Management (SIM)
- IEEE
- Association for Computing Machinery (ACM)
- Academy of Management (AOM)
- American Marketing Association (AMA)
- Production and Operations Management Society

2. RESEARCH, AND SCHOLARLY ACTIVITIES

Research Interests

- Strategies for managing innovation and excellence for corporate transformation, focusing on the role of technology and other intangibles such as customer satisfaction, human capital, and organizational capabilities.

a. Books

Books authored

- Mithas, S. Digital Intelligence: What Every Smart Manager Must Have for Success in an Information Age, (Amazon.com url link http://amzn.com/B01AJBDOPW) Finerplanet, North Potomac, MD, 2016 (revised edition)
    - [This book is adapted, and published for the Indian Subcontinent in 2016 with a Foreword by F. Warren McFarlan, here is a link to the Indian edition: Mithas, S. 2016. Digital Intelligence: What Every Smart Manager Must Have for Success in an Information Age *(ISBN: 978-0670089079)*. New Delhi: Penguin Random House India]

- Mithas, S. *Dancing Elephants and Leaping Jaguars: How to Excel, Innovate, and Transform Your Organization the Tata Way* Finerplanet, North Potomac, 2014
    - [This book is adapted, retitled and published for the Indian Subcontinent in 2015 with a Foreword by Mr Ratan N. Tata, here is a link to the Indian edition: Mithas, S. 2015. *Making the Elephant Dance: The Tata Way to Innovate, Transform and Globalize (available at* http://www.amazon.in/dp/0670088285*)*. New Delhi: Penguin Portfolio]

Refereed Chapter (s) in Books

- Mithas, S., and Lucas, H.C. "Information Technology and Firm Value: Productivity Paradox, Profitability Paradox and New Frontiers," in: *Information Systems and Information Technology Volume 2* (Computing Handbook Set, Third Edition), H. Topi and Allen Tucker (eds). Boca Raton: Taylor and Francis, 2014
- Mithas, S., Almirall, D., and Krishnan, M.S. "A potential outcomes approach to assess causality in information systems research," in: *Economics, Information Systems and Electronic Commerce Research II: Advanced Empirical Methodologies,* R.J. Kauffman and P.P. Tallon (eds.), ME Sharpe, Armonk, New York, 2009, pp. 63-85

b. Articles in Research Journals

1. Kude, T., Mithas, S., Schmidt, C. T., and Heinzl, A. 2019. "How Pair Programming Influences Team Performance: The Role of Backup Behavior, Shared Mental Models, and Task Novelty," *Information Systems Research* (Forthcoming)

2. Park, Y., and Mithas, S. 2019. "Organized Complexity of Digital Business Strategy: A Configurational Perspective," *MIS Quarterly* (Forthcoming)
3. Whitaker, J., Mithas, S., and Liu, C.-W. 2019. "Beauty is in the Eye of the Beholder: Toward a Contextual Understanding of Compensation for IT Professionals Within and Across Geographies," *Information Systems Research* (Forthcoming)
4. Sharma, P. N., Morgeson, F., Mithas, S., and Aljazzaf, S. 2018. "An Empirical and Comparative Analysis of E-Government Performance Measurement Models: Model Selection via Explanation, Prediction, and Parsimony," *Government Information Quarterly* (35:4), pp. 515-535
5. Foerderer, J., Kude, T., Mithas, S., and Heinzl, A. 2018. "Does Platform Owner's Entry Crowd Out Innovation? Evidence from Google Photos," *Information Systems Research* (29:2)), pp. 444-460
6. Khuntia, J., Saldanha, T., Mithas, S., and Sambamurthy, V. 2018. "Information Technology and Sustainability: Evidence from an Emerging Economy," *Production and Operations Management* (27:4), pp. 756-773
7. Huang, P., Tafti, A., and Mithas, S. 2018. "The secret to successful knowledge seeding," *MIT Sloan Management Review* (59:3), pp. 10-13, https://sloanreview.mit.edu/article/the-secret-to-successful-knowledge-seeding/
8. Huang, P., Tafti, A., and Mithas, S. 2018. "Platform Sponsor's Investments and User Contributions in Knowledge Communities: The Role of Knowledge Seeding," *MIS Quarterly* (42:1), pp. 213-240
9. Ravichandran, T., Han, S., and Mithas, S. 2017. "Mitigating Diminishing Returns to R&D: The Role of Information Technology in Innovation," *Information Systems Research* (18:4), pp. 812-827
10. Khuntia, J., Mithas, S., and Agarwal, R. 2017. "How Service Offerings and Operational Maturity Influence the Viability of Health Information Exchanges," *Production and Operations Management* (26:11), pp. 1989-2005
11. Kim, K., Mithas, S., and Kimbrough, M. 2017. "Information Technology Investments, and Firm Risk Across Industries: Evidence from the Bond Market " *MIS Quarterly* (41:4), pp. 1347-1367
12. Mithas, S., Whitaker, J. W., and Tafti, A. R. 2017. "Information Technology, Revenues and Profits: Exploring the Role of Foreign and Domestic Operations," *Information Systems Research* (28:2), pp. 430-444
13. Hult, G.T.M., Morgan, N., Morgeson, F.V., Mithas, S., and Fornell, C. 2017. "Do managers know what their customers think of their firms' products and services and why?" *Journal of Academy of Marketing Science* (45:1), pp. 37-54
14. Saldanha, T., Mithas, S., and Krishnan, M. S. 2017. "Leveraging Customer Involvement for Fueling Innovation: The Role of Relational and Analytical Information Processing Capabilities," *MIS Quarterly* (41:1), pp. 267-286
15. Mithas, S., Krishnan, M. S., and Fornell, C. 2016. "Information Technology, Customer Satisfaction, and Profit: Theory and Evidence," *Information Systems Research* (27:1), pp. 166-181
16. Mithas, S., and Rust, R. T. 2016. "How Information Technology Strategy and Investments Influence Firm Performance: Conjectures and Empirical Evidence," *MIS Quarterly* (40:1), pp. 223-245
17. Lariviere, B., Keiningham, T. L., Aksoy, L., Yalcin, A., Morgeson, F. V., and Mithas, S. 2016. "Modeling Heterogeneity in the Satisfaction, Loyalty Intention and Shareholder Value Linkage: A Cross-Industry Analysis at the Customer and Firm Level," *Journal of Marketing Research* (53:1), pp. 91-109
18. Kim, K., Mithas, S., Whitaker, J., and Roy, P.K. "Industry-specific human capital and wages: Evidence from the business process outsourcing industry" *Information Systems Research* (25:3) 2014, pp 618-638.
19. Sharma, R., Mithas, S., and Kankanhalli, A. "Transforming decision-making processes: A research agenda for understanding the impact of business analytics on organisations," *European Journal of Information Systems* (23:4) 2014, pp 433-441
20. Gillon, K., Aral, S., Lin, C.-Y., Mithas, S., and Zozulia, M. "Business Analytics: Radical Shift or Incremental Change?, Available at: http://aisel.aisnet.org/cais/vol34/iss1/13," *Communications of the Association for Information Systems* (34) 2014, pp 287-296

21. Han, K., and Mithas, S. "The Real Savings From IT Outsourcing, available at http://sloanreview.mit.edu/article/the-real-savings-from-it-outsourcing/," *MIT Sloan Management Review* (55:2) 2014, p 16

22. Mithas, S., Tafti, A.R., and Mitchell, W. "How a Firm's Competitive Environment and Digital Strategic Posture Influence Digital Business Strategy," *MIS Quarterly* (37:2) 2013, pp 511-536

23. Han, K., and Mithas, S. "Information technology outsourcing and non-IT operating costs: An empirical investigation," *MIS Quarterly* (37:1) 2013, pp. 315-331

24. Tafti, A., Mithas, S., and Krishnan, M.S. "The Importance of IT-Enabled Flexibility in Alliances, http://sloanreview.mit.edu/x/54312," *MIT Sloan Management Review* (54:3) 2013, pp 13-14

25. Tafti, A., Mithas, S., and Krishnan, M.S. "The Effect of Information Technology Enabled Flexibility on Formation and Market Value of Alliances," *Management Science* (59:1) 2013, pp. 207-225

26. Mithas, S., Tafti, A.R., Bardhan, I.R., and *Goh, J.M.* "The impact of IT Investments on Profits, available at http://sloanreview.mit.edu/x/53302," *MIT Sloan Management Review* (53:3) 2012, p 15

27. Mithas, S., Tafti, A.R., Bardhan, I.R., and *Goh, J.M.* "Information Technology and Firm Profitability: Mechanisms and Empirical Evidence," *MIS Quarterly* (36:1) 2012, pp. 205-224 [**Winner of the CIONET European Research Paper of the Year 2013 Award given by CIONET, an organization of about 4000 CIOs in Europe**]

28. Morgeson, F.V., Van Amburg, D., and Mithas, S. "Misplaced Trust? Exploring the Structure of the E-Government-Citizen Trust Relationship," *Journal of Public Administration Research and Theory* (21:2) 2011, pp 257-283

29. Morgeson, F.V., Mithas, S., Keiningham, T.L., and Aksoy, L. "An Investigation of the Cross-National Determinants of Customer Satisfaction," *Journal of the Academy of Marketing Science* (39:2) 2011, pp 198-215

30. Mithas, S., Ramasubbu, N., and Sambamurthy, V. "How Information Management Capability Influences Firm Performance," *MIS Quarterly* (35:1) 2011, pp 237-256

31. Whitaker, J., Mithas, S., and Krishnan, M.S. "Organizational learning and capabilities for onshore and offshore business process outsourcing," *Journal of Management Information Systems* (27:3) 2011, pp 11-42 (Appeared as a lead research article)

32. Mithas, S., and Lucas, H.C. "Are Foreign IT Workers Cheaper? U.S. Visa Policies and Compensation of Information Technology Professionals," *Management Science* (56:5) 2010, pp 745-765.

33. Fornell, C., Mithas, S., and Morgeson, F.V. "The Economic and Statistical Significance of Stock Returns on Customer Satisfaction," *Marketing Science* (28:5) 2009, pp 820-825.

34. Morgeson, F.V., and Mithas, S. "Does E-Government Measure up to E-Business? Comparing End-User Perceptions of U.S. Federal Government and E-Business Websites," *Public Administration Review* (69:4) 2009, pp 740-752

35. Mithas, S., and Krishnan, M.S. "From association to causation via a potential outcomes approach," *Information Systems Research* (20:2) 2009, pp 295-313

36. Fornell, C., Mithas, S., and Morgeson, F.V. "The statistical significance of portfolio returns," *International Journal of Research in Marketing* (26:2) 2009, pp 162-163 [Invited and reviewed by the editor]

37. Mithas, S., Jones, J.L. and Mitchell, W. "Buyer intention to use Internet-enabled reverse auctions: The role of asset specificity, product specialization, and non-contractibility," *MIS Quarterly* (32:4) 2008, pp 705-724

38. Ramasubbu, N., Mithas, S., Krishnan, M.S., and Kemerer, C.F. "Work Dispersion, Process-Based Learning and Offshore Software Development Performance," *MIS Quarterly* (32:2) 2008, pp. 437-458

39. Mithas, S., and Krishnan, M.S. "Human Capital and Institutional Effects in the Compensation of Information Technology Professionals in the United States," *Management Science*, (54:3) 2008, pp. 415-428

40. Ramasubbu, N., Mithas, S., and Krishnan, M.S. "High-tech, High-touch: The Effect of Employee Skills and Customer Heterogeneity on Customer Satisfaction with Enterprise System Support Services" *Decision Support Systems* (44:2) 2008, pp. 509-523
41. Bardhan, I.R., Mithas, S. and Lin, S. "Performance Impacts of Strategy, Information Technology Applications, and Business Process Outsourcing in US Manufacturing Plants," *Production and Operations Management* (16:6) 2007, pp. 747-762
42. Whitaker, J., Mithas, S., and Krishnan, M.S. "A Field Study of RFID Deployment and Return Expectations," *Production and Operations Management* (16:5) 2007, pp. 599-612
43. Mithas, S. and Whitaker, J. "Is the World Flat or Spiky? Information Intensity, Skills, and Global Service Disaggregation," *Information Systems Research* (18:3) 2007, pp. 237-259 [**Runner up for the "Information Systems Society and ISR Best published paper award for 2007"**; Best paper award for "Research on an International Subject" 2008 by the Robert H. Smith School of Business at University of Maryland CIBER/Business and International Education for the papers published in a refereed journal during 2005-2007; Also profiled in MIT Sloan Management Review: Wagner, D. 2006. "Success factors in outsourcing service jobs: Which jobs are good candidates for global disaggregation? available at http://sloanreview.mit.edu/article/success-factors-in-outsourcing-service-jobs/," *MIT Sloan Management Review* (48:1), p.]
44. Mithas, S. and Jones, J.L. "Do Auction Parameters Affect Buyer Surplus in E-Auctions for Procurement?" *Production and Operations Management* (16:4) 2007, pp. 455-470
45. Tafti, A., Mithas, S. and Krishnan, M.S. "Information technology and the autonomy-control duality: Toward a theory," *Information Technology and Management* (8:2) 2007, pp. 147-167
46. Mithas, S., Ramasubbu, N., Krishnan, M.S. and Fornell, C. "Designing Websites for Customer Loyalty across Business Domains: A Multilevel Analysis," *Journal of Management Information Systems* (23:3) 2006-07, pp 97-127
47. Bardhan, I.R., Whitaker, J. and Mithas, S. "Information Technology, Production Process Outsourcing and Manufacturing Plant Performance," *Journal of Management Information Systems* (23:2) 2006, pp 13-40
48. Mithas, S., Almirall, D. and Krishnan, M.S. "Do CRM Systems Cause One-to-one Marketing Effectiveness?" *Statistical Science* (21:2) 2006, pp 223-233
49. Fornell, C., Mithas, S., Morgeson, F.V. and Krishnan, M.S. "Customer Satisfaction and Stock Prices: High Returns, Low Risk," *Journal of Marketing* (70:1) 2006, pp 3-14
50. Mithas, S., Krishnan, M.S. and Fornell, C. "Why Do Customer Relationship Management Applications Affect Customer Satisfaction?" *Journal of Marketing* (69:4) 2005, pp 201-209.

3. TEACHING, MENTORING AND ADVISING

a. Course (s)

(i) PhD Course (s)

- Research Methods (University of Maryland)
- Current Research in Information Systems (University of Maryland)
- Opportunities for Research at the Disciplinary Interfaces (HKUST)
- Behavioral Research Methods (USF)

(ii) MBA/ Online MBA Course (s)

- Strategic and Transformational Information Technology (MBA Core/Selective Course, University of Maryland)
- IT and Organizational Transformation (MBA Elective Course, University of Maryland)
- Management Information Systems (UC Davis)
- Social Media and Web 2.0 (MBA Elective Course, University of Maryland)
- Competitive Advantage Through an India Strategy (MBA Elective Course, University of Maryland)
- Crafting India and China Strategies for Competitive Advantage (MBA Elective Course, University of Maryland)

- Faculty Advisor for CIBER Consulting Project in India (Fall 2013)

4. SERVICE

a. Professional Activities

(i) Conference Chair/ Track Chair/ Program Committee Member

- Founded and co-chaired Digital Innovations, Transformation, and Society Conference 2018 (DIGITS 2018) at the India Habitat Center in New Delhi on January 13-14, 2018, co-organized by the University of Maryland and Birla Institute of Management Technology (Bimtech). The conference received enthusiastic support of leading academic scholars from around the world, and was co-sponsored by Heinz School at the Carnegie Mellon University, University of Arkansas, University of Colorado at Denver, and IIT Delhi.
- Program Committee member for INFORMS Conference on Information Systems and Technology (CIST) 2017, Houston.
- Program Committee member for INFORMS Conference on Information Systems and Technology (CIST) 2016, Nashville.
- Program Committee member for INFORMS Conference on Information Systems and Technology (CIST) 2015, Philadelphia.
- Member of the All Academy Theme Committee for the 2014 Annual Academy of Management (AOM) Meeting (The Power of Words), Philadelphia.
- Program Committee member for INFORMS Conference on Information Systems and Technology (CIST) 2013, Minnesota.
- Organized IT Teaching Workshop at the Smith School at the University of Maryland (with Peng Huang, Hank Lucas and Ritu Agarwal), May 2013
- Track Co-Chair for "E-business and Competitive Strategy" for International Conference on Information Systems (ICIS) 2012, Orlando, Florida.
- Track Co-Chair for "IT Services and Sourcing" for AMCIS 2011, Detroit, MI.
- Program Committee member for 13th INFORMS Conference on Information Systems and Technology (CIST) 2008, Washington, DC.
- Program Committee member for Workshop on Information Systems Economics (WISE) 2007, Montreal, Canada
- Program Committee member for 11th INFORMS Conference on Information Systems and Technology (CIST) 2006, Pittsburgh
- Program Committee member for 10th INFORMS Conference on Information Systems and Technology (CIST) 2005, San Francisco

Appendix F – Survey

Results of a Spring 2019 survey of 47 students enrolled in USF's M.S. in Business Analytics and Information Systems program that resulted in 24 of the surveyed students indicating a strong interest in pursuing a Ph.D. program in Informatics and Big Data Analytics, if it was offered.

PHD in Big Data Analytics

From a commercial point of view, this program looks very promising and appealing. Though I am uninterested in doing a phD program as of now, I would take up this course whole-heartedly should I consider doing one in future.

Such is the diversity of the course that it covers psychology, ethics, mathematics and computer science and it stands a very good chance at being accepted by a wide variety of students if introduced.

[redacted]

This is an interesting Course. I would have wanted to be a part of such a program if I wished to pursue my Ph.d.

The curriculum is extensive. The range of courses covered is phenomenal. The intake on the number of students should be increased from 3; 4.

1. I would definitely be interested in this program because it is spread across various disciplines, and also because the program has been specially designed for students who have a masters in BAIS. Also, I find exciting the fact that the program can be completed in 3 years.

Definitely interesting program; particularly because it an interdisciplinary program.

Focus on interesting coursework, definitely makes it attractive.

[redacted]

Yes, if the program is like this I might go ahead for PHD I like the course structure. But, still I am not sure about my future plans.

The Program is really interesting, and promising. Some courses does seem heavy on the look, but if properly chosen, the candidate might work through them

It is really good that it interdisciplinary and the candidates are getting to learn courses like ethics, psychology and human behaviour. It will make the decision making ability more apt.

After gaining some more industry knowledge and experience if would be requiring to obtain a Phd, this type of course is really considerable

Yes, I would take this program.

Comment :- The program is diversified across all the sections of Data Science. It should be tagged as Data Science instead of Big data Analtics.

-> Yes, I would definitely like to enroll for this course as it is highly interdisciplinary which interests me the most.

-> while it be offered to the working professionals or someone who works in the industry already and would like to do a phd to be more knowledgable and climb up the ladder in industry.

Big Data Analytics

- i) If program is like this, I would love to be part of it.

ii) most interesting part of course is variety of courses available & some of the out of the box courses like ethical use of data.

iii) As it is designed as per industry focus, it also adds up value to it.

iv) one suggestion, if someone wants to focus on particular area, that should be made available, like one small specialization for ex. nano degree program from Udacity.

Q Is the course / program interesting?
A Definitely, yes!

Q. Would I enroll in it?
A Yes

Q Why would someone be interested in such program?
A. Since we are living in a competitive world, it is expected from a candidate to know everything. Sometimes industry takes this a little literally. So, the program being focused on industry gives a good exposure to the candidate in different & distinct disciplines. This would fit the proverb: Jack of all, Master of none. And that's what industry looks for in a potential candidate.

YES, I WILL BE INTERESTED IN SUCH A PhD PROGRAMME.

Things which work well :

1) Industry focused courses – changing the way people link PhD candidates to academia

2) Large-scale Big Data project with industry – gives hands-on exposure to real-life business problems & identify how to approach such a problem

Things I would love to have :

1) A little more focus on publishing content in right journals (like a course or some resources imbibed in the programme)

I'm interested in the program. I want to learn more about the technical side of data science field and this program does focus on programming and statistics. Another good thing is that the program only take 3-4 years to complete and it is built on the industry's needs. I think a student graduated from this program will have wonderful job opportunities from many big companies.

Yes, I will be interested in pursuing this program due to its unique focus on industry and research. This would be useful if someone is not pursuing a career path in academia. Interesting blend of courses from computer science, psychology and AI might place this program at the cutting edge.

Feedback:

— Would the program require a US-based masters education and could it be a combined 5-year program for new students also?

A PhD in Big Data Analytics is interesting!

The advantage that this program has is the multi-displanary approach. However, the industry focus of this program could distract the students from seeking the deep understanding of one field.

The name of the program could also change in future to consider emerging area rather than "big data".

I would apply to this program as long as it could provide the research aspects of data science.

→ I only wish I had enough time in life to take up this program. It looks very interesting & helpful

Also, NO! Please do not let students transfer their credits (I mean MS credits) if they have already taken a course from a particular bucket.
Let them take another course for that bucket (as prof. Balaji mentioned). That'd be more helpful.

I would be interested in joining a Phd program in Big data analytics. ~~However~~ ~~Introduce~~ I really liked the thought of making few courses in mathematics & statistics mandatory. ~~with~~ which ~~one~~ ~~can~~ really becom

YASMEET
SINGH

I would be very much interested in this programme. The reason being it is an industry-focused course with the person getting to learn from varying departments such as College of Business and College of Public Health. It also given on a balanced although thorough approach towards Big Data and its ethics.

Yes, I am interested.

The curriculum concentrates more on machine learning, deep learning part but less on Big data architecture or big data systems. why?

* Courses like cloud architecture, AWS, are very helpful for the people who work towards industries. So if these can be a part of main curriculum, it may fulfil. ~~the~~ (this is just my opinion).

*> If this course is aligned more towards industry, then students will prefer to do masters only rather than going for P.hd.
Although it is true that this program has great courses and will help in becoming a data scientist / research work.

* my suggestion for this program is to tie up with certain organizations in industry and make sure that in last year, students should go work with the company and develop something useful and of value for them.

* Yes if given a chance, i would join this program in real future.

The best part of this program is it has combination of ethics, cognitive biases and causality along with big data analytics. I am currently working on Neuromarketing that is related to cognitive biases; so may think of joining this program later.

Suggestion:- HCI can be added as a course in this and some basics of Psychology in cognitive biases can also be added.

There can also be an addition of discussion forum with eminent people of various industries to understand real-world problems.

At a first glance the course appears to be highly industry Oriented and on that note I strongly recommend to include courses on Computer Vision, Text Analytics courses. because dealing with unstructured data especially in the areas like Vision and text data is highly demanding skill these days. I ~~would~~ will strongly consider to take this course and highly recommend my colleagues who have great Math, Algo and Programming skills.

I would love to go for it, this is one of the areas which I wanted to pursue after I graduate from BAIS program. The curriculum seems to be well-planned plugging in the main aspects of every field which can impact this field.

[redacted]

These should be some changes in course curriculum. As this course is offered to variety of ~~course~~ students pursuing different master's degree.

This course seems to be centered for the students who ~~are~~ have ~~some~~ prior knowledge of data science.

Else the course is well-structured & the courses provided are great.

If this course is provided then I will take admission in it.

Yes, I'm Intrested in.

It seems a really good programm. However, one of my main concens is abaut how students in Big data Analytics program can compete with other students in other departments Such as [redacted] Computer Science or Industrial Engineering :(Specially in the job Market)

→ The program Involves ~~lot~~ & and happened to have most Ondemand & updated and Industrial ~~fore~~ thought. only few Industries started using ~~these~~ few of the deep learning & Advanced Courses

→ Coursework looks good.

→ ~~If~~ As there is mechanical & Industrial desipline as well, Can do this The Course Can ~~also use~~ I add "Internet of things": Analytics, Computer Vision in the deep learning.

→ Implementation & Connection ~~with~~ of these Alogo's & models to Hardware outputs. ~~AI~~ So that AI Can be enabled & used at its best with ML & CV Algo's.

The Program course structure is interesting as it covers most of the data Science concepts. My suggestion would be move the courses which were taken in BAIS to move into electives and add other courses in place of that so that students might have the opportunity to select course from wide area.

eg As Big Data is already covered in Hadoop, people would leave it aside and tend to choose other options in Databases/Big Data. If we replace Big Data with other courses which has Datawarehousing Concepts or any other courses which is not covered in BAIS.

May be if the course has Computer vision and more computer Science background courses, it would be helpful in entering the industry as this PHD course is not focused on teaching positions.

The program is good.
It can have few more courses that are inclined towards Data Science like Text mining and all.
Also, a programming course in Python / R could be of great benefit to students.

Name – Varsha S

This program is a complete package for a Data Scientist. ~~It~~ ~~was~~ Range of courses listed in this program will cover all corners of Machine Learning, Deep Learning & Data Science program.

– Thanks

Prof,

The program for the P.hd is well constructed. Since its a personal question, and given the fact that I have pursued my ~~Master~~ Bachelor's in Mathematics and Computing. I would like to know that going forward will there still be a requirement to pursue the same courses as I already have Much of the same courses already under my Bachelors Degree.

P.S. I am yet not sure of the P.hd program.

This program seems tempting, as it inculcates all the angles required for a person to shine in the industry. However since the risk involved is high, more detailed explanation of how the scenario when the final project is not upto the level, how will that be treated & since it involves many years of efforts, and people wouldn't want it to go in vain.

Program -

Looks promising for students who want to pursue higher education.

I personally wont go for it since I am not looking to go for higher education.

Comment.

If a person is undergraduate in Computer Science and Graduate in BAIS, will he be waived off the courses from both the degrees or just the Graduate degree courses.

Computer Science - subjects like Data Structures, Graph Theory, Design & Analysis of Algorithms, etc.

Vigneshwar Sripad
U92726121

If I do not having a coding background and the course seems to be demanding knowledge on coding/algorithms.

I would opt not to pursue this Ph.D program as I believe I am not suited for it.

I believe that the program is well-balanced in terms of the learning aspects, so I wouldn't be recommending any changes to the program.

It is evident that a lot of thought went into designing this course as a combination of statistics, computer science and MIS courses are included. It would be great to see a few business management courses like ~~Risk~~ Project management and Business operations are covered too as the end goal would be to be industry-ready for the PhD ~~grads~~ doctorates.

POONAM

I found the course structure very interesting. Any one with analytics background who wants to go deep in their field, this can be a very good option.

Although, I ~~may~~ am interested but due to some reasons, cannot go for PhD But I have some of my acquaintance who would be very much interested in and would be ~~happy~~ more than happy to hear about this course & may also enrol.

Questions:
Is it available Part Time?

- Currently i dont have any plans for PhD.

- Little focus on cloud technology would help.
- overall program looks good to me.

I will be more interested if it is more related to phd in Data Science or Machine learning.

It will be really great if this program should prepare student for academic field rather industry because after getting it done the person should consider hom/her self for Spreading knowledge.

I like the course structure. It covers everything like maths, statistics, computer science, algorithms and big data. Also I think it's great to have a PhD program with industry in focus. As the Demand for Data Science is increasing it's dog by dog its great to have people with skills in all aspects of data science.

1) Yes, the coursework seems good

2) Could add a course on data-cleaning → to make it more industrial ~~spe~~ ready.

3). Could add an elective per say. (domain-specific).

a) Healthcare analytics or Healthcare ~~Ifo~~ Info-Systems.

b). Credit Union or Banking specific course work etc.

↳ This might help in making the course better for industrial acceptance.

In my experience and knowledge over the MS in BAIS, considering the history of the people who have graduated its seems that people by and large have a considerable amount of work experience. When they come in, they want to graduate soon as they want to get back to the industry as soon as possible. So a PHD program somewhat with a similar track that too focused more on Industry wouldn't be much of a choice for any, In my opinion. And Personally I wouldn't.

THE PROGRAM LOOKS VERY INTERESTING
But I MAY NOT TAKE THIS
BECAUSE I ~~do~~ am not someone who
would go for P.HD. But yes as it
Covers a lot of different and popular
technologies & concepts It definitely is
interesting. I like the coursework. ☺

My expectation from PHD, right now are below.

1. Statistic

2. Machine learning / Data science

3. Data

4. AI

We have course for above topic but we have limitation to the extent.

If I want dive deep in data science or Data mining concept we dont have a next level courses.

I would like more specific topic driven courses.

Currently I am not intersest in the PH.D course But I might be intersest in future.

Thank you

1) Program curriculum is very good for the students moving in the field of Data Science. Also It contains the core subject which are not done by the student who are not from the computer Science background.

2) How can the student can Enroll for this course which are graduate in Dec 2019 should also be mentioned in it.

3) Courses which are related to cloud computing should also be part of the curriculum.

The introduction about the upcoming PhD. program was good. The program has courses from different ~~parts~~ branches of Computer Science focusing well on the data side. The concentration has good range of courses right- from Big data and Data bases to Machine learning and Data Mining. Moreover, the 3 new courses on casuality & security and ethics are very beneficial & essential in today's context.
So, it is definately a good program.

I feel the program is great. I would think twice while joining this course, as this is an inter-dicyplenary course and the chance to go towards teaching or research field after this is very thin. This would have been more interesting, if there are courses that are concerned about future technology as the industry requirement always changes and who knows waiting for 3-5 years to get into industry would keep their requirements the same.

PhD in Big Data Analytics

This phD program seems very interesting and challenging. The inter-disciplinary nature of this program is the most-interesting & unique opportunity. But at the same time, it might be quite challenging. I think the selection process for selecting candidates should be more than just the GRE scores and their previous background.

Also, if there is an option given to the enrolled students to choose a domain specialization like applying analytics health sciences, biology, e-commerce, engineering areas like electrical, mechanical. etc, it would be great. This way the student can pursue his final independent-research in the area of interest.

- This is an excellent interdisciplinary PhD proposal for students who wanted to serve industry.
- It might be very difficult to find suitable students who can really tackle versitility of this program.
- Interdisciplinary nature of this program can be strength as well as weakness of this program.
- There is a possibility that industry can have much higher weight on this program that they are suppose to exert in academia. That does not necessarily means it is a bad thing.
- I think 3 years are not enought for the student unless they already have a very high competence level.
- I might not take such a program as I have a very academic bend of mind.

Pros:

1. Industry focus. Much more interesting path for me personally.
2. Flexibility of the program due to electives.
3. Relatively short-term. 5 years (typically) is way more than I expect.
4. Robust mathematical fundamentals.

Cons:

1. Though minimal but still significant "research" part. Though I realize it is a compromise and a "must have" for a Phd program.
2. As usual special purpose vs general purpose dilemma. It may be not clear what roles such program is optimized for.

Agenda Item: III.c.

USF Board of Trustees
June 6, 2019

Issue: B.S. Supply Chain Management – CIP 52.0203

Proposed action: Approval

Executive Summary:

The proposed Bachelor of Science in Supply Chain Management (B.S./SCM) is a 120-credit hour undergraduate program that aims to equip students with the knowledge and skills needed to pursue careers in the supply chain industry. Supply chain management is a business function that ensures the efficient and effective management of the flow of goods, services, and finances among firms to transform raw materials to finished products along with managing reverse flows (e.g., defective or damaged products, product returns, end-of-life disposal) in a sustainable manner.

The proposed B.S./SCM is a direct response to the need for new talent to support Florida's growing supply chain industry. The development of a supply chain management talent pool is highlighted as a core need for workforce development in the Florida Trade & Logistics Study 2.0 (Florida Chamber, 2013) that sets forth the vision for positioning Florida as a global trade hub to support statewide economic development.

The introduction of a bachelor's degree in supply chain management at the University of South Florida arises from the request by members of the business advisory board of USF's Center for Supply Chain Management & Sustainability (CSCMS). Currently, USF offers a 12-credit hour undergraduate concentration in Supply Chain Management (SCM) for students enrolled in the B.S./Marketing degree program. Since its introduction in 2014, USF has awarded 99 B.S./Marketing degrees with the SCM concentration.

While employers are pleased with the skills of students who have earned the SCM concentration, advisory board members strongly expressed the need to have a program with greater breadth and depth than can be provided in a 12-hour concentration. A working group of volunteers drawn from the CSCMS advisory board collaborated with supply chain management faculty to develop the B.S./SCM curriculum with a focus on global supply chain management. The current undergraduate concentration in Supply Chain Management will be discontinued when the B.S./SCM is introduced.

Financial Impact:

No new faculty lines are requested because this new degree program will transition from an existing undergraduate concentration in Supply Chain Management in the Marketing program to a degree program in Supply Chain Management within the Department of Marketing. The faculty salaries will be reallocated from the concentration to the new degree program.

Strategic Goal(s) Item Supports:

- USF Tampa Strategic Plan Goal 1: Student Success

BOT Committee Review Date: ACE May 14, 2019
Supporting Documentation Online (*please circle*): **Yes** **No**
USF System or Institution specific: USF
Prepared by: Donna Davis, Ph.D., Professor, Chair, Department of Marketing

Board of Governors, State University System of Florida

Request to Offer a New Degree Program

(Please do not revise this proposal format without prior approval from Board staff)

University of South Florida, Tampa	**Fall 2019**
University Submitting Proposal	**Proposed Implementation Term**
Muma College of Business	**Marketing**
Name of College(s) or School(s)	**Name of Department(s)/ Division(s)**
Supply Chain Management	**Bachelor of Science in Supply Chain Management**
Academic Specialty or Field	**Complete Name of Degree**
52.0203	
Proposed CIP Code	

The submission of this proposal constitutes a commitment by the university that, if the proposal is approved, the necessary financial resources and the criteria for establishing new programs have been met prior to the initiation of the program.

Date Approved by the University Board of Trustees		**President**		**Date**
Signature of Chair, Board of Trustees	**Date**	**Vice President for Academic Affairs**		**Date**

Provide headcount (HC) and full-time equivalent (FTE) student estimates of majors for Years 1 through 5. HC and FTE estimates should be identical to those in Table 1 in Appendix A. Indicate the program costs for the first and the fifth years of implementation as shown in the appropriate columns in Table 2 in Appendix A. Calculate an Educational and General (E&G) cost per FTE for Years 1 and 5 (Total E&G divided by FTE).

Implementation Timeframe	Projected Enrollment (From Table 1)		Projected Program Costs (From Table 2)				
	HC	FTE	E&G Cost per FTE	E&G Funds	Contract & Grants Funds	Auxiliary Funds	Total Cost
Year 1	60	60	$6,495	$389,673			$389,673
Year 2	80	80					
Year 3	100	100					
Year 4	125	125					
Year 5	150	150	$2,812	$421,795			$421,795

Note: This outline and the questions pertaining to each section must be reproduced within the body of the proposal to ensure that all sections have been satisfactorily addressed. Tables 1 through 4 are to be included as Appendix A and not reproduced within the body of the proposals because this often causes errors in the automatic calculations.

INTRODUCTION

I. Program Description and Relationship to System-Level Goals

A. Briefly describe within a few paragraphs the degree program under consideration, including (a) level; (b) emphases, including majors, concentrations, tracks, or specializations; (c) total number of credit hours; and (d) overall purpose, including examples of employment or education opportunities that may be available to program graduates.

The proposed Bachelor of Science in Supply Chain Management (B.S./SCM) is a 120 credit hour undergraduate program. The USF B.S./SCM aims to equip students with the knowledge and skills needed to pursue careers in the supply chain industry. Supply chain management is a business function that ensures the efficient and effective management of the flow of goods, services, and finances among firms to transform raw materials to finished products along with managing reverse flows (e.g., defective or damaged products, product returns, end-of-life disposal) in a sustainable manner.

The development of a supply chain management talent pool is highlighted as a core need for workforce development in the *Florida Trade & Logistics Study 2.0* (Florida Chamber, 2013) that sets forth the vision for positioning Florida as a global trade hub to support statewide economic development. The proposed B.S./SCM is a direct response to the need for new talent to support Florida's growing supply chain industry. The Florida Department of Economic Opportunity reports that the Trade and Transportation sector accounts for over 1.7 million jobs in Florida. This number is expected to grow by nearly 125,000 jobs from 2018 to 2026, an increase of 7.5%.

The introduction of a bachelor's degree in supply chain management arises from the request by members of the business advisory board of USF's Center for Supply Chain Management & Sustainability (CSCMS). Currently, the University of South Florida (USF) offers a 12 credit hour undergraduate concentration in supply chain management for students enrolled in the B.S./Marketing degree program. Since its introduction in 2014, USF has awarded 99 B.S./Marketing degrees with the SCM concentration. While employers are pleased with the skills of students who have earned the SCM concentration, advisory board members expressed the need to have a program with greater breadth and depth than can be provided in a 12-hour concentration. A working group of volunteers drawn from the CSCMS advisory board collaborated with supply chain management faculty to develop the B.S./SCM proposal. The current undergraduate concentration in supply chain management will be discontinued when the B.S./SCM is introduced.

(a) **Level:** Bachelor of Science in Supply Chain Management (B.S./SCM) CIP 52.0203
(b) **Emphases:** Major in Supply Chain Management; no concentrations, tracks, or specializations
(c) **Total number of credit hours:** 120 credit hours
(d) **Overall purpose:** The B.S./SCM equips students with the knowledge and skills required to pursue careers in the field of supply chain management. The overall purpose of the program is to secure entry-level jobs for USF students to meet the need for talent in Florida's growing supply chain management industry.

Examples of employment or education opportunities available to program graduates: Currently,

graduates with the SCM concentration are hired as supply chain analysts and managers across multiple industries. Recent graduates are now working in the supply chain functions for Target, Amazon, Bristol-Myers Squib, Johnson & Johnson, Bloomin' Brands, Masonite, Citi, Deloitte, C.H. Robinson, Jabil, and Honeywell Aerospace, among others. Starting salaries range from $45,000 - $65,000. Some firms offer signing bonuses ranging from $5,000 - $14,000. While most graduates immediately enter the workforce, a few recent graduates have been accepted into graduate programs in supply chain management at leading universities including Michigan State University and University of Tennessee.

Reference:

Florida Chamber of Commerce (October 2013) *Florida Trade & Logistics Study 2.0*. http://www.flchamber.com/wp-content/uploads/2016/06/Florida_Made-for-Trade_Trade-and-Logistics-Study2.0.pdf

B. Please provide the date when the pre-proposal was presented to CAVP (Council of Academic Vice Presidents) Academic Program Coordination review group. Identify any concerns that the CAVP review group raised with the pre-proposed program and provide a brief narrative explaining how each of these concerns has been or is being addressed.

The CAVP Academic Program Coordination workgroup reviewed the pre-proposal on February 6, 2018. No concerns were raised.

C. If this is a doctoral level program please include the external consultant's report at the end of the proposal as Appendix D. Please provide a few highlights from the report and describe ways in which the report affected the approval process at the university.

Not applicable. This is not a doctoral level program.

D. Describe how the proposed program is consistent with the current State University System (SUS) Strategic Planning Goals. Identify which specific goals the program will directly support and which goals the program will indirectly support (see link to the SUS Strategic Plan on the resource page for new program proposal).

The B.S./SCM directly supports the State University System Strategic Planning Goals (indicated by double check) and indirectly supports other goals (indicated by a check) in the 2025 System Strategic Plan as outlined below.

State University System Goals	Excellence	Productivity	Strategic Priorities
Teaching & Learning	✓✓Strengthen Quality & Reputation of Academic Programs and Universities	✓✓Increase Degree Productivity and Program Efficiency	✓✓Increase the Number of Degrees Awarded in STEM and Other Areas of Strategic Emphasis
Scholarship, Research, and Innovation	✓Strengthen Quality & Reputation of Scholarship, Research, and Innovation	✓Increase Research Activity and Commercialization Activity	Increase Collaboration and External Support for Research Activity
Community & Business Engagement	✓✓Strengthen Quality & Recognition of Commitment to Community and Business Engagement	✓✓Increase Levels of Community & Business Engagement	✓Increase Community and Business Workforce

TEACHING & LEARNING

- **Excellence - GOAL: Strengthen quality and reputation of academic programs and universities**
  Supply chain management programs are annually ranked by prestigious organizations including U.S. News and World Report, Forbes, and Gartner. The proposed B.S./SCM provides the opportunity for USF to gain recognition within the ranks of top-ranked programs including AAU universities such as Carnegie Mellon, Georgia Tech, Massachusetts Institute of Technology, Michigan State, Ohio State, Penn State, and University of Texas/Austin.

- **Productivity – GOAL: Increase degree productivity and program efficiency**
  USF/Tampa is a Florida Preeminent Research University. As a recipient of this prestigious designation, USF is committed to the highest level of program productivity and efficiency with a 90 percent or higher freshman retention rate and a 60 percent or higher four-year graduation rate. Currently, no other Preeminent Research University offers a B.S./SCM. The addition of the B.S./SCM at USF will ensure completion of students' degree programs in a timely manner. At USF, the Student Success Center uses a pro-active case management system to identify students who are having difficulty with academic progress early in their careers. At no cost to the student, a plan is developed that can include testing, tutoring, and other means of support to ensure each student completes the degree program in a timely manner.

- **Strategic priorities for a knowledge economy – GOAL: Increase the number of degrees awarded in STEM and other programs of strategic emphasis**
  Supply chain management is included in the Florida SUS list of Programs of Strategic Emphasis (CIP 52.0203 Logistics, Materials, and Supply Management) and is categorized as a STEM program. It is anticipated that the proposed degree will add up to 60-70 new STEM graduates each year.

SCHOLARSHIP, RESEARCH & INNOVATION

- **Excellence – GOAL: Strengthen quality and reputation of scholarship, research, and innovation**
  Faculty associated with the proposed B.S./SCM are currently engaged in several collaborative, externally funded research projects that directly benefit the economic development of the state of Florida. For example, faculty associated with the proposed B.S./SCM are currently engaged in a collaborative project to develop and distribute an innovative, sustainable carinata-based (Ethiopian mustard seed) source of alternative fuel and high-protein livestock food with the Southeastern Partnership for Advanced Renewables from Carinata (SPARC) team based at the University of Florida and funded by the U.S. Department of Agriculture.

  Other collaborative research projects include projects with the USF Center for Urban Transportation Research (CUTR) funded by the Florida Department of Transportation: (1) evaluation of inbound-outbound freight flows; (2) developing a GIS tool to determine potential locations of logistics activity centers for use in urban freight transportation planning. Future projects that examine urban freight movement and economic development related to infrastructure investments are in the planning stages.

  Two SCM faculty members are Fulbright scholars. Dr. Jim Stock received a core Fulbright fellowship in Helsinki, Finland where he did research in reverse logistics and sustainable

supply chain management. Dr. Rob Hooker is a Fulbright Specialist in the area of supply chain management. His first engagement was with the Stockholm School of Economics.

- **Productivity – Increase research and commercialization activity**
  The aim of the SPARC project is to commercialize products from in the carinata supply chain. The SCM program indirectly supports commercialization activity by providing expertise to start-up ventures in the Tampa Bay area.

- **Strategic priorities for a knowledge economy – Increase collaboration and external support for research activity**
  In addition to ongoing collaboration with UF and CUTR, we are exploring establishing a research center under the auspices of the Volvo Research and Educational Foundations (VREF) program. VREF provides financial support for establishing Centers of Excellence to create platforms for collaborative research related to the future of urban freight transport (http://www.vref.se/futprogramme.4.64ace19a14615fa7f238d79c.html).

COMMUNITY & BUSINESS ENGAGEMENT

- **Excellence – GOAL: Strengthen quality and recognition of commitment to community and business engagement**
  In direct response to the call for statewide collaboration in the supply chain industry, USF brought together a planning group to launch the Florida Supply Chain Summit. Working with a statewide steering committee comprised of representatives from industry, government, and academia, the USF Center for Supply Chain Management & Sustainability led the effort (https://floridasupplychainsummit.com/). The Summit was held in February 2019 and attracted 300 attendees from Florida's supply chain industry. The mission of the Florida Supply Chain Summit is to provide a platform for statewide collaboration among key representatives from industry, professional organizations, government, economic development agencies, and higher education for the purpose of advancing the state of Florida as a global trade hub. This significant, highly visible effort was in the planning stage for over a year.

- **Productivity – GOAL: Increase levels of community and business engagement**
  The Center for Supply Chain Management & Sustainability hosts a Meet the Employers networking event in fall and spring semesters each year to allow employers to directly interact with candidates for supply chain internships and jobs. The USF CSCMP (Council for Supply Chain Management Professionals) Student Roundtable hosts weekly meetings throughout the academic year with guest speakers from Tampa Bay companies that hire SCM students. The Roundtable also sponsors field trips to area company sites and conducts community service activities. A team of Roundtable students serve as student ambassadors at the national CSCMP conference each year. Travel support for the annual conference is provided by the Central Florida CSCMP Roundtable (comprised of executives from Tampa and Orlando).

- **Strategic priorities for a knowledge economy – GOAL: Increase community and business workforce**
  As noted previously, recent USF graduates with B.S./Marketing with the SCM concentration are now working in supply chain and logistics functions for Florida-based companies including Target, Amazon, Johnson & Johnson, Bloomin' Brands, Masonite, Citi, Deloitte, C.H. Robinson, Jabil, and Honeywell Aerospace, among others. The majority of students who complete the supply chain concentration immediately enter the workforce.

E. If the program is to be included in a category within the Programs of Strategic Emphasis as described in the SUS Strategic Plan, please indicate the category and the justification for inclusion.

The Programs of Strategic Emphasis Categories:

1. Critical Workforce:
   - Education
   - Health
   - Gap Analysis
2. Economic Development:
   - Global Competitiveness
3. Science, Technology, Engineering, and Math (STEM)

Please see the Programs of Strategic Emphasis (PSE) methodology for additional explanations on program inclusion criteria at the resource page for new program proposal.

The B.S./SCM (CIP 52.0203 Logistics, Materials, and Supply Management) is identified as a Program of Strategic Emphasis (Fall 2014) under the category of Economic Development – STEM. Supply chain management directly supports the distribution, transportation, and manufacturing industries in Florida.

F. Identify any established or planned educational sites at which the program is expected to be offered and indicate whether it will be offered only at sites other than the main campus.

The B.S./SCM will be delivered on the USF Tampa campus. However, after consolidation of the three separate SACSCOC accredited institutions, the delivery on all campuses (Tampa, St. Petersburg, and Sarasota-Manatee) will occur based on student demand and resource availability.

INSTITUTIONAL AND STATE LEVEL ACCOUNTABILITY

II. Need and Demand

A. Need: Describe national, state, and/or local data that support the need for more people to be prepared in this program at this level. Reference national, state, and/or local plans or reports that support the need for this program and requests for the proposed program which have emanated from a perceived need by agencies or industries in your service area. Cite any specific need for research and service that the program would fulfill.

National need: Growth in the logistics sector (bachelor's degree required) at the national level is projected by the Bureau of Labor Statistics to be 10.3% through 2026, adding nearly 13 million jobs with a median annual wage of $74,590. A recent study published in the Harvard Business Review (Delgado & Mills, 2018) estimates that supply chains contain 37 percent of all U.S. jobs and employ 44 million people: "These jobs have significantly higher than average wages, and account for much of the innovative activity in the economy." An examination of the drivers of the national shortage of supply chain talent states that "Demand for supply chain professionals exceeds supply by a ratio of 6 to 1" (Harrington, 2015).

State need: The Florida Department of Economic Opportunity and Enterprise Florida identify "Logistics and Distribution" as one of the five major industries for economic growth in the state (Enterprise Florida, 2013). In Florida, employment in this sector is expected to grow 12% through 2025 with a median annual wage of $66,850.

The development of a supply chain management talent pool is highlighted as a core need for workforce development in the *Florida Trade & Logistics Study 2.0* (Florida Chamber, 2013) that sets forth the vision for positioning Florida as a global trade hub to support statewide economic development. The report envisions Florida as the leading location for trade and logistics education and training, calling for a globally-oriented talent development program to meet Florida's business needs and to build professional relationships as the basis for future trade and investment decisions. Indeed, the availability of a trained SCM workforce can be a deciding factor as companies decide where to locate new manufacturing or distribution facilities.

Moreover, employment in the supply chain industry provides well-paying jobs.: workers in Florida transportation, trade and logistics earn 30% higher wages than the average for all jobs in the state. An important component of the industry supports globalization: Enterprise Florida reports international trade activity for Florida was $148 billion in 2017 with over $70 billion in exports. The state ranks 8th in the country for exporting, and Florida is home to one in five U.S. exporters (Enterprise Florida, 2018).

Local need: The proposal for the USF B.S./SCM emanated from requests by Tampa Bay business partners who serve on the USF Center for Supply Chain Management & Sustainability's advisory board. Several employers reported the need to hire graduates from universities outside the state of Florida in order to fill open SCM positions. Companies represented on the advisory board include Datex Corporation, Mercury Gate, Marten Transport, Port Tampa Bay, Reed TMS, Citi, Jabil, Mosiac, Masonite, Bristol-Myers Squibb, Bloomin' Brands, and CH Robinson. Advisory board members strongly requested that USF deliver a major to allow greater breadth in the coursework. They further expressed the need for a program that focuses on global supply chain management.

Need for research and service: The vision for the future of Florida is to ensure a globally competitive economy by developing the state as a vibrant hub for international and domestic trade and investment (Florida Chamber, 2013). This vision requires a commitment to a statewide, multimodal system of trade gateways, logistics centers, and transportation corridors that delivers on the promise of efficient and effective freight movement (Florida Department of Transportation, 2010). To achieve this vision, Florida needs a state-wide collaborative platform to identify issues, conduct necessary research, and implement action plans (Pinjari et al., 2015).

To address the need for a state-wide research collaboration, the supply chain management faculty collaborate with researchers in the Center for Urban Transportation Research in the USF College of Engineering to undertake funded research directed at addressing the challenges of logistics-led economic development in Florida. The inaugural statewide gathering of supply industry stakeholders in February 2019 was a direct response to research findings conducted by USF researchers (Pinjari et al., 2015).

In addition, students in the Supply Chain Capstone course will engage with area businesses to conduct field-based research projects related to supply chain management activities. The USF CSCMP Student Roundtable also conducts research for local organizations. For example, student members of the Roundtable worked with Florida's Habitat for Humanity program in 2018 on a project to analyze Habitat's supply base. The project identified over $800,000 in potential savings by centralizing key purchases.

Data sources:

Bureau of Labor Statistics, https://www.bls.gov/data/#employment

Florida Chamber of Commerce (October 2013) *Florida Trade & Logistics Study 2.0*. http://www.flchamber.com/wp-content/uploads/2016/06/Florida_Made-for-Trade_Trade-and-Logistics-Study2.0.pdf

Florida Department of Transportation (2010). *2060 Florida Transportation Plan*.

Florida Department of Transportation (2013). *Florida Freight Mobility and Trade Plan Policy Element*.

Delgado, Mercedes and Karen Mills (2018) "The Supply Chain Economy and the Future of Good Jobs in America," *Harvard Business Review*. https://hbr.org/2018/03/the-supply-chain-economy-and-the-future-of-good-jobs-in-america

Enterprise Florida (September 2013) *Logistics & Distribution*. https://www.enterpriseflorida.com/industries/logistics-distribution/

Enterprise Florida (2018) *Florida's International Business Advantages,* https://www.enterpriseflorida.com/wp-content/uploads/Florida-International-Business-Advantages-Brief.pdf

Harrington, Lisa (2015) "Solving the Talent Crisis: Five Alternatives Every Supply Chain Executive Must Consider." http://www.lharringtongroup.com/pdf/DHL-Automotive-WhitePaper.pdf

Pinjari, Abdul, Donna Davis, Seckin Ozkul (2015) "Evaluation of Logistics-Led Economic Development." FDOT Research Reports.

B. Demand: Describe data that support the assumption that students will enroll in the proposed program. Include descriptions of surveys or other communications with prospective students.

Our experience at USF with enrollment in the current undergraduate supply chain management concentration provides the primary evidence for student demand. Since Fall 2014, USF has offered a supply chain concentration in the B.S./Marketing degree. The 12-hour concentration comprises two courses (6 credit hours) in logistics and supply chain management, one course in international marketing (3 credit hours), and a required internship (3 credit hours). Enrollment in the SCM concentration ranges from 60 – 70 upper-division students per year. Over the past four years, 99 students have graduated with the SCM concentration as displayed on the table below.

SCM Concentration	2014-2015	2015-2016	2016-2017	2017-2018	TOTALS
Graduates	7	29	32	29	99

C. If substantially similar programs (generally at the four-digit CIP Code or 60 percent similar in core courses), either private or public exist in the state, identify the institution(s) and geographic location(s). Summarize the outcome(s) of communication with such programs with regard to the potential impact on their enrollment and opportunities for possible collaboration (instruction and research). In Appendix C, provide data that support the need for an additional program.

Similarity with Other Programs				
Institution Name	Public/ Private	Location Program is being Offered	CIP Code	Program Name
Florida A&M University	Public	Tallahassee	52.0203	B.S./Supply Chain Management
Florida International University	Public	Miami	52.0203	BBA/Logistics & Supply Chain Management
University of North Florida	Public	Jacksonville	52.0203	B.S./ Transportation & Logistics
University of West Florida	Public	Pensacola	52.0203	B.S.BA/Supply Chain Logistics Management

Program information:

Florida A&M University introduced a new B.S. in Supply Chain Management in Spring 2018. FAMU is located in Tallahassee. Enrollment data are not yet available.

Florida International University introduced a BBA in Logistics and Supply Chain Management in Fall 2018. Enrollment data are not yet available

The University of North Florida offers a B.S. in Transportation & Logistics. The oldest supply chain program in Florida (established in 1972), UNF enrolled 175 students in 2017 and produced 34 graduates.

The University of West Florida offers a B.S/B.A. in Supply Chain Logistics Management introduced in 2015. UWF enrolled 81 students in 2017 and produced 6 graduates.

Communication with other institutions: Information about each program, consideration of the potential impact on enrollments, and potential for collaboration were discussed in face-to-face and/or telephone conversations with each of the program directors: FAMU – Dr. Eisenhower Etienne; FIU – Professor Gregory Maloney; UNF – Dr. Robert Frankel; UWF – Dr. Scott Keller. Letters of support from these institutions are provided in Appendix C.

Potential impact on enrollments

All four program directors agree that the USF B.S./SCM will have very little impact on their enrollments. There is very little overlap in the target markets due to geographic differences (i.e., Tallahassee, Miami, and Jacksonville versus central Florida), differences in missions among the universities (e.g., HBCU at FAMU, HSI at FIU), and differences in the focus of the programs (e.g., transportation and logistics versus global supply chain management at USF).

Potential collaboration

The program directors discussed several opportunities for collaboration to support workforce development for the supply chain industry in Florida. The first significant opportunity for collaboration was participation in the inaugural Florida Supply Chain Summit in Orlando in February 2019, hosted by USF (http://floridasupplychainsummit.com). The Summit showcased supply chain programs offered at Florida's higher education institutions and promoted business engagement. The director of the UNF program was a member of the planning team for the Summit. Faculty from UNF and UWF participated in the program, and students from UNF and UWF attended the Summit to network with industry

representatives.

The second key area for collaboration will be the opportunity to share information about best practices as we further develop curricula across the institutions. For example, we can share relevant case studies, video content, information about potential guest speakers, opportunities for collaborative field trips, and participation in study abroad courses related to supply chain management.

Finally, we will be able to collaborate on serving the needs of Florida's supply chain industry by sharing information about internships and position openings and working together on research projects. For example, three of the four programs have required capstone projects that engage students in field-based research. Collaboration across the programs can extend the reach for potential business engagement in student projects.

Data that support the need for an additional program are provided in Appendix C.

D. Use Table 1 in Appendix A (1-A for undergraduate and 1-B for graduate) to categorize projected student headcount (HC) and Full Time Equivalents (FTE) according to primary sources. Generally undergraduate FTE will be calculated as 30 credit hours per year and graduate FTE will be calculated as 24 credit hours per year. Describe the rationale underlying enrollment projections. If students within the institution are expected to change majors to enroll in the proposed program at its inception, describe the shifts from disciplines that will likely occur.

As displayed in Table 1-A, we project a conservative initial enrollment of 60 students (HC) based on enrollment in the current concentration. Following this start-up period, we anticipate steady growth toward a total enrollment of 150 students (HC) by Year 5. Students who are currently enrolled in the supply chain concentration in the B.S./Marketing in the initial year (2019-2020) are likely to shift to the new degree. The undergraduate supply chain management concentration will be discontinued when the B.S./SCM is introduced.

E. Indicate what steps will be taken to achieve a diverse student body in this program. If the proposed program substantially duplicates a program at FAMU or FIU, provide, (in consultation with the affected university), an analysis of how the program might have an impact upon that university's ability to attract students of races different from that which is predominant on their campus in the subject program. <u>The university's Equal Opportunity Officer shall review this section of the proposal and then sign and date Appendix B to indicate that the analysis required by this subsection has been completed</u>.

USF is committed to engaging underrepresented and minority students in our programs. We strongly value equal access to education, ethical development, and all aspects of diversity (cultural, religious, race and ethnicity, socio-economic, linguistic, gender, sexual orientation, etc.). These shared institutional values provide a supportive environment to foster interaction and engagement among students who will shape their organizations' business interactions and transactions with diverse audiences.

According to a recent (2015) joint report by the U.S. Departments of Education, Transportation and Labor (in conjunction with industry stakeholders), women are highly under-represented in the supply chain industry. Additionally, African-Americans and Hispanics are under-represented in jobs that generally require higher skills, pay better wages, and provide more career ladder opportunities. This situation provides an opportunity for the USF B.S./SCM to have a positive impact on diversity in the industry. We expect the enrollment in the B.S./SCM will mirror the gender/ethnic diversity of the Muma College of Business.

Muma College of Business Fall 2017 Undergraduate Enrollment

	Male	Female	Total
American Indian	11	3	14
Asian	148	140	288
Black	216	180	396
Hispanic	471	427	898
Native Hawaiian or Other Pacific Islander	2	4	6
Non-Resident Alien	311	229	540
Not-Reported	81	72	153
Two or More Race	78	68	146
White	1,414	880	2,294
Grand Total	**2,732**	**2,003**	**4,735**

To ensure the desired outcome for student diversity, recruiting efforts will have a broad statewide reach, extending to geographic regions including those having populations of under-represented prospective students. Prospective students will be identified at key high schools with logistics academies and community colleges with supply chain programs. Outreach approaches will also include collaboration with the USF Office of Veteran Success. Many military veterans have work experience in logistics and are well-equipped to undertake a degree in supply chain management.

Conversations with the directors of the FAMU and FIU programs indicate the new B.S./SCM at USF will have no impact on their ability to attract students from the diversity of races that are predominant on their campuses.

III. Budget

A. Use Table 2 in Appendix A to display projected costs and associated funding sources for Year 1 and Year 5 of program operation. Use Table 3 in Appendix A to show how existing Education & General funds will be shifted to support the new program in Year 1. In narrative form, summarize the contents of both tables, identifying the source of both current and new resources to be devoted to the proposed program. (Data for Year 1 and Year 5 reflect snapshots in time rather than cumulative costs.)

Tables 2 and 3 are provided in Appendix A. Costs in Years 1 – 5 reflect the reallocation of existing faculty who teach in the current supply chain management concentration to teach in the B.S./SCM program. The budget assumes a 2% increase in salary and fringe benefits across the five-year projection.

No new faculty lines are requested. All faculty are currently employed by USF and are assigned to office space. Office support, office supplies and services, and travel funding are supported by E&G funds allocated to the Department of Marketing. No scholarships or graduate assistants are required to support the program.

B. Please explain whether the university intends to operate the program through continuing education, seek approval for market tuition rate, or establish a differentiated graduate-level tuition. Provide a rationale for doing so and a timeline for seeking Board of Governors' approval, if appropriate. Please include the expected rate of tuition that the university plans to charge for this program and use this amount when calculating cost

entries in Table 2.

Not applicable. USF does not intend to offer the program through continuing education or seek approval for market tuition rate.

C. If other programs will be impacted by a reallocation of resources for the proposed program, identify the impacted programs and provide a justification for reallocating resources. Specifically address the potential negative impacts that implementation of the proposed program will have on related undergraduate programs (i.e., shift in faculty effort, reallocation of instructional resources, reduced enrollment rates, greater use of adjunct faculty and teaching assistants). Explain what steps will be taken to mitigate any such impacts. Also, discuss the potential positive impacts that the proposed program might have on related undergraduate programs (i.e., increased undergraduate research opportunities, improved quality of instruction associated with cutting-edge research, improved labs, and library resources).

The faculty who will teach in the B.S./SCM program are members of the Department of Marketing which houses the current undergraduate supply chain management concentration that will be terminated when the B.S./SCM is introduced. As teaching loads shift toward the B.S./SCM, the primary impact of the proposed program will be felt as a slight shift in faculty effort. The B.S./SCM comprises seven courses. Three are currently taught by existing faculty (i.e., Supply Chain Management, Logistics & Physical Distribution Management, and Supply Chain Analytics). The current Chair of the Marketing Department is a member of the supply chain faculty. When she returns to the faculty in AY 2019-2020, she will resume a full teaching load. In addition, one instructor in the program will return to a full teaching load in AY 2019-2020, following a two-year assignment as the Director of the Business Honors Program. Together, these shifts away from administrative duties will provide the necessary staffing for the B.S./SCM program with no impact on the Marketing program.

In regard to potential positive impacts associated with the proposed program, the required internship course and field-based capstone course will generate opportunities for undergraduate research.

D. Describe other potential impacts on related programs or departments (e.g., increased need for general education or common prerequisite courses, or increased need for required or elective courses outside of the proposed major).

Additional seats will be needed in the business core courses required for all majors. These courses typically enroll nearly 800 students each semester. The projected enrollments for the B.S./SCM would add 30 – 50 students which should be easily accommodated within the current schedule of courses.

E. Describe what steps have been taken to obtain information regarding resources (financial and in-kind) available outside the institution (businesses, industrial organizations, governmental entities, etc.). Describe the external resources that appear to be available to support the proposed program.

Since 2014, five businesses have contributed $207,000 in cash gifts plus $342,760 in-kind gifts (i.e., software licenses) to the Center for Supply Chain Management & Sustainability. Funds are used to support scholarships, business engagement activities, research projects, and faculty development for the USF supply chain management program. As noted elsewhere in this proposal, the supply chain management faculty have been successful in securing external research funding from state and federal granting agencies.

IV. Projected Benefit of the Program to the University, Local Community, and State

Use information from Tables 1 and 2 in Appendix A, and the supporting narrative for "Need and Demand" to prepare a concise statement that describes the projected benefit to the university, local community, and the state if the program is implemented. The projected benefits can be both quantitative and qualitative in nature, but there needs to be a clear distinction made between the two in the narrative.

The projected benefits of the B.S./SCM are summarized as follows:

University: The B.S./SCM will benefit the university by positioning USF as the leader in supply chain management education and expertise in the state of Florida. The degree will also position USF as a significant resource for new talent in the supply chain industry, thereby enhancing business engagement by providing stronger relationships with companies in this growing industry sector.

As shown on Table 1A in Appendix A, the B.S./SCM will add up to 150 new students in this STEM discipline.

Local Community: The B.S./SCM will benefit the Tampa Bay business community by meeting the need of area businesses for entry-level managers in supply chain management positions. The proposal for the USF B.S./SCM emanated from requests by Tampa Bay business partners who serve on the USF Center for Supply Chain Management & Sustainability's advisory board. Area companies requested that USF offer a supply chain major to allow greater breadth in the coursework not afforded by the current concentration. They further expressed the need for a program that focuses on global supply chain management.

As shown in Table 1 in Appendix C, Florida expects nearly 12% growth in logistics managers by 2026. The B.S./SCM will provide a talent pipeline for Tampa Bay companies to fill open positions as companies expand their operations.

State: The B.S./SCM will benefit the state of Florida by providing skilled employees for entry-level managerial positions that pay well above the average wage in Florida. Candidates for jobs in supply chain management are in increasing demand in Florida. This program will add to the number of STEM graduates to fill those positions.

The projected enrollment level (see Appendix A) will generate 60-70 degrees awarded each year with the potential to make USF the leading producer of SCM graduates in the state of Florida.

V. Access and Articulation – Bachelor's Degrees Only

A. If the total number of credit hours to earn a degree exceeds 120, provide a justification for an exception to the policy of a 120 maximum and submit a separate request to the Board of Governors for an exception along with notification of the program's approval. (See criteria in Board of Governors Regulation 6C-8.014)

Not applicable. The B.S./SCM is a 120 credit hour program.

B. List program prerequisites and provide assurance that they are the same as the approved common prerequisites for other such degree programs within the SUS (see link to the Common Prerequisite Manual on the resource page for new program proposal). The courses in the Common Prerequisite Counseling Manual are intended to be those that are required of both native and transfer students prior to entrance to the major program, not simply lower-level courses that are required prior to graduation. The common

prerequisites and substitute courses are mandatory for all institution programs listed, and must be approved by the Articulation Coordinating Committee (ACC). This requirement includes those programs designated as "limited access."

If the proposed prerequisites are not listed in the Manual, provide a rationale for a request for exception to the policy of common prerequisites. NOTE: Typically, all lower-division courses required for admission into the major will be considered prerequisites. The curriculum can require lower-division courses that are not prerequisites for admission into the major, as long as those courses are built into the curriculum for the upper-level 60 credit hours. If there are already common prerequisites for other degree programs with the same proposed CIP, every effort must be made to utilize the previously approved prerequisites instead of recommending an additional "track" of prerequisites for that CIP. Additional tracks may not be approved by the ACC, thereby holding up the full approval of the degree program. Programs will not be entered into the State University System Inventory until any exceptions to the approved common prerequisites are approved by the ACC.

Following the requirements for Track 3/3, the following prerequisites are mandatory for the B.S./SCM and are consistent with the Common Prerequisites for business degrees in the SUS. Common prerequisites for the B.S./SCM include completion of the following State Mandated Common Course Prerequisites (or equivalents) with a grade of B- or higher in each course:

Courses at USF	Courses at a Florida College System Institution
ACG 2021 Principles of Financial Accounting	ACG X021 or ACG X022 or (ACG X001 & ACG X011)
ACG 2071 Principles of Managerial Accounting	ACG X071 or ACG X301 or ACG X072
CGS 2100 Computers in Business	CGS X100 or CGS X570 or CGS X531 or BUL X241 or CG SX092 or PHI X600 or BUL X131 or MAN X440 or GEB X350
ECO 2013 Economic Principles (Macroeconomics)	ECO X013
ECO 2023 Economic Principles (Microeconomics)	ECO X023
MAC 2233 Business Calculus	MAC X233 or MAC X230 or MAC X311 or MAC X281
QMB 2100 Business and Economic Statistics I or STA 2023 Introductory Statistics I	STA X023 or QMB X100 or STA X122 or EGS X025 or ESI X213 or STA X024 or STA X032 or STA X037

Lower Division course requirements for Track 3/3 are displayed on the following page.

LOWER LEVEL COURSES

	Cr. Hrs.	
ECOX013	3	
& ECOX023	3	
& MACX311	4	Analytic Geometry and Calculus I
or MACX281		
or MACX233		
or MACX230		
& STAX023	3	Statistics
or EGSX025		
or ESIX213		
or STAX024		
or STAX032		
or STAX037		
or STAX122		
or QMBX100		
& ACGX021	3	Principles of Financial Accounting
or ACGX022		
or ACGX001		
& ACGX011		
& ACGX071	4	Principles of Managerial Accounting
or ACGX301		
or ACGX072		
& BULX241 *(1)*	2	Law, Public Policy, Negotiation & Business
or CGSX092		
or PHIX600		
or BULX131		
or MANX440		
or GEBX350		
or CGSX100		
or CGSX570		
or CGSX531		

FOR ALL MAJORS: Students are strongly encouraged to select required lower division electives that will enhance their general education coursework and that will support their intended baccalaureate degree program. Students should consult with an academic advisor in their major degree area.

NOTE: TRAX010 and TRAX154 are acceptable alternative credit for coursework required for the degree program.

C. If the university intends to seek formal Limited Access status for the proposed program, provide a rationale that includes an analysis of diversity issues with respect to such a designation. Explain how the university will ensure that Florida College System transfer students are not disadvantaged by the Limited Access status. NOTE: The policy and criteria for Limited Access are identified in Board of Governors Regulation 6C-8.013.

Submit the Limited Access Program Request form along with this document.

Not applicable. The program will not be limited access.

D. If the proposed program is an AS-to-B.S. capstone, ensure that it adheres to the guidelines approved by the Articulation Coordinating Committee for such programs, as set forth in Rule 6A-10.024 (see link to the Statewide Articulation Manual on the resource page for new program proposal). List the prerequisites, if any, including the specific AS degrees which may transfer into the program.

Not applicable. The program will not be an AS-to-B.S. capstone.

INSTITUTIONAL READINESS

VI. Related Institutional Mission and Strength

A. Describe how the goals of the proposed program relates to the institutional mission statement as contained in the SUS Strategic Plan and the University Strategic Plan (see link to the SUS Strategic Plan on the resource page for new program proposal).

The B.S./SCM is aligned with the USF System, USF/Tampa, and Muma College of Business (MCOB) strategic plans. All of these plans focus on student success, business engagement, and global literacy.

Specifically, the B.S./SCM promotes **student success** by equipping students with the knowledge and skills required for careers in high demand in Florida and the nation in the area of global supply chain management. The B.S./SCM supports the institutional mission by ensuring the availability of well-paying jobs in the discipline upon graduation.

As a discipline, the field of supply chain management is highly **engaged with industry** to ensure the development of a talent pool to support the growing demand for supply chain professionals and to keep abreast of ever-changing technological and regulatory changes. The program supports the institutional mission of business engagement by supporting Florida's economic development through strengthening the talent pool.

By its very nature, supply chain management is a **global** discipline. Graduates of the B.S./SCM must understand relationships among suppliers, producers, and customers located around the world. The USF B.S./SCM emphasizes global supply chain management.

B. Describe how the proposed program specifically relates to existing institutional strengths, such as programs of emphasis, other academic programs, and/or institutes and centers.

The Center for Analytics and Creativity (CAC) in the Muma College of Business provides significant resources for the proposed B.S./SCM. Under the auspices of the CAC, all undergraduate students in the MCOB will earn a Data Science Citizen certificate issued by USF and Tableau (data visualization software company). The CAC hosts the annual Florida Business Analytics Forum with guest speakers related to analytics, including supply chain analytics. For example, the 2018 Forum focused on blockchain technology and machine learning, two technology advances at the forefront of shaping supply chain design. As described elsewhere, faculty currently collaborate on supply chain research with the Center for Urban Transportation Research in the USF College of Engineering.

C. Provide a narrative of the planning process leading up to submission of this proposal.

Include a chronology in table format of the activities, listing both university personnel directly involved and external individuals who participated in planning. Provide a timetable of events necessary for the implementation of the proposed program.

The planning process for the B.S./SCM began with a request from executives who are members of the advisory board of the Center for Supply Chain Management & Sustainability. Subsequently, SCM faculty took up the request to consider the resources needed to offer a B.S./SCM. A working group of volunteers drawn from the advisory board then engaged with the SCM faculty to examine similar programs and develop a list of knowledge and skills for the B.S./SCM. This information was then conveyed to the full advisory board for discussion and feedback. The SCM faculty used this feedback to develop curricular goals, learning outcomes, and proposed courses for the B.S./SCM.

The B.S./SCM pre-proposal was reviewed and approved for the USF AY 2018-2019 Accountability Plan. The full proposal was developed for review and approval in AY 2018-2019.

Planning Process

Date	Participants	Planning Activity
April 2016	CSCMS Advisory Board	Review of SCM program resulted in request for a B.S. in Supply Chain Management
June 2016	Donna Davis with SCM faculty: Jim Stock, Dick Plank, Jeannette Mena, Rob Hooker, Kerry Walsh	Discussion of feasibility of B.S./SCM and plan for engaging Advisory Board members; draft curricular goals and learning outcomes
October 2016	Curriculum Working Group (CSCMS Advisory Board members) with SCM faculty	Discussion of business needs; review of similar programs; focus on global supply chain management; revise curricular goals and learning outcomes
June 2017	CSCMS Advisory Board with SCM faculty	Presentation of curricular goals and learning outcomes to Advisory Board for discussion and feedback
September/October 2017	SCM faculty	Develop B.S./SCM pre-proposal
June 2018	SCM faculty and CSCMS business partners	Review of courses and curriculum map for full proposal

Events Leading to Implementation

Date	Implementation Activity
November 2017	Pre-Proposal (PP) approved by Department of Marketing
December 2017	PP approved by Undergraduate Program Committee/Muma College of Business
January 2018	PP approved by USF Undergraduate Faculty Council
January 2018	PP approved by Academic Program Advisory Council
February 2018	SUS CAVP Academic Program Coordination Workgroup expressed no concerns
May 2018	PP approved by ACE Committee
June 2018	PP approved by BOT for inclusion on USF Tampa Accountability Plan
June 2018	PP approved by BOG for inclusion on USF Tampa Accountability Plan
September 2018	New Program Full Proposal (NPFP) approved by Department of Marketing
October 2018	NPFP approved by Undergraduate Program Committee, Muma College of

	Business
October 2018	NPFP approved by Muma College of Business
March 2019	NPFP submitted to USF Undergraduate Faculty Council
April 2019	NPFP submitted to APAC
May 2019	NPFP submitted to ACE Committee
June 2019	NPFP submitted to BOT
June 2019	NPFP submitted to BOG for Staff Review
After addition to BOG program inventory	Promote B.S./SCM to students Add B.S./SCM to USF catalog
Fall 2019	Start degree program after receipt of approval letter from the BOG

VII. Program Quality Indicators - Reviews and Accreditation

Identify program reviews, accreditation visits, or internal reviews for any university degree programs related to the proposed program, especially any within the same academic unit. List all recommendations and summarize the institution's progress in implementing the recommendations.

Programs in the home department for this proposal, the Department of Marketing, are reviewed in the accreditation process by AACSB as part of the Muma College of Business accreditation process. The Muma College of Business was successfully reaccredited by AACSB in 2018. The AACSB reaccreditation process takes place every five years. The B.S./SCM will be reviewed in the next reaccreditation cycle, which will begin with an internal program review in 2021-2022 in preparation for a site visit in 2022-2023.

VIII. Curriculum

A. Describe the specific expected student learning outcomes associated with the proposed program. If a bachelor's degree program, include a web link to the Academic Learning Compact or include the document itself as an appendix.

The B.S./SCM Academic Learning Compact is included in Appendix C. The following Learning Outcomes are consistent with USF System policy and BOG requirements for an undergraduate academic learning compact.

Learning Outcomes

Content/Discipline Knowledge and Skills

Students will demonstrate the ability to:

1. Explain the importance of supply chain management in a global business environment;
2. Describe the dynamics of relationships among firms in a global supply chain, and;
3. Discuss the legal and ethical issues related to global supply chain management.

Critical Thinking Skills

Students will demonstrate the ability to:

1. Conduct analyses used in day-to-day operations of global supply chains including inventory, transportation, warehousing, and network design analyses;
2. Utilize business analytics and data visualization software to conduct SCM analyses, and;

3. Conduct trade-off analyses for the optimization of supply chain operations.

Communication Skills

Students will demonstrate the ability to:

1. Effectively present information and analyses in oral presentations and discussions, and;
2. Communicate analyses and recommendations in written form.

B. Describe the admission standards and graduation requirements for the program.

Admission standards:

Students applying to the University of South Florida are expected to meet the University's admissions standards, as listed on USF's Office of Admissions' website (https://www.usf.edu/admissions/).

To matriculate to the upper-division courses required for the B.S./SCM, students must earn a minimum grade of B- in the following courses:

ACG 2021 Principles of Financial Accounting
ACG 2071 Principles of Managerial Accounting
CGS 2100 Computers in Business
ECO 2013 Economic Principles: Macroeconomics
ECO 2023 Economic Principles: Microeconomics
MAC 2233 Business Calculus
QMB 2100 Business & Economic Statistics I

Graduation requirements:

For graduation, students must satisfy the curriculum (course) requirements from their catalog year while maintaining GPA and grading requirements as set forth in USF System Regulation 3.007 (http://ugs.usf.edu/pdf/ugc/3%20007-BA_DEGREE.pdf).

C. Describe the curricular framework for the proposed program, including number of credit hours and composition of required core courses, restricted electives, unrestricted electives, thesis requirements, and dissertation requirements. Identify the total numbers of semester credit hours for the degree.

The 120 credit hour B.S./SCM is comprised of the following components. There are no thesis requirements.

General Education	36 credit hours
Non-Business Electives	18 credit hours
Business Core Courses	39 credit hours
Supply Chain Management major	21 credit hours *
Unrestricted Electives	6 credit hours
Total	120 credit hours

* All courses in the Supply Chain Management major are 3 credit hours.

- SCM 3005 Supply Chain Management (Global Citizen Program certified)
- SCM 3570 Global Sourcing (newly proposed)
- SCM 4210 Logistics & Physical Distribution Management

- SCM 4202 Supply Chain Analytics (newly proposed)
- SCM 4721 Global Commerce (newly proposed)
- SCM 4940 Supply Chain Internship (newly proposed)
- SCM 4890 Supply Chain Capstone Project (newly proposed)

D. Provide a sequenced course of study for all majors, concentrations, or areas of emphasis within the proposed program.

SUPPLY CHAIN MANAGEMENT 4-SEMESTER PLAN FOR TRANSFER STUDENTS

Semester 1	Credit Hours	Semester 2	Credit Hours
ENC 3250 Professional Writing or ENC 3310 Expository Writing	3	MAN 3025 Principles of Management	3
SCM 3005 Supply Chain Management	3	FIN 3403 Principles of Finance	3
ISM 3011 Information Systems in Organizations	3	**SCM 3570 Global Sourcing**	3
QMB 3200 Business & Economic Statistics II	3	**SCM 4210 Logistics & Physical Distribution Mgmt**	3
MAN 4504 Operations & Supply Chain Management	3	GEB 3033 Business Workplace Skills & Best Practices	3
Semester Total	**15**	**Semester Total**	**15**
Summer			
SCM 4940 Supply Chain Internship	**3**		

Semester 3	Credit Hours	Semester 4	Credit Hours
BUL 3320 Law & Business I	3	GEB 4890 Strategic Management & Decision Making	3
SCM 4202 Supply Chain Analytics	**3**	**SCM 4890 Supply Chain Capstone Project**	3
SCM 4721 Global Commerce	**3**	Unrestricted Elective	3
Unrestricted Elective	3	Unrestricted Elective	3
Unrestricted Elective	3	Unrestricted Elective	3
Semester Total	**15**	**Semester Total**	**15**

SUPPLY CHAIN MANAGEMENT 8-SEMESTER PLAN

Semester 1	Credit Hours	Semester 2	Credit Hours
ENC 1101 Composition I	3	Unrestricted Elective	3
MAC 2233 Business Calculus	3	ENC 1102 Composition II	3
CGS 2100 Computers in Business	3	Gen Ed\State GE Core Humanities	3
SPC 2608 Public Speaking	3	Gen Ed\State GE Natural Science	3
SLS 2901 Academic Foundations Seminar	3	ECO 2013 Economic Principles (Macro)	3
Semester Total	**15**	**Semester Total**	**15**
Summer			
Summer Opportunities			

Semester 3	Credit Hours	Semester 4	Credit Hours
ACG 2021 Principles of Financial Accounting	3	QMB 2100 Business & Economic Statistics I	3
ECO 2023 Economic Principles	3	ACG 2071 Principles of Managerial Accounting	3
Elective	3	MAR 3023 Basic Marketing	3
Unrestricted elective (recommendation: AMH 2020 or POS 2041 to meet Civics Literacy requirement)	3	Unrestricted Elective	3
GEB 3033 Business Workplace Skills & Best Practices	3	Unrestricted Elective	3
Semester Total	**15**	**Semester Total**	**15**
Summer			
QMB 3200 Business & Economic Statistics II	3		
MAN 4504 Operations & Supply Chain Management	3		
Semester Total	**6**		

Semester 5	Credit Hours	Semester 6	Credit Hours
ENC 3250 Professional Writing or ENC 3310 Expository Writing	3	MAN 3025 Principles of Management	3
SCM 3005 Supply Chain Management	3	FIN 3403 Principles of Finance	3
ISM 3011 Information Systems in Organizations	3	**SCM 3570 Global Sourcing**	3
Unrestricted Elective	3	**SCM 4210 Logistics & Physical Distribution Mgmt**	3
Unrestricted Elective	3		
Semester Total	**15**	**Semester Total**	**12**
Summer			
SCM 4940 Supply Chain Internship	**3**		

Semester 7	Credit Hours	Semester 8	Credit Hours
BUL 3320 Law & Business I	3	GEB 4890 Strategic Management & Decision Making	3
SCM 4202 Supply Chain Analytics	**3**	**SCM 4890 Supply Chain Capstone Project**	3
SCM 4721 Global Commerce	**3**	Unrestricted Elective	3
Unrestricted Elective	3	Unrestricted Elective	3
Semester Total	**12**	**Semester Total**	**12**

E. Provide a one- or two-sentence description of each required or elective course.

SCM 3005 Supply Chain Management (3 credit hours) Supply chain management is the study of the end-to-end coordination of physical, information, and financial flows across globally dispersed companies from raw material inputs to delivery of products and services to customers and end consumers.

SCM 3570 Global Sourcing (3 credit hours) This course is a study of global sourcing in supply chain management including analysis of the sourcing environment as well as components of the international distribution system. The emphasis is on information flows and the application of quantitative techniques used to establish and control strategic sourcing.

SCM 4210 Logistics & Physical Distribution Management (3 credit hours) A study of supply chain management methods focused on delivering optimal customer service levels through the efficient and effective management of inventory, transportation, material handling, information, and facilities.

SCM 4202 Supply Chain Analytics (3 credit hours) This course introduces students to software tools and decision support models that are frequently used in the design and operation of integrated global supply chains.

SCM 4721 Global Commerce (3 credit hours) This course provides a comprehensive overview of the fundamentals of global commerce including the logistics of importing and exporting. The course focuses on the impact of global logistics on world trade.

SCM 4940 Supply Chain Internship (3 credit hours) This course consists of two components – an academic component that focuses on professional development skills and an on-site experiential learning component comprised of a minimum of 120 hours in an on-site experience.

SCM 4890 Supply Chain Capstone Project (3 credit hours) This course integrates supply chain management knowledge and applies it to decision making across major functional roles within firms in managing global supply chains.

F. For degree programs in the science and technology disciplines, discuss how industry-driven competencies were identified and incorporated into the curriculum and indicate whether any industry advisory council exists to provide input for curriculum development and student assessment.

As noted previously, the curriculum for this program was developed with the guidance of the advisory board of senior supply chain managers for the Center for Supply Chain Management & Sustainability (CSCMS). A working group of volunteers drawn from the advisory board (Curriculum Working Group) developed a list of knowledge and skills that were then mapped into the courses. Technical skills -- including introduction to software applications and analytical skills -- play a critical role in global supply chain management. In addition, the Curriculum Working Group as well as the full advisory board emphasized the need for development of communication, critical thinking, and leadership skills.

The business partners that comprise the advisory board of the CSCMS meet annually. This group will continue to provide guidance and oversight of the overall quality and relevance of the B.S./SCM program. Feedback about student performance will be solicited from employers in the internship and field-based supply chain capstone courses. The capstone course will serve to collect data for the Assurance of Learning for the B.S./SCM program.

G. For all programs, list the specialized accreditation agencies and learned societies that would be concerned with the proposed program. Will the university seek accreditation for the program if it is available? If not, why? Provide a brief timeline for seeking accreditation, if appropriate.

The Muma College of Business was successfully reaccredited by AACSB in 2018. The AACSB reaccreditation process takes place every five years. The B.S./SCM will be reviewed in the next reaccreditation cycle which will begin with an internal program review in 2021-2022 in preparation for a site visit in 2022-2023.

H. For doctoral programs, list the accreditation agencies and learned societies that would be concerned with corresponding bachelor's or master's programs associated with the proposed program. Are the programs accredited? If not, why?

Not applicable. This is not a doctoral program.

I. Briefly describe the anticipated delivery system for the proposed program (e.g., traditional delivery on main campus; traditional delivery at branch campuses or centers; or nontraditional delivery such as distance or distributed learning, self-paced instruction, or external degree programs). If the proposed delivery system will require specialized services or greater than normal financial support, include projected costs in Table 2 in Appendix A. Provide a narrative describing the feasibility of delivering the proposed program through collaboration with other universities, both public and private. Cite specific queries made of other institutions with respect to shared courses, distance/distributed learning technologies, and joint-use facilities for research or internships.

The courses in the B.S./SCM will be delivered in face-to-face courses on the USF campuses. No special facilities or extraordinary financial support are required for the degree.

IX. Faculty Participation

A. Use Table 4 in Appendix A to identify existing and anticipated full-time (not visiting or adjunct) faculty who will participate in the proposed program through Year 5. Include (a) faculty code associated with the source of funding for the position; (b) name; (c) highest degree held; (d) academic discipline or specialization; (e) contract status (tenure, tenure-earning, or multi-year annual [MYA]); (f) contract length in months; and (g) percent of annual effort that will be directed toward the proposed program (instruction, advising, supervising internships and practica, and supervising thesis or dissertation hours).

Table 4 displays the faculty who will deliver the courses in the B.S./SCM. All faculty are currently employed by USF.

Dr. Donna Davis, Professor, Marketing & Supply Chain Management
Dr. Rob Hooker, Associate Professor, Marketing & Supply Chain Management
Ms. Kerry Walsh, Instructor, Marketing & Supply Chain Management
Dr. Seckin Ozkul, Instructor, Supply Chain Management

B. Use Table 2 in Appendix A to display the costs and associated funding resources for existing and anticipated full-time faculty (as identified in Table 4 in Appendix A). Costs for visiting and adjunct faculty should be included in the category of Other Personnel Services (OPS). Provide a narrative summarizing projected costs and funding sources.

The costs associated with the B.S./SCM program are exclusively related to the faculty effort devoted to teaching the courses in the program. These faculty members are currently teaching the courses in the 12-hour supply chain management concentration along with various required and elective courses in the marketing program. Their salaries are completely funded by E&G funds. The budget assumes a 2% increase in salary and fringe benefits across the five-year projection.

C. Provide in the appendices the abbreviated curriculum vitae (CV) for each existing faculty member (do not include information for visiting or adjunct faculty).

See Appendix D for the faculty CV's.

D. Provide evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service. Such evidence may include trends over time for average course load, FTE productivity, student HC in major or service courses, degrees granted, external funding attracted, as well as qualitative indicators of excellence.

The B.S./SCM will be housed in the Department of Marketing in the Muma College of Business. Currently, the 12-hour supply chain management concentration is an option for marketing majors. Faculty associated with the new degree are members of the Department of Marketing where they teach courses in the supply chain concentration and the marketing major. The following statistics are for the Department of Marketing.

	2014-2015	2015-2016	2016-2017	2017-2018
Average course load	4.2	4.2	3.9	3.9
HC enrollment	549	571	559	593
Number of degrees awarded	261	278	257	265
Scholarly publications	19	25	20	26
External grants	$518,118	$437,244	$1,008,143	$642,377

The faculty who currently teach the supply chain management courses are heavily involved in service at all levels. All are active members of the Council for Supply Chain Management Professionals (CSCMP), the global association for supply chain managers and educators. While he teaches courses only at the graduate level, Dr. James Stock is a founding faculty member in USF's supply chain program. Dr. Stock is a Distinguished University Professor, Fulbright Core Scholar, and member of the American Association for the Advancement of Science. Dr. Donna Davis is a member of the Muma College of Business leadership team in her role as chair of the Department of Marketing. Dr. Rob Hooker is a Fulbright Specialist in the area of supply chain management. Dr. Seckin Ozkul serves on multiple committees for the Transportation Research Board. Kerry Walsh has served as faculty advisor of the CSCMP Student Roundtable at USF since its inception in 2014.

X. Non-Faculty Resources

A. Describe library resources currently available to implement and/or sustain the proposed program through Year 5. Provide the total number of volumes and serials available in this discipline and related fields. List major journals that are available to the university's students. Include a signed statement from the Library Director that this subsection and subsection B have been reviewed and approved.

Part I – Overview of USF Libraries, Mission, and Program/Discipline Strengths

The University of South Florida's Libraries consist of USF's main research library, located on the Tampa

Campus and the Hinks and Elaine Shimberg Health Sciences Library, the Nelson Poynter Memorial Library, USF St. Petersburg campus; and the Jane Bancroft Cook Library, which is a joint-use facility shared with New College of Florida and the USF Sarasota-Manatee campus.

The USF Libraries serve as the nexus for the teaching, learning, and research for the faculty and students at the University of South Florida. Together, the USF Libraries provide access to more than 2 million volumes and an extensive collection of electronic resources including over 58,975 e-journal subscriptions and 927 aggregator databases, 580,000 e-books, and 826,000 digital images. In addition, students have access to over 60,000 audio/visual materials including videos, CDs, and DVDs.

In addition to extensive electronic and print resources, the USF Tampa Library offer unique access to primary research materials through Special & Digital Collections. Specializations include: Florida Studies Center Collection, the Children and Young Adult Literature Collection, the Science Fiction & Fantasy Collection, the Holocaust and Genocide Studies Center Collection, the Arts Collection, the Literature & Book Arts Collection, the University Archives, and Digital Collections, which provide online access to many materials from Special Collections, as well as collections digitized through partnerships with other libraries and repositories.

The library endeavors to develop and maintain a collection that will satisfy the needs for resources that support the undergraduate and graduate curriculum for the Supply Chain Management program in the Muma College of Business Marketing Department as well as serve the more specialized demands from graduate students and faculty for more advanced research materials.

Part II - USF Libraries' Collections
MONOGRAPHS (Print and Ebooks)

The numbers of both print and electronic monographs below were derived from searching the library's catalog for book titles by Library of Congress Subject Headings relevant to the Supply Chain Management program.

Library of Congress Subject Heading	Call Number	Print	Electronic
Business Logistics	HD38.5	115	376
Inventory Control	TS160-TS163	67	70
Industrial Management	HD28-HD70	9861	8093
Industrial Procurement	HD39.5	42	49
Management Science	T55.4-T57.97	793	761
Marketing Management	HF5415.13	1233	283
Marketing Channels	HF5415.129	23	5
Materials Management	TS161	28	32
Operations Research	T57.6-T57.97	498	451
Physical Distribution of Goods	HF5415.6	6	5
Shipment of Goods	HF5761-HF5780	33	11
Total		**12,699**	**10,136**

Additional ebooks without Library of Congress Subject Headings

- 1,825 (Book titles with "Supply Chain Management" in the title, abstract, or author fields)
    - 357 (Ebook titles containing "Supply Chain Management")

Total Number of Monographs

- Print = 12,699
- Electronic = 11,961

B. Describe additional library resources that are needed to implement and/or sustain the program through Year 5. Include projected costs of additional library resources in Table 2 in Appendix A. Please include the signature of the Library Director in Appendix B.

No additional resources will be required. The current library resources are sufficient for the program.

C. Describe classroom, teaching laboratory, research laboratory, office, and other types of space that are necessary and currently available to implement the proposed program through Year 5.

Classroom space and office space are the only resources needed for the program. The B.S./SCM will add up to three classes each semester that will need to be assigned classroom space. We will be able to accommodate these courses within current space allocations. All faculty are in currently assigned office space; hence, no new office space is needed.

D. Describe additional classroom, teaching laboratory, research laboratory, office, and other space needed to implement and/or maintain the proposed program through Year 5. Include any projected Instruction and Research (I&R) costs of additional space in Table 2 in Appendix A. Do not include costs for new construction because that information should be provided in response to X (E) below.

No additional classroom or office space is required. Existing classroom and office space is sufficient.

E. If a new capital expenditure for instructional or research space is required, indicate where this item appears on the university's fixed capital outlay priority list. Table 2 in Appendix A includes only Instruction and Research (I&R) costs. If non-I&R costs, such as indirect costs affecting libraries and student services, are expected to increase as a result of the program, describe and estimate those expenses in narrative form below. It is expected that high enrollment programs in particular would necessitate increased costs in non-I&R activities.

No capital expenditure for instructional or research space is required.

F. Describe specialized equipment that is currently available to implement the proposed program through Year 5. Focus primarily on instructional and research requirements.

No specialized equipment is required to implement or sustain the program.

G. Describe additional specialized equipment that will be needed to implement and/or sustain the proposed program through Year 5. Include projected costs of additional equipment in Table 2 in Appendix A.

No specialized equipment is required to implement or sustain the program.

H. Describe any additional special categories of resources needed to implement the program through Year 5 (access to proprietary research facilities, specialized services, extended travel, etc.). Include projected costs of special resources in Table 2 in Appendix A.

No additional special categories of resources are needed to implement the program.

I. Describe fellowships, scholarships, and graduate assistantships to be allocated to the proposed program through Year 5. Include the projected costs in Table 2 in Appendix A.

No fellowship, scholarships, or graduate assistantships will be allocated to the program.

J. Describe currently available sites for internship and practicum experiences, if appropriate to the program. Describe plans to seek additional sites in Years 1 through 5.

Internships are currently offered at multiple locations in the Greater Tampa Bay region. Students who complete the supply chain management concentration are required to complete a minimum of one internship; many complete multiple internships. Companies that have hired USF interns with the supply chain management concentration include:

Amazon	Deloitte	Masonite
Ashley Furniture	Honeywell Aerospace	Mosaic
Bloomin' Brands, Inc.	Hybrid Logistics	Patterson Companies
Blue Grace Logistics	Jabil	Ravago Americas
Bristol-Myers Squibb	Johnson & Johnson	Reed TMS
C.H.Robinson	Keuhne + Nagel	Saddle Creek Logistics
ChopTank	Knight Refrigerated	Target
Datex International	Marten Transport	Tech Data

These companies will continue to provide internship opportunities when the B.S./SCM program is launched and the concentration is discontinued. We continue to add new internships by expanding the number of internships with existing companies and adding new companies to the list as the word spreads about the USF supply chain management program.

APPENDIX A

TABLE 1-A
PROJECTED HEADCOUNT FROM POTENTIAL SOURCES
(Baccalaureate Degree Program)

Source of Students (Non-duplicated headcount in any given year)*	Year 1		Year 2		Year 3		Year 4		Year 5	
	HC	FTE	HC	FTE	HC	FTE	HC	FTE	HC	FTE
Upper-level students who are transferring from other majors within the university**	20	20	10	10	0	0	0	0	0	0
Students who initially entered the university as FTIC students and who are progressing from the lower to the upper level***	25	25	45	45	55	55	60	60	75	75
Florida College System transfers to the upper level***	10	10	20	20	40	40	60	60	70	70
Transfers to the upper level from other Florida colleges and universities***	2	2	2	2	2	2	2	2	2	2
Transfers from out of state colleges and universities***	3	3	3	3	3	3	3	3	3	3
Other (Explain)***	0	0	0	0	0	0	0	0	0	0
Totals	60	60	80	80	100	100	125	125	150	150

* List projected annual headcount of students enrolled in the degree program. List projected yearly cumulative ENROLLMENTS instead of admissions.

** If numbers appear in this category, they should go DOWN in later years.

*** Do not include individuals counted in any PRIOR CATEGORY in a given COLUMN.

APPENDIX A

TABLE 2

PROJECTED COSTS AND FUNDING SOURCES

Instruction & Research Costs (non-cumulative)	Year 1								Year 5						
	Funding Source							Subtotal coulumns 1+...+7	Funding Source						Subtotal coulumns 9+...+ 14
	Reallocated Base* (E&G)	Enrollment Growth (E&G)	New Recurring (E&G)	New Non-Recurring (E&G)	Contracts & Grants (C&G)	Philanthropy Endowments	Enterprise Auxiliary Funds		Continuing Base** (E&G)	New Enrollment Growth (E&G)	Other*** (E&G)	Contracts & Grants (C&G)	Philanthropy Endowments	Enterprise Auxiliary Funds	
Columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Faculty Salaries and Benefits	389,673	0	0	0	0	0	0	$389,673	421,795	0	0	0	0	0	$421,795
A & P Salaries and Benefits	0	0	0	0	0	0	0	$0	0	0	0	0	0	0	$0
USPS Salaries and Benefits	0	0	0	0	0	0	0	$0	0	0	0	0	0	0	$0
Other Personal Services	0	0	0	0	0	0	0	$0	0	0	0	0	0	0	$0
Assistantships & Fellowships	0	0	0	0	0	0	0	$0	0	0	0	0	0	0	$0
Library	0	0	0	0	0	0	0	$0	0	0	0	0	0	0	$0
Expenses	0	0	0	0	0	0	0	$0	0	0	0	0	0	0	$0
Operating Capital Outlay	0	0	0	0	0	0	0	$0	0	0	0	0	0	0	$0
Special Categories	0	0	0	0	0	0	0	$0	0	0	0	0	0	0	$0
Total Costs	**$389,673**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	$389,673	$421,795	$0	$0	$0	$0	$0	$421,795

*Identify reallocation sources in Table 3.

**Includes recurring E&G funded costs ("reallocated base," "enrollment growth," and "new recurring") from Years 1-4 that continue into Year 5.

***Identify if non-recurring.

Faculty and Staff Summary

Total Positions	Year 1	Year 5
Faculty (person-years)	1.88	1.88
A & P (FTE)	0	0
USPS (FTE)	0	0

Calculated Cost per Student FTE

	Year 1	Year 5
Total E&G Funding	$389,673	$421,795
Annual Student FTE	60	150
E&G Cost per FTE	$6,495	$2,812

APPENDIX A

TABLE 3
ANTICIPATED REALLOCATION OF EDUCATION & GENERAL FUNDS*

Program and/or E&G account from which current funds will be reallocated during Year 1	Base before reallocation	Amount to be reallocated	Base after reallocation
Marketing - Supply Chain concentration	389,673	389,673	$0
	0	0	
	0	0	
	0	0	
	0	0	
	0	0	
Totals	$389,673	$389,673	$0

* If not reallocating funds, please submit a zeroed Table 3

APPENDIX A

TABLE 4
ANTICIPATED FACULTY PARTICIPATION

Faculty Code	Faculty Name or "New Hire" Highest Degree Held Academic Discipline or Speciality	Rank	Contract Status	Initial Date for Participation in Program	Mos. Contract Year 1	FTE Year 1	% Effort for Prg. Year 1	PY Year 1	Mos. Contract Year 5	FTE Year 5	% Effort for Prg. Year 5	PY Year 5
A	Donna Davis, Ph.D. Supply Chain Management	Professor	Tenure	Fall 2019	9	0.75	0.50	0.38	9	0.75	0.50	0.38
A	Rob Hooker, Ph.D Supply Chain Management	Assoc. Prof.	Tenure	Fall 2019	9	0.75	0.75	0.56	9	0.75	0.75	0.56
A	Seckin Ozkul, Ph.D. Transportation Management	Instructor I	MYA	Fall 2019	9	0.75	0.25	0.19	9	0.75	0.25	0.19
A	Kerry Walsh, M.S. Supply Chain Management	Instructor I	MYA	Fall 2019	9	0.75	1.00	0.75	9	0.75	1.00	0.75
	Total Person-Years (PY)							1.88				1.88

Faculty Code		Source of Funding	PY Workload by Budget Classsification Year 1	Year 5
A	Existing faculty on a regular line	Current Education & General Revenue	1.88	1.88
B	New faculty to be hired on a vacant line	Current Education & General Revenue	0.00	0.00
C	New faculty to be hired on a new line	New Education & General Revenue	0.00	0.00
D	Existing faculty hired on contracts/grants	Contracts/Grants	0.00	0.00
E	New faculty to be hired on contracts/grants	Contracts/Grants	0.00	0.00
		Overall Totals for **Year 1**	1.88	**Year 5** 1.88

Revised December 8, 2016

APPENDIX B

Please include the signature of the Equal Opportunity Officer and the Library Director.

Carrie Blake for Cecil Howard 1/29/2019

Signature of Equal Opportunity Officer Date

11/21/18

Signature of Library Director Date

This appendix was created to facilitate the collection of signatures in support of the proposal. Signatures in this section illustrate that the Equal Opportunity Officer has reviewed section II.E of the proposal and the Library Director has reviewed sections X.A and X.B.

APPENDIX C

- Academic Learning Compact
- B.S./SCM 8-Semester Plan
- B.S./SCM 4-Semester Plan for Transfer Students
- Data related to the need for another degree program in the state
- Letters of support

ACADEMIC LEARNING COMPACT
Supply Chain Management, Undergraduate, B.S.
Mission Statement

The **University of South Florida Muma College of Business** emphasizes creativity and analytics to promote student success, produce scholarship with impact, and engage with all stakeholders in a diverse global environment. The Supply Chain Management major prepares students for initial entry-level positions in supply chain management. The curriculum focuses on knowledge and skill development related to the management of global supply chains. In addition, the curriculum provides for the development of skills in critical thinking, quantitative analysis, oral communication, and written communication.

Goal 1: Discipline Specific Knowledge and Skills

1a. Student Learning Outcome Statement
Students will demonstrate the ability to explain the importance of supply chain management in a global business environment.

1b. Method of Assessment
Faculty in the capstone course SCM 4890 Supply Chain Capstone Project will use a rubric to grade an individual case study completed by every student. The rubric is scaled from 1 - 4 (1=unacceptable, 2=needs improvement, 3=Good, 4=excellent) across three dimensions, one of which is the ability to explain the importance of supply chain management in a global business environment. The other two dimensions are used to assess other learning outcomes. The rubric was developed internally by supply chain faculty. In order to calibrate ratings, a group of faculty met to score artifacts of student work and discuss what denoted one rating from another. Two instructors will use the rubric to evaluate each case; differences will be resolved in a discussion between the instructors.

1c. Performance Targets
At least 90% of students will score 3 (Good) or higher; at least 45% will score 4 (Excellent).

2a. Student Learning Outcome Statement
Students will demonstrate the ability to describe the dynamics of relationships among firms in a global supply chain.

2b. Method of Assessment
Faculty in the capstone course SCM 4890 Supply Chain Capstone Project will use a rubric to grade an individual case study completed by every student. The rubric is scaled from 1 - 4 (1=unacceptable, 2=needs improvement, 3=Good, 4=excellent) across three dimensions, one of which is the ability to describe the dynamics of relationships among firms in a global supply chain. The other two dimensions are used to assess other learning outcomes. The rubric was developed internally by supply chain faculty. In order to calibrate ratings, a group of faculty met to score artifacts of student work and discuss what denoted one rating from another. Two instructors will use the rubric to evaluate each case; differences will be resolved in a discussion between the instructors.

2c. Performance Targets
At least 90% of students will score 3 (Good) or higher; at least 45% will score 4 (Excellent).

3a. Student Learning Outcome Statement
Students will demonstrate the ability to discuss the legal and ethical issues related to global supply chain management.

3b. Method of Assessment
Faculty in the capstone course SCM 4890 Supply Chain Capstone Project will use a rubric to grade an individual case study completed by every student. The rubric is scaled from 1 - 4 (1=unacceptable, 2=needs improvement, 3=Good, 4=excellent) across three dimensions, one of which is the ability to discuss the legal and ethical issues related to global supply chain management. The other two dimensions are used to assess other learning outcomes. The rubric was developed internally by supply chain faculty. In order to calibrate ratings, a group of faculty met to score artifacts of student work and discuss what denoted one rating from another. Two instructors will use the rubric to evaluate each case; differences will be resolved in a discussion between the instructors.

3c. Performance Targets
At least 90% of students will score 3 (Good) or higher; at least 45% will score 4 (Excellent).

Goal 2: Critical Thinking Skills

1a. Student Learning Outcome Statement
Students will demonstrate the ability to conduct analyses used in day-to-day operations of global supply chains including inventory, transportation, warehousing, and network design analyses.

1b. Method of Assessment
Faculty in SCM 4202 Supply Chain Analytics will assess individual in-class assignments. The assignments will be four problems that evaluate the student's ability to conduct analyses across four areas: inventory, transportation, warehousing, and network design

1c. Performance Targets
At least 80% of students will score 70% or higher on each of the four areas; at least 50% will score 80% or higher on each area.

2a. Student Learning Outcome Statement
Students will demonstrate the ability to utilize business analytics and data visualization software to conduct SCM analyses.

2b. Method of Assessment
Faculty in SCM 4202 Supply Chain Analytics will assess four individual in-class assignments. The assignments will be four problems that require the use of advanced Excel tools (e.g., Solver, V-Lookup, Macros) and data visualization software (e.g., Tableau).

2c. Performance Targets
At least 90% of students will score 80% or higher on the use of advanced Excel tools; at least 60% will score 80% or higher on the use of Tableau.

3a. Student Learning Outcome Statement
Students will demonstrate the ability to conduct trade-off analyses for the optimization of supply chain operations.

3b. Method of Assessment
Faculty in SCM 4202 Supply Chain Analytics will assess four individual in-class assignments. The assignments will be four problems that require trade-off analyses. Scores across all four assignments will be averaged.

3c. Performance Targets
At least 90% of students will score 70% or higher across all four assignments; at least 45% will score 80% or higher across all four assignments.

Goal 3: Communication Skills

1a. Student Learning Outcome Statement
Students will demonstrate the ability to effectively present information and analyses in oral presentations and discussions.

1b. Method of Assessment
Faculty in the capstone course SCM 4890 Supply Chain Capstone Project will use a rubric to evaluate a video of a presentation completed by every student. The rubric is scaled from 1 - 4 (1=unacceptable, 2=needs improvement, 3=Good, 4=excellent) across four dimensions: organization, visual aids, topic knowledge, stage presence). The rubric was developed internally by supply chain faculty. In order to calibrate ratings, a group of faculty met to score artifacts of student work and discuss what denoted one rating from another. Two instructors will grade each video; ratings will be averaged to calculate a final score for each student.

1c. Performance Targets
At least 90% of students will score 3 (Good) or higher; 45% will score 4 (Excellent).

2a. Student Learning Outcome Statement
Students will demonstrate the ability to communicate analyses and recommendations in written form.

2b. Method of Assessment
Faculty in the capstone course SCM 4890 Supply Chain Capstone Project will use a rubric to evaluate a common individual case completed by every student. The rubric is scaled from 1 - 4 (1=unacceptable, 2=needs improvement, 3=Good, 4=excellent) across four dimensions: organization, effectiveness, justification of recommendations, professional writing. The rubric was developed internally by supply chain faculty. In order to calibrate ratings, a group of faculty met to score artifacts of student work and discuss what denoted one rating from

another. Two instructors will grade each case; ratings will be averaged to calculate a final score for each student.

2c. Performance Targets
At least 90% of students will score 3 (Good) or higher; 45% will score 4 (Excellent).

Revised December 8, 2016

Curriculum Map

		SCM 3005 Supply Chain Management	SCM 3570 Global Sourcing	SCM 4210 Logistics & Physical Distribution	SCM 4202 Supply Chain Analytics	SCM 4723 Global Commerce	SCM 4940 Supply Chain Internship	SCM 4890 Supply Chain Capstone Project
Discipline Specific Knowledge and Skills								
LO1	Students will demonstrate the ability to explain the importance of supply chain management in a global business environment;	I		R		M		A
LO2	Students will demonstrate the ability to describe the dynamics of relationships among firms in a global supply chain	I	R	R		M		A
LO3	Students will demonstrate the ability to discuss the legal and ethical issues related to global supply chain management	I	R	R		M		A
Critical Thinking								
LO1	Students will demonstrate the ability to conduct analyses used in day-to-day operations of global supply chains including inventory, transportation, warehousing, and network design analyses.	I	R	M	A		R	
LO2	Students will demonstrate the ability to utilize business analytics and data visualization software to conduct SCM analyses.	I	R	M	A		R	
LO3	Students will demonstrate the ability to conduct trade-off analyses for the optimization of supply chain operations.	I	R	M	A		R	
Communication Skills								
LO1	Students will demonstrate the ability to effectively present information and analyses in oral presentations and discussions.	I		R	M		R	A
LO2	Students will demonstrate the ability to communicate analyses and recommendations in written form.	I		R	M		R	A

Revised December 8, 2016

SUPPLY CHAIN MANAGEMENT 8-SEMESTER PLAN *

Semester 1	Credit Hours	Semester 2	Credit Hours
ENC 1101 Composition I	3	Elective	3
MAC 2233 or MAC 2241 or MAC 2281 or MAC 2311	3	ENC 1102 Composition II	3
CGS 2100 Computers in Business	3	Gen Ed\State GE Core Humanities	3
SPC 2608 Public Speaking	3	Gen Ed\State GE Natural Science	3
SLS 2901 or Nonbusiness Elective	3	ECO 2013 Economic Principles (Macro)	3
Semester Total	**15**	**Semester Total**	**15**
Summer			
Summer Opportunities			

Semester 3	Credit Hours	Semester 4	Credit Hours
ACG 2021 Principles of Financial Accounting	3	QMB 2100 Business & Economic Statistics I	3
ECO 2023 Economic Principles	3	ACG 2071 Principles of Managerial Accounting	3
Elective	3	MAR 3023 Basic Marketing	3
SCOV Civics Literacy	3	Elective	3
GEB 3033 Business Workplace Skills & Best Practices	3	Elective	3
Semester Total	**15**	**Semester Total**	**15**
Summer			
QMB 3200 Business & Economic Statistics II	3		
SCM 4504 Operations & Supply Chain Management	3		
Semester Total	**6**		

Semester 5	Credit Hours	Semester 6	Credit Hours
ENC 3250 or ENC 3301	3	MAN 3025 Principles of Management	3
SCM 3005 Supply Chain Management	3	FIN 3403 Principles of Finance	3
ISM 3011 Information Systems in Organizations	3	**SCM 3570 Global Sourcing**	3
Elective	3	**SCM 4210 Logistics & Physical Distribution Mgmt**	3
Elective	3		
Semester Total	**15**	**Semester Total**	**12**
Summer			
SCM 4940 Supply Chain Internship	**3**		

Semester 7	Credit Hours	Semester 8	Credit Hours
BUL 3320 Law & Business I\Human & Cultural Diff	3	GEB 4890 Strategic Management & Decision Making	3
SCM 4202 Supply Chain Analytics	**3**	**SCM 4824 Supply Chain Capstone Project**	3
SCM 4721 Global Commerce	**3**	Non-Business Elective	3
Elective	3	Elective	3
Semester Total	**12**	**Semester Total**	**12**

Revised December 8, 2016

SUPPLY CHAIN MANAGEMENT 4-SEMESTER PLAN FOR TRANSFER STUDENTS

Semester 1	Credit Hours	Semester 2	Credit Hours
ENC 3250 or ENC 3301	3	MAN 3025 Principles of Management	3
SCM 3005 Supply Chain Management	3	FIN 3403 Principles of Finance	3
ISM 3011 Information Systems in Organizations	3	**SCM 3570 Global Sourcing**	3
QMB 3200 Business & Economic Statistics II	3	**SCM 4210 Logistics & Physical Distribution Mgmt**	3
SCM 4504 Operations & Supply Chain Management	3	GEB 3033 Business Workplace Skills & Best Practices	3
Semester Total	**15**	**Semester Total**	**15**
Summer			
SCM 4940 Supply Chain Internship	**3**		

Semester 3	Credit Hours	Semester 4	Credit Hours
BUL 3320 Law & Business I\Human & Cultural Diff	3	GEB 4890 Strategic Management & Decision Making	3
SCM 4202 Supply Chain Analytics	**3**	**SCM 4824 Supply Chain Capstone Project**	3
SCM 4721 Global Commerce	**3**	Elective	3
Elective	3	Elective	3
Elective	3	Elective	3
Semester Total	**15**	**Semester Total**	**15**

Data related to the need for another degree in the state

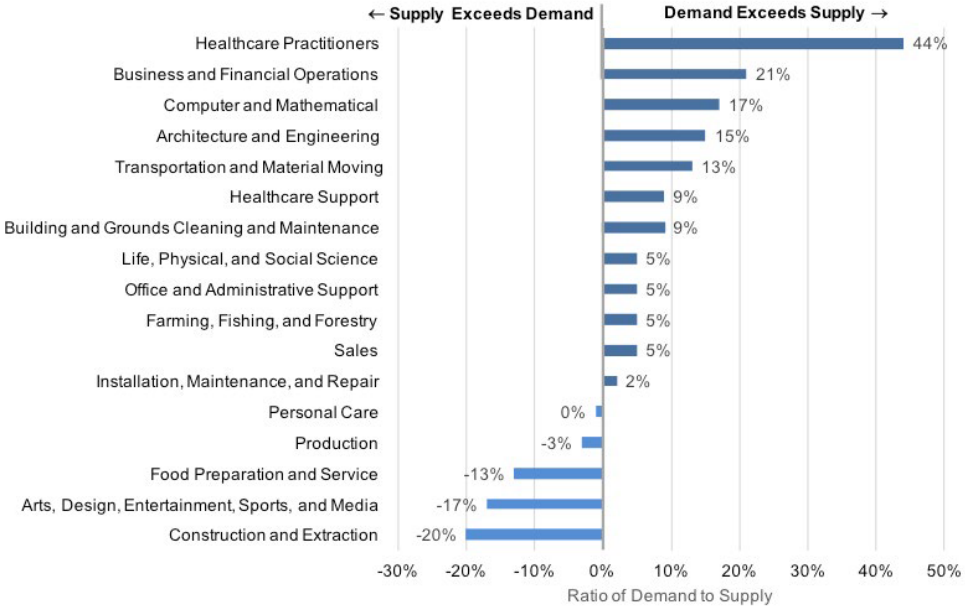
Growth in the Trade, Transportation, and Utilities industry sector is the underlying force that drives demand for supply chain management professionals in the state of Florida and the nation. The Florida Department of Economic Opportunity reports that the Trade and Transportation sector (excluding Utilities) accounts for over 1.7 million jobs in Florida (see Appendix C Table 1). This number is expected to grow by nearly 125,000 jobs from 2018 to 2026, an increase of 7.5%. In 2018, there were 51,027 job vacancies in Florida in this sector; that is, 3% of the available jobs were not filled.

The demand for Logisticians (minimum of Bachelor's degree required) in Florida is estimated at 6,721 in 2018 (see Appendix C Table 1). This number is expected to grow by 785 jobs to 7,506 by 2026, an increase of 11.7%.

The most recent BOG report of graduates from Florida institutions (2015-2016) shows only 40 degrees awarded in the 52.0203 CIP (Logistics, Materials & Supply Management): 34 from University of North Florida and 6 from University of West Florida. While this number will increase as recently introduced programs mature, the gap between demand and supply continues to grow.

A study by Burning Glass (2018) displayed on Figure 1 shows that the skills gap for the Transportation and Materials Handling sector is among the top five in the country, weighing in at a 13% shortage.

Figure 1. Demand/Supply Ratio by Occupation



Revised December 8, 2016

Table 1. JOBS BY INDUSTRY IN FLORIDA

FLORIDA DEPARTMENT OF ECONOMIC OPPORTUNITY

NAICS Code	NAICS Title	Employment 2018	Employment 2026	Growth	Percent Growth
11	**Management Occupations - Logisticians**	**6,721**	**7,506**	**785**	**11.7**
	Trade and Transportation	1,724,908	1,849,680	124,772	7.5
42	*Wholesale Trade*				
423	Merchant Wholesalers, Durable Goods	179,802	192,468	12,666	7.0
424	Merchant Wholesalers, Nondurable Goods	128,256	136,896	8,640	6.7
425	Wholesale Electronic Markets and Agents and Brokers	43,936	47,473	3,537	8.1
44	*Retail Trade*				
441	Motor Vehicle and Parts Dealers	151,499	164,386	12,887	8.5
442	Furniture and Home Furnishings Stores	38,810	40,525	1,715	4.4
443	Electronics and Appliance Stores	40,827	42,561	1,734	4.3
444	Building Material and Garden Equipment and Supplies Dealers	88,651	95,081	6,430	7.3
445	Food and Beverage Stores	228,561	243,215	14,654	6.4
446	Health and Personal Care Stores	82,885	92,848	9,963	12.0
447	Gasoline Stations	46,675	49,595	2,920	6.3
448	Clothing and Clothing Accessories Stores	112,135	112,392	257	0.2
451	Sporting Goods, Hobby, Book, and Music Stores	37,942	43,255	5,313	14.0
452	General Merchandise Stores	214,407	226,092	11,685	5.5
453	Miscellaneous Store Retailers	56,729	59,842	3,113	5.5
454	Nonstore Retailers	44,128	50,248	6,120	13.9
48	*Transportation and Warehousing*				
481	Air Transportation	42,589	48,017	5,428	12.8
482	Rail Transportation	4,948	4,679	-269	-5.4
483	Water Transportation	13,387	14,170	783	5.9
484	Truck Transportation	54,315	58,502	4,187	7.7
485	Transit and Ground Passenger Transportation	16,373	18,232	1,859	11.4
486	Pipeline Transportation	368	390	22	6.0
488	Support Activities for Transportation	60,800	67,330	6,530	10.7
493	Warehousing and Storage	36,885	41,483	4,598	12.5

February 27, 2019

Dr. Moez Limayem
Muma College of Business
University of South Florida
4202 East Fowler Avenue
Tampa, FL 33620-5500

Dean Limayem,

The purpose of this letter is to provide support for USF's two proposed degree programs in supply chain management- the Bachelor of Science degree in supply chain management- and the Master of Science degree in supply chain management. Both degrees address a major talent shortfall within the global supply chain management industry space. Additionally, supply chain salaries for graduates are higher than most starting salaries for most other occupations. Placement rates for students concentrating in SCM have exceeded 90% for the past few years and with B.S. and M.S. programs, the hiring rates could even be higher.

The content and specific courses to be offered were created utilizing a partnership between industry practitioners and faculty at USF's Center for Supply Chain Management & Sustainability. The proposed M.S./SCM degree program is the first of its kind to leverage a USF partnership with MIT in that several courses are offered online by MIT. This helps reduce program costs for students and enables USF faculty to add additional electives and innovative courses to the programs, such as Sustainable Supply Chain Management, Global Sourcing, and others.

Supply Chain is now part of the STEM initiative, thus the promotion and emphasis on needed skills. These degrees are very attractive to the female student as a favorable altermative to computer science and engineering. Individuals in the programs develop skillsets that allow them to contribute to their future employers immediately after they are hired.

These programs are worthwhile and fill a need in the marketplace. I am pleased to provide my support for these programs. If you have any questions, do not hesitate to contact me.

Sincerely,

Monica B. Wooden
Co-founder MercuryGate International, Inc.
mbw@mercurygate.com
813-505-6235

February 25, 2019

Moez Limayem
Muma College of Business
University of South Florida
4202 East Fowler Avenue
Tampa, FL 33620-5500

Dear Dean Limayem

The purpose of this letter is to highlight my support for the two proposed degree programs in supply chain management, at USF's Muma College of Business. While geared for individuals at different stages in their careers, both the BS and MS programs address a critical talent shortfall within the global supply chain management industry space. Whether dealing with the trade imbalance issues in Florida, or working on other national and/or global supply chain initiatives, our economy needs individuals with these skills.

The proposed programs were created through an industry/academic collaboration featuring Muma supply chain faculty and executive advisory board members of the Center for Supply Chain Management & Sustainability. Therefore, the learning objectives were developed to address current and future needs in this high-growth field. The BS/SCM program helps to address critical workforce, economic development, and STEM education needs through courses emphasizing global logistics, transportation, and manufacturing. Targeted to managers, the proposed MS/SCM degree program helps seasoned supply chain professionals build and refine their skills, enabling them to further their careers in management and executive roles. This program is the first of its kind to leverage a USF partnership with MIT for content delivery. This helps reduce costs for students, while opening up opportunities for them to continue with graduate coursework in a one-of-a-kind format.

The innovative programs highlighted above are very much needed in and across industries. They help individuals continue to develop their skills in ways that allow them to tackle problems not even yet invented. Please accept my support of these programs, and feel free to contact me with questions.

Sincerely,

Michael Armanious

10320 49th Street North Clearwater Fl 33762
727.571.4159 | **datexcorp.com**

FIU | Office of the Provost
FLORIDA INTERNATIONAL UNIVERSITY

April 15, 2019

Dr. Ralph C. Wilcox
Provost and Executive Vice President
University of South Florida
4242 East Fowler Avenue, CGS 401
Tampa, FL 33620

Dear Provost Wilcox:

Thank you for the opportunity to review both the proposed BS and MS Logistics, Materials, and Supply Chain Management. Florida International University is supportive of your creating separate degree programs in this field.

As FIU continues to work within the Florida Consortium of Metropolitan Research Universities with your institution, we look forward to following your success in the degree implementations and continuing our collaborative efforts. The Supply Chain faculty in FIU's Marketing Department expect there to be opportunities in the future to work together on solving some of Florida's supply chain challenges.

Sincerely,

Kenneth G. Furton
Provost and Executive Vice President

Kenneth G. Furton
Provost and Executive Vice President
Modesto A. Maidique Campus, PC 526, 11200 SW 8 Street, Miami, FL 33199
Tel 305-348-2151 · Fax 305-348-2994 · provost.fiu.edu

Florida Agricultural and Mechanical University
TALLAHASSEE, FLORIDA 32307-3200

Excellence With Caring

TELEPHONE: (850) 599-3276
FAX: (850) 561-2551

OFFICE OF THE PROVOST AND
VICE PRESIDENT FOR ACADEMIC AFFAIRS

April 23, 2019

Dr. Ralph C. Wilcox
Provost and Executive Vice President
University of South Florida
4202 East Fowler Avenue, CGS 401
Tampa, FL 33620-6100

Dear Dr. Wilcox:

Thank you for the opportunity to review the proposal for the new degree program--Bachelors in Logistics, Materials, and Supply Chain Management. Florida Agricultural and Mechanical University (FAMU) currently offers a B.S. in Supply Chain Management (CIP 52.0203). Supply chain is a fast growing industry and the need for professionals trained in this area is significant. The proposed program by USF helps to further address this need along with FAMU and other programs within the SUS offering such a degree. Therefore, FAMU offers full support for the Bachelors in Logistics, Materials, and Supply Chain Management.

Best wishes to your team as they move forward in developing the program. We believe this program will be a benefit to the State University System and workforce of Florida.

Sincerely,

Maurice Edington, Provost and Vice President
for Academic Affairs

c: Dean Shawnta Friday-Stroud
School of Business and Industry

Dr. Sundra Kincey
Assistant VP for Academic Affairs

FAMU IS AN EQUAL OPPORTUNITY/EQUAL ACCESS UNIVERSITY

UNF UNIVERSITY of NORTH FLORIDA

DEPARTMENT OF MARKETING & LOGISTICS

March 27, 2018

Dr. David Swanson
Associate Professor of Transportation and Logistics
Co-Editor-in-Chief *Transportation Journal*
Department of Marketing and Logistics
Coggin College of Business
University of North Florida
1 UNF Drive
Jacksonville, FL 32224

Dean Moez Limayem
Muma College of Business
University of South Florida
4202 E. Fowler Avenue
Tampa, FL 33620

Dear Dr. Limayem,

I was excited to hear that the University of South Florida is nearing the finalization of a BS and MS in Supply Chain Management. I wanted to write a letter in support of your efforts.

The demand for people trained in supply chain management continues to grow, and this demand is outpacing the supply. It's not enough for students to be trained in one aspect of supply chain management, such as transportation, purchasing, or logistics information systems. Industry is requiring students who have a strong understanding of end-to-end supply chain management. The USF degree programs in supply chain management will go a long way toward meeting industry demands in Florida.

In Fall 2019 the University of North Florida will be accepting students who seek a MS degree in Logistics and Supply Chain Management, which closely parallels the USF curriculum for the MS in SCM. You may have heard that Florida International University also has recently approved a graduate degree program in supply chain management. These programs are testimony of the need for supply chain management education, and there is demand in all the economic regions of Florida.

Sincerely,

David

David Swanson, PhD
Associate Professor of Transportation and Logistics
Co-Editor-in-Chief, *Transportation Journal*
University of North Florida

1 UNF Drive, Jacksonville, FL 32224-2645
Tel: (904) 620.2780 Fax: (904) 620.2782
Equal Opportunity/Equal Access/Affirmative Action Institution

University of West Florida

Marketing & Economics
11000 University Parkway
Pensacola, FL 32514-5750

April 3, 2019

Dean Moez Limayem
Muma College of Business
University of South Florida
4202 E. Fowler Avenue
Tampa, FL 33620

Dear Dean Limayem,

It is a privilege to support the efforts of the University of South Florida in establishing Bachelors and Masters Degrees in Supply Chain Management. Having participated in proposing and establishing our supply chain related degrees at UWF, I have researched the state of logistics within Florida and throughout the United States. It is clear to me that graduates, having supply chain management knowledge and skills, are in high demand by industry, yet, there are not enough stand alone supply chain degree programs to meet industry demand.

Trade and logistics has been identified by the Florida Chamber of Commerce as highly important for positioning Florida as a leader among states for global trade and investment. The Florida Trade and Logistics 2013 study concluded the need for 150,000 supply chain related new jobs up to the present. Nationwide, the U.S. Bureau of Labor Statistics indicates an expected 22% growth of jobs related to supply chain management by 2022.

To meet such industry demand, the stand alone supply chain related degrees from our Florida colleges and universities must also grow. Our graduates receive starting salaries among the highest awarded to business graduates; approximate starting annual salaries averaging $50,000 to $60,000 and some exceeding $70,000. Moreover, our students have nearly 100% job placement in a supply chain related position upon graduation. This is very similar to that of our other Florida supply chain degree programs and across the nation, as a whole.

Dean Limayem, without disciplined knowledge in supply chain management, frontline and executive managers are likely to make critical workplace decisions that are more costly and reduce quality of service. Consequently, Florida's goal to gain a competitive advantage in trade and logistics could be jeopardized in the absence of growth among our university supply chain degree programs.

Two publications fully discuss the importance of supply chain knowledge and the state of supply chain and logistics education; "Are You the Weakest Link in Your Supply Chain?" Slone, Mentzer and Dittman, *Harvard Business Review*, 1997, V. 85, No. 9, pp. 116-127; and "The Future of Logistics Education," Ozment and Keller, *Transportation Journal*, 2011, V. 50, No. 1, pp. 65-83. Adding to those, a recent study indicates a 6:1 demand to supply ratio for new college graduates in supply chain management related fields (*Supply Chain Insight*, August 2013, p. 3).

Phone 850.474.2652 Fax 850.474.3069
Web uwf.edu
An Equal Opportunity/Equal Access Institution

Our UWF standalone Supply Chain Logistics Management Degree has increased to over 100 majors and has exceeded our initial projected growth by about 30% to this point. Dean Limayem, industry demand is high for graduates, student demand is high for the major, and salaries and opportunities for graduates in supply chain management are among the highest. Your proposed degrees in supply chain management are important to the students, industry, and discipline within Florida and across the nation.

Thank you for the opportunity to show my support. My colleagues and I look forward to future opportunities to collaborate with your supply chain faculty and advance the opportunities for our Florida students, contribute to Florida's advancement in supply chain related industries, and pursue joint research to advance our collective knowledge of supply chain management.

Sincerely,

Scott B. Keller

Scott B. Keller, Ph.D.
Professor, Logistics and Supply Chain Management
Director of the Center for Supply Chain Management Excellence
Associate Editor, Journal of Business Logistics
Former Editor-in-Chief, International Journal of Logistics Management
Department of Marketing, Supply Chain Logistics, and Economics
University of West Florida
11000 University Parkway
Pensacola, FL 32514
850-857-6441
skeller@uwf.edu

Appendix D

Donna Davis

Education

Ph.D., University of Tennessee, Marketing and Information Management, 2003
M.B.A., University of Tennessee, 1993
B. A., Maryville College, 1983

Academic Experience

University of South Florida

Marketing Department Chair	2016 - present
Professor	2015 – present
Co-Director, Center for Supply Chain Management & Sustainability	2013 – present
Associate Professor	2013 - 2015

Texas Tech University

Associate Professor, Georgie G. Snyder Professorship	
Coordinator, Global Supply Chain Management Program	2009-2013
Assistant Professor	2003-2009

Current Memberships in Professional Organizations

Council for Supply Chain Management Professionals
American Marketing Association
Academy of Marketing Science

Service Activities Within and Outside of Institution

University Committees

Muma College of Business Undergraduate Programs Committee	2013 – 2015
Muma College of Business MBA Committee	2013 – 2015

Editorial Positions

Senior Associate Editor: *International Journal of Physical Distribution & Logistics Management*
Executive Advisory Board: *Journal of Business Logistics*
Editorial Review Board: *Journal of Supply Chain Management, Industrial Marketing Management,* and *Journal of Business Research*

Research – Selected Refereed Journal Articles

- Davis, Donna F. 2014. Research that makes a difference. *International Journal of Physical Distribution & Logistics Management* 44 (5): Guest Editorial.
- Davis, Donna F. and Wesley Friske. 2013. The role of public-private partnerships in facilitating cross-border logistics: A case study at the U.S./Canadian border. *Journal of Business Logistics* 34 (4): 347-359.
- Golicic, Susan L., Brian S. Fugate and Donna F. Davis. 2012. Examining market information and brand equity through resource-advantage theory: A carrier manager perspective. *Journal of Business Logistics* 33 (1): 20-33.
- Golicic, Susan L. and Donna F. Davis. 2012. Implementing mixed methods research in supply chain management. *International Journal of Physical Distribution & Logistics Management* 42 *(8):* 1-27.
- Hunt, Shelby and Donna F. Davis. 2012. Grounding supply chain management in resource-advantage theory: In defense of a resource-based view of the firm. *Journal of Supply Chain Management* 48 (2): 14-20.
- Marquardt, Adam, Susan L. Golicic and Donna F. Davis. 2010. B2B services branding in the logistics service industry. *Journal of Services Marketing,* 25(1): 47-57.

- Davis, Donna F., Susan L. Golicic and Adam Marquardt. 2009. Measuring brand equity for logistics services. *International Journal of Logistics Management 20*(2): 201–212.
- Davis, Donna F. and John T. Mentzer. 2008. Relational resources in interorganizational exchange: The role of trade equity and brand equity. *Journal of Retailing 84*(4): 435-448.
- Hunt, Shelby D. and Donna F. Davis. 2008. Grounding supply chain management in resource advantage theory, *Journal of Supply Chain Management 44*(1): 10-21.
- Davis, Donna F., Susan L. Golicic and Adam Marquardt. 2008. Branding a B2B service: Does a brand differentiate a logistics service provider? *Industrial Marketing Management* 37(2): 218-227.
- Davis, Donna F., and John T. Mentzer. 2007. Organizational factors in sales forecasting management: An integrative framework and research agenda, *International Journal of Forecasting 23*(3): 475-495.
- McCarthy, Teresa M., Donna F. Davis, Susan L. Golicic and John T. Mentzer. 2006. The Evolution of Sales Forecasting Management: A 20-Year Longitudinal Study of Forecasting Practices, *Journal of Forecasting 25*(5): 303-324.
- Golicic, Susan L., Donna F. Davis, Teresa M. McCarthy, and John T. Mentzer. 2002. The Impact of E-Commerce on Supply Chain Management, *International Journal of Physical Distribution & Logistics Management 32*(10): 851-71.

Research Funding

- 2016, Co-PI, Evaluation of Florida's Inbound and Outbound Freight Imbalance, *Florida Department of Transportation*, $199,660.
- 2015, Co-PI, Land Use Analysis to Enhance Successful Logistics Activity Center Development, *Florida Department of Transportation – District 7*, $123,601.
- 2015, Principal Investigator, Supply Chain Audit for Pasco County Food Services, *Pasco County School District,* $10,000.
- 2014, Co-PI, Evaluation of Logistics-Led Economic Development, *Florida Department of Transportation*, $220,000.
- 2011, Principal Investigator, Border Management. *International Council for Canadian Studies*, $8,987.
- 2009-2012, Principal Investigator, Supply Chain Resources for International Business Education (*SCRIBE*), *Business & International Education program, U.S. Dept. of Education*, $186,879.

Revised December 8, 2016

Robert Hooker

Education
Ph.D. Business Administration, The Florida State University, 2010
Master of Business Administration, The Florida State University, 2005
Bachelor of Science, The Florida State University, 2002

Academic Experience

University of South Florida, Associate Professor	2015-Present
Florida State University, Instructor	2005-2010

Non-Academic Experience

First Command Financial Services, Ft. Worth, TX, Marketing Specialist/Consultant	2004-2005
State of Florida, Dept. of Management Services, Tallahassee, FL, Researcher	2005
JP Morgan Chase, Chicago, IL/Detroit, MI, Banking Analyst	2002-2003

Current Memberships in Professional Organizations
Council for Supply Chain Management Professionals
Institute for Supply Management
Decision Sciences Institute
Academy of Marketing Science
American Marketing Association

Service Activities Within and Outside of Institution
Editorial Review Board - Journal of Supply Chain Management
Reviewer - Journal of Cleaner Production, European Journal of Information Systems, Sustainable Value Chain Management, Encyclopedia of E-Collaboration,
Managing Editor - CAIS (Jan. 2008- March 2009)
Conference Co-coordinator – New Ventures in Virtual Worlds Conference
(McComB.S. Business School – University of Texas at Austin, 2009)
USF Search Committees (Supply Chain, Strategy, IS/DS, and Entrepreneurship (2011-2013)
USF CES Committee (2011-2012)
USF AACSB Assessment Committee (2011-2012)
USF PolySTEM Committee (2012)
USF Graduate Committee (2011-2012)

Research – Refereed Journal Articles

- Hooker, R.E., Wasko, M.W., Paradice, D.B., Teigland, R., Hofacker, C. (Forthcoming), “Beyond Gaming: Linking Flow, Brand Attitudes, and Purchase Intent in Realistic and Emergent Three-dimensional Virtual Environments,” *Information Technology & People*.
- Hooker, R.E., Lewis, C.C., Wasko, M.W., Worrell, J.L., and Yoon, T. (2016), “E-Lance Enabled Network Exchanges within Supply Chains: The Influence of Network Governance and Social Control Mechanisms on Network Success,” *International Journal of Information Systems and Supply Chain Management*, 9(2), pp. 1-20.
- Plank, R.E. and Hooker, R.E. (2014), "Sales and Operations Planning: Using the Internet and Internet Based Tools to Further Supply Chain Integration," Journal of Research in Interactive Marketing.
- Giunipero, L.C., Hooker, R.E., Denslow, D. (2012), “Purchasing and Supply Management Sustainability: Drivers and Barriers,” Journal of Purchasing and Supply Management.
- Giunipero, L.C., Hooker, R.E., Joseph-Mathews, S., Yoon, T., and Brudvig, S. (2011), "A Decade of SCM Literature: Past, Present, and Future Implications," Russian Management Journal (Featured as a “Modern Classic”).
- Di Gangi, P.M., Wasko, M., and Hooker, R.E. (Dec. 2010), “Getting your customers’ ideas to work for you: Building user innovation communities,” MIS Quarterly Executive.

- Giunipero, L.C., Hooker, R.E., Joseph-Mathews, S., Yoon, T., and Brudvig, S. (Oct. 2008), "A Decade of SCM Literature: Past, Present, and Future Implications," Journal of Supply Chain Management.*

*One of the Top 10 most downloaded articles in JSCM history.

Refereed Book Chapters

- Hooker, R.E., Denslow, D., and Giunipero, L.C. (2013), "Environmental Sustainability in the Supply Chain: A Review of Past Literature and Discussion of Potential Drivers and Barriers." In Lindgreen, A., F. Maon, J. Vanhamme, and S. Sen (Eds.) Sustainable Value Chain Management, Farnham, UK: Gower Publishing.
- Stoecklin-Serino, C., Paradice, D.B. and Hooker, R.E. (2011), "An Examination of the Impacts of Brand Equity, Security, and Personalization on Trust Processes in an E-Commerce Environment: An Updated Discussion." In Clarke, S. and A. Dwivedi (Eds.) Organizational and End-User Interactions: New Explorations, IGI Global, Hershey, PA.
- Hooker, R.E., Lewis, C., Smith, H., Wasko, M., Worrell, J.L., & Yoon, T. (2007), "Governing E-Collaboration in E-Lance Networks." In N. Kock (Ed.), Encyclopedia of E-Collaboration. Hershey, PA: Idea Group.

Grant Activity

- **U.S. Department of Agriculture,** Project ID: 3210-1020-02, Southeast Partnership for Advanced Renewables from Carinata (SPARC), Supply Chain Risk and Resilience Modeling, $61k, (2018-2019, Awarded)
- **U.S. Department of Agriculture,** Project ID: 3210-1020-01, Southeast Partnership for Advanced Renewables from Carinata (SPARC), Fuel Optimization Transportation Modeling, $57k, (2018-2019, Awarded)
- **U.S. Department of State,** Project ID: P000974, Supply Chain Research Project Grant with
- Swedish Government, $3.1k, (2017, Awarded)
- **Nordic Innovation Center** (Associate Research Recipient), $1M, (2010-2012, Awarded)
- **Global Faculty Fellowship Grant**, $1.4k, (Fall 2017, Awarded)

Revised December 8, 2016

Seckin Ozkul

Education

Ph.D. in Transportation Engineering, University of Florida 2014
Master of Civil Engineering (with focus on Transportation), University of South Florida 2009
Bachelor of Civil Engineering, Auburn University 2006

Academic Experience

University of South Florida, Marketing Dept., Instructor August 2018-present
Center for Urban Transportation Research, USF, Research Associate & Adjunct 2014-2018
University of Florida, Graduate Research Assistant 2010-2014
Auburn University, Research Assistant 2005-2006

Non-academic Experience

Sprinkle Consulting, Tampa, FL, Staff Engineer 2007-2010
Vratsinas Construction Company, Atlanta, GA, Assist. to the Project Mgr. May 2005-August 2005

Current Memberships in Professional Organizations

- Associate, Center for Supply Chain Management and Sustainability (CSCMS) at Muma College of Business, USF
- Affiliated Faculty Member, Center for Urban Transportation Research (CUTR) at USF
- Founding Member, USF Freight Mobility, Trade and Logistics Research Group
- Fellow, International Road Federation (IRF)
- Secretary, TRB Freight Transportation Economics and Regulation Committee (AT010)
- Member, TRB Urban Freight Transportation Committee (AT025)
- Member, TRB Highway Capacity and Quality of Service Committee (AHB40)
- Member, ASCE Freight and Logistics Committee
- Member, Institute of Transportation Engineers (ITE)
- Member, Tau Beta Pi Engineering Honor Society
- Past-Vice President, University of Florida ITE Student Chapter – 2014

Research

Refereed Journal Articles

- Lin, P.S**., Ozkul, S,** Guo, R. & Chen, C. (2018). Assessment of Countermeasure Effectiveness and Informativeness in Mitigating Wrong-Way Entries onto Limited-Access Facilities. Accident Analysis and Prevention, 116, 79-93.
- **Ozkul, S.,** Menon, N., Pinjari, A., Davis, D. & Seggerman, K. (2017). Determination of Success and Deterrence Factors for Logistics Activity Center (LAC) Development. Journal of Transport Policy (In review).
- Wei, F., Wang, Z., Lin, P., Hsu, P., **Ozkul, S.**, Jackman, J., & Bato, M. (2016) Safety Effects Of Street Illuminance at Urban Signalized Intersections in Florida. Transportation Research Record: Journal of the Transportation Research Board, 2555, 95-102.
- **Ozkul, S.,** & Washburn, S. S. (2015). Updated Commercial Truck Speed versus Distance-Grade Curves for the Highway Capacity Manual. Transportation Research Record: Journal of the Transportation Research Board, 2483, 91-101.
- **Ozkul, S.**, Washburn, S. S., & McLeod, D. S. (2013). Revised Version of the Automobile Level-of-Service Methodology for Urban Streets in the Highway Capacity Manual 2010. Transportation Research Record: Journal of the Transportation Research Board, 2395(1), 66-72.
- Petritsch, T. A., **Ozkul, S.**, McLeod, P., Landis, B., & McLeod, D. (2010). Quantifying Bicyclists' Perceptions of Shared-Use Paths Adjacent to the Roadway. Transportation Research Record: Journal of the Transportation Research Board, 2198(1), 124-132.

Revised December 8, 2016

SELECTED PROJECTS (2007-2018)

- SPARC Initiative to Create a Carinata Biofuel Supply Chain in the Southeastern United States (Funding awarded: $118,315 – co-PI)
- Evaluation of Florida's Inbound and Outbound Freight Imbalance (Funding awarded: $199,700 - PI)
- Metropolitan Freight Transportation Implementing Effective Strategies (Funding awarded: $375,000 – Co-PI's portion: $75,000)
- Land Use Analysis to Enhance Successful Logistics Activity Center Development (Funding awarded: $123,600 - PI)
- Commercial Heavy Vehicle Impacts on Signalized Arterials (Funding Awarded: $231,684 – PI)
- Determination of Traffic Adjustment Factors for Florida's High Tourist Activity Sites (Funding awarded: $119,947 - PI)
- Comparing Countermeasures for Mitigating Wrong-way Entries onto Limited Access Facilities (Funding awarded: $268,398 – Co-PI's portion: $68,000)
- Connected Vehicle Pilot- Tampa Hillsborough Expressway Authority (THEA) – Phase 1 (Funding Awarded: $200,000 – Research engineer's portion: $25,000)
- Assessing Interactions between Access Management Treatments and Multi-Modal Users (Funding Awarded: $800,000 – Research engineer's portion: $35,000)
- Data for Truck-Route Choice Analysis of Port Everglades Petroleum Commodity Flows (Funding Awarded: $45,000 – Co-PI's portion: $5,000)
- Development of Effective Truck Route Signing Program for City of Tampa (Funding Awarded: $60,000 – Co-PI's portion: $45,000)
- Evaluation of Logistics Led Economic Development in Florida (Funding Awarded: $220,000 – Co-PI's portion: $95,000)

Revised December 8, 2016

James Stock

Education
Ph.D., The Ohio State University, 1975
MBA, The University of Miami, 1971
B.S., The University of Miami, 1968

Academic Experience

University of South Florida	
Distinguished University Professor, University of South Florida	2012-present
Frank Harvey Endowed Professor of Marketing	2008-present
Professor	1989-2007
Michigan State University	
Professor, Department of Marketing and Transportation Administration,	1987-1989
School of Systems and Logistics, Air Force Institute of Technology	
Distinguished Visiting Professor of Logistics Management	1986-1988
University of Oklahoma	1980-1987
Associate Professor of Marketing	
University of Notre Dame	1975-1980
Assistant Professor of Marketing	

Current Memberships in Professional Organizations
American Association for the Advancement of Science (AAAS)
Beta Gamma Sigma (BGS)
Faculty Commons (formerly Christian Leadership Ministries)
Council of Supply Chain Management Professionals (CSCMP)
Phi Kappa Phi
SOLE—The International Society of Logistics
Warehousing Education and Research Council (WERC)

Selected Service Activities Within and Outside of Institution
University of South Florida:

- Co-Director, Center for Supply Chain Management and Sustainability, College of Business, Department of Marketing (2013-present)
- A.P.J. Abdul Kalam Postgraduate Fellowship Selection Committee (2016)
- Chair, USF Distinguished University Professor Selection Committee (2016)
- Faculty Liaison to the Workgroup on Finance and Audit, USF Board of Trustees (2013-2015)
- USF Honors and Awards Committee (2007-2010; 2010-2013)
- USF Distinguished University Professor Guidelines Review Committee (2013)
- USF Standing Committee for Research Misconduct (2004-2007; 2007-2010; 2010-2013; 2013-2016; 2016-2019)
- USF Graduate Council (1991-1995); Vice Chair (1993-1994)
- Ph.D. Coordinator, Department of Marketing (1991-2000, 2004-2013)

Editorships:

- Editor, *Journal of Business Logistics* (2006-2010)
- Editor, *International Journal of Physical Distribution and Logistics Management* (1990-2003)
- Managing Editor, *Logistics Spectrum* (1992-1994)
- Business Logistics Section Editor, *Logistics Spectrum* 1999; 2000-2001

Editorial Review Boards:

- *Asia-Pacific Marketing Review* (2012-present)
- *European Business Review* (2005-present)
- *International Journal of Physical Distribution and Logistics Management* (2004-present)
- *International Journal of Value Chain Management* (2003-present)
- *Journal of Business Logistics* (2004-present)
- *Logistics Quarterly* (2011-present)
- *Logistics Research* (2008-present)
- *Paradigm—Journal of IMT Ghaziabad* (2005-present)
- *Pertanika Journal of Social Sciences & Humanities* (2009-present)
- *South African Journal of Transportation and Supply Chain Management* (2005-present)
- *Strategic Insights into Quality* (1992-1998)
- *Logistics Spectrum* (1988-1995)
- *The Journal of International Marketing* (1994-1995)
- *The Marketing Strategy Letter* (1992-1993)
- *International Journal of Physical Distribution and Materials Management* (1980-1989)
- *Strategy and Executive Action* (1983-1987)

Selected Research 2008 - 2018

Refereed Journal Articles

- Swanson, David, Lakshmi Goel, Kristoffer Francisco, and James Stock, "An Analysis of Supply Chain Management Research by Topic," *Supply Chain Management: An International Journal*, Vol. 12, Issue 3 (2018), pp. 100-116.
- Swanson, David, Lakshmi Goel, Kristoffer Francisco, and James Stock, "Applying Theories to Logistics and Supply Chain Management from Other Disciplines: A Systematic Literature Review," *Transportation Journal*, Vol. 56, No. 3 (Summer 2017), pp. 299-356.
- Stock, James, Diane Edmondson, Jennifer Espinosa, Robert Riggle and Terry Sincich, "RFID Technology: A Retrospective Look at Firm Adoption with a View towards the Future" *International Journal of Value Chain Management*, Vol. 7, No. 4 (2016), pp. 317-351.
- Wang, Zhangqiong, James Stock and Shuncai Li, "Supply Chain Management Sustainability Practices in Chinese Service Firms: A Content Analysis of CSR Reports," *Journal of Academy of Business and Economics*, Vol. 15, Issue 4 (December 2015), pp. 71-76.
- Nakhata, Chinintorn, James R. Stock and Tania B. Texiera, "Doctoral Dissertations in Logistics and Supply Chain-Related Areas: 2005-2009," *Logistics Research*, Vol. 6, Issue 4 (2013), pp. 119-131.
- Stock, James R., Stefanie Boyer, and Tracy Harmon, "Research Opportunities in Supply Chain Management," *Journal of the Academy of Marketing Science* Special Issue on Marketing and Supply Chain Management, Vol. 38, No. 1 (2010), pp. 32-41.
- Stock, James R., "A Research View of Supply Chain Management: Developments and Topics for Exploration," *ORiON*, Vol. 25, No. 2 (2009), pp. 147-160.
- Stock, James R. and Stefanie Boyer, "Developing a Consensus Definition of Supply Chain Management: A Qualitative Study," *International Journal of Physical Distribution and Logistics Management*, Vol. 39, No. 8 (2009), pp. 690-711.
- Stock, James R. and Jay Prakash Mulki, "Product Returns Processing: An Examination of Practices of Manufacturers, Wholesalers/Distributors and Retailers," *Journal of Business Logistics*, Vol. 30, No. 1 (2009), pp. 33-62.
- Stock, James R., "Chapter 25: Reverse Logistics, Green Logistics and Packaging," in *Logistics Engineering Handbook*, G. Don Taylor, editor (Boca Raton, FL: CRC Press, 2008), pp. 25-1 through 25-16.

Revised December 8, 2016

Kerry Walsh

Education

MS in Marketing, University of South Florida	2010
B.A., Business Economics, University of California, Santa Barbara	2008

Academic Experience

Exide Instructor, University of South Florida	2018-present
Instructor, University of South Florida	2013-present
Director, Business Honors Program, University of South Florida	2016-2018
Adjunct Instructor, University of South Florida	2010-2012

Non-academic Experience

Editor/author, Pearson Higher Education	2013-present
Logistics Director, Purple Cows, Inc., Provo, UT	2010-2014
Principal, KMW Management, Tarpon Springs, FL	2004-present
Vice President, Sourcing & Operation, Sourcingpartner, Inc. Dallas, TX	1999-2004
Merchandise Import Manager, S.P. Richards Co., Atlanta, GA	1997-1999
Product Manager, Rolodex Corp., Secaucus, NJ	1990-1997

Current Memberships in Professional Organizations

American Marketing Association
Council for Supply Chain Management Professionals

Service Activities Within and Outside of Institution
University of South Florida:

Faculty advisor, USF Council for Supply Chain Management Professionals Student Roundtable

Agenda Item: III.d.

USF Board of Trustees
June 6, 2019

Issue: M.S. Supply Chain Management – CIP 52.0203

Proposed action: Approval

Executive Summary:

The proposed Master of Science in Supply Chain Management (M.S./SCM) is a 32-credit hour graduate program that aims to equip working professionals in the supply chain industry with the knowledge and skills required to advance in their careers in the field of supply chain management. The program is designed to allow students to continue full-time employment while pursuing the degree. Since 2014, the University of South Florida has offered a 15-credit hour graduate concentration in Supply Chain Management for working professionals enrolled in the part-time M.B.A. program, which will be discontinued when the M.S./SCM is introduced.

Supply chain management is a business function that ensures the efficient and effective management of the flow of goods, services, and finances among firms to transform raw materials to finished products along with managing reverse flows (e.g., defective or damaged products, product returns, end-of-life disposal) in a sustainable manner. The development of a supply chain management talent pool is highlighted as a core need for workforce development in the Florida Trade & Logistics Study 2.0 (Florida Chamber, 2013) that sets forth the vision for positioning Florida as a global trade hub to support statewide economic development. The proposed M.S./SCM is a direct response to the need for talent development to support Florida's growing supply chain industry.

The primary market for the M.S./SCM will be Florida companies that will identify employees who would benefit from advanced training while staying on the job. The goal is to enroll a cohort of 25 students in year 1, doubling to 50 students by year 5. The proposed M.S./SCM is in direct response to requests by members of the business advisory board of USF's Center for Supply Chain Management & Sustainability (CSCMS) who expressed the need to have a program with greater breadth and depth than can be provided in an M.B.A. concentration. A working group of volunteers drawn from the CSCMS advisory board collaborated with supply chain management faculty to develop the M.S./SCM curriculum.

Financial Impact:

No new faculty lines are requested because this new degree program will transition from an existing graduate Supply Chain Management concentration in the M.B.A. program to a graduate degree program in Supply Chain Management within the Department of Marketing. The faculty salaries will be reallocated from the concentration to the new degree program.

Strategic Goal(s) Item Supports:

- USF Tampa Strategic Plan Goal 1: Student Success

BOT Committee Review Date: ACE May 14, 2019
Supporting Documentation Online (*please circle*): **Yes** **No**
USF System or Institution specific: USF
Prepared by: Donna Davis, Ph.D., Professor, Chair, Department of Marketing

Board of Governors, State University System of Florida

Request to Offer a New Degree Program

(Please do not revise this proposal format without prior approval from Board staff)

University of South Florida, Tampa	**Spring 2020**
University Submitting Proposal	**Proposed Implementation Term**
Muma College of Business	**Marketing**
Name of College(s) or School(s)	**Name of Department(s)/ Division(s)**
Supply Chain Management	**Master of Science in Supply Chain Management**
Academic Specialty or Field	**Complete Name of Degree**
52.0203	
Proposed CIP Code	

The submission of this proposal constitutes a commitment by the university that, if the proposal is approved, the necessary financial resources and the criteria for establishing new programs have been met prior to the initiation of the program.

Date Approved by the University Board of Trustees		**President**	**Date**
Signature of Chair, Board of Trustees	**Date**	**Vice President for Academic Affairs**	**Date**

Provide headcount (HC) and full-time equivalent (FTE) student estimates of majors for Years 1 through 5. HC and FTE estimates should be identical to those in Table 1 in Appendix A. Indicate the program costs for the first and the fifth years of implementation as shown in the appropriate columns in Table 2 in Appendix A. Calculate an Educational and General (E&G) cost per FTE for Years 1 and 5 (Total E&G divided by FTE).

Implementation Timeframe	Projected Enrollment (From Table 1)		Projected Program Costs (From Table 2)				
	HC	FTE	E&G Cost per FTE	E&G Funds	Contract & Grants Funds	Auxiliary Funds	Total Cost
Year 1	25	17.71	$11.436	$202,508			$202,508
Year 2	25	17.71					
Year 3	50	35.42					
Year 4	50	35.42					
Year 5	50	35.42	$6,091	$215,739			$215,739

Note: This outline and the questions pertaining to each section must be reproduced within the body of the proposal to ensure that all sections have been satisfactorily addressed. Tables 1 through 4 are to be included as Appendix A and not reproduced within the body of the proposals because this often causes errors in the automatic calculations.

INTRODUCTION

I. Program Description and Relationship to System-Level Goals

A. Briefly describe within a few paragraphs the degree program under consideration, including (a) level; (b) emphases, including majors, concentrations, tracks, or specializations; (c) total number of credit hours; and (d) overall purpose, including examples of employment or education opportunities that may be available to program graduates.

The proposed Master of Science in Supply Chain Management (M.S./SCM) is a 32-credit hour graduate program. The USF M.S./SCM aims to equip working professionals in the supply chain industry with the knowledge and skills required to advance in their careers in the field of supply chain management. The program is designed to allow students to continue full-time employment while pursuing the degree. Supply chain management is a business function that ensures the efficient and effective management of the flow of goods, services, and finances among firms to transform raw materials to finished products along with managing reverse flows (e.g., defective or damaged products, product returns, end-of-life disposal) in a sustainable manner.

The development of a supply chain management talent pool is highlighted as a core need for workforce development in the *Florida Trade & Logistics Study 2.0* (Florida Chamber, 2013) that sets forth the vision for positioning Florida as a global trade hub to support statewide economic development. The proposed M.S./SCM is a direct response to the need for talent development to support Florida's growing supply chain industry. The primary market for the M.S./SCM will be Florida companies that will identify employees who would benefit from advanced training while staying on the job. Thus, the USF M.S./SCM would become a component of talent development for Florida-based companies in the supply chain industry.

Currently, the University of South Florida (USF) offers a 15-credit hour graduate concentration in Supply Chain Management for working professionals enrolled in the part-time M.B.A. program. The current M.B.A. concentration in Supply Chain Management will be discontinued when the M.S./SCM is introduced. The proposed M.S./SCM is in direct response to requests by members of the business advisory board of USF's Center for Supply Chain Management & Sustainability (CSCMS). Advisory board members expressed the need to have a program with greater breadth and depth than can be provided in a 15-hour concentration. A working group of volunteers drawn from the CSCMS advisory board collaborated with supply chain management faculty to develop the M.S./SCM proposal to meet the needs of industry.

The USF M.S./SCM uses a two-step design. Students who enroll in the M.S./SCM will earn a 15-credit- hour Supply Chain Management graduate certificate upon completion of the initial five-course sequence. These courses will be offered online to allow students to continue in full-time employment. It is important to note that this two-step design allows students to stop with a USF graduate certificate in Supply Chain Management. This approach will provide greater access to graduate education by allowing students who cannot make a commitment to a full degree program due to work or personal obligations to earn a graduate certificate. For example, students who already hold master's degrees (e.g., M.S./Industrial Engineering or M.S./Information Systems) might need only the fundamentals of supply chain management provided by the graduate certificate, rather than a second master's degree.

Beyond the initial 15 credit hours earned in the graduate certificate, students will complete an additional 17 credit hours over two semesters to earn the M.S./SCM. The courses will be offered in a hybrid format (30% face-to-face and 70% online) where students are in residence for one week each semester (January and May) and complete the remainder of the work online. This format allows students to stay on the job while they earn the M.S./SCM.

Program Summary:

(a) **Level:** M.S. degree in Supply Chain Management (M.S./SCM) CIP 52.0203
(b) **Emphases:** There are no emphases, concentrations, tracks or specializations in the degree.
(c) **Total number of credit hours:** 32 credit hours
(d) **Overall purpose:** The overall purpose of the program is to provide advanced training to working professionals in Florida's supply chain industry who need to advance their supply chain knowledge and skills. The target market is managers who currently work in operational areas such as procurement, transportation, information systems, production planning, and inventory management who received formal training at the undergraduate level in disciplines such as management, engineering, or information systems and now need the knowledge and tools from the supply chain discipline to advance in their careers.

References:

Florida Chamber of Commerce (October 2013) *Florida Trade & Logistics Study 2.0.* http://www.flchamber.com/wp-content/uploads/2016/06/Florida_Made-for-Trade_Trade-and-Logistics-Study2.0.pdf

B. Please provide the date when the pre-proposal was presented to CAVP (Council of Academic Vice Presidents) Academic Program Coordination review group. Identify any concerns that the CAVP review group raised with the pre-proposed program and provide a brief narrative explaining how each of these concerns has been or is being addressed.

The CAVP Academic Program Coordination Workgroup reviewed the pre-proposal on February 6, 2018 and no concerns were raised.

C. If this is a doctoral level program please include the external consultant's report at the end of the proposal as Appendix D. Please provide a few highlights from the report and describe ways in which the report affected the approval process at the university.

Not applicable. This is not a doctoral level program.

D. Describe how the proposed program is consistent with the current State University System (SUS) Strategic Planning Goals. Identify which specific goals the program will directly support and which goals the program will indirectly support (see link to the SUS Strategic Plan on the resource page for new program proposal).

The M.S./SCM directly supports the State University System Strategic Planning Goals (indicated by double check) and indirectly supports other goals (indicated by a check) in the 2025 System Strategic Plan as outlined below.

State University System Goals	Excellence	Productivity	Strategic Priorities
Teaching & Learning	✓✓Strengthen Quality & Reputation of Academic Programs and Universities	✓✓Increase Degree Productivity and Program Efficiency	✓✓Increase the Number of Degrees Awarded in STEM and Other Areas of Strategic Emphasis
Scholarship, Research, and Innovation	✓Strengthen Quality & Reputation of Scholarship, Research, and Innovation	✓Increase Research Activity and Commercialization Activity	Increase Collaboration and External Support for Research Activity
Community & Business Engagement	✓✓Strengthen Quality & Recognition of Commitment to Community and Business Engagement	✓✓Increase Levels of Community & Business Engagement	✓Increase Community and Business Workforce

TEACHING & LEARNING

- **Excellence - GOAL: Strengthen quality and reputation of academic programs and universities**
  Supply chain management programs are annually ranked by prestigious organizations including U.S. News and World Report, Forbes, and Gartner. The proposed M.S./SCM provides the opportunity for USF to gain recognition within the ranks of top-ranked programs including AAU universities such as Carnegie Mellon, Georgia Tech, Massachusetts Institute of Technology, Michigan State, Ohio State, Penn State, and University of Texas/Austin.

- **Productivity – GOAL: Increase degree productivity and program efficiency**
  The proposed M.S./SCM degree will allow students to complete their degrees while maintaining full-time employment. Classes will be offered either completely online or in a hybrid format where students are in residence for only one week per semester that accommodates the schedules of working professionals. Students will be admitted as a cohort and tracked for timely completion of their degrees.

- **Strategic priorities for a knowledge economy – GOAL: Increase the Number of Degrees Awarded in STEM and Other Areas of Strategic Emphasis**
  Supply chain management is included in the Florida SUS list of Programs of Strategic Emphasis (CIP 52.0203 Logistics, Materials, and Supply Management) and is categorized as a STEM program. The proposed degree will add up to 50 new STEM graduate degrees awarded each year at USF.

SCHOLARSHIP, RESEARCH & INNOVATION

- **Excellence - GOAL: Strengthen Quality and Reputation of Scholarship, Research and Innovation**
  Faculty associated with the proposed M.S./SCM are currently engaged in several collaborative, externally funded research projects that directly benefit the economic development of the state of Florida. For example, faculty associated with the proposed M.S./SCM are currently engaged in a collaborative project to develop and distribute an innovative, sustainable carinata-based (Ethiopian mustard seed) source of alternative fuel and high-protein livestock food. The project is part of the Southeastern Partnership for Advanced Renewables from Carinata (SPARC) team based at the University of Florida and funded by the US Department of Agriculture.

  Other collaborative research projects include projects with the USF Center for Urban Transportation Research (CUTR) funded by the Florida Department of Transportation: (1) evaluation of inbound-outbound freight flows; (2) developing a GIS tool to determine potential locations of logistics activity centers for use in urban freight transportation planning. Future projects that examine urban freight movement and economic development related to infrastructure investments are in the planning stages.

  Two SCM faculty members are Fulbright scholars. Dr. Jim Stock received a core Fulbright fellowship in Helsinki, Finland where he did research in reverse logistics and sustainable supply chain management. Dr. Rob Hooker is a Fulbright Specialist in the area of supply chain management. His first engagement was with the Stockholm School of Economics.

- **Productivity – Increase research and commercialization activity**
  The aim of the SPARC project is to commercialize products from in the carinata supply chain. Research conducted by SCM faculty indirectly supports commercialization activity by providing expertise to start-up ventures in the Tampa Bay area.

- **Strategic priorities for a knowledge economy – Increase collaboration and external support for**

research activity
In addition to ongoing collaboration with UF and CUTR, we are exploring establishing a research center under the auspices of the Volvo Research and Educational Foundations (VREF) program that would engage researchers from up to five U.S.-based centers. VREF provides financial support for establishing Centers of Excellence to create platforms for collaborative research related to the future of urban freight transport (http://www.vref.se/futprogramme.4.64ace19a14615fa7f238d79c.html).

COMMUNITY & BUSINESS ENGAGEMENT

- **Excellence – GOAL: Strengthen quality and recognition of commitment to community and business engagement**
  In direct response to the call for statewide collaboration in the supply chain industry, USF brought together a planning group to launch the Florida Supply Chain Summit. Working with a statewide steering committee comprised of representatives from industry, government, and academia, the USF Center for Supply Chain Management & Sustainability led the effort (https://floridasupplychainsummit.com/). The Summit was held in February 2019 and drew 300 attendees from Florida's supply chain industry. The mission of the Florida Supply Chain Summit is to provide a platform for statewide collaboration among key representatives from industry, professional organizations, government, economic development agencies, and higher education for the purpose of advancing the state of Florida as a global trade hub. This significant, highly visible effort was in the planning stage for over a year.

- **Productivity – GOAL: Increase levels of community and business engagement**
  Executives from the supply chain industry will be engaged in the M.S./SCM as guest lecturers and as collaborators/evaluators in the Supply Chain Management Capstone course. In addition, the USF CSCMP (Council for Supply Chain Management Professionals) Student Roundtable hosts weekly meetings throughout the academic year with guest speakers from Tampa Bay companies. The Roundtable also sponsors field trips to area company sites and conducts community service activities. For example, student members of the Roundtable worked with Florida's Habitat for Humanity program in 2018 on a project to analyze Habitat's supply base. The project identified over $800,000 in potential savings by centralizing key purchases.

- **Strategic priorities for a knowledge economy – GOAL: Increase community and business workforce**
  As a discipline, the field of supply chain management is highly engaged with industry to ensure the development of a talent pool to support the growing demand for supply chain professionals and to keep abreast of dynamic technological and regulatory changes. The proposed M.S./SCM is directly targeted at increasing the number of Florida SCM professionals with graduate degrees. Business partners engaged in developing the USF M.S./SCM curriculum include Bloomin' Brands, Bristol-Myers Squibb, CH Robinson, Datex, Honeywell Aerospace, Jabil, Marten Transport, Masonite, Ravago/Entec, Saddle Creek Logistics, and TechData.

E. If the program is to be included in a category within the Programs of Strategic Emphasis as described in the SUS Strategic Plan, please indicate the category and the justification for inclusion.

The Programs of Strategic Emphasis Categories:

1. Critical Workforce:
   - Education
   - Health
   - Gap Analysis
2. Economic Development:
   - Global Competitiveness
3. Science, Technology, Engineering, and Math (STEM)

Please see the Programs of Strategic Emphasis (PSE) methodology for additional explanations on program inclusion criteria at the resource page for new program proposal.

The M.S./SCM (52.0203 Logistics, Materials, and Supply Management) is identified as a Program of Strategic Emphasis (Fall 2014) under the category of Economic Development – STEM. These programs directly support the distribution, transportation, and manufacturing industries in Florida. The proposed M.S./SCM will add up to 50 new STEM graduates each year to USF's profile.

F. Identify any established or planned educational sites at which the program is expected to be offered and indicate whether it will be offered only at sites other than the main campus.

The USF M.S./SCM courses will be offered completely online or in a hybrid format with on campus (30%) and online (70%) components.

INSTITUTIONAL AND STATE LEVEL ACCOUNTABILITY

II. Need and Demand

A. Need: Describe national, state, and/or local data that support the need for more people to be prepared in this program at this level. Reference national, state, and/or local plans or reports that support the need for this program and requests for the proposed program which have emanated from a perceived need by agencies or industries in your service area. Cite any specific need for research and service that the program would fulfill.

National need: Growth in the logistics sector at the national level is projected by the Bureau of Labor Statistics to be 10.3% through 2026, adding nearly 13 million jobs with a median annual wage of $74,590. A recent study published in the Harvard Business Review (Delgado & Mills, 2018) estimates that supply chains contain 37 percent of all U.S. jobs and employ 44 million people: "These jobs have significantly higher than average wages, and account for much of the innovative activity in the economy." The intensity of STEM jobs in the industry drive a high level of patent activities. An examination of the drivers of the national shortage of supply chain talent states that "Demand for supply chain professionals exceeds supply by a ratio of 6 to 1" (Harrington, 2015).

State need: The Florida Department of Economic Opportunity and Enterprise Florida identify "Logistics and Distribution" as one of the five major industries for economic growth in the state (Enterprise Florida, 2013). In Florida, employment in this sector is expected to grow 12% through 2025 with a median wage of $66,850.

The development of a supply chain management talent pool is highlighted as a core need for workforce development in the *Florida Trade & Logistics Study 2.0* (Florida Chamber, 2013) that sets forth the vision for positioning Florida as a global trade hub to support statewide economic development. The report envisions Florida as the leading location for trade and logistics education and training, calling for a globally oriented talent development program to meet Florida's business needs and to build professional relationships as the basis for future trade and investment decisions.

Moreover, employment in the supply chain industry provides well-paying jobs: workers in Florida transportation, trade and logistics earn 30% higher wages than the average for all jobs in the state. An important component of the industry supports globalization: Enterprise Florida reports international trade activity for Florida was $148 billion in 2017 with over $70 billion in exports. The state ranks 8th in the country for exporting with Florida as home to one in five U.S. exporters (Enterprise Florida, 2018).

Local need: The proposal for the USF M.S./SCM emanated from requests by Tampa Bay business partners who serve on the USF Center for Supply Chain Management &

Sustainability's advisory board. Companies represented on the advisory board include Datex Corporation, Mercury Gate, Marten Transport, Port Tampa Bay, Reed TMS, Citi, Jabil, Mosiac, Masonite, Bristol-Myers Squibb, Bloomin' Brands, and CH Robinson. While these companies are pleased with the graduates who have earned the concentration in supply chain management, they requested that USF deliver a master's degree to allow greater depth in the coursework.

Need for research and service: The vision for the future of Florida is to ensure a globally competitive economy by developing the state as a vibrant hub for international and domestic trade and investment (Florida Chamber, 2013). This vision requires a commitment to a statewide, multimodal system of trade gateways, logistics centers, and transportation corridors that delivers on the promise of efficient and effective freight movement (Florida Department of Transportation, 2010). To achieve this vision, Florida needs a statewide collaborative platform to identify issues, conduct necessary research, and implement action plans (Pinjari et al., 2015).

To address the need for a state-wide research collaboration, the supply chain management faculty collaborate with researchers in the Center for Urban Transportation Research in the College of Engineering to undertake funded research directed at addressing the challenges of logistics-led economic development in Florida. The inaugural statewide gathering of supply industry stakeholders in February 2019 was a direct response to research findings conducted by USF researchers (Pinjari et al., 2015).

Data sources:

Bureau of Labor Statistics https://www.bls.gov/data/#employment

Florida Chamber of Commerce (October 2013) *Florida Trade & Logistics Study 2.0.* http://www.flchamber.com/wp-content/uploads/2016/06/Florida_Made-for-Trade_Trade- and-Logistics-Study2.0.pdf

Florida Department of Transportation (2010). *2060 Florida Transportation Plan*.

Florida Department of Transportation (2013). *Florida Freight Mobility and Trade Plan Policy Element*.

Delgado, Mercedes and Karen Mills (2018) "The Supply Chain Economy and the Future of Good Jobs in America," *Harvard Business Review.* https://hbr.org/2018/03/the-supply-chain-economy-and-the-future-of-good-jobs-in-america

Enterprise Florida (September 2013) *Logistics & Distribution*. https://www.enterpriseflorida.com/industries/logistics-distribution/

Enterprise Florida (2018) *Florida's International Business Advantages* https://www.enterpriseflorida.com/wp-content/uploads/Florida-International-Business-Advantages-Brief.pdf

Harrington, Lisa (2015) "Solving the Talent Crisis: Five Alternatives Every Supply Chain Executive Must Consider." http://www.lharringtongroup.com/pdf/DHL-Automotive-WhitePaper.pdf

Pinjari, Abdul, Donna Davis, Seckin Ozkul (2015) "Evaluation of Logistics-Led Economic Development." FDOT Research Reports.

B. Demand: Describe data that support the assumption that students will enroll in the proposed program. Include descriptions of surveys or other communications with

prospective students.

Our experience at USF with enrollment in graduate supply chain courses provides evidence for student demand. Since 2014, USF has offered a Supply Chain Management concentration in the Masters in Business Administration (MBA). The 15- hour concentration comprises three courses (9 hours) in logistics and supply chain management supplemented by two electives (6 hours) drawn from information systems, management, and engineering. While we do not actively recruit students to the concentration, fourteen students are currently enrolled in the MBA SCM concentration. The three logistics and supply chain management courses consistently fill, enrolling up to 35 students per course each semester. Students are drawn from those pursuing the SCM concentration as well as students from the Patel College of Global Sustainability and the College of Engineering, who enroll in the courses as electives.

C. If substantially similar programs (generally at the four-digit CIP Code or 60 percent similar in core courses), either private or public exist in the state, identify the institution(s) and geographic location(s). Summarize the outcome(s) of communication with such programs with regard to the potential impact on their enrollment and opportunities for possible collaboration (instruction and research). In Appendix C, provide data that support the need for an additional program.

Similarity with Other Programs				
Institution Name	**Public/ Private**	**Location Program is being Offered**	**CIP Code**	**Program Name**
Florida A&M University	Public	Tallahassee	52.0203	MS/Supply Chain Management
Florida International University	Public	Miami	52.0203	MS/Logistics & Supply Chain Management
University of North Florida	Public	Jacksonville	52.0203	MS/Transportation & Supply Chain Management

Three Florida universities recently started new M.S. degree programs in the 52.0203 CIP: Florida A&M University, Florida International University, and University of North Florida. Information about each program, consideration of the potential impact on enrollments, and potential for collaboration were discussed in telephone conversations with each of the program directors: FAMU – Dr. Eisenhower Etienne; FIU – Professor Gregory Maloney; UNF – Dr. Robert Frankel. Data to support the need for an additional program are provided in Appendix C.

Program information:

Florida A&M University introduced a full-time, 30-credit hour M.S. in Supply Chain Management in Fall 2018. The delivery format is face-to-face and online; the program takes two years to complete. No enrollment data is available for Fall 2018. FAMU is located in Tallahassee.

The program at Florida International University is a 30-credit hour M.S. in Logistics & Supply Chain Management introduced in Fall 2018. The ten-month program targets working professionals in the Miami area. The delivery format is face-to-face with classes offered on Saturdays. No enrollment data is available for Fall 2018.

The University of North Florida will introduce a full-time 32-credit hour M.S. in Transportation & Supply Chain Management in Fall 2019. This degree is offered in a face-to-face and online format and takes two years to complete. Building on UNF's successful undergraduate

program in transportation and logistics, coursework in the M.S. program focuses on transportation and logistics. The primary target market for this program will be working professionals in the Jacksonville area. Initial enrollment in the program is targeted at 25 students.

Impact on enrollments

All three program directors agreed that the USF M.S./SCM will have no impact on their enrollments due to the distinctive structure and target market of the USF M.S./SCM program. There is very little overlap in the target markets due to geographic differences (i.e., Tallahassee, Miami, and Jacksonville versus Central Florida), differences in missions among the universities (e.g., HBCU at FAMU, HSI at FIU), and differences in the focus of the programs (e.g., transportation and logistics versus global supply chain management at USF).

Potential Collaboration

The program directors discussed several opportunities for collaboration to support workforce development for the supply chain industry in Florida. The first opportunity for collaboration was participation in the inaugural Florida Supply Chain Summit in Orlando in February 2019, hosted by USF (http://floridasupplychainsummit.com). This event brought together 300 representatives from companies in Florida's supply chain industry and representatives from industry associations, government agencies, and higher education. The director of the UNF program was a member of the planning team for the Summit.

The second key area for collaboration will be the opportunity to share information about best practices as we further develop our curricula across the institutions to serve workforce development in the state of Florida. For example, we can share relevant case studies, video content, information about potential guest speakers, and opportunities for field trips.

Finally, we will be able to collaborate on serving the needs of Florida's supply chain industry by sharing information about position openings as well as working together on research projects. For example, collaboration across the programs can extend the reach for potential business engagement in student capstone projects.

D. Use Table 1 in Appendix A (1-A for undergraduate and 1-B for graduate) to categorize projected student headcount (HC) and Full Time Equivalents (FTE) according to primary sources. Generally undergraduate FTE will be calculated as 30 credit hours per year and graduate FTE will be calculated as 24 credit hours per year. Describe the rationale underlying enrollment projections. If students within the institution are expected to change majors to enroll in the proposed program at its inception, describe the shifts from disciplines that will likely occur.

The USF M.S./SCM is a cohort-based program. As displayed in Table 1-B, we anticipate enrolling 25 students (HC) each year in the first two years as we launch the program. Following this start-up period, we will admit two cohorts annually for a total enrollment of 50 students (HC). Using the formula of 24 credit hours per year to calculate FTE, enrollments will be 18 FTE for the first two years followed by 35 FTE for subsequent years. We do not anticipate students who are currently enrolled at USF will enroll in this program.

E. Indicate what steps will be taken to achieve a diverse student body in this program. If the proposed program substantially duplicates a program at FAMU or FIU, provide, (in consultation with the affected university), an analysis of how the program might have an impact upon that university's ability to attract students of races different from that which is predominant on their campus in the subject program. The university's Equal

Opportunity Officer shall review this section of the proposal and then sign and date Appendix B to indicate that the analysis required by this subsection has been completed.

USF is committed to engaging underrepresented and minority students in our programs. We strongly value equal access to education, ethical development, and all aspects of diversity (cultural, religious, race and ethnicity, socio-economic, linguistic, gender, sexual orientation, etc.). These shared institutional values provide a supportive environment to foster interaction and engagement among students who will shape their organizations' business interactions and transactions with diverse audiences.

We expect the diversity of students enrolled in the M.S./SCM will mirror the diversity of companies in Florida's supply chain industry. According to a recent (2015) joint report by the U.S. Departments of Education, Transportation and Labor (in conjunction with industry stakeholders), women are highly under-represented in the supply chain industry. Additionally, African-Americans and Hispanics are under-represented in jobs that generally require higher skills, pay better wages, and provide more career ladder opportunities. This situation provides an opportunity for the USF M.S./SCM to have a positive impact on diversity in the industry by providing greater access to graduate education underrepresented groups.

To ensure the desired outcome for student diversity, we will work with employers to secure recommendations for students in under-represented groups. Outreach approaches will also include collaboration with Florida military operations (e.g., SOCOM, MacDill Air Force Base). Members of our military often work in logistics and supply chain management and have the need for advanced training.

Conversations with the directors of the FAMU and FIU programs indicate the new M.S./SCM at USF is targeting a significantly different market and will have no impact on their ability to attract students of from races different from those that are predominant on their campuses.

III. Budget

A. Use Table 2 in Appendix A to display projected costs and associated funding sources for Year 1 and Year 5 of program operation. Use Table 3 in Appendix A to show how existing Education & General funds will be shifted to support the new program in Year 1. In narrative form, summarize the contents of both tables, identifying the source of both current and new resources to be devoted to the proposed program. (Data for Year 1 and Year 5 reflect snapshots in time rather than cumulative costs.)

Tables 2 and 3 are provided in Appendix A. Costs in Years 1 – 5 reflect the reallocation of faculty effort for existing faculty who currently teach in the current graduate Supply Chain Management concentration to the M.S./SCM program. The budget assumes a 2% increase in salary and fringe benefits across the five-year projection for the courses taught in Spring term; summer term salaries are capped at $12,500 plus fringe benefits per 3 credit hour course.

No new faculty lines are requested. One faculty member, Dr. Davis, will be resuming a full teaching load in Fall 2019 when she completes her term as Chair of the Marketing Department and will devote most of her time to the M.S./SCM. All faculty are currently employed by USF and are assigned to office space. Office support, office supplies and services, and travel funding are supported by E&G funds allocated to the Department of Marketing. No scholarships or graduate assistants are required to support the program.

B. Please explain whether the university intends to operate the program through continuing education, seek approval for market tuition rate, or establish a differentiated graduate-

level tuition. Provide a rationale for doing so and a timeline for seeking Board of Governors' approval, if appropriate. Please include the expected rate of tuition that the university plans to charge for this program and use this amount when calculating cost entries in Table 2.

Not applicable. USF does not intend to offer the program through continuing education, seek approval for market tuition rate, or establish a differentiated graduate-level tuition.

C. If other programs will be impacted by a reallocation of resources for the proposed program, identify the impacted programs and provide a justification for reallocating resources. Specifically address the potential negative impacts that implementation of the proposed program will have on related undergraduate programs (i.e., shift in faculty effort, reallocation of instructional resources, reduced enrollment rates, greater use of adjunct faculty and teaching assistants). Explain what steps will be taken to mitigate any such impacts. Also, discuss the potential positive impacts that the proposed program might have on related undergraduate programs (i.e., increased undergraduate research opportunities, improved quality of instruction associated with cutting-edge research, improved labs and library resources).

The faculty who will teach in the M.S./SCM program are members of the Department of Marketing that houses the current graduate supply chain management concentration. The Supply Chain Management concentration will be discontinued when the M.S./SCM is offered.

In regard to potential positive impacts associated with the proposed program, the target market for this program (i.e., working professionals) will strengthen USF ties with companies in the supply chain industry. Faculty who supervise the required capstone projects could gain access to companies in support of their research, boosting their research productivity.

D. Describe other potential impacts on related programs or departments (e.g., increased need for general education or common prerequisite courses, or increased need for required or elective courses outside of the proposed major).

Two of the three courses offered in the summer term will be taught by faculty from other program areas. The Leadership/Management Concepts course is taught by a faculty member in the Sport & Entertainment Management program, which is also part of the Department of Marketing. The Risk Management and Legal Issues course is taught by a member of the Lynn Pippenger School of Accountancy. The faculty and program directors concur that teaching these summer courses will not affect their ability to serve their own programs.

E. Describe what steps have been taken to obtain information regarding resources (financial and in-kind) available outside the institution (businesses, industrial organizations, governmental entities, etc.). Describe the external resources that appear to be available to support the proposed program.

Since 2014, five businesses have contributed $207,000 in cash gifts plus $342,760 in-kind gifts (i.e., software licenses) to the Center for Supply Chain Management & Sustainability. On April 8, 2019, a gift of $5 million to the Center was announced. Funds are used to support scholarships, business engagement activities, research projects, and faculty development for the USF supply chain management program. As noted elsewhere in this proposal, the supply chain management faculty have been successful in securing external research funding from state and federal granting agencies.

IV. Projected Benefit of the Program to the University, Local Community, and State

Use information from Tables 1 and 2 in Appendix A, and the supporting narrative for "Need and Demand" to prepare a concise statement that describes the projected benefit to the university, local community, and the state if the program is implemented. The projected

benefits can be both quantitative and qualitative in nature, but there needs to be a clear distinction made between the two in the narrative.

The projected benefits of the M.S./SCM are summarized as follows:

University: The M.S./SCM will benefit the university by positioning USF as the leader in supply chain management education and expertise in the state of Florida. The degree will enhance business engagement by providing stronger relationships with a growing industry sector. The addition of the degree is a critical element for attracting ongoing external funding from industry and government agencies.

Appendix A shows that the M.S./SCM will add up to 50 new STEM degrees awarded by USF.

Local Community: The M.S./SCM will benefit the Tampa Bay business community by meeting the need of area businesses to provide advanced training for managers in supply chain management positions. The proposal for the USF M.S./SCM emanated from requests by Tampa Bay business partners who serve on the USF Center for Supply Chain Management & Sustainability's advisory board. Area companies requested that USF offer a master's degree in supply chain management to allow greater depth in the coursework not afforded by the current M.B.A./SCM concentration.

As shown in Table 1 in Appendix C, Florida expects nearly 12% growth in logistics managers by 2026. The M.S./SCM will allow Tampa Bay companies to retain supply chain managers by allowing them to continue full-time employment as they seek to advance their skills.

State: The M.S./SCM will benefit the state of Florida by providing a program for advanced training for working professionals in the supply chain industry. As noted previously, jobs in supply chain management are in increasing demand in Florida. This program will add to the number of STEM graduates.

The Florida Department of Economic Opportunity reports that the Trade and Transportation sector (excluding Utilities) accounts for over 1.7 million jobs in Florida (see Appendix C). This number is expected to grow by nearly 125,000 jobs from 2018 to 2026, an increase of 7.5%. In 2018, there were 51,027 job vacancies in Florida in this sector; that is, 3% of the available jobs were not filled.

V. Access and Articulation – Bachelor's Degrees Only

A. If the total number of credit hours to earn a degree exceeds 120, provide a justification for an exception to the policy of a 120 maximum and submit a separate request to the Board of Governors for an exception along with notification of the program's approval. (See criteria in Board of Governors Regulation 6C-8.014)

Not applicable.

B. List program prerequisites and provide assurance that they are the same as the approved common prerequisites for other such degree programs within the SUS (see link to the Common Prerequisite Manual on the resource page for new program proposal). The courses in the Common Prerequisite Counseling Manual are intended to be those that are required of both native and transfer students prior to entrance to the major program, not simply lower-level courses that are required prior to graduation. The common prerequisites and substitute courses are mandatory for all institution programs listed, and must be approved by the Articulation Coordinating Committee (ACC). This requirement includes those programs designated as "limited access."

If the proposed prerequisites are not listed in the Manual, provide a rationale for a request for exception to the policy of common prerequisites. NOTE: Typically, all lower-division courses required for admission into the major will be considered prerequisites. The curriculum can require lower-division courses that are not prerequisites for admission into the major, as long as those courses are built into the curriculum for the upper-level 60 credit

hours. If there are already common prerequisites for other degree programs with the same proposed CIP, every effort must be made to utilize the previously approved prerequisites instead of recommending an additional "track" of prerequisites for that CIP. Additional tracks may not be approved by the ACC, thereby holding up the full approval of the degree program. Programs will not be entered into the State University System Inventory until any exceptions to the approved common prerequisites are approved by the ACC.

Not applicable.

C. If the university intends to seek formal Limited Access status for the proposed program, provide a rationale that includes an analysis of diversity issues with respect to such a designation. Explain how the university will ensure that Florida College System transfer students are not disadvantaged by the Limited Access status. NOTE: The policy and criteria for Limited Access are identified in Board of Governors Regulation 6C-8.013. Submit the Limited Access Program Request form along with this document.

Not applicable.

D. If the proposed program is an AS-to-BS capstone, ensure that it adheres to the guidelines approved by the Articulation Coordinating Committee for such programs, as set forth in Rule 6A-10.024 (see link to the Statewide Articulation Manual on the resource page for new program proposal). List the prerequisites, if any, including the specific AS degrees which may transfer into the program.

Not applicable.

INSTITUTIONAL READINESS

VI. Related Institutional Mission and Strength

A. Describe how the goals of the proposed program relates to the institutional mission statement as contained in the SUS Strategic Plan and the University Strategic Plan (see link to the SUS Strategic Plan on the resource page for new program proposal).

The M.S./SCM is aligned with USF System, USF/Tampa, and Muma College of Business (MCOB) strategic plans. All of these plans focus on student success, business engagement and global literacy.

Specifically, the M.S./SCM promotes **student success** by equipping students with the knowledge and skills required for advancement in careers in high demand in Florida and the nation in the area of global supply chain management. The M.S./SCM supports the institutional mission by ensuring the availability of well-paying jobs in the discipline for graduates.

As a discipline, the field of supply chain management is highly **engaged with industry** to ensure the development of a talent pool to support the growing demand for supply chain professionals and to keep abreast of ever-changing technological and regulatory changes. The program supports the institutional mission of business engagement by supporting Florida's economic development through strengthening the talent pool.

By its very nature, supply chain management is a **global** discipline. Graduates of the USF M.S./SCM must understand relationships among suppliers, producers and customers located around the world.

B. Describe how the proposed program specifically relates to existing institutional strengths, such as programs of emphasis, other academic programs, and/or institutes and centers.

The Center for Analytics and Creativity (CAC) in the Muma College of Business provides significant resources for the proposed M.S./SCM. The CAC hosts the annual Florida Business Analytics Forum with guest speakers related to analytics, including supply chain analytics. For example, the 2018 Forum

focused on blockchain technology and machine learning, two technology advances at the forefront of shaping supply chain design. As described elsewhere, faculty currently collaborate on supply chain research with the Center for Urban Transportation Research in the USF College of Engineering.

C. Provide a narrative of the planning process leading up to submission of this proposal. Include a chronology in table format of the activities, listing both university personnel directly involved and external individuals who participated in planning. Provide a timetable of events necessary for the implementation of the proposed program.

The planning process for the M.S./SCM began with a request from executives who are members of the advisory board of the Center for Supply Chain Management & Sustainability. Subsequently, SCM faculty took up the request to consider the resources needed to offer an M.S./SCM. A working group of volunteers drawn from the advisory board then engaged with the SCM faculty to examine similar programs and develop a list of knowledge and skills for the M.S./SCM. This information was then conveyed to the full advisory board for discussion and feedback. The SCM faculty used this feedback to develop curricular goals, learning outcomes, and proposed courses for the M.S./SCM.

The M.S./SCM pre-proposal was reviewed and approved by appropriate governing bodies at the department, college, university, and state levels in 2017-2018. The full proposal was developed for review and approval in AY 2018-2019.

Planning Process

Date	Participants	Planning Activity
April 2016	CSCMS Advisory Board	Review of SCM program resulted in request for a MS in Supply Chain Management
June 2016	Donna Davis with SCM faculty	Discussion of feasibility of M.S./SCM and plan for engaging Advisory Board members; draft curricular goals and learning outcomes
October 2016	Curriculum Working Group (Advisory Board members) with SCM faculty	Discussion of business needs; review of similar programs; focus on global supply chain management; revise curricular goals and learning outcomes
June 2017	CSCMS Advisory Board with SCM faculty	Presentation of curricular goals and learning outcomes to Advisory Board for discussion and feedback
September/October 2017	SCM faculty	Develop M.S./SCM pre-proposal
June 2018	SCM faculty and CSCMS business partners	Review of courses and curriculum map for full proposal

Events Leading to Implementation

Date	Implementation Activity
November 2017	Pre-Proposal (PP) approved by Department of Marketing
December 2017	PP approved by Graduate Program Committee/Muma College of Business
January 2018	PP approved by USF Graduate Faculty Council
January 2018	PP approved by Academic Program Advisory Council
February 2018	PP approved by SUS Council of Academic Vice Presidents
May 2018	PP approved by ACE Committee
June 2018	PP approved by BOT for inclusion on USF Tampa Accountability Plan
June 2018	PP approved by BOG for inclusion on USF Tampa Accountability Plan
September 2018	New Program Full Proposal (NPFP) approved by Department of Marketing
October 2018	NPFP approved by Graduate Program Committee, Muma College of Business
October 2018	NPFP approved by Muma College of Business
March 2019	NPFP submitted to USF Graduate Faculty Council
April 2019	NPFP submitted to APAC
May 2018	NPFP submitted to ACE Committee
June 2019	NPFP submitted to BOT
June 2019	NPFP submitted for BOG for staff review
After addition to BOG program inventory	Promote M.S./SCM to students Add M.S./SCM to USF graduate catalog
Spring 2020	Start degree program after receipt of approval letter from the BOG

VII. Program Quality Indicators - Reviews and Accreditation

Identify program reviews, accreditation visits, or internal reviews for any university degree programs related to the proposed program, especially any within the same academic unit. List all recommendations and summarize the institution's progress in implementing the recommendations.

Programs in the home academic unit for this proposal, the Department of Marketing, are reviewed in the accreditation process by AACSB as part of the Muma College of Business accreditation process. The Muma College of Business was successfully reaccredited by AACSB in 2018. The AACSB reaccreditation process takes place every five years. The M.S./SCM will be reviewed in the next reaccreditation cycle which will begin with an internal program review in AY 2021-2022 in preparation for a site visit in AY 2022-2023.

VIII. Curriculum

A. Describe the specific expected student learning outcomes associated with the proposed program. If a bachelor's degree program, include a web link to the Academic Learning Compact or include the document itself as an appendix.

Learning Outcomes:

Graduates of the M.S./SCM will demonstrate the ability to:

1. Conduct advanced analyses used in day-to-day operations of global supply chains including inventory management, transportation management, warehouse management, and network design;
2. Explain how technology is used in supply chain management from fundamental use to innovative applications;
3. Demonstrate the ability to apply core analytical techniques in modeling the physical, information, and financial flows in global supply chains;

4. Effectively present information and analyses in oral presentations and discussions, and;
5. Communicate analyses and recommendations in written form.

B. Describe the admission standards and graduation requirements for the program.

Minimum requirements for admission to the USF M.S./SCM include:

- A baccalaureate degree from a regionally accredited U.S. institution or its equivalent from a foreign institution.
- Official transcripts from all institutions attended.
- Resume, a 1-2 page personal statement of purpose, and 2 letters of recommendation.
- Minimum of three years of managerial work experience in the discipline.

Graduation requirements:

- Completion of 32 credit hours with a minimum overall GPA of 3.0.

C. Describe the curricular framework for the proposed program, including number of credit hours and composition of required core courses, restricted electives, unrestricted electives, thesis requirements, and dissertation requirements. Identify the total numbers of semester credit hours for the degree.

The M.S./SCM is a 32-credit hour program. Students will earn a graduate certificate in supply chain management upon completion of the initial 15 credit hours. Seventeen credit hours beyond the initial 15-credit hours are offered in a hybrid format (30% face-to-face and 70% online) to allow students to continue working full-time while completing the M.S./SCM at USF. The capstone course is a field-based research project designed by the student in consultation with a Muma College of Business faculty member and the student's employer/supervisor.

Curricular Framework

SCM 6006 Supply Chain Management (3 credits) *
SCM 6200 Logistics & Physical Distribution Management (3 credits) *
ISM 6156 Enterprise Resource Planning & Business Process Management (3 credits) *
ISM 6436 Operations and Supply Chain Processes (3 credits) *
ISM 6527 Lean Six Sigma (3 credits) *

SCM 6169 Sustainable Supply Chain Management & Reverse Logistics (3 credits – new proposal)
SCM 6206 Logistics Systems & Analytics (3 credits)
SCM 6939 Seminar in Supply Chain Management (3 credits – new proposal)
BUL 5842 Risk Management and Legal Issues (3 credits)
MAN 6147 Leadership Management/Concepts (2 credits)
SCM 6919 Supply Chain Management Capstone Project (3 credits – new proposal)

* Courses for 15-credit-hour graduate certificate in supply chain management

D. Provide a sequenced course of study for all majors, concentrations, or areas of emphasis within the proposed program.

Term	Course	Credits
Summer	Enterprise Resource Planning & Business Process Management	3
Summer	Operations and Supply Chain Processes	3
Fall	Supply Chain Management	3
Fall	Logistics & Physical Distribution Management	3
Fall	Lean Six Sigma	3
Spring	Sustainable Supply Chain Management & Reverse Logistics	3
Spring	Logistics Systems & Analytics	3
Spring	Seminar in Supply Chain Management	3
Summer	Risk Management and Legal Issues	3
Summer	Leadership Management/Concepts	2
Summer	Supply Chain Management Capstone Project	3
	Total Hours	**32**

E. Provide a one- or two-sentence description of each required or elective course.

SCM 6006 Supply Chain Management: Overview of key supply chain processes and functions, including logistics, marketing, finance, operations, and procurement, and the implications of supply chain management for creating value for customers and other supply chain members.

SCM 6200 Logistics & Physical Distribution Management: A study of managerial methods focusing on the establishment and control of optimum customer service levels in the areas of inventory, transportation, fixed facility location, material handling, and information. Component parts of each system are analyzed quantitatively

ISM 6156 Enterprise Resource Planning & Business Process Management: This course introduces students to business processes management and enterprise resource planning systems, and their use and implementation in key functional areas of todayâ€™s global businesses.

ISM 6436 Operations and Supply Chain Processes: This course provides an overview of several aspects of operations management, a discipline in business concerned with managing the transformation of inputs into outputs.

ISM 6527 Lean Six Sigma: In this course students gain experience with process improvement from a Lean and Six Sigma perspective. The course shows Lean as a management philosophy to eliminate waste, and Six Sigma as tools and ideas to reduce variation and improving quality.

SCM 6169 Sustainable Supply Chain Management and Reverse Logistics (new proposal): This course emphasizes the managerial aspects of reverse logistics and sustainability in supply chain management. The course provides students with the knowledge necessary to understand the principles and important issues relating to the reverse logistics process and corporate sustainability efforts with respect to the supply chain.

SCM 6206 Logistics Systems & Analytics: Provides an overview of the main types of supply chain software including ERP, WMS, and TMS systems. Describes the main functionality, how they are used, as

well as the software selection process and how software upgrade and implementation projects should be organized and managed.

SCM 6939 Seminar in Supply Chain Management (new proposal): A combination of lectures and cases and/or article(s) related to a current challenges in supply chain management. Led by faculty, researchers in the USF Center for Supply Chain Management & Sustainability, and invited guest speakers from industry.

BUL 5842 Risk Management and Legal Compliance: This course is designed for nonaccounting students who need to understand, monitor and control risks. The content of this course spans corporate governance, risk strategy and legal/regulatory compliance including analysis of significant laws/regulations.

MAN 6147 Leadership/Management Concepts: Provides a foundation for the study of processes of leadership in organization and society. Presents an overview of various concepts of management, such as the personal values of leaders and leadership in an organization.

SCM 6919 Supply Chain Management Capstone Project (new proposal): Students conduct research under the direction of a faculty member on a supply chain problem, typically conducted at the student's place of employment. Projects may include reports of site visits, in-person interviews and quantitative analysis of data provided by the student's employer or a sponsoring company.

F. For degree programs in the science and technology disciplines, discuss how industry-driven competencies were identified and incorporated into the curriculum and indicate whether any industry advisory council exists to provide input for curriculum development and student assessment.

As noted previously, the curriculum for this program was developed with the guidance of the advisory board of senior supply chain managers and executives for the Center for Supply Chain Management & Sustainability (CSCMS). A working group of volunteers drawn from the advisory board developed a list of knowledge and skills that were then mapped into the courses. Technical skills -- including introduction to software applications and analytical skills -- play a critical role in global supply chain management. In addition, the working group, as well as the full advisory board, emphasized the need for the development of critical thinking and leadership skills.

The business partners who comprise the advisory board of the CSCMS meet annually. This group will continue to provide guidance and oversight on the overall quality and relevance of the M.S./SCM program. Feedback about student performance will be solicited from employers in the Supply Chain Management Capstone Project course. In addition, this course will serve to collect data for the Assurance of Learning for the M.S./SCM program.

G. For all programs, list the specialized accreditation agencies and learned societies that would be concerned with the proposed program. Will the university seek accreditation for the program if it is available? If not, why? Provide a brief timeline for seeking accreditation, if appropriate.

The Muma College of Business was successfully reaccredited by AACSB in 2018. The AACSB reaccreditation process takes place every five years. All programs are reviewed in the AACSB reaccreditation process. The M.S./SCM will be reviewed in the next reaccreditation cycle which will begin with an internal program review in AY 2021-2022 in preparation for a site visit in AY 2022-2023.

H. For doctoral programs, list the accreditation agencies and learned societies that would be concerned with corresponding bachelor's or master's programs associated with the proposed program. Are the programs accredited? If not, why?

Not applicable.

I. Briefly describe the anticipated delivery system for the proposed program (e.g., traditional

delivery on main campus; traditional delivery at branch campuses or centers; or nontraditional delivery such as distance or distributed learning, self-paced instruction, or external degree programs). If the proposed delivery system will require specialized services or greater than normal financial support, include projected costs in Table 2 in Appendix A. Provide a narrative describing the feasibility of delivering the proposed program through collaboration with other universities, both public and private. Cite specific queries made of other institutions with respect to shared courses, distance/distributed learning technologies, and joint-use facilities for research or internships.

The M.S./SCM courses will be delivered in either online or hybrid format that combines face-to-face with online instruction. Courses will be developed with the support of Innovative Education experts. No special facilities or extraordinary financial support are required for the degree.

IX. Faculty Participation

A. Use Table 4 in Appendix A to identify existing and anticipated full-time (not visiting or adjunct) faculty who will participate in the proposed program through Year 5. Include (a) faculty code associated with the source of funding for the position; (b) name; (c) highest degree held; (d) academic discipline or specialization; (e) contract status (tenure, tenure-earning, or multi-year annual [MYA]); (f) contract length in months; and (g) percent of annual effort that will be directed toward the proposed program (instruction, advising, supervising internships and practica, and supervising thesis or dissertation hours).

Table 4 displays the faculty who will deliver the courses in the M.S./SCM. All faculty are currently employed by USF.

Dr. Donna Davis, Professor, Marketing & Supply Chain Management
Dr. James Stock, Professor, Marketing & Supply Chain Management
Dr. Rob Hooker, Associate Professor, Marketing & Supply Chain Management

B. Use Table 2 in Appendix A to display the costs and associated funding resources for existing and anticipated full-time faculty (as identified in Table 4 in Appendix A). Costs for visiting and adjunct faculty should be included in the category of Other Personnel Services (OPS). Provide a narrative summarizing projected costs and funding sources.

The costs associated with the M.S./SCM program are exclusively related to the faculty effort devoted to teaching the courses in the program. These faculty members are currently teaching the courses in the graduate supply chain management concentration. The courses taught outside the department will be taught in summer semester or in a one-week bootcamp format and, thus, will not affect teaching loads for the regular semester. The chairs of the departments involved and faculty who teach those courses have been consulted to ensure there are no conflicts with existing commitments. Faculty salaries are completely funded by E&G funds.

C. Provide in the appendices the abbreviated curriculum vitae (CV) for each existing faculty member (do not include information for visiting or adjunct faculty).

See Appendix D.

D. Provide evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service. Such evidence may include trends over time for average course load, FTE productivity, student HC in major or service courses, degrees granted, external funding attracted, as well as qualitative indicators of excellence.

The M.S./SCM will be hosted in the Department of Marketing in the Muma College of Business. Faculty associated with the new degree are members of the Department of Marketing. The following statistics are for the Department of Marketing.

	2014-2015	2015-2016	2016-2017	2017-2018
Average course load	4.2	4.2	3.9	3.9
HC enrollment	549	571	559	693
Number of degrees awarded	261	278	257	265
Scholarly publications	19	25	20	26
External grants	$518,118	$437,244	$1,008,143	$642,377

Research productivity is evidenced in the steady upward trend for scholarly peer-reviewed publications along with the substantial external research funding. As noted elsewhere in this proposal, the SCM faculty are specifically involved in research collaborations that attract external funding from national and state agencies including USDA and FDOT.

The faculty who currently teach the supply chain management courses are heavily involved in service at all levels. Their service on departmental, college, university, and disciplinary committees and activities are noted on their CV's in Appendix D. All are active members of the Council for Supply Chain Management Professionals (CSCMP), the global association for supply chain managers and educators.

Other qualitative indicators of excellence include recognition of SCM faculty at the university and national level. Dr. James Stock is a Distinguished University Professor, Fulbright Core Scholar, and member of the American Association for the Advancement of Science. Dr. Rob Hooker is a Fulbright Specialist in the area of supply chain management.

X. Non-Faculty Resources

A. Describe library resources currently available to implement and/or sustain the proposed program through Year 5. Provide the total number of volumes and serials available in this discipline and related fields. List major journals that are available to the university's students. Include a signed statement from the Library Director that this subsection and subsection B have been reviewed and approved.

Part I – Overview of USF Libraries, Mission, and Program/Discipline Strengths

The University of South Florida's Libraries consist of USF's main research library, located on the Tampa Campus and the Hinks and Elaine Shimberg Health Sciences Library, the Nelson Poynter Memorial Library, USF St. Petersburg campus; and the Jane Bancroft Cook Library, which is a joint-use facility shared with New College of Florida and the USF Sarasota-Manatee campus. The USF Libraries serve as the nexus for the teaching, learning, and research for the faculty and students at the University of South Florida. Together, the USF Libraries provide access to more than 2 million volumes and an extensive collection of electronic resources including over 58,975 e-journal subscriptions and 927 aggregator databases, 580,000 e-books, and 826,000 digital images. In addition, students have access to over 60,000 audio/visual materials including videos, CDs, and DVDs.

In addition to extensive electronic and print resources, the USF Tampa Library offer unique access to primary research materials through Special & Digital Collections. Specializations include: Florida Studies Center Collection, the Children and Young Adult Literature Collection, the Science Fiction & Fantasy Collection, the Holocaust and Genocide Studies Center Collection, the Arts Collection, the Literature & Book Arts Collection, the University Archives, and Digital Collections, which provide online access to many materials from Special Collections, as well as collections digitized through partnerships with other libraries and repositories.
The library endeavors to develop and maintain a collection that will satisfy the needs for resources that support the undergraduate and graduate curriculum for the Supply Chain Management program in the Muma College of Business Marketing Department as well as serve the more specialized demands from graduate students and faculty for more advanced research materials.

Part II - USF Libraries' Collections
MONOGRAPHS (Print and Ebooks)

The numbers of both print and electronic monographs below were derived from searching the library's catalog for book titles by Library of Congress Subject Headings relevant to the Supply Chain Management program.

Library of Congress Subject Heading	Call Number	Print	Electronic
Business Logistics	HD38.5	115	376
Inventory Control	TS160-TS163	67	70
Industrial Management	HD28-HD70	9861	8093
Industrial Procurement	HD39.5	42	49
Management Science	T55.4-T57.97	793	761
Marketing Management	HF5415.13	1233	283
Marketing Channels	HF5415.129	23	5
Materials Management	TS161	28	32
Operations Research	T57.6-T57.97	498	451
Physical Distribution of Goods	HF5415.6	6	5
Shipment of Goods	HF5761-HF5780	33	11
Total		**12,699**	**10,136**

Additional ebooks without Library of Congress Subject Headings

- 1,825 (Book titles with "Supply Chain Management" in the title, abstract, or author fields)
    - 357 (Ebook titles containing "Supply Chain Management")

Total Number of Monographs

- Print = 12,699
- Electronic = 11,961

B. Describe additional library resources that are needed to implement and/or sustain the program through Year 5. Include projected costs of additional library resources in Table 2 in Appendix A. Please include the signature of the Library Director in Appendix B.

No additional resources will be required. The current library resources are sufficient for the program.

C. Describe classroom, teaching laboratory, research laboratory, office, and other types of space that are necessary and currently available to implement the proposed program through Year 5.

Classroom space and office space are the only resources needed for the program. The M.S./SCM will add three classes that will need to be assigned space for the one week residency each semester; current space allocation is sufficient to accommodate these courses. All faculty are in currently assigned office space; hence, no new office space is needed.

D. Describe additional classroom, teaching laboratory, research laboratory, office, and other space needed to implement and/or maintain the proposed program through Year 5. Include any projected Instruction and Research (I&R) costs of additional space in Table 2 in Appendix A. Do not include costs for new construction because that information should be provided in response to X (E) below.

No additional classroom or office space is required. Existing classroom and office space is sufficient.

E. If a new capital expenditure for instructional or research space is required, indicate where this item appears on the university's fixed capital outlay priority list. Table 2 in Appendix A includes only Instruction and Research (I&R) costs. If non-I&R costs, such as indirect costs affecting libraries and student services, are expected to increase as a result of the

program, describe and estimate those expenses in narrative form below. It is expected that high enrollment programs in particular would necessitate increased costs in non-I&R activities.

No capital expenditure for instructional or research space is required.

F. Describe specialized equipment that is currently available to implement the proposed program through Year 5. Focus primarily on instructional and research requirements.

No specialized equipment is required to implement or sustain the program.

G. Describe additional specialized equipment that will be needed to implement and/or sustain the proposed program through Year 5. Include projected costs of additional equipment in Table 2 in Appendix A.

No specialized equipment is required to implement or sustain the program.

H. Describe any additional special categories of resources needed to implement the program through Year 5 (access to proprietary research facilities, specialized services, extended travel, etc.). Include projected costs of special resources in Table 2 in Appendix A.

No additional special categories of resources are needed to implement the program.

I. Describe fellowships, scholarships, and graduate assistantships to be allocated to the proposed program through Year 5. Include the projected costs in Table 2 in Appendix A.

Students enrolled in this program will be employed full-time in the supply chain industry. We expect that most, if not all, students enrolled in this program will secure tuition remission support from their employers. No fellowships or graduate assistantships are planned.

J. Describe currently available sites for internship and practicum experiences, if appropriate to the program. Describe plans to seek additional sites in Years 1 through 5.

Students in this program are working professionals. Internships and practica are not necessary.

APPENDIX A

TABLE 1-B

PROJECTED HEADCOUNT FROM POTENTIAL SOURCES

(Graduate Degree Program)

Source of Students (Non-duplicated headcount in any given year)*	Year 1		Year 2		Year 3		Year 4		Year 5	
	HC	FTE	HC	FTE	HC	FTE	HC	FTE	HC	FTE
Individuals drawn from agencies/industries in your service area (e.g., older returning students)	25	17.71	25	17.71	50	35.42	50	35.42	50	35.42
Students who transfer from other graduate programs within the university**	0	0	0	0	0	0	0	0	0	0
Individuals who have recently graduated from preceding degree programs at this university	0	0	0	0	0	0	0	0	0	0
Individuals who graduated from preceding degree programs at other Florida public universities	0	0	0	0	0	0	0	0	0	0
Individuals who graduated from preceding degree programs at non-public Florida institutions	0	0	0	0	0	0	0	0	0	0
Additional in-state residents***	0	0	0	0	0	0	0	0	0	0
Additional out-of-state residents***	0	0	0	0	0	0	0	0	0	0
Additional foreign residents***	0	0	0	0	0	0	0	0	0	0
Other (Explain)***	0	0	0	0	0	0	0	0	0	0
Totals	**25**	**17.7083333**	**25**	**17.7083333**	**50**	**35.41666667**	**50**	**35.4166667**	**50**	**35.41666667**

* List projected annual headcount of students enrolled in the degree program. List projected yearly cumulative ENROLLMENTS instead of admissions.

** If numbers appear in this category, they should go DOWN in later years.

*** Do not include individuals counted in any PRIOR category in a given COLUMN.

APPENDIX A

TABLE 2
PROJECTED COSTS AND FUNDING SOURCES

Instruction & Research Costs (non-cumulative)	Year 1								Year 5						
	Funding Source								Funding Source						
	Reallocated Base* (E&G)	Enrollment Growth (E&G)	New Recurring (E&G)	New Non-Recurring (E&G)	Contracts & Grants (C&G)	Philanthropy Endowments	Enterprise Auxiliary Funds	**Subtotal coulumns 1+...+7**	Continuing Base** (E&G)	New Enrollment Growth (E&G)	Other*** (E&G)	Contracts & Grants (C&G)	Philanthropy Endowments	Enterprise Auxiliary Funds	**Subtotal coulumns 9+...+ 14**
Columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Faculty Salaries and Benefits	202,508	0	0	0	0	0	0	**$202,508**	215,739	0	0	0	0	0	**$215,739**
A & P Salaries and Benefits	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
USPS Salaries and Benefits	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Other Personal Services	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Assistantships & Fellowships	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Library	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Expenses	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Operating Capital Outlay	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Special Categories	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Total Costs	**$202,508**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$202,508**	**$215,739**	**$0**	**$0**	**$0**	**$0**	**$0**	**$215,739**

*Identify reallocation sources in Table 3.

**Includes recurring E&G funded costs ("reallocated base," "enrollment growth," and "new recurring") from Years 1-4 that continue into Year 5.

***Identify if non-recurring.

Faculty and Staff Summary

Total Positions	Year 1	Year 5
Faculty (person-years)	0.56	0.56
A & P (FTE)	0	0
USPS (FTE)	0	0

Calculated Cost per Student FTE

	Year 1	Year 5
Total E&G Funding	$202,508	$215,739
Annual Student FTE	17.70833333	35.41666667
E&G Cost per FTE	$11,436	$6,091

Worksheet Table 2 Budget

APPENDIX A

TABLE 3
ANTICIPATED REALLOCATION OF EDUCATION & GENERAL FUNDS*

Program and/or E&G account from which current funds will be reallocated during Year 1	Base before reallocation	Amount to be reallocated	Base after reallocation
Marketing: Existing Supply Chain Management Concentration that will be discontinued	305,903	202,508	**$103,395**
	0	0	
	0	0	
	0	0	
	0	0	
	0	0	
Totals	$305,903	$202,508	**$103,395**

*** If not reallocating funds, please submit a zeroed Table 3**

APPENDIX A

TABLE 4
ANTICIPATED FACULTY PARTICIPATION

Faculty Code	Faculty Name or "New Hire" Highest Degree Held Academic Discipline or Speciality	Rank	Contract Status	Initial Date for Participation in Program	Mos. Contract Year 1	FTE Year 1	% Effort for Prg. Year 1	PY Year 1	Mos. Contract Year 5	FTE Year 5	% Effort for Prg. Year 5	PY Year 5
A	Donna Davis, Ph.D. Supply Chain Management	Professor	Tenure	Spring 2020	9	0.75	0.25	0.19	9	0.75	0.25	0.19
A	Jim Stock, Ph.D. Supply Chain Management	Professor	Tenure	Spring 2020	9	0.75	0.25	0.19	9	0.75	0.25	0.19
A	Rob Hooker, Ph.D Supply Chain Management	Assoc. Prof.	Tenure	Spring 2020	9	0.75	0.25	0.19	9	0.75	0.25	0.19
	Total Person-Years (PY)							**0.56**				**0.56**

Faculty Code		Source of Funding	PY Workload by Budget Classsification Year 1	Year 5
A	Existing faculty on a regular line	Current Education & General Revenue	0.56	0.56
B	New faculty to be hired on a vacant line	Current Education & General Revenue	0.00	0.00
C	New faculty to be hired on a new line	New Education & General Revenue	0.00	0.00
D	Existing faculty hired on contracts/grants	Contracts/Grants	0.00	0.00
E	New faculty to be hired on contracts/grants	Contracts/Grants	0.00	0.00
		Overall Totals for Year 1	**0.56**	**Year 5 0.56**

Revised December 8, 2016

APPENDIX B

Please include the signature of the Equal Opportunity Officer and the Library Director.

Signature of Equal Opportunity Officer — Date 1/29/2019

Signature of Library Director — Date 11/21/18

This appendix was created to facilitate the collection of signatures in support of the proposal. Signatures in this section illustrate that the Equal Opportunity Officer has reviewed section II.E of the proposal and the Library Director has reviewed sections X.A and X.B.

APPENDIX C

Data related to the need for another degree in the state

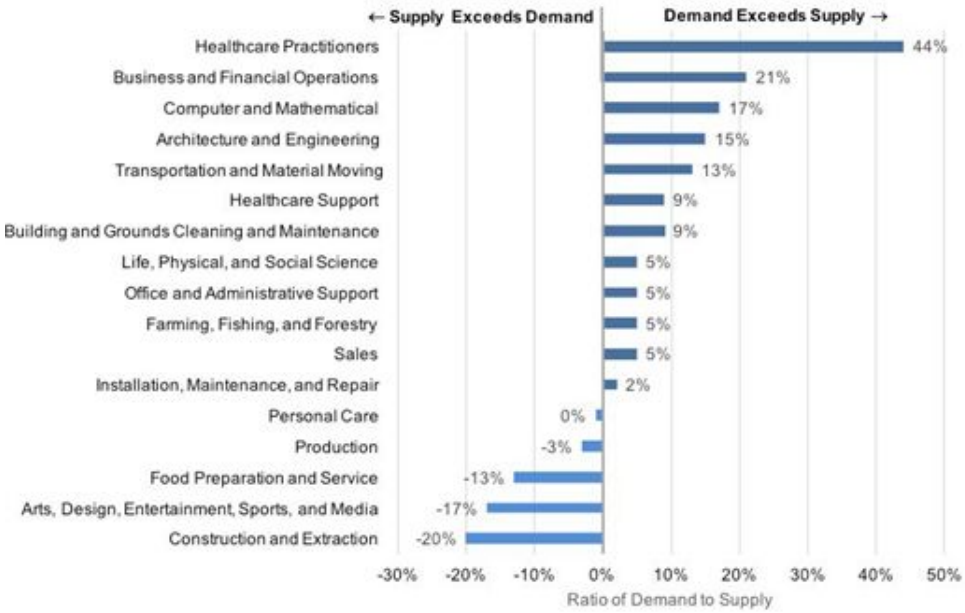
Growth in the Trade, Transportation, and Utilities industry sector is the underlying force that drives demand for supply chain management professionals in the state of Florida and the nation. The Florida Department of Economic Opportunity reports that the Trade and Transportation sector (excluding Utilities) accounts for over 1.7 million jobs in Florida (see Table 1). This number is expected to grow by nearly 125,000 jobs from 2018 to 2026, an increase of 7.5%. In 2018, there were 51,027 job vacancies in Florida in this sector; that is, 3% of the available jobs were not filled.

The demand for Logisticians in Florida is estimated at 6,721 in 2018 (see Table 1). This number is expected to grow by 785 jobs to 7,506 by 2026, an increase of 11.7%.

The current Master's level programs in Florida have not yet produced any graduates. Two were introduced in Fall 2018 and one will be introduced in Fall 2019. The USF M.S./SCM is designed specifically to meet the needs of Florida companies by allowing working professionals to continue working full time while they pursue their degrees.

A study by Burning Glass (2018) shows that the skills gap for the Transportation and Materials Handling sector is among the top five in the country, weighing in at a 13% shortage.

Figure 1. Demand/Supply Ratio by Occupation



Revised December 8, 2016

Table 1. JOBS BY INDUSTRY IN FLORIDA

FLORIDA DEPARTMENT OF ECONOMIC OPPORTUNITY

NAICS Code	NAICS Title	Employment 2018	Employment 2026	Growth	Percent Growth
11	**Management Occupations - Logisticians**	**6,721**	**7,506**	**785**	**11.7**
	Trade and Transportation	1,724,908	1,849,680	124,772	7.5
42	*Wholesale Trade*				
423	Merchant Wholesalers, Durable Goods	179,802	192,468	12,666	7.0
424	Merchant Wholesalers, Nondurable Goods	128,256	136,896	8,640	6.7
425	Wholesale Electronic Markets and Agents and Brokers	43,936	47,473	3,537	8.1
44	*Retail Trade*				
441	Motor Vehicle and Parts Dealers	151,499	164,386	12,887	8.5
442	Furniture and Home Furnishings Stores	38,810	40,525	1,715	4.4
443	Electronics and Appliance Stores	40,827	42,561	1,734	4.3
444	Building Material and Garden Equipment and Supplies Dealers	88,651	95,081	6,430	7.3
445	Food and Beverage Stores	228,561	243,215	14,654	6.4
446	Health and Personal Care Stores	82,885	92,848	9,963	12.0
447	Gasoline Stations	46,675	49,595	2,920	6.3
448	Clothing and Clothing Accessories Stores	112,135	112,392	257	0.2
451	Sporting Goods, Hobby, Book, and Music Stores	37,942	43,255	5,313	14.0
452	General Merchandise Stores	214,407	226,092	11,685	5.5
453	Miscellaneous Store Retailers	56,729	59,842	3,113	5.5
454	Nonstore Retailers	44,128	50,248	6,120	13.9
48	*Transportation and Warehousing*				
481	Air Transportation	42,589	48,017	5,428	12.8
482	Rail Transportation	4,948	4,679	-269	-5.4
483	Water Transportation	13,387	14,170	783	5.9
484	Truck Transportation	54,315	58,502	4,187	7.7
485	Transit and Ground Passenger Transportation	16,373	18,232	1,859	11.4
486	Pipeline Transportation	368	390	22	6.0
488	Support Activities for Transportation	60,800	67,330	6,530	10.7
493	Warehousing and Storage	36,885	41,483	4,598	12.5

February 27, 2019

Dr. Moez Limayem
Muma College of Business
University of South Florida
4202 East Fowler Avenue
Tampa, FL 33620-5500

Dean Limayem,

The purpose of this letter is to provide support for USF's two proposed degree programs in supply chain management- the Bachelor of Science degree in supply chain management- and the Master of Science degree in supply chain management. Both degrees address a major talent shortfall within the global supply chain management industry space. Additionally, supply chain salaries for graduates are higher than most starting salaries for most other occupations. Placement rates for students concentrating in SCM have exceeded 90% for the past few years and with B.S. and M.S. programs, the hiring rates could even be higher.

The content and specific courses to be offered were created utilizing a partnership between industry practitioners and faculty at USF's Center for Supply Chain Management & Sustainability. The proposed B.S./SCM and M.S./SCM degree programs enable USF faculty to add additional electives and innovative courses to the programs, such as Sustainable Supply Chain Management, Global Sourcing, and others.

Supply Chain is now part of the STEM initiative, thus the promotion and emphasis on needed skills. These degrees are very attractive to the female student as a favorable altermative to computer science and engineering. Individuals in the programs develop skillsets that allow them to contribute to their future employers immediately after they are hired.

These programs are worthwhile and fill a need in the marketplace. I am pleased to provide my support for these programs. If you have any questions, do not hesitate to contact me.

Sincerely,

Monica B. Wooden
Co-founder MercuryGate International, Inc.
mbw@mercurygate.com
813-505-6235

February 25, 2019

Moez Limayem
Muma College of Business
University of South Florida
4202 East Fowler Avenue
Tampa, FL 33620-5500

Dear Dean Limayem

The purpose of this letter is to highlight my support for the two proposed degree programs in supply chain management, at USF's Muma College of Business. While geared for individuals at different stages in their careers, both the BS and MS programs address a critical talent shortfall within the global supply chain management industry space. Whether dealing with the trade imbalance issues in Florida, or working on other national and/or global supply chain initiatives, our economy needs individuals with these skills.

The proposed programs were created through an industry/academic collaboration featuring Muma supply chain faculty and executive advisory board members of the Center for Supply Chain Management & Sustainability. Therefore, the learning objectives were developed to address current and future needs in this high-growth field. The BS/SCM program helps to address critical workforce, economic development, and STEM education needs through courses emphasizing global logistics, transportation, and manufacturing. Targeted to managers, the proposed MS/SCM degree program helps seasoned supply chain professionals build and refine their skills, enabling them to further their careers in management and executive roles. This program is the first of its kind to leverage a USF partnership with MIT for content delivery. This helps reduce costs for students, while opening up opportunities for them to continue with graduate coursework in a one-of-a-kind format.

The innovative programs highlighted above are very much needed in and across industries. They help individuals continue to develop their skills in ways that allow them to tackle problems not even yet invented. Please accept my support of these programs, and feel free to contact me with questions.

Sincerely,

Michael Armanious

10320 49th Street North Clearwater Fl 33762
727.571.4159 | **datexcorp.com**

FIU | Office of the Provost
FLORIDA INTERNATIONAL UNIVERSITY

April 15, 2019

Dr. Ralph C. Wilcox
Provost and Executive Vice President
University of South Florida
4242 East Fowler Avenue, CGS 401
Tampa, FL 33620

Dear Provost Wilcox:

Thank you for the opportunity to review both the proposed BS and MS Logistics, Materials, and Supply Chain Management. Florida International University is supportive of your creating separate degree programs in this field.

As FIU continues to work within the Florida Consortium of Metropolitan Research Universities with your institution, we look forward to following your success in the degree implementations and continuing our collaborative efforts. The Supply Chain faculty in FIU's Marketing Department expect there to be opportunities in the future to work together on solving some of Florida's supply chain challenges.

Sincerely,

Kenneth G. Furton
Provost and Executive Vice President

Kenneth G. Furton
Provost and Executive Vice President
Modesto A. Maidique Campus, PC 526, 11200 SW 8 Street, Miami, FL 33199
Tel 305-348-2151 · Fax 305-348-2994 · provost.fiu.edu

Florida Agricultural and Mechanical University
TALLAHASSEE, FLORIDA 32307-3200

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TELEPHONE: (850) 599-3276
FAX: (850) 561-2551

OFFICE OF THE PROVOST AND
VICE PRESIDENT FOR ACADEMIC AFFAIRS

April 23, 2019

Dr. Ralph C. Wilcox
Provost and Executive Vice President
University of South Florida
4202 East Fowler Avenue, CGS 401
Tampa, FL 33620-6100

Dear Dr. Wilcox:

Thank you for the opportunity to review the proposal for the new degree program--Masters in Logistics, Materials, and Supply Chain Management. Florida Agricultural and Mechanical University (FAMU) currently offers a M.S. in Supply Chain Management (CIP 52.0203). Supply chain is a fast growing industry and the need for professionals trained in this area is significant. The proposed program by USF helps to further address this need along with FAMU and other programs within the SUS offering such a degree. Therefore, FAMU offers full support for the Masters in Logistics, Materials, and Supply Chain Management.

Best wishes to your team as they move forward in developing the program. We believe this program will be a benefit to the State University System and workforce of Florida.

Sincerely,

Maurice Edington, Provost and Vice President
for Academic Affairs

c: Dean Shawnta Friday-Stroud
School of Business and Industry

Dr. Sundra Kincey
Assistant VP for Academic Affairs

FAMU IS AN EQUAL OPPORTUNITY/EQUAL ACCESS UNIVERSITY

UNF UNIVERSITY of NORTH FLORIDA

DEPARTMENT OF MARKETING & LOGISTICS

March 27, 2018

Dr. David Swanson
Associate Professor of Transportation and Logistics
Co-Editor-in-Chief *Transportation Journal*
Department of Marketing and Logistics
Coggin College of Business
University of North Florida
1 UNF Drive
Jacksonville, FL 32224

Dean Moez Limayem
Muma College of Business
University of South Florida
4202 E. Fowler Avenue
Tampa, FL 33620

Dear Dr. Limayem,

I was excited to hear that the University of South Florida is nearing the finalization of a BS and MS in Supply Chain Management. I wanted to write a letter in support of your efforts.

The demand for people trained in supply chain management continues to grow, and this demand is outpacing the supply. It's not enough for students to be trained in one aspect of supply chain management, such as transportation, purchasing, or logistics information systems. Industry is requiring students who have a strong understanding of end-to-end supply chain management. The USF degree programs in supply chain management will go a long way toward meeting industry demands in Florida.

In Fall 2019 the University of North Florida will be accepting students who seek a MS degree in Logistics and Supply Chain Management, which closely parallels the USF curriculum for the MS in SCM. You may have heard that Florida International University also has recently approved a graduate degree program in supply chain management. These programs are testimony of the need for supply chain management education, and there is demand in all the economic regions of Florida.

Sincerely,

David

David Swanson, PhD
Associate Professor of Transportation and Logistics
Co-Editor-in-Chief, *Transportation Journal*
University of North Florida

University of West Florida

Marketing & Economics
11000 University Parkway
Pensacola, FL 32514-5750

April 3, 2019

Dean Moez Limayem
Muma College of Business
University of South Florida
4202 E. Fowler Avenue
Tampa, FL 33620

Dear Dean Limayem,

It is a privilege to support the efforts of the University of South Florida in establishing Bachelors and Masters Degrees in Supply Chain Management. Having participated in proposing and establishing our supply chain related degrees at UWF, I have researched the state of logistics within Florida and throughout the United States. It is clear to me that graduates, having supply chain management knowledge and skills, are in high demand by industry, yet, there are not enough stand alone supply chain degree programs to meet industry demand.

Trade and logistics has been identified by the Florida Chamber of Commerce as highly important for positioning Florida as a leader among states for global trade and investment. The Florida Trade and Logistics 2013 study concluded the need for 150,000 supply chain related new jobs up to the present. Nationwide, the U.S. Bureau of Labor Statistics indicates an expected 22% growth of jobs related to supply chain management by 2022.

To meet such industry demand, the stand alone supply chain related degrees from our Florida colleges and universities must also grow. Our graduates receive starting salaries among the highest awarded to business graduates; approximate starting annual salaries averaging $50,000 to $60,000 and some exceeding $70,000. Moreover, our students have nearly 100% job placement in a supply chain related position upon graduation. This is very similar to that of our other Florida supply chain degree programs and across the nation, as a whole.

Dean Limayem, without disciplined knowledge in supply chain management, frontline and executive managers are likely to make critical workplace decisions that are more costly and reduce quality of service. Consequently, Florida's goal to gain a competitive advantage in trade and logistics could be jeopardized in the absence of growth among our university supply chain degree programs.

Two publications fully discuss the importance of supply chain knowledge and the state of supply chain and logistics education; "Are You the Weakest Link in Your Supply Chain?" Slone, Mentzer and Dittman, *Harvard Business Review*, 1997, V. 85, No. 9, pp. 116-127; and "The Future of Logistics Education," Ozment and Keller, *Transportation Journal*, 2011, V. 50, No. 1, pp. 65-83. Adding to those, a recent study indicates a 6:1 demand to supply ratio for new college graduates in supply chain management related fields (*Supply Chain Insight*, August 2013, p. 3).

Phone 850.474.2652 Fax 850.474.3069
Web uwf.edu
An Equal Opportunity/Equal Access Institution

Our UWF standalone Supply Chain Logistics Management Degree has increased to over 100 majors and has exceeded our initial projected growth by about 30% to this point. Dean Limayem, industry demand is high for graduates, student demand is high for the major, and salaries and opportunities for graduates in supply chain management are among the highest. Your proposed degrees in supply chain management are important to the students, industry, and discipline within Florida and across the nation.

Thank you for the opportunity to show my support. My colleagues and I look forward to future opportunities to collaborate with your supply chain faculty and advance the opportunities for our Florida students, contribute to Florida's advancement in supply chain related industries, and pursue joint research to advance our collective knowledge of supply chain management.

Sincerely,

Scott B. Keller, Ph.D.
Professor, Logistics and Supply Chain Management
Director of the Center for Supply Chain Management Excellence
Associate Editor, Journal of Business Logistics
Former Editor-in-Chief, International Journal of Logistics Management
Department of Marketing, Supply Chain Logistics, and Economics
University of West Florida
11000 University Parkway
Pensacola, FL 32514
850-857-6441
skeller@uwf.edu

Appendix D

Donna Davis

Education
Ph.D., University of Tennessee, Marketing and Information Management, 2003
M.B.A., University of Tennessee, 1993
B. A., Maryville College, 1983

Academic Experience
University of South Florida

Marketing Department Chair	2016 - present
Professor	2015 – present
Co-Director, Center for Supply Chain Management & Sustainability	2013 – present
Associate Professor	2013 - 2015

Texas Tech University

Associate Professor, Georgie G. Snyder Professorship	
Coordinator, Global Supply Chain Management Program	2009-2013
Assistant Professor	2003-2009

Current Memberships in Professional Organizations
Council for Supply Chain Management Professionals
American Marketing Association
Academy of Marketing Science

Service Activities Within and Outside of Institution
University Committees

Muma College of Business Undergraduate Programs Committee	2013 – 2015
Muma College of Business MBA Committee	2013 – 2015

Editorial Positions

Senior Associate Editor: *International Journal of Physical Distribution & Logistics Management*
Executive Advisory Board: *Journal of Business Logistics*
Editorial Review Board: *Journal of Supply Chain Management, Industrial Marketing Management,* and *Journal of Business Research*

Research – Selected Refereed Journal Articles

- Davis, Donna F. 2014. Research that makes a difference. *International Journal of Physical Distribution & Logistics Management* 44 (5): Guest Editorial.
- Davis, Donna F. and Wesley Friske. 2013. The role of public-private partnerships in facilitating cross-border logistics: A case study at the U.S./Canadian border. *Journal of Business Logistics* 34 (4): 347-359.
- Golicic, Susan L., Brian S. Fugate and Donna F. Davis. 2012. Examining market information and brand equity through resource-advantage theory: A carrier manager perspective. *Journal of Business Logistics* 33 (1): 20-33.
- Golicic, Susan L. and Donna F. Davis. 2012. Implementing mixed methods research in supply chain management. *International Journal of Physical Distribution & Logistics Management* 42 *(8):* 1-27.
- Hunt, Shelby and Donna F. Davis. 2012. Grounding supply chain management in resource-advantage theory: In defense of a resource-based view of the firm. *Journal of Supply Chain Management* 48 (2): 14-20.
- Marquardt, Adam, Susan L. Golicic and Donna F. Davis. 2010. B2B services branding in the logistics service industry. *Journal of Services Marketing,* 25(1): 47-57.

Monica B. W

- Davis, Donna F., Susan L. Golicic and Adam Marquardt. 2009. Measuring brand equity for logistics services. *International Journal of Logistics Management 20*(2): 201–212.
- Davis, Donna F. and John T. Mentzer. 2008. Relational resources in interorganizational exchange: The role of trade equity and brand equity. *Journal of Retailing 84*(4): 435-448.
- Hunt, Shelby D. and Donna F. Davis. 2008. Grounding supply chain management in resource advantage theory, *Journal of Supply Chain Management 44*(1): 10-21.
- Davis, Donna F., Susan L. Golicic and Adam Marquardt. 2008. Branding a B2B service: Does a brand differentiate a logistics service provider? *Industrial Marketing Management* 37(2): 218-227.
- Davis, Donna F., and John T. Mentzer. 2007. Organizational factors in sales forecasting management: An integrative framework and research agenda, *International Journal of Forecasting 23*(3): 475-495.
- McCarthy, Teresa M., Donna F. Davis, Susan L. Golicic and John T. Mentzer. 2006. The Evolution of Sales Forecasting Management: A 20-Year Longitudinal Study of Forecasting Practices, *Journal of Forecasting 25*(5): 303-324.
- Golicic, Susan L., Donna F. Davis, Teresa M. McCarthy, and John T. Mentzer. 2002. The Impact of E-Commerce on Supply Chain Management, *International Journal of Physical Distribution & Logistics Management 32*(10): 851-71.

Research Funding

- 2016, Co-PI, Evaluation of Florida's Inbound and Outbound Freight Imbalance, *Florida Department of Transportation*, $199,660.
- 2015, Co-PI, Land Use Analysis to Enhance Successful Logistics Activity Center Development, *Florida Department of Transportation – District 7*, $123,601.
- 2015, Principal Investigator, Supply Chain Audit for Pasco County Food Services, *Pasco County School District,* $10,000.
- 2014, Co-PI, Evaluation of Logistics-Led Economic Development, *Florida Department of Transportation*, $220,000.
- 2011, Principal Investigator, Border Management. *International Council for Canadian Studies*, $8,987.
- 2009-2012, Principal Investigator, Supply Chain Resources for International Business Education (*SCRIBE*), *Business & International Education program, U.S. Dept. of Education*, $186,879.

Robert Hooker

Education
Ph.D. Business Administration, The Florida State University, 2010
Master of Business Administration, The Florida State University, 2005
Bachelor of Science, The Florida State University, 2002

Academic Experience
University of South Florida, Associate Professor 2015-Present
Florida State University, Instructor 2005-2010

Non-Academic Experience
First Command Financial Services, Ft. Worth, TX, Marketing Specialist/Consultant 2004-2005
State of Florida, Dept. of Management Services, Tallahassee, FL, Researcher 2005
JP Morgan Chase, Chicago, IL/Detroit, MI, Banking Analyst 2002-2003

Current Memberships in Professional Organizations
Council for Supply Chain Management Professionals
Institute for Supply Management
Decision Sciences Institute
Academy of Marketing Science
American Marketing Association

Service Activities Within and Outside of Institution
Editorial Review Board - Journal of Supply Chain Management
Reviewer - Journal of Cleaner Production, European Journal of Information Systems, Sustainable Value Chain Management, Encyclopedia of E-Collaboration,
Managing Editor - CAIS (Jan. 2008- March 2009)
Conference Co-coordinator – New Ventures in Virtual Worlds Conference
(McCombs Business School – University of Texas at Austin, 2009)
USF Search Committees (Supply Chain, Strategy, IS/DS, and Entrepreneurship (2011-2013)
USF CES Committee (2011-2012)
USF AACSB Assessment Committee (2011-2012)
USF PolySTEM Committee (2012)
USF Graduate Committee (2011-2012)

Research – Refereed Journal Articles
- Hooker, R.E., Wasko, M.W., Paradice, D.B., Teigland, R., Hofacker, C. (Forthcoming), “Beyond Gaming: Linking Flow, Brand Attitudes, and Purchase Intent in Realistic and Emergent Three-dimensional Virtual Environments,” *Information Technology & People*.
- Hooker, R.E., Lewis, C.C., Wasko, M.W., Worrell, J.L., and Yoon, T. (2016), “E-Lance Enabled Network Exchanges within Supply Chains: The Influence of Network Governance and Social Control Mechanisms on Network Success,” *International Journal of Information Systems and Supply Chain Management*, 9(2), pp. 1-20.
- Plank, R.E. and Hooker, R.E. (2014), "Sales and Operations Planning: Using the Internet and Internet Based Tools to Further Supply Chain Integration," Journal of Research in Interactive Marketing.
- Giunipero, L.C., Hooker, R.E., Denslow, D. (2012), “Purchasing and Supply Management Sustainability: Drivers and Barriers,” Journal of Purchasing and Supply Management.
- Giunipero, L.C., Hooker, R.E., Joseph-Mathews, S., Yoon, T., and Brudvig, S. (2011), "A Decade of SCM Literature: Past, Present, and Future Implications," Russian Management Journal (Featured as a “Modern Classic”).
- Di Gangi, P.M., Wasko, M., and Hooker, R.E. (Dec. 2010), “Getting your customers’ ideas to work for you: Building user innovation communities,” MIS Quarterly Executive.

- Giunipero, L.C., Hooker, R.E., Joseph-Mathews, S., Yoon, T., and Brudvig, S. (Oct. 2008), "A Decade of SCM Literature: Past, Present, and Future Implications," Journal of Supply Chain Management.*

*One of the Top 10 most downloaded articles in JSCM history.

Refereed Book Chapters

- Hooker, R.E., Denslow, D., and Giunipero, L.C. (2013), "Environmental Sustainability in the Supply Chain: A Review of Past Literature and Discussion of Potential Drivers and Barriers." In Lindgreen, A., F. Maon, J. Vanhamme, and S. Sen (Eds.) Sustainable Value Chain Management, Farnham, UK: Gower Publishing.
- Stoecklin-Serino, C., Paradice, D.B. and Hooker, R.E. (2011), "An Examination of the Impacts of Brand Equity, Security, and Personalization on Trust Processes in an E-Commerce Environment: An Updated Discussion." In Clarke, S. and A. Dwivedi (Eds.) Organizational and End-User Interactions: New Explorations, IGI Global, Hershey, PA.
- Hooker, R.E., Lewis, C., Smith, H., Wasko, M., Worrell, J.L., & Yoon, T. (2007), "Governing E-Collaboration in E-Lance Networks." In N. Kock (Ed.), Encyclopedia of E-Collaboration. Hershey, PA: Idea Group.

Grant Activity

- **U.S. Department of Agriculture,** Project ID: 3210-1020-02, Southeast Partnership for Advanced Renewables from Carinata (SPARC), Supply Chain Risk and Resilience Modeling, $61k, (2018-2019, Awarded)
- **U.S. Department of Agriculture,** Project ID: 3210-1020-01, Southeast Partnership for Advanced Renewables from Carinata (SPARC), Fuel Optimization Transportation Modeling, $57k, (2018-2019, Awarded)
- **U.S. Department of State,** Project ID: P000974, Supply Chain Research Project Grant with
- Swedish Government, $3.1k, (2017, Awarded)
- **Nordic Innovation Center** (Associate Research Recipient), $1M, (2010-2012, Awarded)
- **Global Faculty Fellowship Grant**, $1.4k, (Fall 2017, Awarded)

Revised December 8, 2016

James Stock

Education
Ph.D., The Ohio State University, 1975
MBA, The University of Miami, 1971
B.S., The University of Miami, 1968

Academic Experience

University of South Florida	
Distinguished University Professor, University of South Florida	2012-present
Frank Harvey Endowed Professor of Marketing	2008-present
Professor	1989-2007
Michigan State University	
Professor, Department of Marketing and Transportation Administration,	1987-1989
School of Systems and Logistics, Air Force Institute of Technology	
Distinguished Visiting Professor of Logistics Management	1986-1988
University of Oklahoma	1980-1987
Associate Professor of Marketing	
University of Notre Dame	1975-1980
Assistant Professor of Marketing	

Current Memberships in Professional Organizations
American Association for the Advancement of Science (AAAS)
Beta Gamma Sigma (BGS)
Faculty Commons (formerly Christian Leadership Ministries)
Council of Supply Chain Management Professionals (CSCMP)
Phi Kappa Phi
SOLE—The International Society of Logistics
Warehousing Education and Research Council (WERC)

Selected Service Activities Within and Outside of Institution
University of South Florida:

- Co-Director, Center for Supply Chain Management and Sustainability, College of Business, Department of Marketing (2013-present)
- A.P.J. Abdul Kalam Postgraduate Fellowship Selection Committee (2016)
- Chair, USF Distinguished University Professor Selection Committee (2016)
- Faculty Liaison to the Workgroup on Finance and Audit, USF Board of Trustees (2013-2015)
- USF Honors and Awards Committee (2007-2010; 2010-2013)
- USF Distinguished University Professor Guidelines Review Committee (2013)
- USF Standing Committee for Research Misconduct (2004-2007; 2007-2010; 2010-2013; 2013-2016; 2016-2019)
- USF Graduate Council (1991-1995); Vice Chair (1993-1994)
- Ph.D. Coordinator, Department of Marketing (1991-2000, 2004-2013)

Editorships:

- Editor, *Journal of Business Logistics* (2006-2010)
- Editor, *International Journal of Physical Distribution and Logistics Management* (1990-2003)
- Managing Editor, *Logistics Spectrum* (1992-1994)
- Business Logistics Section Editor, *Logistics Spectrum* 1999; 2000-2001

Editorial Review Boards:

- *Asia-Pacific Marketing Review* (2012-present)
- *European Business Review* (2005-present)
- *International Journal of Physical Distribution and Logistics Management* (2004-present)
- *International Journal of Value Chain Management* (2003-present)
- *Journal of Business Logistics* (2004-present)
- *Logistics Quarterly* (2011-present)
- *Logistics Research* (2008-present)
- *Paradigm—Journal of IMT Ghaziabad* (2005-present)
- *Pertanika Journal of Social Sciences & Humanities* (2009-present)
- *South African Journal of Transportation and Supply Chain Management* (2005-present)
- *Strategic Insights into Quality* (1992-1998)
- *Logistics Spectrum* (1988-1995)
- *The Journal of International Marketing* (1994-1995)
- *The Marketing Strategy Letter* (1992-1993)
- *International Journal of Physical Distribution and Materials Management* (1980-1989)
- *Strategy and Executive Action* (1983-1987)

Selected Research 2008 - 2018

Refereed Journal Articles

- Swanson, David, Lakshmi Goel, Kristoffer Francisco, and James Stock, "An Analysis of Supply Chain Management Research by Topic," *Supply Chain Management: An International Journal*, Vol. 12, Issue 3 (2018), pp. 100-116.
- Swanson, David, Lakshmi Goel, Kristoffer Francisco, and James Stock, "Applying Theories to Logistics and Supply Chain Management from Other Disciplines: A Systematic Literature Review," *Transportation Journal*, Vol. 56, No. 3 (Summer 2017), pp. 299-356.
- Stock, James, Diane Edmondson, Jennifer Espinosa, Robert Riggle and Terry Sincich, "RFID Technology: A Retrospective Look at Firm Adoption with a View towards the Future" *International Journal of Value Chain Management*, Vol. 7, No. 4 (2016), pp. 317-351.
- Wang, Zhangqiong, James Stock and Shuncai Li, "Supply Chain Management Sustainability Practices in Chinese Service Firms: A Content Analysis of CSR Reports," *Journal of Academy of Business and Economics*, Vol. 15, Issue 4 (December 2015), pp. 71-76.
- Nakhata, Chinintorn, James R. Stock and Tania B. Texiera, "Doctoral Dissertations in Logistics and Supply Chain-Related Areas: 2005-2009," *Logistics Research*, Vol. 6, Issue 4 (2013), pp. 119-131.
- Stock, James R., Stefanie Boyer, and Tracy Harmon, "Research Opportunities in Supply Chain Management," *Journal of the Academy of Marketing Science* Special Issue on Marketing and Supply Chain Management, Vol. 38, No. 1 (2010), pp. 32-41.
- Stock, James R., "A Research View of Supply Chain Management: Developments and Topics for Exploration," *ORiON*, Vol. 25, No. 2 (2009), pp. 147-160.
- Stock, James R. and Stefanie Boyer, "Developing a Consensus Definition of Supply Chain Management: A Qualitative Study," *International Journal of Physical Distribution and Logistics Management*, Vol. 39, No. 8 (2009), pp. 690-711.
- Stock, James R. and Jay Prakash Mulki, "Product Returns Processing: An Examination of Practices of Manufacturers, Wholesalers/Distributors and Retailers," *Journal of Business Logistics*, Vol. 30, No. 1 (2009), pp. 33-62.
- Stock, James R., "Chapter 25: Reverse Logistics, Green Logistics and Packaging," in *Logistics Engineering Handbook*, G. Don Taylor, editor (Boca Raton, FL: CRC Press, 2008), pp. 25-1 through 25-16.

Agenda Item: III.e.

USF Board of Trustees
June 6, 2019

Issue: B.S. Environmental Chemistry – CIP 40.0509

Proposed action: Approval

Executive Summary: The proposed new degree program is the Bachelor of Science in Environmental Chemistry (B.S.). The degree provides students with all of the State Mandated Prerequisites and core courses found in a General Chemistry degree program with additional emphasis on environmental science, data analytics and business. Students graduating with a degree in Environmental Chemistry will be prepared to apply basic skills in chemistry to solve global and marketplace problems that face Florida's environment. They will have the skills to investigate the manner in which human activity impacts air, water and soil and how pollutants enter the environment. The University of South Florida at the St. Petersburg Campus will be the first university in the State to offer a full degree in Environmental Chemistry. Only one other institution in the Southeastern United States offers this degree (University of Georgia) and there are only 13 other degree programs with this IPEDS code in the United States. National databases suggest that job opportunities for Environmental Chemists will increase from 11 percent nationally and 18 percent statewide between 2016 and 2026, exceeding the growth of all other occupations. Students graduating with a degree in Environmental Chemistry will earn roughly $70,000 in annual income because of the specialization in physical sciences in addition to environmental science.

Financial Impact: This new degree program will be funded through the reallocation of base Education & General faculty costs in proportion to teaching effort contributed to the new program. Additional costs, including a physical lab build-out and funding for a new faculty hire will be supported by funds generated through new enrollment, current base funding, and those released from internal reallocation of existing resources at USFSP.

Strategic Goal(s) Item Supports:
The Environmental Chemistry degree will increase STEM education at the St. Petersburg campus.
BOT Committee Review Date: ACE May 14, 2019
Supporting Documentation Online (*please circle*): (**Yes**) **No**
USF System or Institution specific: USF St. Petersburg
Prepared by: Susan Toler, Ph.D., Associate Dean, College of Arts and Sciences, USF St. Petersburg

Board of Governors, State University System of Florida

Request to Offer a New Degree Program

(Please do not revise this proposal format without prior approval from Board staff)

University of South Florida St. Petersburg	**Fall 2019**
University Submitting Proposal	**Proposed Implementation Term**
College of Arts & Sciences	**College of Arts & Sciences**
Name of College(s) or School(s)	**Name of Department(s)/ Division(s)**
Chemistry	**Bachelor of Science in Environmental Chemistry**
Academic Specialty or Field	**Complete Name of Degree**
40.0509	
Proposed CIP Code	

The submission of this proposal constitutes a commitment by the university that, if the proposal is approved, the necessary financial resources and the criteria for establishing new programs have been met prior to the initiation of the program.

Date Approved by the University Board of Trustees			**President**		**Date**
Signature of Chair, Board of Trustees		**Date**	**Vice President for Academic Affairs**		**Date**

Provide headcount (HC) and full-time equivalent (FTE) student estimates of majors for Years 1 through 5. HC and FTE estimates should be identical to those in Table 1 in Appendix A. Indicate the program costs for the first and the fifth years of implementation as shown in the appropriate columns in Table 2 in Appendix A. Calculate an Educational and General (E&G) cost per FTE for Years 1 and 5 (Total E&G divided by FTE).

Implementation Timeframe	Projected Enrollment (From Table 1)		Projected Program Costs (From Table 2)				
	HC	FTE	E&G Cost per FTE	E&G Funds	Contract & Grants Funds	Auxiliary Funds	Total Cost
Year 1	96	77	$3,912	$300,468	$0	$0	$300,468
Year 2	111	89					
Year 3	123	98					
Year 4	130	104					
Year 5	140	112	$8,360	$936,348	$0	$0	$936,348

Note: This outline and the questions pertaining to each section must be reproduced within the body of the proposal to ensure that all sections have been satisfactorily addressed. Tables 1 through 4 are to be included as Appendix A and not reproduced within the body of the proposals because this often causes errors in the automatic calculations.

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INTRODUCTION

I. Program Description and Relationship to System-Level Goals

A. Briefly describe within a few paragraphs the degree program under consideration, including (a) level; (b) emphases, including majors, concentrations, tracks, or specializations; (c) total number of credit hours; and (d) overall purpose, including examples of employment or education opportunities that may be available to program graduates.

The Bachelor of Science (B.S.) in Environmental Chemistry is designed to provide students with an undergraduate degree in Chemistry including State Mandated Prerequisites in addition to core courses found in a General Chemistry degree. While emphasis is on a chemistry foundation, additional core and elective courses focus on environmental science and the application of practical scientific knowledge to meet employer needs. Additional electives provide students with an opportunity to develop skills in Environmental Science, Business and Data Analysis and Programming depending on their elective choices. The degree consists of 120 hours and offers students a wide range of employment opportunities, such as careers as Clinical laboratory technologists and technicians, chemists, environmental scientists and specialists, and environmental science and protection technicians. Because of the strong STEM foundation in the curriculum, students will also be prepared for a wide range of graduate programs, such as Sustainability and Environmental Science. The Educational Advisory Board (EAB, Appendix E) suggests state-wide demand for bachelor-level environmental chemistry professionals increased 70% from September 2016 to September 2018 (Appendix E). The program's emphasis on applied chemistry with emphasis on environmental science, and optional electives in management and machine learning in addition to basic programming are high on the list of skills employers are seeking.

The University of South Florida as a system supports this newly developed Environmental Chemistry degree program. While the program initially will be offered and have its administrative home on the St. Petersburg campus, student demand in time may warrant offering the program on the Tampa and/or Sarasota-Manatee campuses. In the context of consolidation, resources to support this degree in terms of faculty talent and financial support will be available system-wide.

B. Please provide the date when the pre-proposal was presented to CAVP (Council of Academic Vice Presidents) Academic Program Coordination review group. Identify any concerns that the CAVP review group raised with the pre-proposed program and provide a brief narrative explaining how each of these concerns has been or is being addressed.

The pre-proposal was presented to the CAVP Academic Program Coordination Review Group on April 6, 2018. No concerns were identified.

C. If this is a doctoral level program please include the external consultant's report at the end of the proposal as Appendix D. Please provide a few highlights from the report and describe ways in which the report affected the approval process at the university.

Not applicable. This is not a doctoral level program.

D. Describe how the proposed program is consistent with the current State University System (SUS) Strategic Planning Goals. Identify which specific goals the program will directly support and which goals the program will indirectly support (see link to the SUS Strategic Plan on the resource page for new program proposal).

The Environmental Chemistry degree program is consistent with the State University System Strategic Planning Goals in a number of ways. Table 1 outlines a wide range of areas in which the degree increases excellence, productivity and strategic priorities across teaching, scholarship and community partnerships. This unique program will develop citizens who will find solutions to the economic and societal challenges of the future. Students graduating with a degree in Environmental Chemistry will be

prepared to apply basic skills in chemistry to solve global and marketplace problems that face Florida's environment. It is expected that faculty research will develop innovative solutions to problems with the Florida environment and human health. These innovations will have a significant impact on quality of life and the economy. Students will be able to face the challenges environmental problems present with creative solutions to issues facing the environment and the citizens of Florida.

Table 1 also indicates the extent to which the Environmental Chemistry degree program directly meets the SUS Strategic Planning Goals (represented by double checks) or indirectly meets the goals (represented by a single check).

Table 1
Alignment with State University System Strategic Goals

State University System Goals	Excellence	Productivity	Strategic Priorities for a Knowledge Economy
Teaching & Learning	✓✓The program in Environmental Chemistry will strengthen both the quality and academic reputation of undergraduate programs at USFSP.	✓✓The proposed program will increase degree productivity and program efficiency because it offers a new degree program in a high demand area in the economy.	✓✓The degree in Environmental Chemistry will increase the number of degrees awarded in STEM. This particular CIP of 40.0509 is not offered anywhere else in the state.
Scholarship, Research & Innovation	✓Students and faculty working in Environmental Chemistry will significantly strengthen the quality and reputation of research, scholarship and innovation at USFSP.	✓Research and partnerships with a large number of state, local and private agencies will take place to address this applied chemistry degree.	✓Collaboration and external support for research in Environmental Chemistry is inevitable, as the program develops.
Community & Business Engagement	✓✓A community and business board will be developed to collaborate with faculty on necessary skill sets to enhance the employability of USFSP students in this degree program.	✓✓It is expected that the community and business partners will provide internships to support students in Environmental Chemistry.	✓The proposed degree provides a basic Chemistry degree with added skills in environmental science, business and data analysis to meet specific workforce needs.

E. If the program is to be included in a category within the Programs of Strategic Emphasis as described in the SUS Strategic Plan, please indicate the category and the justification for inclusion.

The Programs of Strategic Emphasis Categories:

1. Critical Workforce:
   - Education
   - Health
   - Gap Analysis
2. Economic Development:
   - Global Competitiveness
3. Science, Technology, Engineering, and Math (STEM)

Please see the Programs of Strategic Emphasis (PSE) methodology for additional explanations on program inclusion criteria at the resource page for new program proposal.

The Environmental Chemistry B.S. is identified as a Science, Technology, Engineering and Math (STEM) category of Strategic Emphasis. The program represents the first degree program in the State University System with the 40.0509 CIP classification. Other Chemistry programs in the state fall under the General Chemistry CIP 40.0501. Only two of these programs provide "tracks/concentrations" in Environmental Chemistry, in the context of a General Chemistry degree. The University of South Florida St. Petersburg will be the first state university to offer a full degree in Environmental Chemistry as described by IPEDS:

> *A program that focuses on the scientific study of natural systems (air, water, and soil) through the use of chemical techniques and instrumentation, with an emphasis on the movement and fate of pollutants and chemical aspects of contaminant remediation. Includes instruction in analytical, inorganic, organic, and physical chemistry; aquatic, soil and atmospheric chemistry; environmental engineering; environmental toxicology; and analytical methods.*
> (https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cip=40.0509)

F. Identify any established or planned educational sites at which the program is expected to be offered and indicate whether it will be offered only at sites other than the main campus.

The University of South Florida as a system supports this newly developed Environmental Chemistry degree program. While the program initially will be offered and have its administrative home on the St. Petersburg campus, student demand in time may warrant offering the program on the Tampa and/or Sarasota-Manatee campuses. In the context of consolidation, resources to support this degree in terms of faculty talent and financial support will be available system-wide.

INSTITUTIONAL AND STATE LEVEL ACCOUNTABILITY

II. Need and Demand

A. Need: Describe national, state, and/or local data that support the need for more people to be prepared in this program at this level. Reference national, state, and/or local plans or reports that support the need for this program and requests for the proposed program which have emanated from a perceived need by agencies or industries in your service area. Cite any specific need for research and service that the program would fulfill.

Environmental Chemists are in a position to address some of the most difficult challenges the human race will face in the future. They have the skills to investigate the manner in which human activity impacts our air, water and soil and how chemicals introduced by the human race enter the environment. It is expected that job opportunities for Environmental Chemists will increase from 11% between 2016 and 2026. This projected increase in the demand for Environmental chemists exceeds the growth of all other occupations (U.S. Bureau of Labor Statistics, "Occupational Outlook Handbook: Environmental Sciences and Specialists," online at http://www.bls.gov/ooh/Life-Physical-and-Social-Science/Environmental-scientists-and-specialists.htm). More recent projections by EAB suggest an 18% growth rate in statewide employment (Appendix E). This employment outlook is attributed to the increased public interest in the hazards facing the environment in addition to the demands on the environment by population growth. An Educational Advisory Board (EAB) analysis of the state employment outlook suggests that there were 1,540 openings for bachelor-chemistry professionals in the past 12 months. Local trends revealed that 246 job openings for bachelor-chemistry professionals were posted for Tampa, St. Petersburg and Clearwater over the past 12 months. An additional 273 openings for bachelor-level chemistry professionals were posted in Orlando, Kissimmee and Sanford, Florida over the past 12 months (See Appendix E). The applied skills of an Environmental Chemist are sought in consulting firms, federal, state and local government agencies, industry and academia (American Chemical Society, 2014). Greater research and understanding of the impact of chemicals in the air, water and land is critical to understanding and resolving some of our greatest challenges in public health. Colleges and universities are hiring an increased number of Environmental Chemists as the demand for new research and understanding of the impact of chemicals in the environment on human health increases (American Chemical Society, 2014).

This program offers a curriculum unique within the State of Florida and nationally. In addition to a strong foundation in Chemistry, the top skills sought in the employment market included strong knowledge of Environmental Science, Policy & Law, Business Management and basic computer skills in data analytics (see Appendix E). The interdisciplinary nature of the present degree proposal provides students with an opportunity to acquire skills in these areas, depending on their elective choices.

Several employers have provided letters of support (see Appendix F). The College has already begun to develop an Environmental Chemistry Advisory Board to support internship opportunities in the Tampa, St. Petersburg and Sarasota-Manatee communities and to encourage regular feedback regarding student skills and curriculum development between the community and the University.

B. Demand: Describe data that support the assumption that students will enroll in the proposed program. Include descriptions of surveys or other communications with prospective students.

Documentation sited in Section IIA from the American Chemical Society (ACS) and the Occupational Outlook Handbook strongly suggests that an increased interest in Environmental Chemistry is predicted. Because there is no university in the Florida State University System that offers an Environmental Chemistry degree program under the 40.0509 CIP, the closest estimates of enrollment and graduation rates we have available might loosely be inferred from the General Chemistry programs across the State of Florida. Based on enrollment and graduation data from the SUS website, enrollment has been has been variable and inconsistent in the General Chemistry CIP across state institutions. While smaller state institutions have had some enrollment reduction, larger state institutions such as University of Florida and University of South Florida have enjoyed stronger linear growth trends (Table 2). As suggested by the American Chemical Society, greater growth trends and earning rates will be the trend in the area of Environmental Chemistry. Degrees awarded across these institutions are outlined in Table 3.

Table 2

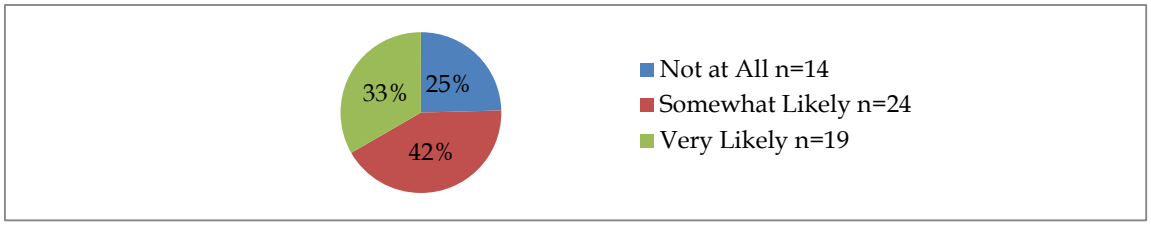
Enrollment by State University System Institutions for CIP 40.0501 (General Chemistry)										
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
FAMU	126	132	147	130	100	90	80	88	84	91
FAU	232	263	281	302	308	321	301	221	207	200
FGCU	48	53	74	85	95	99	93	65	60	43
FIU	455	470	551	640	696	741	756	757	706	656
FPU										
FSU	113	117	126	147	147	255	268	327	309	137
NCF										
UCF	209	200	238	236	263	291	284	292	348	311
UF	665	588	547	544	570	569	607	654	663	708
UNF	130	141	168	257	331	349	315	313	330	320
USF	379	405	422	446	455	420	411	419	403	425
UWF	100	118	115	134	141	140	138	137	109	109
Total	2,457	2,487	2,669	2,921	3,106	3,275	3,253	3,273	3,219	3,000

Table 3

Degrees Awarded by State University Institutions by CIP 40.0501 (General Chemistry)								
	2008 - 2009	2009 - 2010	2010 - 2011	2011 - 2012	2012 - 2013	2013 - 2014	2014 - 2015	2015 - 2016
FAMU	17	8	10	9	7	7	7	6
FAU	37	28	41	43	31	49	37	45
FGCU	3	3	6	3	11	13	12	13
FIU	56	48	70	65	91	90	82	117
FPU								
FSU	19	24	23	21	28	29	24	29
NCF								
UCF	9	7	20	25	23	26	26	25
UF	132	131	127	112	108	117	123	109
UNF	12	10	15	18	19	8	13	21
USF	44	45	57	52	69	54	57	74
UWF	8	16	17	20	24	18	24	24
Total	337	320	386	368	411	411	405	463

A simple questionnaire was sent to 297 Biology and Environmental Science students enrolled in Organic Chemistry I and II as well as Analytical Chemistry courses offered by USFSP. The Environmental Chemistry program was briefly described and students were asked to indicate how likely it would be that they would choose this as their major. While the response rate was small (n=58, 20% response) the interest in Environmental Chemistry was encouraging. Seventy-five percent of the respondents indicated they were "Somewhat likely" or "Very likely" to select this as their major.

Figure 1
Student Interest in Environmental Chemistry Major



C. If substantially similar programs (generally at the four-digit CIP Code or 60 percent similar in core courses), either private or public exist in the state, identify the institution(s) and geographic location(s). Summarize the outcome(s) of communication with such programs with regard to the potential impact on their enrollment and opportunities for possible collaboration (instruction and research). In Appendix C, provide data that support the need for an additional program.

Table 4 outlines public institutions in the State University System and local private institutions that offer degrees under CIP 40.0501, the General Chemistry code. The current proposal for Environmental Chemistry is **CIP 40.0509**, a degree specifically focused on Environmental Chemistry based on the IPEDS definition discussed in Section IE. No other university in the State of Florida offers a degree under this highly specialized CIP code. Currently, Florida State University offers a "track or concentration" as part of their General Chemistry degree (CIP 40.0599 Chemistry Other) which has an emphasis in Environmental Chemistry. Each of these colleges and universities required the State Mandated Pre-requisites for degree completion as part of their core or general degree requirements. These pre-requisites represent less than 50% of the core curriculum proposed in Environmental Chemistry.

Table 4
Public and Private Institutions in the St. Petersburg Region Offering Chemistry Degrees (CIP 40.0501)

Institution	Location	Region
Florida Gulf Coast University	**Fort Myers, Florida**	**Southwest Florida**
Florida State University	**Tallahassee, Florida**	**North Florida**
University of Central Florida	**Orlando, Florida**	**East Central Florida**
University of Florida	**Gainesville, Florida**	**North Florida**
University of South Florida	**Tampa, Florida**	**West Central Florida**
Eckerd College	**St. Petersburg, Florida**	**West Central Florida**
University of Tampa	**Tampa, Florida**	**West Central Florida**

Because the proposed Environmental Chemistry degree that is interdisciplinary and applied, the degree is distinct from all of the degree programs offered locally, statewide and in the Southeastern United States. The EAB report (see Appendix E) suggests that only one other institution (University of Georgia) reported completion of Bachelor's level Environmental Chemistry degrees in this CIP code of 40.0509. All other institutions in the south do not offer degrees in this CIP code: this includes: Alabama, Arkansas, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Oklahoma, Tennessee and Florida. This program is even more distinct in that it provides a curriculum that includes Business courses in Management, Economics and Machine Learning or Data Analytics in addition to a wide range of Environmental Science courses. These program requirements are unique to the current degree proposal

and respond to workforce needs as described in the EAB report (see Appendix E).

D. Use Table 1 in Appendix A (1-A for undergraduate and 1-B for graduate) to categorize projected student headcount (HC) and Full Time Equivalents (FTE) according to primary sources. Generally undergraduate FTE will be calculated as 30 credit hours per year and graduate FTE will be calculated as 24 credit hours per year. Describe the rationale underlying enrollment projections. If students within the institution are expected to change majors to enroll in the proposed program at its inception, describe the shifts from disciplines that will likely occur.

Table 1-A (Appendix A) outlines projected student headcount and full time equivalents (FTE) based on a number of estimates. Student enrollment in the first year is expected to be predominantly FTIC and upper-level majors in Environmental Science and Biology who may change their major from within USF System (70 students, Figure 1). As USF consolidation evolves, it is anticipated that General Chemistry majors from Tampa may also wish to specialize in Environmental Chemistry on the St. Petersburg campus. A FUSE program is developed (see Appendix D) and will be coordinated with all local Florida College System (FCS) institutions. In years two through five, growth of the program will be attributed to Florida College System upper level transfers in addition to incoming FTIC students. Enrollment projections were also estimated based on the past history of the ratio of Biology majors in the first year of the USFSP program to all majors in the Biology department in Tampa. This estimate is based on the assumption that the Environmental Chemistry growth rate will be roughly proportional and equivalent to the growth rate of the USFSP Biology program in proportion to the USF Tampa Biology programs. Other data used in estimating student headcount are discussed in Section II. B.

E. Indicate what steps will be taken to achieve a diverse student body in this program. If the proposed program substantially duplicates a program at FAMU or FIU, provide, (in consultation with the affected university), an analysis of how the program might have an impact upon that university's ability to attract students of races different from that which is predominant on their campus in the subject program. <u>The university's Equal Opportunity Officer shall review this section of the proposal and then sign and date Appendix B to indicate that the analysis required by this subsection has been completed</u>.

The Environmental Chemistry degree program is not offered at either FAMU or FIU.

The University of South Florida actively recruits and supports prospective students across many underserved populations. The USF Admissions staff actively reaches out to underrepresented groups and engages with high schools on a monthly basis. This outreach is focused on students who are in the admission process to ensure timely application completion and admission decisions. This community commitment is central to the USF's Institutional Diversity and Inclusion Plan. This Plan emphasizes recruiting, retaining and graduation of students from underrepresented groups, particularly in fields where they are underrepresented.

The St. Petersburg campus draws the majority of its students from the surrounding Pinellas County region. Of the 4,096 undergraduate students enrolled at USFSP in the fall 2018 semester, 19% were Hispanic, 8% were African American and 64% were female. This program will provide access to students in these groups, which are historically underrepresented in STEM fields.

Program specific efforts to achieve a diverse student body involve the development of several educational grants that have been submitted and will be submitted to develop programs at Lakewood High School and Campbell Park Elementary School. These proposals involve students in Environmental Science and Chemistry projects that test water and soil quality. They are focused on engaging students in STEM activities and increasing student awareness of occupations in these fields as well as degree programs available to them at USFSP.

III. Budget

A. Use Table 2 in Appendix A to display projected costs and associated funding sources for Year 1 and Year 5 of program operation. Use Table 3 in Appendix A to show how existing Education & General funds will be shifted to support the new program in Year 1. In narrative form, summarize the contents of both tables, identifying the source of both current and new resources to be devoted to the proposed program. (Data for Year 1 and Year 5 reflect snapshots in time rather than cumulative costs.)

Year 1 total costs are projected to be $300,468 and Year 5 projected cost is $936,348. As reported in **Table 4-A**, all USFSP chemistry faculty (5) will be teaching in the new degree program with additional support from chemistry faculty from the College of Marine Science (see Section IX Faculty Participation). The salary and benefit funding of the existing Chemistry faculty members ($531,391), in proportion to their teaching contribution to the Environmental Chemistry program, will be reallocated to the proposed degree program ($145,552). A new Tenure-track Chemistry Professor, who will be a generalist and capable of teaching a wide range of undergraduate chemistry courses has been approved and budgeted for this program. Funding for this position was reallocated from a vacant tenured faculty position and approved by USFSP Academic Affairs.

Table 3-A identifies the reallocation of $145,552 in salary and benefits funding from existing faculty members in proportion to their teaching contribution. An additional reallocation of $21,796 from the College of Business Information Systems Management salary will support the data analytics portion of the curriculum. **Table 2-A** outlines a cost of $167,348 for faculty salaries and benefits to deliver the program in Year 1. As the program develops, it is expected the cost of faculty salaries and benefits will remain the same in Year 5.

The sources of funding for Year 1 will be reallocated from base E. & G. (Table 2-A). It is expected that by Year 5 the total cost of the program will be part of the continuing base E. & G.

In Year 1 and 5 additional expenditures of $7,000 each year will be required for continuing Library resource support. Additional costs in Year 1 include $6,000 in adjunct expenses for new course sections and $12,000 in Year 5 for course coverage. As the Environmental Chemistry program grows in enrollment, along with our other STEM programs in Environmental Science & Policy and Biology, it is expected that Year 5 will require construction of an additional Chemistry Lab to continue to support the growing need for teaching laboratories. The Year 5 lab construction cost is estimated to be $375,000, with an additional $375,000 estimated in Operating Capital Outlay (OCO). Appendix F includes a letter of support from the USFSP Regional Chancellor, Dr. Martin Tadlock, indicating the funding will be available for these expenditures from Education and General carry forward funds. Laboratory supplies in Year 1 will require $12,120 in additional expenses, it is anticipated that course laboratory fees will support the need for supplies in Year 5. Thirty-three thousand dollars ($33,000) for equipment to service new labs such as Physical Chemistry, Inorganic Chemistry and Environmental Chemistry are additional expenses anticipated in Year 5. The current inventory of laboratory equipment and the inventory of new equipment needed for the degree program are outlined in detail in Section X. G. The budget for the proposed Environmental Chemistry program have been reviewed and supported by the USFSP leadership.

B. Please explain whether the university intends to operate the program through continuing education, seek approval for market tuition rate, or establish differentiated graduate-level tuition. Provide a rationale for doing so and a timeline for seeking Board of Governors' approval, if appropriate. Please include the expected rate of tuition that the university plans to charge for this program and use this amount when calculating cost entries in Table 2.

The University of South Florida St. Petersburg does not intend to operate the program through continuing education; or seek approval for market tuition rate or establish differentiated graduate-level tuition.

C. If other programs will be impacted by a reallocation of resources for the proposed program, identify the impacted programs and provide a justification for reallocating resources. Specifically address the potential negative impacts that implementation of the proposed program will have on related undergraduate programs (i.e., shift in faculty effort, reallocation of instructional resources, reduced enrollment rates, greater use of adjunct faculty and teaching assistants). Explain what steps will be taken to mitigate any such impacts. Also, discuss the potential positive impacts that the proposed program might have on related undergraduate programs (i.e., increased undergraduate research opportunities, improved quality of instruction associated with cutting-edge research, improved labs and library resources).

It is anticipated that students from the Biology program and the Environmental Science and Policy program may change majors early in their undergraduate career. The survey data presented in Figure 1, suggests roughly 30 students from other majors may move to the Environmental Chemistry program. Given the number of Biology students currently enrolled at USFSP (estimated to be 745); this will not have a significant impact on the program. Introducing the new program to students allows them more options to pursue their vocational interests, since it will be the first and only Chemistry program offered on this campus. If the program grows as anticipated, it is possible that more Math, Chemistry and Physics faculty will be needed in response to the overall growth in STEM programs in St. Petersburg.

The proposed program will increase undergraduate research opportunities in STEM. More advanced Chemistry instruction will be available to students with the introduction of a new Chemistry curriculum, such as Physical Chemistry, Inorganic Chemistry. Project/Research based courses such as The Use of Chemical Literature, and Independent Research in Chemistry will more than double student involvement in meaningful research that impacts the environment. Collaborations with local industries will establish an Environmental Chemistry Advisory Board to oversee the degree program and encourage internships. This collaboration will address the needs of students and the surrounding communities. Appendix F provides documentation of the community partnerships this degree program will promote.

D. Describe other potential impacts on related programs or departments (e.g., increased need for general education or common prerequisite courses, or increased need for required or elective courses outside of the proposed major).

Depending on the actual enrollment growth rate of the Environmental Chemistry degree, it is possible that additional sections of general education courses and State Mandated prerequisites will take place. The courses that are most likely to see an increased demand include: Calculus II, Physics I & Lab, Physics II and Lab, in addition to General Chemistry I & Lab, General Chemistry II and Lab as well as Organic Chemistry courses. This increase in demand is not exclusively due to the introduction of the Environmental Chemistry degree, but also related to the increasing enrollment in the Biology and Environmental Science and Policy programs.

E. Describe what steps have been taken to obtain information regarding resources (financial and in-kind) available outside the institution (businesses, industrial organizations, governmental entities, etc.). Describe the external resources that appear to be available to support the proposed program.

We have contacted a number of local businesses identified by the Career Center, who are seeking interns and have job postings for students with skills in Environmental Chemistry. Several of these businesses have provided letters of support found in Appendix F. We are in the process of forming an Environmental Chemistry Advisory Board of local businesses who not only provide internships to students, but also support the program through regular feedback regarding student knowledge and skills essential to the curriculum development which will keep students current in a dynamic field. It is anticipated that our community partners will continue to provide a wide range of support for our students.

Community partners that have expressed support for the program include:

- The City of St. Petersburg
- Southwest Florida Water Management
- Zoo Tampa
- Pinellas County Environmental Protection Commission

Additional partnerships and letters of support from within the USF System have been established with Dean Kirchman, Dean of the College of Science and Mathematics in Sarasota-Manatee in addition to Jacqueline Dixon, Dean of the College of Marine Science (CMS). Letters of support can be found in Appendix F. Historically, a close working relationship with CMS and our Biology department has resulted in dual listing their graduate courses with our undergraduate courses. This enabled our students to work with world class faculty from the College of Marine Science. Dean Dixon anticipates extending this collaboration to our Environmental Chemistry students as we dual list our undergraduate courses with their graduate courses. An example of courses identified by Dean Dixon as potential resources for this degree include: OCE 6050 Chemical Oceanography, OCE 6934 Physical Chemistry of Seawater, OCE 6934 CO2 System Analytical Technique, and many others.

IV. Projected Benefit of the Program to the University, Local Community, and State
Use information from Tables 1 and 2 in Appendix A, and the supporting narrative for "Need and Demand" to prepare a concise statement that describes the projected benefit to the university, local community, and the state if the program is implemented. The projected benefits can be both quantitative and qualitative in nature, but there needs to be a clear distinction made between the two in the narrative.

The Environmental Chemistry degree program will be the first of its kind in the State of Florida and all but one state in the Southern United States with a CIP code of (40.0509). While other universities offer concentrations and majors in Environmental Chemistry under the General Chemistry or Other category, this degree program was developed using the IPEDS definition of Environmental Chemistry and guided by the certification standards of the American Chemical Society.

The American Chemical Society (ACS) identified the discipline of Environmental Chemistry as one that is critical to facing some of the most difficult challenges the human race will need to address in our future (American Chemical Society, 2014: https://www.acs.org/content/dam/acsorg/membership/acs/benefits/extra-insights/environmental-chemistry.pdf). This degree program provides students with a remarkable educational opportunity. They will develop skills to investigate the manner in which human activity impacts our air, water and soil and how chemicals introduced by the human race enter the environment. This is not only critical to protecting the environment but also critical to protecting human health. It is expected that job opportunities nationally for Environmental Chemists will increase 11% to 18% between 2016 and 2026, depending on the source of predictions (See Appendix E). This projected increase in the demand for Environmental Chemists exceeds the growth of all other occupations. Bachelor-level employees have an opportunity to earn roughly $70,000 in annual income when they earn a degree that specializes in physical science and environmental science (U.S. Bureau of Labor Statistics, "Occupational Outlook Handbook: Environmental Sciences and Specialists," online at http://www.bls.gov/ooh/Life-Physical-and-Social-Science/Environmental-scientists-and-specialists.htm). This employment outlook is attributed to the increased public interest in the hazards facing the environment, in addition to the demands on the environment by population growth.

The Educational Advisory Board analysis of the state employment outlook suggests that there were 1,540 openings for bachelor-chemistry professionals in the past 12 months. Local trends revealed that 246 job openings for bachelor-chemistry professionals were posted for Tampa, St. Petersburg and Clearwater over the past 12 months. An additional 273 openings for bachelor-level chemistry professionals were posted in Orlando, Kissimmee and Sanford, Florida over the past 12 months (See Appendix E). The applied skills of an Environmental Chemist are sought in consulting firms, federal, state and local government agencies, industry and academia (American Chemical Society, 2014 https://www.acs.org/content/dam/acsorg/membership/acs/benefits/extra-insights/environmental-chemistry.pdf). Greater research and understanding of the impact of chemicals in the air, water and land is

critical to understanding and resolving some of our greatest challenges in public health. Colleges and universities are hiring an increased number of Environmental Chemists as the demand for new research and understanding of the impact of chemicals in the environment on human health increases (American Chemical Society, 2014 https://www.acs.org/content/dam/acsorg/membership/acs/benefits/extra-insights/environmental-chemistry.pdf).

Several employers have provided letters of support (see Appendix F). The College intends to develop the Environmental Chemistry Advisory Board to support internship opportunities in the community and to encourage regular feedback regarding student skills and curriculum development. This will provide an ongoing feedback loop between the community and the university curriculum.

V. Access and Articulation – Bachelor's Degrees Only

A. If the total number of credit hours to earn a degree exceeds 120, provide a justification for an exception to the policy of a 120 maximum and submit a separate request to the Board of Governors for an exception along with notification of the program's approval. (See criteria in Board of Governors Regulation 6C-8.014)

The total number of credit hours to earn a degree in Environmental Chemistry does not exceed 120.

B. List program prerequisites and provide assurance that they are the same as the approved common prerequisites for other such degree programs within the SUS (see link to the Common Prerequisite Manual on the resource page for new program proposal). The courses in the Common Prerequisite Counseling Manual are intended to be those that are required of both native and transfer students prior to entrance to the major program, not simply lower-level courses that are required prior to graduation. The common prerequisites and substitute courses are mandatory for all institution programs listed, and must be approved by the Articulation Coordinating Committee (ACC). This requirement includes those programs designated as "limited access."

If the proposed prerequisites are not listed in the Manual, provide a rationale for a request for exception to the policy of common prerequisites. NOTE: Typically, all lower-division courses required for admission into the major will be considered prerequisites. The curriculum can require lower-division courses that are not prerequisites for admission into the major, as long as those courses are built into the curriculum for the upper-level 60 credit hours. If there are already common prerequisites for other degree programs with the same proposed CIP, every effort must be made to utilize the previously approved prerequisites instead of recommending an additional "track" of prerequisites for that CIP. Additional tracks may not be approved by the ACC, thereby holding up the full approval of the degree program. Programs will not be entered into the State University System Inventory until any exceptions to the approved common prerequisites are approved by the ACC.

The Environmental Chemistry Degree falls into CIP 40.0509, which does not currently exist in the State University System. In the context of developing this curriculum the stringent pre-requisites of the General Chemistry CIP (40.0501) were adopted in addition to a foundation in environmental science. Students are required to earn a C (not C-) or better in all core courses in the curriculum, approximately 50% of these courses are State Mandated Pre-Requisites. These pre-requisites establish a strong foundation for a General Chemistry degree, essential to an Environmental Chemistry degree:

- CHM 2045 General Chemistry I & CHM 2045L General Chemistry I Lab
- CHM 2046 General Chemistry II & CHM 2046L General Chemistry II Lab
- MAC 2311 Calculus I
- MAC 2312 Calculus II
- CHM 2210 Organic Chemistry I & CHM 2210L Organic Chemistry I Lab
- CHM 2211 Organic Chemistry II & CHM 2211L Organic chemistry II Lab

- PHY 2048 Physics I & PHY 2048L Physics I Lab
- PHY 2049 Physics II & PHY 2049L Physics II Lab

C. If the university intends to seek formal Limited Access status for the proposed program, provide a rationale that includes an analysis of diversity issues with respect to such a designation. Explain how the university will ensure that Florida College System transfer students are not disadvantaged by the Limited Access status. NOTE: The policy and criteria for Limited Access are identified in Board of Governors Regulation 6C-8.013. Submit the Limited Access Program Request form along with this document.

The University does not intend to seek formal Limited Access status for this degree program.

D. If the proposed program is an AS-to-BS capstone, ensure that it adheres to the guidelines approved by the Articulation Coordinating Committee for such programs, as set forth in Rule 6A-10.024 (see link to the Statewide Articulation Manual on the resource page for new program proposal). List the prerequisites, if any, including the specific AS degrees which may transfer into the program.

This program is not an AS-BS capstone.

INSTITUTIONAL READINESS

VI. Related Institutional Mission and Strength

A. Describe how the goals of the proposed program relate to the institutional mission statement as contained in the SUS Strategic Plan and the University Strategic Plan (see link to the SUS Strategic Plan on the resource page for new program proposal).

State University System Strategic Goals (p. 10):

Support students' development of the knowledge, skills, and aptitudes needed for success in the global society and marketplace.

- The USFSP degree in Environmental Chemistry will support the development of knowledge and skills needed to address the human health and environmental challenges that we will face in the future. Human activity in all forms impacts the water, air and soil. Graduates of this program will be equipped with the knowledge and skills necessary to solve local and global problems of the environment.

Transform and revitalize Florida's economy and society through research, creativity, discovery, and innovation.

- Students of Environmental Chemistry will be required to develop an undergraduate thesis or complete an internship addressing critical environmental problems. They will be encouraged to conduct research and through innovation and critical thinking propose solutions to these problems. To this end, they will preserve and revitalize Florida's economic and social environment.

Mobilize resources to address the significant challenges and opportunities facing Florida's citizens, communities, regions, the state, and beyond.

- The community partnerships with local and state government as well as private industry that students form in the context of internships and advisory boards will mobilize university and private resources to address the environmental challenges that face Florida.

Deliver knowledge to advance the health, welfare, cultural enrichment, and economy through community and business engagement and service.

- The research that will develop as a result of this degree program by both faculty and students will advance our knowledge of the impact of all forms of human activity on the health, welfare,

cultural enrichment and economy of Florida.

University of South Florida Systems Strategic Goals:

Develop well educated and highly skilled global citizens through our continuing commitment to student success.

- The degree in Environmental Chemistry is a rigorous academic program that educates students in the foundations of organic, physical, inorganic and environmental chemistry. This program will enable students to become citizens who are able to apply the basic principles of chemistry in finding solutions to critical environmental problems.

High impact research and innovation to change lives, improve health, and foster sustainable societal development and positive societal change.

- As the program grows it is anticipated that both faculty and students will become involved in research and innovation that will improve human health and well-being.

Develop a highly effective, major economic engine, creating partnerships to build a strong and sustainable future for Florida in the global economy.

- Solving problems with the tools available to Environmental Chemists is good for the bottom line. Businesses that can support a sustainable environment are the global businesses that will thrive in the future.

Sound financial management to establish a strong and sustainable economic base in support of USF's continued economic advancement.

- The close partnership that will develop through the Environmental Chemistry Advisory board between the university and local agencies and businesses will only continue to improve the program in a dynamic environment.

University of South Florida St. Petersburg's Strategic Goals:

Distinctive Identity.

- The degree in Environmental Chemistry continues to crystalize the USFSP campus as the campus of Sustainability, Environmental and Marine Sciences. This is a degree program that will enable our graduates to "become scholars who lead lives if impact".

Student Success and Culture.

- It is expected that new Chemistry faculty that share passions in both Sustainability and Environmental Chemistry will actively work with students to promote excellence in both teaching and research.

Strategic Partnerships.

- The Environmental Chemistry Advisory Board will establish strategic partnerships with both government and industry to provide internships, employment and continue to steer this degree program in the direction of the future.

B. Describe how the proposed program specifically relates to existing institutional strengths, such as programs of emphasis, other academic programs, and/or institutes and centers.

The St. Petersburg campus of the University of South Florida is clearly emerging as an institution with unique strengths and exciting potential in the areas of Environmental Science, Sustainability, Marine Science and Business. The emergence of the Joint Institute for the Gulf of Mexico at the USFSP campus is a natural evolution to the unique strengths of the St. Petersburg campus. The introduction of a degree program in Environmental Chemistry builds upon these unique strengths.

The existing partnership with the College of Marine Sciences has enabled our Biology students to enjoy

courses with world-class faculty from CMS through dual-listed courses in our curriculum. Dean Dixon of the College of Marine Sciences has offered additional dual-listing for the Environmental Chemistry degree program in an effort to expand this partnership (See Appendix F).

This is an interdisciplinary program that is developed on a natural science foundation and incorporates both Environmental Science and Business into the curriculum. Students will build a solid educational foundation in Chemistry and develop skills in working with data analysis, big data and machine learning (predictive analytics) in Business and develop knowledge of Environmental policy, environmental law and field methods in Environmental Science and Chemistry. This interdisciplinary set of skills enables graduates of this program to address the growing concern of how human activity impacts not only our soil, water and air but also human health.

C. Provide a narrative of the planning process leading up to submission of this proposal. Include a chronology in table format of the activities, listing both university personnel directly involved and external individuals who participated in planning. Provide a timetable of events necessary for the implementation of the proposed program.

In September, 2016, the Regional Vice Chancellor of Academic Affairs (RVCAA) initiated the Master Academic Planning process at USFSP, to be completed in five phases. During Phase I, each academic unit was invited to use program indicators including student/faculty FTE ratio, FTIC retention in the program, transfer retention in the program, enrollment growth trend over the last three years, graduation rates, SCH for permanent and contingent faculty, graduation rates with excess credit hours, and enrollment growth in under-represented populations, and many others. During Phase II, each unit prepared a list of Strengths, Weaknesses, Opportunities, Threats and a vision of their future direction. Phase III. entailed program planning, including a determination regarding whether each program should grow, remain the same, or be revised, based on findings from the preceding phases.

During this time, faculty in the College of Arts and Sciences identified the emerging field of Environmental Chemistry as a degree program that complemented the unique identity of USFSP. In Phase IV of the planning process, the RVCAA working with the campus deans' composed a draft Master Academic Plan which was thoroughly discussed and revised with significant input from faculty across colleges and disciplines. Ultimately, in Phase V, the final Master Academic Plan was created for USFSP. During the USF System Master Academic Planning process, the USFSP Environmental Chemistry proposal was identified as a priority in Year 2 of the 2018-2019 initiative. With that encouragement, the Chemistry faculty in the College of Arts and Sciences prepared a program pre-proposal for CIP 40.0509.

Table 5

Planning Process

Date	Participants	Planning Activity
September & October, 2016	College Dean, Assistant Dean and Chemistry Faculty	In the context of developing the Master Academic Plan (MAP), Institutional Research developed program indicators to review, across disciplines, the feasibility of new academic programs essential to the mission of USFSP. The Dean met with Chemistry faculty to discuss the feasibility of developing an Environmental Chemistry program that is distinct from the general Chemistry program currently offered in Tampa.
October, November 2016	College Dean, Assistant Dean and Chemistry Faculty	Pre-Proposal: analysis of each program in terms of Strengths, Weaknesses, Opportunities and Threats (SWOT) to identify potential collaborations that offer new degree programs.
November 2016 to Spring 2017	All college programs, college Deans and RVCAA	Multiple drafts and revisions of the MAP to identify programs that might be developed with existing faculty and resources.
March & April 2017	College Dean and Chemistry faculty began collaboration to develop Pre-Proposal	Continued conversations regarding he merits of a Chemistry degree with an Environmental Chemistry specialization versus an Environmental Chemistry degree. It was determined that an Environmental Chemistry degree best met the needs of USFSP,

Fall 2017	College Dean and Chemistry faculty work to develop Pre-Proposal.	Pre-proposal development
January 31, 2018	College of Arts & Sciences Academic Programs Committee Review Pre-Proposal	Pre-proposal approved
January 2018 to February 2018	Consultation with ODS system Academic Planning	Pre-proposal approved
February, 2018	College of Arts & Sciences Dean approves Pre-Proposal	Pre-proposal approved
February 16, 2018	USFSP Undergraduate Council approval	Pre-proposal approved
February 22, 2018	APAC review and approval	Pre-proposal approved
April 6, 2018	CAVP Workgroup review and approval	No concerns expressed
May 22, 2018	ACE Accountability review and approval	Accountability Plan approved
June 12, 2018	BOT Accountability review and approval	Accountability Plan approved
June 20, 2019	BOG Accountability review and approval	Accountability Plan approved

Table 6
Events Leading to Implementation

Date	Implementation Activity
Summer – Fall 2018	Consultation with USF Office of Decision Support Academic Planning
Fall, 2018	Communication and outreach to Community Partners to discuss internships, letters of support and membership on the Environmental Chemistry Advisory Board
November, 2018	College of Arts & Sciences Academic Program Committee approval
November, 2018	College of Arts & Sciences Dean's review
December 5, 2018	USFSP Undergraduate Council review
December, 2018	Review by Vice-Chancellor for Academic Affairs
February, 2019	APAC review
March, 2019	ACE Committee review and approval
March , 2019	Board of Trustees review and approval
Spring, 2019	Communications with SACSCOC to determine if the program reflects substantive change
March 27 & 28, 2019	Board of Governor's staff review and approval for addition to the Academic Program Inventory
Summer 2019	Pending approval of BOG, final development of Environmental Chemistry Advisory Board
Summer 2019	Approved program added to the catalog, USF's electronic systems and marketed

VII. Program Quality Indicators - Reviews and Accreditation

Identify program reviews, accreditation visits, or internal reviews for any university degree programs related to the proposed program, especially any within the same academic unit. List all recommendations and summarize the institution's progress in implementing the recommendations.

The University of South Florida St. Petersburg (USFSP) is currently accredited by the Southern Association of Colleges and Schools and Commission on Colleges (SACSCOC). If the final program is approved by the Board of Governors staff, submission of a Substantive Change to SACSCOC will be required. If the University of South Florida's consolidation has been completed at the time of the program approval, the program may not represent a Substantive Change because USF has a General Chemistry degree. In this case, SACSCOC will be notified of the degree offering with required documentation as a Non-substantive Change.

Formal program reviews take place at the University of South Florida on a 7-year cycle. These program reviews require a substantial self-study, as well as an external evaluation and recommendations by outside reviewers from peer institutions.

The proposed program will undergo annual Academic learning Compact reviews by the Program Director and/or Chair to assess student learning outcomes (See Appendix C for Academic Learning Compacts). Additional institutional SACSCOC accreditation reviews ensure appropriate faculty

credentialing, ALC compliance and compliance with all other requirements characteristic of a quality higher education program.

As the program matures, it is anticipated that faculty will seed certification from the American Chemical Society (ACS); all of the required courses for ACS certification are in the curriculum.

VIII. Curriculum

A. Describe the specific expected student learning outcomes associated with the proposed program. If a bachelor's degree program, include a web link to the Academic Learning Compact or include the document itself as an appendix.

(Please see Appendix C)

Educational Objectives of the Program:

1. Graduates will be able to demonstrate strong interdisciplinary knowledge in Chemistry, Environmental Science and Business to solve critical environmental problems in government, industry, private consultation and education.
2. Graduates will apply their interdisciplinary knowledge of physical science in Chemistry, Environmental Science and Business to foster communications across disciplinary boundaries.
3. Graduates will make a contribution to society through innovation in the field by advancing new ideas and knowledge in the combined disciplines of chemistry, environmental science and business.

Expected Student Learning Outcomes:

1. Discipline Specific Knowledge and Skills:

- Outcome 1: Demonstrate knowledge (understanding and retention) of the main sub-disciplines of Chemistry – Organic, Analytical, Inorganic, Physical, and Environmental Chemistry – and their application to environmental issues
- Outcome 2: Laboratory skills: Demonstrate mastery of Chemistry and Environmental Chemistry laboratory skills by performing valid, accurate, efficient and safe laboratory procedures and techniques in – quantitative analytical and physical measurements; synthesis of molecules; instrumental methods of analysis and structure determination,

2. Critical Thinking Skills:

- Outcome 1: Demonstrate critical thinking skills in – evaluating and interpreting scientific data; formulating and testing scientific hypotheses; generating appropriate questions; gathering relevant information through review of published literature and by experimentation and making scientifically-valid conclusions; applying mathematical principles to solve quantitative problems in Environmental Chemistry; making the connections between Environmental Chemistry and other disciplines

3. Communication Skills:

- Outcome 1: Demonstrate the ability to – write clearly and effectively to produce a well-organized and well-developed paper presenting results of meta-analyses of published literature or of experimental studies consistent with accepted practices in Chemistry and Environmental Chemistry; articulate scientific information and/or experimental results clearly and effectively through formal presentations to peers and faculty.

4. *Civic Engagement:*

- Outcome 1: Demonstrate an ability to apply methods in Chemistry to deal with human concerns related to Environmental issues through participation in individual research, independent study or internships

B. Describe the admission standards and graduation requirements for the program.

Students applying to the Environmental Chemistry degree program are expected to meet the University of South Florida admission standards as noted on USF's "Admissions" website (https://www.usfsp.edu/admissions/). Because this program will be launched very near the implementation phase of the USF consolidation process the admission standards will be implemented system-wide.

Graduation requirements include the minimum requirements for USF and the College of Arts and Sciences:

- Minimum of 120 earned semester hours with overall 2.0 Grade Point Average (GPA), including all courses attempted within the USF System;
- A transfer student must have a 2.0 GPA or higher when combined with all work attempted at other institutions;
- Satisfactory completion of writing, computation (6a-10.030) and civic literacy (8.006) course requirements;
- A minimum of C (not C-) or greater in all core courses in the Environmental Chemistry curriculum and an overall GPA of 2.5 or greater in all core course requirements;
- Earn a minimum of 42 semester hours of upper-level work (courses numbered 3000 and above);
- Complete all General Education Liberal Arts Requirements;
- Compete all program requirements; and
- Be recommended for graduation by the Dean of the College of Arts and Sciences

C. Describe the curricular framework for the proposed program, including number of credit hours and composition of required core courses, restricted electives, unrestricted electives, thesis requirements, and dissertation requirements. Identify the total numbers of semester credit hours for the degree.

The curricular framework is interdisciplinary in nature. The degree program will be based on a solid foundation in General Chemistry, characteristic of all degrees in General Chemistry in the SUS. Additional coursework in the Core Curriculum includes a two-semester sequence of Environmental Chemistry, emphasizing the chemistry of water, soil and air, providing students with applied skills such as the evaluation of contaminants. Core curriculum outside of Chemistry and Environmental Chemistry includes Information Systems Management providing skills in machine learning and big data analysis. Nine credit hours of electives in Business and Environmental Science or Chemistry are also required. This interdisciplinary program reflects an important partnership between Chemistry, Business and Environmental Science.

Students must complete 56 credit hours in the Environmental Chemistry major. The Core Curriculum includes 44 credit hours for the degree. Eighteen (18) credit hours included in the Core Curriculum are State Mandated Prerequisites. An additional 12 credit hours of Major Electives are in Business, Environmental Science or Chemistry.

Required Courses for Environmental Chemistry: 56 Total Credits (including Major Electives)			
Course Prefix & Number	**Course Title**	**Credits**	**Pre-requisites**
CHM 2045 & CHM 2045L	General Chemistry I & Lab	3 + 1	MAC 1105
CHM 2046 & CHM 2046L	General Chemistry II & Lab	3 + 1	CHM 2045 & Lab
CHM 2210 & CHM 2210L	Organic Chemistry I & Lab	3 + 2	CHM 2046 & Lab

CHM 2211 & CHM 2211L	Organic Chemistry II & Lab	3 + 2	CHM 2210 & Lab
CHM 3120C	Elementary Analytical Chemistry & Lab	4	CHM 2046 & Lab
CHM 4410	Physical Chemistry I	4	CHM 2046 & Lab; MAC 2312; PHY 2049 & Lab
CHM 4410L	Physical Chemistry Lab	1	CHM 4410 co-requisite
CHM 4411	Physical Chemistry II	4	CHM 2046 & Lab, MAC 2312, PHY 2049 & Lab
CHM 4080 (newly proposed)	Environmental Chemistry I	3	CHM 2046 & Lab
CHM 4081 (newly proposed)	Environmental Chemistry II	3	CHM 2211 & Lab
CHM 3610	Intermediate Inorganic Chemistry	3	CHM 2046 & Lab
CHM 3610L	Intermediate Inorganic Chemistry Lab	1	CHM 3610 co-requisite
ISM 4546	Machine Learning (Predictive Analytics)	3	STA 2023
	Total Credit Hours:	**44**	

Major Electives

Business, Environmental Science and Chemistry Major Electives (Choose 12 Credits)			
Course Prefix & Number	**Course Title**	**Credits**	**Pre-requisites**
MAN 3025	Principles of Management	3	Junior Standing
ECO 2013	Macroeconomics	3	None
COP 2030	Programming Concepts	3	None
EVR 2001 & EVR 2001L	Introduction to Environmental Science & Lab	3 + 1	None
EVR 2861	Introduction to Environmental Policy	3	None
EVR 4114	Climate Change	3	EVR 2001
POS 3697	Environmental Law	3	None
CHM 4970	Undergraduate Research	1 to 3	None
EVR 4051	Environmental Field Methods	3	STA 2023
CHM 4940 (new to SCNS)	Applied Chemistry Internship	1 to 3	Juniors or Seniors Only
CHM 4130C	Methods of Instrument Analysis	4	CHM 4410, CHM 4060
CHM 4060	Use of Chemical Literature	1	CHM 2045, CHM 2046, CHM 2210, CHM 2211

Additional credit hours in the program include 16 credits in State Mandated Prerequisites:

Additional State Mandated Pre-Requisites (16 Credits Hours)							
It is suggested MAC 2311 & PHY 2048 & Lab and CHM 2045 & Lab be taken to meet General Education Requirements							
MAC 2311	Calculus I	4 Credits	***Take as Gen. Ed.***	PHY 2048 & PHY 2048L	Physics I & Lab	3 + 1 Credits	***Take as Gen. Ed.***
MAC 2312	Calculus II	4 Credits		PHY 2049 & PHY 2049L	Physics II & Lab	3 + 1 Credits	

Ten (10) general electives are required, and additional Chemistry and Biology courses are recommended:

GENERAL ELECTIVES: Choose 11 Credits (Recommended Courses)		
CHM 4932	Selected topics in Chemistry (1-3 cr.)	1 to 3 Credits
BSC 2010 + Lab	Biology I: Cellular Biology & Lab (3 + 1 cr.)	3 + 1 Credits
BSC 2011 + Lab	Biology II: Diversity & Lab (3 + 1 cr.)	3 + 1 Credits
MET 4002C	Climatology (4 cr.)	4 Credits
BCH 3023	Introductory Biochemistry (3 cr.)	3 Credits
BCH 3023L	Basic Biochemistry Lab (2 cr.)	2 Credits
GEO 2200 + Lab	Intro. To Physical Geography + Lab (3 + 1 cr.)	3 + 1 Credits
MET 4012C	Meteorology (4 cr.)	4 Credits
OCE 2001	Introduction to Oceanography	3 Credits

Thirty-Six (40) General Education credits some of which overlap with State Mandated Prerequisites and Core Curriculum. Four additional credit hours in the General Education curriculum are due to several required labs and 4-credit hour math courses:

General Education Curriculum (40 Credits)		
I. English (6 Credits)		
ENC 1101	English Composition I	3 Credits
ENC 1102	English Composition II	3 Credits
II Mathematics (6 Credits)		

MAC 1105	College Algebra	3 Credits
MAC 2311	Calculus I	4 Credits
III. Natural Science (6 Credits)		
CHM 2045 & Lab	General Chemistry I & Lab	3 + 1 Credits
PHY 2048 & Lab	General Physics I & Lab	3 + 1 Credits
IV. Humanities (6 Credits)		
Open Selection	Open Selection	3 Credits
Open Selection	Open Selection	3 Credits
V. Social Sciences (6 Credits)		
ECO 2013	Principles of Microeconomics	3 Credits
POS 2041 or AMH 2020	Civic Literacy Requirement	3 Credits
General Education Free Electives (7 Credits)		
STA 2023 (GE Elective)	Introductory Statistics	3 Credits
MAC 1147	Pre-Calculus	4 Credits

Nine (9) hours of USFSP Exit Requirements complete the degree (Following USF consolidation these hours will no longer be required and redistributed to General Electives and Major Electives):

USFSP Exit Requirements (9 Credits)		
I. Major Works & Major Issues:		
GEO 4372 (Required)	Global Conservation (6A)	3
ECP 3302	Environmental Economics	3
BSC 4057	Environmental Issues	3
EVR 4027	Wetlands Environment	3
GEO 4379	Geographic Perspectives on Environment	3
GLY 4734	Beaches & Coastal Environments	3
II. Literature & Writing Pick 3 Credits		

D. Provide a sequenced course of study for all majors, concentrations, or areas of emphasis within the proposed program.

The following sequenced course of study is also nearly identical to the FUSE plan also developed for this degree program (see Appendix D). The focus of this plan is to enable students to seamlessly move from the Florida College system into the USF major in Environmental Chemistry:

Semester 1			**Semester 2**		
ENC 1101	English Composition I	3	ENC 1102	English Composition II	3
MAC 1105	College Algebra	3	MAC 1147	Pre-Calculus	4
XXX XXXX	Humanities	3	CHM 2045	General Chemistry I	3
ECO 2013	Principles of Macroeconomics	3	CHM 2034L	General Chemistry I Lab	1
XXX XXXX	General Elective	3	POS 2041/AMH2020	American National Government / American History	3
	Total Credit Hours:	**15**		**Semester Credit Hours**:	**14**

Semester 3			**Semester 4**		
MAC 2311	Calculus I	4	MAC 2312	Calculus II	4
CHM 2046	General Chemistry II	3	STA 2023	Introductory Statistics	3
CHM 2046L	General Chemistry II Lab	1	PHY 2048	General Physics I	3
XXX XXXX	Humanities General Education	3	PHY 2048L	General Physics I Lab	1
XXX XXXX	General Elective (See Recommendations)	3	XXX XXXX	General Elective (See Recommendations)	4
	Total Credit Hours:	**14**		**Total Credit Hours:**	**15**

Semester 5			**Semester 6**		
CHM 2210	Organic Chemistry I	3	CHM 2011	Organic Chemistry II	3
CHM 2210L	Organic Chemistry I Lab	2	CHM 2011L	Organic Chemistry II Lab	2
ISM 4546	Machine Learning	3	PHY 2049	General Physics II	3
XXX XXXX	General Elective (See Recommendations)	2	PHY 2049L	General Physics II Lab	1
XXX XXXX	Environmental Chemistry Major Elective	3	XXX XXXX	Environmental Chemistry Major Elective	3
	Total Credit Hours:	**13**		**Total Credit Hours:**	**12**

Semester 7			**Semester 8**		
CHM 3120C	Elementary Analytical Chemistry & Lab	4	CHM 4411	Physical Chemistry II	4
CHM 4410	Physical Chemistry I	4	CHM 4081	Environmental Chemistry II	3
CHM 4410L	Physical Chemistry I Lab	1	CHM 3610	Intermediate Inorganic Chemistry	3
CHM 4080	Environmental Chemistry I	3	CHM 3610L	Intermediate Inorganic Chemistry Lab	1

			XXX XXXX	Environmental Chemistry Major Elective	3
	Total Credit Hours:	**12**		**Total Credit Hours:**	**14**

SUMMER SEMESTERS (9 Hours)

Summer Session 1			**Summer Session 2**		
GEO 4372	Global Conservation (recommended)	3	XXX XXXX	Environmental Exit	3
			XXX XXXX	Literature & Writing	3
	Total Credit Hours:	**3**		**Total Credit Hours:**	**6**

E. Provide a one- or two-sentence description of each required or elective course.

BSC 2010 Biology I - Cellular Processes (3)
CR: BSC 2010L PR: CHM 1045/C- or CHS 2440/C.
An analysis of biological systems at the cellular and subcellular levels: cell structure and function, respiration, photosynthesis, mitosis and meiosis, genetics and gene expression.

BSC 2010L Biology I Cellular Processes Laboratory (1)
CR: BSC 2010.
Laboratory portion of Biology I Cellular Processes relating to cellular and subcellular structure and function. Mitosis, meiosis, and Mendelian genetics will be stressed.

BSC 2011 Biology II - Diversity (3)
An analysis of biological systems at the organismal level: evolution, speciation, history of life, and ecology. Lecture only.

BSC 2011L Biology II Diversity Laboratory (1)
CR: BSC 2011.
Laboratory portion of Biology II Diversity relating to organismal structure and function. Microscopy, as well as, plant and animal development will be stressed.

BCH 3023 Introductory Biochemistry (3)
Introduction to the chemistry and intermediary metabolism of biologically important substances.

BCH 3023L Basic Biochemistry Lab (2)
CR: BCH 3023.
Practical work in determination and characterization of important biomolecules.

BSC 4057 Environmental Issues (3)
Study of biological, economic, ethical, legal, political and social issues relating to current envir4onmental problems.

CHM 2045 General Chemistry I (3)
PR: 530 SAT Quantitative score or completion of MAC 1105 College Algebra with a C or better AND one year of high school chemistry or completion of CHM 2023 with a grade of C or better.
Principles and applications of chemistry including properties of substances and reactions, thermochemistry, atomic-molecular structure and bonding, periodic properties of elements and compounds.

CHM 2045L General Chemistry I Laboratory (1)
CR: CHM 2045. Laboratory portion of General Chemistry I. Introduction to laboratory techniques; study of properties of elements and compounds; synthesis and analysis of natural and commercial materials.

CHM 2046 General Chemistry II (3)
PR: CHM 1045 or 1045C or CHM 2045 or 2045C or 2440, 2440C (minimum grade C)
Principles and applications of chemistry including solutions, chemical thermodynamics, kinetics, equilibria, aqueous chemistry, electrochemistry, and nuclear chemistry.

CHM 2046L General Chemistry II Laboratory (1)
CR: CHM 2045, PR: CHM 2045L
Laboratory portion of General Chemistry II. Continuation of chemistry laboratory.

CHM 2210 Organic Chemistry I (3)
PR: CHM 1046 or 1046C or CHM 2046 and CHM 2046L or 2046C (minimum grade C).
Fundamental principles of organic chemistry. Lecture.

CHM 2210L Organic Chemistry Laboratory I (2)
CR: CHM 2200 or CHM 2210.
Laboratory portion of Organic Chemistry I. Introduction of organic laboratory principles and techniques.

CHM 2211 Organic Chemistry II (3)
PR: prerequisite CHM 2210 or 2210C (minimum grade C).
Continuation of organic chemistry. Lecture.

CHM 2211L Organic Chemistry II Lab (2)
CR: CHM 2211, PR: CHM 2210L,
Continuation of organic chemistry laboratory.

CHM 3120C Elementary Analytical Chemistry (4)
PR: (CHM 1046/C AND CHM 1046L/C) OR (CHM 2046/C AND CHM 2046L/C)
Fundamentals of gravimetric, volumetric, spectrophotometric analysis. Lec.-lab.

CHM 3610: Intermediate Inorganic Chemistry (3)
CR: CHM 3610L, PR: CHM 2046, CHM 2046L.
Fundamental principles of inorganic chemistry including atomic structure, bonding theories and structural consequences, transition metal chemistry and illustrative laboratory work.

CHM 3610L: Intermediate Inorganic Chemistry Laboratory (1)
CR: CHM 3610, PR: Two semesters of general chemistry lecture and lab.
Illustrative laboratory work concerning the fundamental principles of inorganic chemistry including atomic structure, bonding, transition metals chemistry, structural consequences and spectroscopic methods.

CHM 4060: Use of Chemical Literature (3)
PR: CHM 2045, CHM 2046, CHM 2010, CHM 2011
Discussions and assignments using abstracts, bibliographies, indices, encyclopedias, journals, patent files, electronic databases, and other information sources to obtain chemical and technical material and including written and oral presentations. Career information and opportunities are discussed.

CHM 4410: Physical Chemistry I (4)
PR: CHM 2046, MAC 2242 or MAC 2282 or MAC 2312, and PHY 2054 or PHY 2049
Thermodynamics, the state of matter and solutions are presented. The course includes a recitation.

CHM 4410L: Physical Chemistry laboratory (1)
CR: CHM 4410
A physical chemistry laboratory with emphasis on modern techniques and instruments. Lab.

CHM 4130C: Methods of Instrument Analysis (4)
PR: CHM 4060, CHM 4410
Theory and application of instrumental methods in chemical research, chemical synthesis and analysis; electrochemical and calorimetric techniques, separation methods, spectroscopy, statistical analysis of data, computer data handling, and individual projects. Lecture – Lab.

CHM 4411: Physical Chemistry II (4)
PR: CHM 2046, MAC 2242 or MAC 2282 or MAC 2312, and PHY 2054 or PHY 2049
Introduction to quantum mechanics and molecular spectroscopy. Chemical Kinetics and statistical mechanics are also presented. The course includes a recitation.

CHM 4080: Environmental Chemistry I (3) (Newly approved)
PR: CHM 2046, CHM 2046L
Application of geochemical principles to environmental issues. Topics include but are not limited to: contaminants in water, soil and air. Environmental methods and instrumentation, quality assurance, and quality control in environmental analysis; principles of toxicology; risk assessment and risk management.

CHM 4081: Environmental Chemistry II (3) (Newly approved)
PR: CHM 2211, CHM 2211L.
Overview of the sources of organic matter in aquatic systems, air and soil. Attention will also be devoted to anthropogenic (xenobiotic) organic molecules. Discussion of how analytical techniques such as 13C NMR, mass spectroscopy, and capillary electrophoresis provide useful organic biogeochemical information

CHM 4932 Selected Topics in Chemistry (1-3)
PR: Instructor Permission.
The course content will depend on the interest of faculty members and student demand.

CHM 4940 Applied Chemistry Internship (1 - 3) (Newly proposed)
PR: Junior or senior standing
A course to oversee and guide student's internship experience. Internship will be coordinated with a mentor external to the course. Students will meet to discuss internship experiences and progress, and present results.

CHM 4970: Undergraduate Research (1-3)
PR: Instructors Permission. S/U Grade System
Specialized independent research determined by the student's needs and interests. The written contract required by the College of Arts & Sciences specifies the regulations governing independent research.

COP 2030 Programming Concepts (3)
PR: None
This course covers basic programming concepts using the Python language for implementation and developing problem solving skills.

ECO 2013 Economic Principles (Macroeconomics) (3)
Introduction to the theory of income determination with emphasis on monetary and fiscal policies. Objectives of full employment, price stability, economic growth and balance of payments stability.

ECO 2023 Economic Principles (Microeconomics) (3)
Introduction to the theory of price determination. How an economy decides what to produce, how to produce, and how to distribute goods and services.

ECP 3302 Environmental Economics (3)
PR: ECO 2023. An economic analysis of environmental issues. The economics of resource use and pollution control are examined using the concepts of externalities, cost-benefit analysis, public goods, and property rights.

EVR 2001 Introduction to Environmental Science (3)
An introductory lecture course linking the human and physical biological world. The course will develop an understanding of population and resource interactions.

EVR 2001L Environmental Science Lab (1)
A laboratory course linking the human and physical/biological world. The lab will develop an understanding of population and resource interactions and complement the lecture course. Field trips.

EVR 2861 Introduction to Environmental Policy (3)
An introduction to environmental policy using class lectures, student projects, and independent readings. Emphasis will be placed on understanding basic policy mechanisms and major policy actions relating to environmental issues at the local, national and international level.

EVR 4027 Wetland Environments (3)
Study of the general properties and ecology of wetlands, examination of the distribution and functions of wetlands, and consideration of wetland conservation and policies.

EVR 4051 Environmental Field Methods (3)
PR: STA 2023 or QMB 2100
This course will provide an overview of aspects of conducting environmental research, field experience, the critical analysis of environmental data, and learning the fundamentals of producing a scientifically sound report.

EVR 4114 Climate Change (3)
PR: EVR 2001
The objective is to provide an understanding of the scientific principles pertaining to global and regional climate change. Both mechanisms causing the change and human impacts on climate will be examined.

GEO 2200 Introduction to Physical Geography (3)
This course explores the principles of physical geography, maps; earth sun relationships, meteorological, hydrological, pedagogical, Aeolian, and glacial processes, and resulting landforms.

GEO 2200L Introduction to Physical Geography Lab (1)
CR: GEO 2200
Laboratory portion of Introduction to Physical Geography (GEO 2200).

GEO 4372 Global Conservation (3)
The distribution, exploitation, and conservation of physical and human resources, ecology.

GEO 4379 Geographic Perspectives on Environment (3)
PR: GEA 2000 /C
This course examines human ideas about the natural environment and the fundamental character of the human-nature relationship across space and time through a survey of literature (geography, environmental history, ethics) on environmental perspectives.

GLY 4734 Beaches and Coastal Environments (3)
A comprehensive introduction to the nature of all coastal environments including beaches, dunes, tidal inlets, estuaries, reefs, and river deltas. Emphasis will be on the natural state of these environments and how human activities have and will impact them. Consideration of coastal management policies Involving economics, ethics, policy, and environmental law.

ISM 4546: Machine Learning (Predictive Analytics) (3) (to be vetted by College of Business)
PR: STA 2023
This course is an introduction to the concepts and principles of data mining. The course enables prospective marketers, data analysts, and entrepreneurs to extract useful information from large data sets and discover trends and patterns using a state-of-the-art data mining software program.

MAC 2311 Calculus I (4)
PR: (C (2.0) or better in MAC 1114 and C (2.0) or better in MAC 1140, or C (2.0) or better in MAC 1147, or 650 or better SAT Math score, or 29 or better ACT Math score, or 90 or better College-Level Math CPT score and knowledge of trigonometry. Differentiation, limits, differentials, extremes, indefinite integral. No credit for students with credit in MAC 2233 or MAC 2243 or MAC 2311.

MAC 2312 Calculus II (4)
PR: MAC 2311/C . No credit for students with credit in MAC 2242 or MAC 2282.
Anti-derivatives, the definite integral, applications, series, log, exponential and trigonometry functions.

MAN 3025 Principles of Management (3)
PR: Junior standing.
Examines intrapersonal, interpersonal, group/team, organizational, and environmental (both stakeholder and societal) factors influencing the management task.

MET 4002C Climatology (4)
PR: GEO 2200
An introductory survey of climatology. A qualitative study of the dynamics and general circulation of the atmosphere. Surface and upper level atmosphere linkages in the mid latitudes will be examined. Discussion of the regional climatic patterns and anomalies throughout the world. This course includes several integrated lab investigations.

MET 4012C Meteorology (4)
PR: GEO 2200
The earth's atmosphere and its processes; weather forecasting and analysis; instrumentation. Lecture/lab.

OCE 2001 Introduction to Oceanography
This is a class in basic oceanography covering chemical (what is the sea made of), physical (tides, currents, waves), geological (ocean floor and coasts) and biological (all life in the oceans) aspects, and their interactions.

PHY 2048 General Physics I (3)
PR: MAC 2281 or MAC 2311. Must be taken concurrently with lab and, if dropped, then dropped simultaneously. May not receive credit for both the PHY 2053 and PHY 2048 courses.
First semester of a two semester sequence of calculus-based general physics (mechanics, wave motion, sound, thermodynamics, geometrical and physical optics, electricity, and magnetism) for physics majors and engineering students.

PHY 2048L General Physics I Laboratory (1)
PR: MAC 2281 or MAC 2311. Must be taken concurrently with lecture and, if dropped, then dropped simultaneously. May not receive credit for both the PHY 2053L and PHY 2048L courses.
First semester of a two-semester sequence of general physics (mechanics, wave motion, sound, thermodynamics, geometrical and physical optics, electricity, and magnetism) and laboratory for physics majors and engineering students.

PHY 2049 General Physics II (3) AS PHY
PR: MAC 2282 or MAC 2312, PHY 2048, PHY 2048L. Must be taken concurrently with lab and, if dropped, then dropped simultaneously. May not receive credit for both the PHY2054 PHY 2054 and PHY 2049 courses. Second semester of general physics and laboratory for physics majors and engineering students.

PHY 2049L General Physics II Laboratory (1)
PR: MAC 2282 or MAC 2312, PHY 2048, PHY 2048L. Must be taken concurrently with lecture and, if dropped, then dropped simultaneously. May not receive credit for both the PHY 2054L PHY 2054L and PHY 2049L courses. Second semester of general physics and laboratory for physics majors and

engineering students.

POS 3697 Environmental Law (3)
Examines some of the major issues involving environmental law. Specially, the course provides a survey and analysis of statutes, both state and federal, regulating water, air, and soil pollution, and resource conservation and recovery. It will also address questions pertaining to problems of implementation, interpretation, enforcement, and development of environmental laws.

STA 2023 Introductory Statistics I (3)
PR: C (2.0) or better in High School Algebra or Elementary Algebra CPT score of 72 or better.
Descriptive and Inferential Statistics; Principles of Probability Theory, Discrete and Continuous Probability Distributions: Binomial Probability Distribution, Poisson Probability Distribution, Uniform Probability Distribution, Normal Distributions and more.

F. For degree programs in the science and technology disciplines, discuss how industry-driven competencies were identified and incorporated into the curriculum and indicate whether any industry advisory council exists to provide input for curriculum development and student assessment.

Educational Advisory Board (EAB) provided a Market Analysis in 2017 to address the need, demand and industry-driven competencies identified by employers (see Appendix E). In addition to a strong foundation in Chemistry, the top skills sought in the employment market included knowledge of Environmental Science, Policy & Law, Business Management and basic computer skills in data analytics (see Appendix E). These industry-driven competencies were incorporated into the curriculum as illustrated by core and elective courses such as: Machine Learning (Predictive Analytics), Microeconomics, Principles of Management and Environmental Science, Policy and Law. The interdisciplinary nature of the present degree proposal integrates courses in all of these areas to address employers' need.

Several employers have provided letters of support (see Appendix F). The College has identified individuals in local government and industry as early members of the Environmental Chemistry Advisory Board. It is anticipated that member agencies of the Environmental Chemistry Advisory Board will support internship opportunities in the community and will provide regular feedback regarding student skills and curriculum development. This will represent a strong collaboration between the community and the University.

G. For all programs, list the specialized accreditation agencies and learned societies that would be concerned with the proposed program. Will the university seek accreditation for the program if it is available? If not, why? Provide a brief timeline for seeking accreditation, if appropriate.

Substantive change approval will be requested from the Southern Association of Colleges and Schools and Commission on Colleges (SACSCOC) immediately upon program approval from the Board of Trustees. Program certification is available through the American Chemical Society (ACS). This is a process that can take several years and will not begin until the USF System consolidation is complete. In the context of consolidation the program organization and administrative home for Environmental Chemistry degree may also change, this will impact the timeframe for ACS certification: (https://www.acs.org/content/acs/en/about/governance/committees/training/acs-guidelines-supplements.html?_ga=2.146426743.2127920837.1538413581-1134229337.1537722791).

H. For doctoral programs, list the accreditation agencies and learned societies that would be concerned with corresponding bachelor's or master's programs associated with the proposed program. Are the programs accredited? If not, why?

Not Applicable. This is not a doctoral program.

I. Briefly describe the anticipated delivery system for the proposed program (e.g., traditional delivery on main campus; traditional delivery at branch campuses or centers; or nontraditional delivery such as distance or distributed learning, self-paced instruction, or external degree programs). If the proposed delivery system will require specialized services or greater than normal financial support, include projected costs in Table 2 in Appendix A. Provide a narrative describing the feasibility of delivering the proposed program through collaboration with other universities, both public and private. Cite specific queries made of other institutions with respect to shared courses; distance/distributed learning technologies, and joint-use facilities for research or internships.

This program will be offered on the University of South Florida St. Petersburg campus in a face-to-face format (90%) and online format (10%).

IX. Faculty Participation

A. Use Table 4 in Appendix A to identify existing and anticipated full-time (not visiting or adjunct) faculty who will participate in the proposed program through Year 5. Include (a) faculty code associated with the source of funding for the position; (b) name; (c) highest degree held; (d) academic discipline or specialization; (e) contract status (tenure, tenure-earning, or multi-year annual [MYA]); (f) contract length in months; and (g) percent of annual effort that will be directed toward the proposed program (instruction, advising, supervising internships and practica, and supervising thesis or dissertation hours).

Full-time faculty who will teach in the Environmental Chemistry degree program can be found in Appendix A, Table 4. The faculty have both the breadth and depth of knowledge that enable them to provide the instruction for all courses within the major. They include:

Henry A. Alegria, Ph.D., Associate Professor, Environmental Science and Chemistry
Yasin F. Elshorbany, Ph.D., Assistant Professor, Chemistry
John P. Osegovic, Ph.D., Instructor I, Chemistry
Madhu Pandey, Ph.D., Instructor I, Chemistry
XueFeng (Bob) Wang, Ph.D., Instructor, Chemistry
Varol O. Kayhan, Ph.D., Associate Professor, Information Systems and Decision Sciences

We will also hire a new Tenure-track Chemistry Professor, funded from an existing vacant line, who will be a generalist and capable of teaching a wide range of courses in the curriculum.

Additional faculty resources are available through our partnership with the College of Marine Sciences. Dean Dixon of CMS has offered an opportunity to dual-list their graduate courses with undergraduate courses in the Environmental Chemistry degree program. These courses offer our students the educational opportunity to work with world-class faculty in areas such as Chemical Oceanography, Biogeochemistry, Physical Chemistry of Seawater, Organic Geochemistry and many others. Faculty include distinguished researchers such as:

Kristen Buck, Ph.D., Associate Professor, working with biogeochemical cycling of trace metals in marine ecosystems.
Robert H. Byrne, Ph.D. Professor, elected as a Fellow of the American Geophysical Union for his contributions to the understanding of ocean acidification.
David Hollander, Professor, Chemical Oceanography, researching the influence of climate change on biogeochemical cycling of carbon, nitrogen and other biolimiting elements.

B. Use Table 2 in Appendix A to display the costs and associated funding resources for existing and anticipated full-time faculty (as identified in Table 4 in Appendix A). Costs for visiting and adjunct faculty should be included in the category of Other Personnel Services (OPS). Provide a narrative summarizing projected costs and funding sources.

As described in Section III A. and reported in Table 2-A, the proposed degree program in Environmental Chemistry will be based on reallocated funds. Salary and benefits of existing faculty members, proportional to their teaching effort, will be reallocated to the degree program totaling $143,302 in Year 1 and will remain constant in Year 5. We have been approved to hire one full-time Instructor of Chemistry in the first year with a salary of $74,250 including fringe benefits. The new hire will be based on an existing, vacant line.

An additional cost of $6,000.00 in adjunct salaries has been estimated for Year 1 with a increased cost of $12,000.00 in Year 5 as enrollment increases.

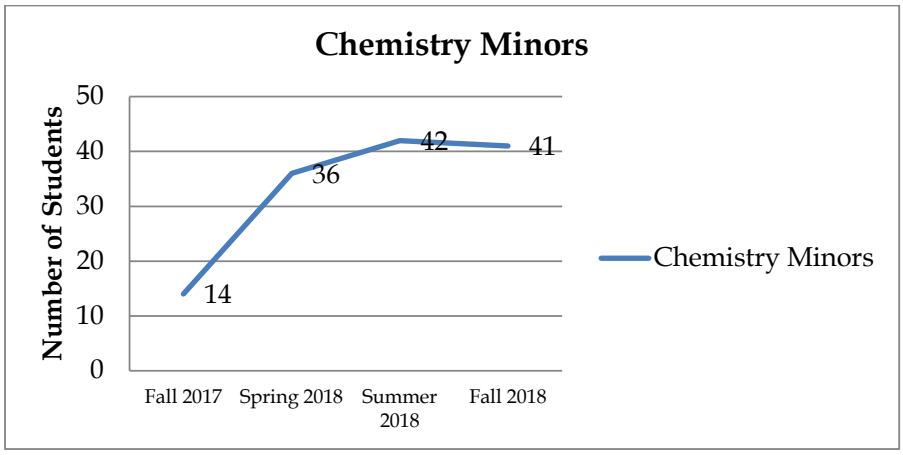
C. Provide in the appendices the abbreviated curriculum vitae (CV) for each existing faculty member (do not include information for visiting or adjunct faculty).

Curriculum Vitae are included in Appendix G

D. Provide evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service. Such evidence may include trends over time for average course load, FTE productivity, student HC in major or service courses, degrees granted, external funding attracted, as well as qualitative indicators of excellence.

The Chemistry faculty have provided service courses in General Chemistry, Organic Chemistry and Analytical Chemistry to the General Education program, the Environmental Science and the Biology programs. As students' interest in the field of Chemistry grew, USFSP launched a Chemistry minor in the 2017-2018 academic year. Since that time, there has been a significant increase in the number of students formally declared in the Chemistry minor. Figure 2 illustrates the growth in the number of Chemistry minors certified over the very brief period of time the minor has been available to students:

Figure 2
Growth in Number of Chemistry Minors



Even in the context of challenging transitions, the Chemistry faculties have proven to be highly productive in terms of teaching, research, and service.

Teaching:
Student credit hour (SCH) productivity in teaching ranges from 2,500 to 3,000 in Chemistry lectures alone across academic years. The current service courses offered focused primarily on General Chemistry, Organic Chemistry and Analytical Chemistry. Current faculty have expertise and experience in teaching Inorganic Chemistry, Physical Chemistry, History of Chemistry, Instrumental Methods, Environmental Chemistry and Atmospheric Chemistry at other national and international universities. Faculty have

distinguished themselves as educators by receiving the Chancellor's Award for Teaching Excellence, and Fulbright Scholarships. In addition to supervising Honor's theses, faculty are actively involved in supervision of dozens of undergraduate research projects, master's theses at USFSP and doctoral theses from USF Tampa.

Research:
Faculty have been awarded numerous grants ranging from small, internal and local grants of $20,000 to National Science Foundation educational grants of well over $500,000 for the STREAMS program in collaboration with the College of Marine Science. Dr. Osegovic has three U.S. Patents, while Dr. Alegria and Dr. Pandey share one U.S. Patent. Faculty have a wide range of book chapters and published articles in distinguished journals ranging from research on Arctic land permafrost and sea ice to PCB and PBDE's contamination in the Tampa Bay air.

Service:
Dr. Elshorbany provides service to the scientific community as a professional reviewer to journals such as *Atmospheric Chemistry and Physics, Atmospheric Environment, Journal of Geophysical Research, Environmental Science* and *Pollution Research and Environmental Science and Technology*. Dr. Alegria provides international and national consultation on the fate and transport of pollutants in air, soil and water on sensitive ecosystems and on human health. He has offered these services to the countries of Belize, Puerto Rico, and Turkey.

The faculty are a community of educators and scholars who have been dedicated to serving our students and encouraging undergraduate research. The new degree program offers them an opportunity to develop into a cohesive administrative unit.

X. Non-Faculty Resources

A. Describe library resources currently available to implement and/or sustain the proposed program through Year 5. Provide the total number of volumes and serials available in this discipline and related fields. List major journals that are available to the university's students. Include a signed statement from the Library Director that this subsection and subsection B have been reviewed and approved.

Library Overview:

The Nelson Poynter Memorial Library, University of South Florida St. Petersburg (USFSP), houses an extensive collection of materials that supports the educational, research, and service missions of USF St. Petersburg. USFSP faculty, staff, and students have on-site access to the Poynter Library's collection of over 221,620 items, including monographs, current periodical and serial subscriptions, newspaper subscriptions, and audiovisual titles, as well as to the shared electronic resources of the USF System (a Carnegie Research 1 doctoral institution). Electronic resources of the USF System include access to more than 1.6 million e-books, over 50,000 journal titles, over 28,000 streaming videos, and over 900 aggregator databases containing e-books, journal articles, magazine articles, newspaper articles, streaming video, audio files, and still images. Access to subscribed electronic resources is available remotely 24/7.
As a result of the UBorrow agreement between USF and the other Florida state universities and colleges, USFSP students and faculty have rapid access to nearly 20 million additional books. USFSP students and faculty can also take advantage of a well-regarded interlibrary loan (ILL) service, which will quickly obtain items not held by Florida state university and college libraries.

Databases Specializing in Environmental Chemistry:

Specialized discovery databases accessible to USFSP students and faculty related to environmental chemistry include:

- Corrosion Abstracts
- Environmental Index

- Index Chemicus
- Pollution Abstracts
- ProQuest Environmental Science Collection
- Reaxys
- SciFinder Scholar
- Toxicology Abstracts
- Water Resources Abstracts

Multidisciplinary Databases:

Additional content related to environmental chemistry issues can be found in the following indices and full-text databases covering multidisciplinary sciences:

- Applied Science & Technology Source
- Data Citation Index
- Elsevier ScienceDirect
- General Science Full Text
- GEOBASE
- GeoRef
- Inspec (Engineering Village)
- Scitation
- SpringerLink
- Web of Science

Other notable peer-reviewed journals in the areas of environmental chemistry that are available to USF faculty and students include:

- *Advances in Environmental Chemistry*
- *Bioresource Technology*
- *Chemistry and Biodiversity*
- *Chemistry and Ecology*
- *ChemSusChem*
- *Current Opinion in Green and Environmental Chemistry*
- *Environmental Chemistry Letters*
- *International Journal of Environmental Analytical Chemistry*
- *Isotopes in Environmental and Health Studies*
- *Journal of Water Chemistry and Technology*
- *SAR and QSAR in Environmental Research*
- *Toxicological & Environmental Chemistry*
- *Trends in Environmental Analytical Chemistry*

An examination of the USF Library Catalog for books on the targeted subject heading of "environmental chemistry" indicates:

Print book titles: 71
EBook titles and chapters:

Elsevier Science	30,802 book chapters
Wiley books & reference works	9,626
ProQuest EBook Central	8,921
Springer	1,187
Taylor and Francis	361
Project Muse	45

e-Book Collection (EBSCOhost)	21

B. Describe additional library resources that are needed to implement and/or sustain the program through Year 5. Include projected costs of additional library resources in Table 2 in Appendix A. Please include the signature of the Library Director in Appendix B.

The budget has allocated an additional $7,000 in years one and five for additional library resources. A large portion of the USF Libraries' budget supports the continuation of electronic resources. Environmental chemistry, environmental toxicology, and the broader chemistry and environmental science disciplines are well represented throughout the USF Libraries' electronic journal subscriptions.

C. Describe classroom, teaching laboratory, research laboratory, office, and other types of space that are necessary and currently available to implement the proposed program through Year 5.

Existing classroom space in the Science and Technology Building (STG), Kate Tiedemann College of Business (LPH) as well as classroom space available in Harbor Hall is expected to be sufficient for the early development of this program. New campus computer classrooms in LPH are expected to be more than adequate for the needs of this proposed program. In anticipation of a major redesign and renovation of Davis Hall, it is anticipated that additional office space and classroom space will be available to Environmental Chemistry faculty and students. The recent introduction of the Warehouse Labs and the new WHL Scientific Instrument room, which will house equipment and instruments to be used by advanced Chemistry students. This is more than sufficient to support the program in Environmental Chemistry.

D. Describe additional classroom, teaching laboratory, research laboratory, office, and other space needed to implement and/or maintain the proposed program through Year 5. Include any projected Instruction and Research (I&R) costs of additional space in Table 2 in Appendix A. Do not include costs for new construction because that information should be provided in response to X (E) below.

It is anticipated that this program will only require one new full time Instructor to support this program in years one through five. Because of the anticipated renovations on the second floor of Davis Hall it is expected that new offices will be available for existing and new faculty by Fall 2020. As the program develops and grows in the first five years, it is possible that additional tenure-track faculty lines may be necessary. However, in the context of USF consolidation, it is also possible that tenure track faculty resources will be available for teaching from both the Tampa campus and the Sarasota-Manatee campus.

E. If a new capital expenditure for instructional or research space is required, indicate where this item appears on the university's fixed capital outlay priority list. Table 2 in Appendix A includes only Instruction and Research (I&R) costs. If non-I&R costs, such as indirect costs affecting libraries and student services, are expected to increase as a result of the program, describe and estimate those expenses in narrative form below. It is expected that high enrollment programs in particular would necessitate increased costs in non-I&R activities.

In the context of USF consolidation, it is expected that the St. Petersburg campus will begin to increase capital expenditures in response to new STEM degrees such as Nursing. In that context, it is expected that increased capacity in Math and Science over the years will more than enough to accommodate the faculty and student needs in Environmental Chemistry.

As the Environmental Chemistry program grows in enrollment, along with our other STEM programs in Environmental Science & Policy and Biology, it is expected that Year 5 will require construction of an additional Chemistry lab to continue to support the growing need for teaching laboratories. The Year 5 lab construction cost is estimated to be $375,000, with an additional $375,000 estimated in Operating

Capital Outlay (OCO). Laboratory supplies in Year 1 will require $12,120 in expenses, it is anticipated that course laboratory fees will support the need for supplies in Year 5. Thirty-three thousand dollars ($33,000) for equipment to service new labs such as Physical Chemistry, Inorganic Chemistry and Environmental Chemistry are additional expenses anticipated in Year 5. A letter of support from Dr. Martin Tadlock, Regional Chancellor of USFSP is provided in Appendix F. This letter documents the University has established this program as a priority on its fixed capital outlay.

F. Describe specialized equipment that is currently available to implement the proposed program through Year 5. Focus primarily on instructional and research requirements.

The following instruments are already available within USFSP CAS and will be used in several of the courses within the program such as Analytical Chemistry, Inorganic Chemistry, Physical Chemistry, and Methods of Instrument Analysis:

- UV-Vis spectrophotometer
- ATR-FTIR spectrometer
- Gas Chromatograph
- HPLC (high performance liquid chromatograph)
- Differential Scanning Calorimeter
- Atomic Adsorption Spectrometer
- Nanodrop Fluorescence spectrometer

G. Describe additional specialized equipment that will be needed to implement and/or sustain the proposed program through Year 5. Include projected costs of additional equipment in Table 2 in Appendix A.

Because of the growth rate in all STEM programs at USFSP, it is anticipated that there will be a need for additional Chemistry teaching laboratory space. For this reason, the estimated cost of a new Chemistry lab is projected into the cost in Year 5. It should be noted, the laboratory will service all STEM programs at USFSP and not simply Environmental Chemistry. In addition to the new lab, the introduction of Physical Chemistry and Inorganic Chemistry will require additional instrumentation that is not currently available to the College of Arts & Sciences at USFSP. The list that follows is considered basic instrumentation in many accredited physical chemistry lab courses. The projected costs listed in Table 2-A are listed under Expenses ($12,120) and Operating Capital Outlay ($33,000).

- Vacuum pumps (4 needed)
- Manometers (4 needed)
- Specialized glassware for vacuum lines.
- Heating mantles (4 needed)
- Oxygen bomb calorimeter
- RTD thermometers (4 needed)
- Oscilloscope
- Raman Spectrometer
- Thermogravimetric Analysis
- Electron Spin Spectrometer and/or Nuclear Magnetic Resonance Spectrometer *
- Florescence spectrometer *

* If this equipment is available off site through partnerships or agreements with existing industries or medical facilities such as Johns Hopkins, or Bayfront Medical Center the university may not have to purchase this equipment.

H. Describe any additional special categories of resources needed to implement the program through Year 5 (access to proprietary research facilities, specialized services, extended travel, etc.). Include projected costs of special resources in Table 2 in Appendix A.

Additional resources include instrumentation that will be beneficial to the Environmental Chemistry program, but not essential, are available at the St. Petersburg campus, or available through the College of Marine Sciences at the St. Petersburg campus. These resources include:

- Inductively Coupled Mass Spectrometer (ICP-MS) (Located at the College of Marine Science – CMS)
- Sector Field Mass Spectrometer (CMS)
- Scanning Electron Mass Spectrometer / X-Ray Microanalysis (CMS)
- Continuous Flow Isotope Ratio Mass Spectrometer (CMS)
- Triple quadrupole Mass Spectrometer (Dr. Algeria's research lab)

I. Describe fellowships, scholarships, and graduate assistantships to be allocated to the proposed program through Year 5. Include the projected costs in Table 2 in Appendix A.

There are no requests for fellowships, scholarships and graduate assistantships to be allocated to the proposed program at this point in time through Year 5.

J. Describe currently available sites for internship and practicum experiences, if appropriate to the program. Describe plans to seek additional sites in Years 1 through 5.

The USF Career Center and the Internship Coordinator in the College of Arts & Sciences uses the Handshake platform for job and internship postings and employer connections. In the last year, there have been 1,425 internship postings on Handshake that have expressed an interest in hiring Environmental Chemistry-related majors. This includes the major groups of Environmental Management & Sciences, Chemistry, and Biochemistry. Some examples of companies hosting these internships are: Greenway Health, FIS, Unilever, Southwest Florida Water Management, SAS, BP, Greenkey Solar, Bristol-Myers Squibb, and Zoo Tampa.

The College of Arts & Sciences Internship Coordinator works closely with the Career Center's Employer Relations Coordinator to identify and collaborate with new employers in areas where our graduates are seeking employment. The Career Center will continue to explore new internship sites in the first five years of the Environmental Chemistry program through use of Handshake, Burning Glass, Chamber of Commerce and the Economic Development organizations in the area.

Companies – Posting for Positions in the last 12 months in Tampa/St. Petersburg according to Burning Glass.

- Thermo Fisher Scientific Inc.
- City Tampa
- United States Ecology
- Cemex
- Verizon Communications Inc.
- State of Florida
- US Government
- City of Clearwater

APPENDIX A

TABLE 1-A
PROJECTED HEADCOUNT FROM POTENTIAL SOURCES
(Baccalaureate Degree Program)

Source of Students (Non-duplicated headcount in any given year)*	Year 1		Year 2		Year 3		Year 4		Year 5	
	HC	FTE	HC	FTE	HC	FTE	HC	FTE	HC	FTE
Upper-level students who are transferring from other majors within the university**	45	36	20	16	11	9	5	4	3	2
Students who initially entered the university as FTIC students and who are progressing from the lower to the upper level***	25	20	56	45	77	62	90	72	97	78
Florida College System transfers to the upper level***	16	12.8	25	20	25	20	25	20	30	24
Transfers to the upper level from other Florida colleges and universities***	5	4	5	4	5	4	5	4	5	4
Transfers from out of state colleges and universities***	5	4	5	4	5	4	5	4	5	4
Other (double-majors)***	0	0	0	0	0	0	0	0	0	0
Totals	**96**	**77**	**111**	**89**	**123**	**98**	**130**	**104**	**140**	**112**

*** List projected annual headcount of students enrolled in the degree program. List projected yearly cumulative ENROLLMENTS instead of admissions.**
**** If numbers appear in this category, they should go DOWN in later years.**
***** Do not include individuals counted in any PRIOR CATEGORY in a given COLUMN.**

APPENDIX A

TABLE 2
PROJECTED COSTS AND FUNDING SOURCES

Instruction & Research Costs (non-cumulative)	Year 1 Funding Source								Year 5 Funding Source						
	Reallocated Base* (E&G)	Enrollment Growth (E&G)	New Recurring (E&G)	New Non-Recurring (E&G)	Contracts & Grants (C&G)	Philanthropy Endowments	Enterprise Auxiliary Funds	**Subtotal coulumns 1+...+7**	Continuing Base** (E&G)	New Enrollment Growth (E&G)	Other*** (E&G)	Contracts & Grants (C&G)	Philanthropy Endowments	Enterprise Auxiliary Funds	**Subtotal coulumns 9+...+ 14**
Columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Faculty Salaries and Benefits	167,348	0	0	0	0	0	0	**$167,348**	167,348	0	0	0	0	0	**$167,348**
A & P Salaries and Benefits	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
USPS Salaries and Benefits	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Other Personal Services	6,000	0	0	0	0	0	0	**$6,000**	12,000	0	0	0	0	0	**$12,000**
Assistantships & Fellowships	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Library	7,000	0	0	0	0	0	0	**$7,000**	7,000	0	0	0	0	0	**$7,000**
Expenses	87,120	0	0	0	0	0	0	**$87,120**	375,000	0	0	0	0	0	**$375,000**
Operating Capital Outlay	33,000	0	0	0	0	0	0	**$33,000**	375,000	0	0	0	0	0	**$375,000**
Special Categories	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Total Costs	**$300,468**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$300,468**	**$936,348**	**$0**	**$0**	**$0**	**$0**	**$0**	**$936,348**

*Identify reallocation sources in Table 3.

**Includes recurring E&G funded costs ("reallocated base," "enrollment growth," and "new recurring") from Years 1-4 that continue into Year 5.

***Identify if non-recurring.

Faculty and Staff Summary

Total Positions	Year 1	Year 5
Faculty (person-years)	1.28	1.28
A & P (FTE)	0	0
USPS (FTE)	0	0

Calculated Cost per Student FTE

	Year 1	Year 5
Total E&G Funding	$300,468	$936,348
Annual Student FTE	76.8	112
E&G Cost per FTE	$3,912	$8,360

APPENDIX A

TABLE 3
ANTICIPATED REALLOCATION OF EDUCATION & GENERAL FUNDS*

Program and/or E&G account from which current funds will be reallocated during Year 1	Base before reallocation	Amount to be reallocated	Base after reallocation
Information Systems Management Faculty Salary and Benefits	174,353	21,796	**$152,557**
Chemistry Faculty Salary and Benefits	531,391	145,552	**$385,839**
Totals	$705,744	$167,348	**$538,396**

*** If not reallocating funds, please submit a zeroed Table 3**

APPENDIX A

TABLE 4
ANTICIPATED FACULTY PARTICIPATION

Faculty Code	Faculty Name or "New Hire" Highest Degree Held Academic Discipline or Speciality	Rank	Contract Status	Initial Date for Participation in Program	Mos. Contract Year 1	FTE Year 1	% Effort for Prg. Year 1	PY Year 1	Mos. Contract Year 5	FTE Year 5	% Effort for Prg. Year 5	PY Year 5
A	Henry Alegria, Ph.D.	Associate	Tenured	Fall 2019	9	0.75	0.42	0.31	9	0.75	0.42	0.31
	Chemistry	Professor										
A	Yasin F. Elshorbany, Ph.D.	Assistant	Tenure-	Fall 2019	9	0.75	0.13	0.09	9	0.75	0.13	0.09
	Chemistry	Professor	Track									
A	John Osegovic, Ph.D.	Instructor	MYA	Fall 2019	9	0.75	0.38	0.28	9	0.75	0.38	0.28
	Chemistry											
A	Madhu Pandey, Ph.D.	Instructor	MYA	Fall 2019	9	0.75	0.33	0.25	9	0.75	0.33	0.25
	Chemistry											
A	Xue Feng "Bob" Wang, Ph.D.	Instructor	MYA	Fall 2019	9	0.75	0.17	0.13	9	0.75	0.17	0.13
	Chemistry											
A	Varol Kayhan, Ph.D.	Associate	Tenured	Fall 2019	9	0.75	0.13	0.09	9	0.75	0.13	0.09
	Information Systems Management	Professor										
B	New Hire , Ph.D.	Assistant	Tenure-	Fall 2019	9	0.75	0.17	0.13	9	0.75	0.17	0.13
	Chemistry	Professor	Track									
	(PY)							**1.28**				**1.28**

Faculty Code		Source of Funding	PY Workload by Budget Classsification Year 1	Year 5
A	Existing faculty on a regular line	Current Education & General Revenue	1.16	1.16
B	New faculty to be hired on a vacant line	Current Education & General Revenue	0.13	0.13
C	New faculty to be hired on a new line	New Education & General Revenue	0.00	0.00
D	Existing faculty hired on contracts/grants	Contracts/Grants	0.00	0.00
E	New faculty to be hired on contracts/grants	Contracts/Grants	0.00	0.00

					Overall Totals for		**Year 1**	**1.28**			**Year 5**	**1.28**

APPENDIX B

Please include the signature of the Equal Opportunity Officer and the Library Director.

Cecil Howard

Signature of Equal Opportunity Officer — Date: 4/22/19

Catherine Cardwell

Catherine Cardwell, Library Dean
Signature of Library Director — Date: 11-27-18

This appendix was created to facilitate the collection of signatures in support of the proposal. Signatures in this section illustrate that the Equal Opportunity Officer has reviewed section II.E of the proposal and the Library Director has reviewed sections X.A and X.B.

APPENDIX C
Program Assessment
Academic Learning Compacts

Academic Learning Compact (ALC) for B.S. in Environmental Chemistry	
Degree: B.S. Environmental Chemistry	**CIP Code: 40.0509 (proposed)**
Program Mission Statement: Consistent with the mission of the College of Arts & Sciences at USFSP, the Environmental Chemistry program will strive for excellence in teaching, research and service to the community. Graduates of our program will: 1. Demonstrate strong interdisciplinary knowledge in chemistry, environmental science and business to solve critical environmental problems in government, industry, private consultation, health care and education. 2. Use their interdisciplinary knowledge of physical science in chemistry, environmental science and business to foster communications across disciplinary boundaries. 3. Make a contribution to society through innovation in the field by advancing new ideas and knowledge in the combined disciplines of chemistry, environmental science and business.	
Graduates of the B.S. in Environmental Chemistry program will demonstrate the following:	
A. Discipline Specific Knowledge and Skills:	
Learning Outcome 1:	Demonstrate knowledge (understanding and retention) of the main sub-disciplines of Chemistry: Organic, Analytical, Inorganic, Physical and Environmental Chemistry.
Method of Assessment:	Completion of the Diagnostic of Undergraduate Chemistry Knowledge (DUCK) examination in the Senior Year developed by the American Chemical Society (SCS).
Criterion for Success:	Graduates of the Environmental Chemistry degree program will meet or exceed the national average on this examination.
Learning Outcome 2:	Laboratory skills: Students will demonstrate mastery of Chemistry and Environmental Chemistry skills by performing valid, accurate, efficient and safe laboratory procedures and techniques in quantitative, analytical and physical measurements; synthesis of molecules; instrumental analysis and structure determination.
Method of Assessment:	Earn a grade of C (not C-) or better in the following: Organic Chemistry II Lab, Elementary Analytical Chemistry Lab, Physical Chemistry I Lab and Intermediate Inorganic Chemistry Lab.
Criterion for Success:	Seventy percent of graduates of Environmental Chemistry degree program will earn a C (not C-) or better designated Laboratory Instruction.
B. Critical Thinking Skills:	
Outcome 1:	Students will demonstrate critical thinking skills by producing reports across the range of chemical disciplines. Reports will contain a literature review, formulate and test scientific hypotheses, and conduct a quantitative and qualitative analysis. They will develop conclusions based on chemical concepts.
Method of Assessment:	Students will research a specific problem in Environmental Chemistry, conduct a literature review, formulate a scientific hypothesis, conduct a quantitative analysis and qualitative analysis of the data and develop conclusions based on the data.
Criterion for Success:	Seventy percent of the graduates of Environmental Chemistry will successfully (C or better) integrate these scientific principles into either an undergraduate internship paper or undergraduate research paper.
C. Communication Skills:	
Outcome 1:	Students will provide a poster and oral presentation of their undergraduate research or internship papers.
Means of Assessment:	Students will present their work to an interdisciplinary audience of Chemistry, Environmental Science, and Business faculty and students.
Criterion for Success:	Seventy percent of the graduates of the program will successfully (C or better) communicate their findings to an interdisciplinary audience, based on a grading rubric.
D. Civic Engagement:	
Outcome 1:	Students will apply methods of Chemistry to address the human impact on air, water or soil through community internships or undergraduate research.
Means of Assessment:	Students will complete a paper representing a literature review and formulate an informed scientific solution a problem presented in the Internship or undergraduate research. This will be evaluated by Faculty supervisors and/or Internship supervisors in the community.
Criterion for Success:	Seventy percent of the graduates of the program will formulate a novel solution to an environmental problem based on a grade of C or better (not C-) by faculty and/or community supervisors.

APPENDIX D
Course Catalog (Proposed)

B.S. in Environmental Chemistry (CIP 40.0509)

Total Degree Hours: 120

The Environmental Chemistry degree program at University of South Florida St. Petersburg will prepare students to understand the impact of human activity on air, water, soil and human health. Students will gain a strong interdisciplinary knowledge of Chemistry, Environmental Science and Business to solve critical environmental problems in government, industry, health care and education. Students will learn to use this interdisciplinary knowledge to improve communication and understanding across disciplinary boundaries. They will make a contribution to society by advancing new ideas and innovation in the fields of Chemistry, Environmental Science and Business.

Students must complete 120 course hours, including all State Mandated Pre-Requisites, core courses and major electives. Students' requirement of 120 hours also includes all university and college degree requirements which include:

- Minimum of 120 earned semester hours with overall 2.00 GPA, including all courses attempted within the USF system.
- A transfer student must have a minimum USF GPA of 2.0 or higher and an overall GPA of 2.0 or higher.
- Students must complete a minimum of 30 credit hours at USFSP.
- Complete a minimum of 20 credit hours in their major at USFSP.
- Satisfactorily complete state mandated composition and computation and civics literacy state requirements.
- Earn a minimum of 42 semester hours in upper-level work (courses numbered 3000 and above).
- Complete all General Education Requirements.
- Complete all program requirements, and
- Be recommended for graduation by the Dean of the College of Arts and Sciences.

University General Education Requirements (36 hours): See recommended General Education Curriculum in Environmental Chemistry.

- Six (6) hours credit in Communications
- Six (6) hours credit in Computation
- Six (6) hours credit in Natural Sciences
- Six (6) hours credit in Social Sciences
- Six (6) hours credit in Humanities
- Six (6) additional hours of approved General Education electives

College of Arts and Sciences Exit Requirements (9 hours): See recommended Exit Requirements in Environmental Chemistry.

- Six (6) hours credit in Major Works & Major Issues (GEO 4372 Recommended)
- Three (3) hours credit in Literature & Writing

Students must complete all degree requirements with a grade of C (not C-) or better.

Required Core Courses: (44 Hours)

CHM 2045 / 2045L General Chemistry I and Laboratory (3 + 1 Hours)
CHM 2046 / 2046L General Chemistry II and laboratory (3 + 1 Hours)
CHM 2210 / 2210L Organic Chemistry I and Laboratory (3 + 2 Hours)
CHM 2211 / 2211L Organic Chemistry II and Laboratory (3 + 2 Hours)
CHM 3120C Elementary Analytical Chemistry and Laboratory (4 Hours)
CHM 4410 / 4410L Physical Chemistry I and Laboratory (4 + 1 Hours)
CHM 4411 Physical Chemistry II (4 Hours)
CHM 3610 / 3610L Intermediate Inorganic Chemistry (3 + 1 Hours)
CHM 4080 Environmental Chemistry I (3 Hours)

CHM 4081 Environmental Chemistry II (3 Hours)
ISM 4546 Machine Learning (Predictive Analytics) (3 Hours)

Additional State Mandated Pre-Requisites (16 Hours)

MAC 2311 Calculus I (4 Hours) (included in General Education)
MAC 2312 Calculus II (4 Hours)
PHY 2048 / PHY 2048L Physics I and Laboratory (3 + 1 Hours) (included in General Education)
PHY 2049 / PHY 2049L Physics II and Laboratory (3 + 1 Hours)

Major Electives in Environmental Chemistry (12 Hours)

MAN 3023 Principles of Management (3 Hours)
ECO 2013 Macroeconomics (3 Hours)
COP 2030 Programming (3 Hours)
EVR 2001 & EVR 2001L Introduction to Environmental Science & Lab (3 + 1)
EVR 2861 Introduction to Environmental Policy (3 Hours)
EVR 4114 Climate Change (3 Hours)
EVR 4051 Environmental Field Methods (3 Hours)
POS 3697 Environmental Law (3 Hours)
CHM 4970 Undergraduate Research (3 Hours)
CHM 4940 Applied Chemistry Internship (1 to 3 Hours) New to SCNS
CHM 4130C Methods of Instrument Analysis (4 Hours)
CHM 4060 Use of Chemical Literature (1 Hour)

College of Arts & Sciences USFSP:
Intended Program of Study – B.S. Environmental Chemistry
CIP: 40.0509

Florida College Associate of Arts Degree:

FIRST-YEAR FRESHMAN

FRESHMAN FALL			
Course Prefix & Number	**Title**	**Curriculum**	**Credit Hours**
ENC 1101	English Composition I	Gen. Ed. State Communication	3
MAC 1105	College Algebra	Gen. Ed State Math	3
XXX XXXX	Humanities	Gen. Ed. Humanities	3
ECO 2013	Macroeconomics	Gen. Ed. Social Science	3
XXX XXXX	General Elective	General Elective	3
			15

FRESHMAN SPRING			
Course Prefix & Number	**Title**	**Curriculum**	**Credit Hours**
ENC 1102	English Composition II	Gen. Ed. State Communication	3
MAC 1147	Pre-Calculus	Gen. Ed State Math	4
CHM 2045	General Chemistry I	Gen. Ed. Science/Core	3
CHM 2045L	General Chemistry I Lab	Gen. Ed. Science/Core	1
POS 2041 or AMH 2020	Civic Literacy Requirement	Gen. Ed. Social Science	3
			14

SECOND-YEAR SOPHOMORE

SOPHOMORE FALL			
Course Prefix & Number	**Title**	**Curriculum**	**Credit Hours**
CHM 2046	General Chemistry II	Gen. Ed. Science/Core	3
CHM 2046L	General Chemistry II Lab	Gen. Ed. Science/Core	1
XXX XXXX	Humanities	Gen. Ed. Humanities	3
MAC 2311	Calculus I	Gen. Ed State Math	4
BSC 2010	Biology I	Recommended General Elective	3
BSC 2010L	Biology I Lab	Recommended General Elective	1
			15

SOPHOMORE SPRING			
Course Prefix & Number	**Title**	**Curriculum**	**Credit Hours**
STA 2023	Introductory Statistics	Gen. Ed. Math	3
BSC 2011	Biology II	Recommended General Elective	3
BSC 2011L	Biology II Lab	Recommended General Elective	1
PHY 2048	General Physics I	State Pre-requisite	3
PHY 2048L	General Physics I Lab	State Pre-requisite	1
MAC 2312	Calculus II	State Pre-requisite	5
			16

FLORIDA COLLEGE SYSTEM TOTAL HOURS: 60

University of South Florida:
Intended Program of Study – B.S. Environmental Chemistry
CIP: 40.0509

THIRD-YEAR JUNIOR

JUNIOR FALL

Course Prefix & Number	Title	Curriculum	Credit Hours
CHM 2010	Organic Chemistry I	Core/State Pre-requisite	3
CHM 2010L	Organic Chemistry II Lab	Core/State Pre-requisite	2
ISM 4546	Machine Learning/Data Analytics	Core	3
XXX XXXX	Environmental Chemistry Elective	Major Elective	2
XXX XXXX	Environmental Chemistry Elective	Major Elective	3
			13

JUNIOR SPRING

Course Prefix & Number	Title	Curriculum	Credit Hours
CHM 2011	Organic Chemistry II	Core/State Pre-requisite	3
CHM 2011L	Organic Chemistry II Lab	Core/State Pre-requisite	2
XXX XXXX	Environmental Chemistry Elective	Major Elective	3
PHY 2049	General Physics II	State Pre-requisite	3
PHY 2049L	General Physics II Lab	State Pre-requisite	1
			12

FOURTH-YEAR SENIOR

SENIOR FALL

Course Prefix & Number	Title	Curriculum	Credit Hours
CHM 3120C	Elementary Analytical Chemistry & Lab	Core	4
CHM 4410	Physical Chemistry I	Core	4
CHM 4410L	Physical Chemistry I Lab	Core	1
CHM 4080	Environmental Chemistry I	Core	3
			12

SENIOR SPRING

Course Prefix & Number	Title	Curriculum	Credit Hours
CHM 4411	Physical Chemistry II	Core	4
XXX XXXX	Environmental Chemistry Elective	Major Elective	3
CHM 3610	Intermediate Inorganic Chemistry	Core	3
CHM 3610L	Intermediate Inorganic Lab	Core	1
CHM 4081	Environmental Chemistry II	Core	3
			14

UNIVRSITY OF SOUTH FLORIDA SUMMER SEMESTERS

SUMMER SESSION I

Course Prefix & Number	Title	Curriculum	Credit Hours
XXX XXXX	Recommended Exit	Major Works & Major Issues	3
XXX XXXX	Exit	Literature & Writing	3

SUMMER SESSION II

Course Prefix & Number	Title	Curriculum	Credit Hours
XXX XXXX	Recommended Exit	Major Works & Major Issues	3

UNIVERSITY OF SOUTH FLORIDA SYSTEM TOTAL HOURS: 60

APPENDIX E: Educational Advisory Board Report

DATA SNAPSHOT

Market Demand for a Bachelor's-Level Environmental Chemistry Program

Prepared for the University of South Florida-St. Petersburg

COE

COE Forum

Morgan Flitt
Market Research Associate

Elizabeth Casey-Rutland
Market Research Manager

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1) Research Methodology

Project Challenge

Leadership at the University of South Florida-St. Petersburg approached the Forum as they considered launching a bachelor's-level degree in environmental chemistry. Through quantitative data analytics, the Forum sought to assess the market viability of a bachelor's-level environmental chemistry program.

EAB's market research function provides insights which guide strategic programmatic decisions at member institutions. The Forum combines qualitative and quantitative data to help administrators identify opportunities for new program development, assess job market trends, and align curriculum with employer and student demand.

EAB reports rely primarily on labor market data from the Emsi Analyst™ tool (description below). Reports occasionally use data from the United States Census Bureau and United States Bureau of Labor Statistics data to explore occupation and job trends. Market research reports may also incorporate Integrated Postsecondary Education Data System (IPEDS) data to assess student enrollment, demographics, and completion rates across competitor programs.

Methodology and Definitions

Methodology: Unless stated otherwise, this report includes data from online job postings from October 1, 2017 to September 30, 2018. The Forum identified the top skills, titles, employers, salary, and demand over time for the profiled region.

To best estimate demand for bachelor's-level environmental chemistry professionals, the Forum analyzed job postings for bachelor's-level professionals with skills conferred by the proposed environmental chemistry program at the **University of South Florida-St. Petersburg** (e.g., 'environmental chemistry,' 'analytical chemistry').

To provide salary information, the Forum identified five of the top 10 occupations available to bachelor's-level environmental chemistry professionals that most closely align with the expected professional outcomes of a bachelor's-level environmental chemistry program. The Forum consulted Emsi Analyst™ to determine the median statewide and national hourly wage for each occupation and the Bureau of Labor Statistics (BLS) to identify the median nationwide annual salaries.

Definitions: "State" and "statewide" refer to Florida.

"Local" and "local data" refer to the Tampa-St. Petersburg-Clearwater, FL metropolitan statistical area (MSA).

Annual growth in job postings is measured in the change in demand between September 2016 and September 2018.

Emsi's Analyst and Alumni Insight

EAB's Partner for Comprehensive Labor Market Data

This report includes data made available through EAB's partnership with Emsi (Economic Modeling Specialists International), a labor market analytics firm serving higher education, economic development, and industry leaders in the U.S., Canada and the United Kingdom.

Emsi curates and maintains the most comprehensive labor market data sets available for academic program planning, providing real-time job posting data, workforce and alumni outcomes data, and traditional government sources of data. Under this partnership, EAB may use Emsi's proprietary Analyst™ and Alumni Insight™ tools to answer member questions about employer demand, the competitive landscape, in-demand skills, postings versus actual hires, and skills gaps between job postings and professionals in the workforce. The Emsi tools also provide EAB with in-depth access to unsuppressed, zip-code-level government data for occupations, industries, programs, and demographics. For more complete descriptions of the Emsi tools, visit:

http://www.economicmodeling.com/analyst/

https://www.economicmodeling.com/alumni-insight/

To learn more about Emsi and its software and services, please contact Bob Hieronymus, Vice President of Business Development at bob.hieronymus@economicmodeling.com or (208) 883-3500.

Project Sources

The Forum consulted the following sources for this report:

EAB's internal and online libraries (eab.com).

National Center for Education Statistics (NCES) (nces.ed.gov).

The Bureau of Labor Statistics (bls.gov).

2) Executive Overview

Develop a bachelor's-level environmental chemistry program at the *University of South Florida* to align with statewide and regional employer demand and projected employment growth. In September 2018, statewide employers sought bachelor's-level environmental chemistry professionals in 70 percent more job postings than in September 2016 (i.e., demand grew from 498 to 847 job postings). Further, statewide employer demand for bachelor's-level environmental chemistry professionals increased an average of six job postings per month in the same period. Emsi Analyst™ projects an 18 percent growth in statewide employment of "environmental science and protection technicians," an occupation available to environmental chemistry professionals, from 2016 to 2026.[1] This exceeds the predicated average growth in statewide employment of 13 percent across all occupations during this time.

Advertise salary potential for bachelor's-level environmental chemistry professionals to recruit outcomes-focused students to the environmental chemistry program. The Bureau of Labor Statistics (BLS) reports a nationwide average annual salary across all occupations of $50,600 in 2017.[2] Five of the top ten occupations for bachelor's-level environmental chemistry professionals statewide range in reported annual median salary from $45,000 to $85,000. Ensure marketing materials highlight the high potential earnings for bachelor's-level environmental chemistry professionals across various available professions. An emphasis in marketing materials on salary outcomes can attract millennials, who desire immediate return on investment in educational programs (e.g., salary increases).[3]

Form partnerships with employers to facilitate experiential learning opportunities and students' postgraduate employment. Administrators should work to communicate the **University of South Florida**'s distinct value to secure and grow impactful employer partnerships.[4] Require students to complete internships to help them network and market themselves to employers. Top statewide and regional employers that seek environmental chemistry professionals include employers in government, technology, and health-related fields. Further, advertise partnerships with top local employers in marketing materials to emphasize the opportunity for students to gain professional experience and to attract career-minded students.

3) Employer Demand

Demand over Time

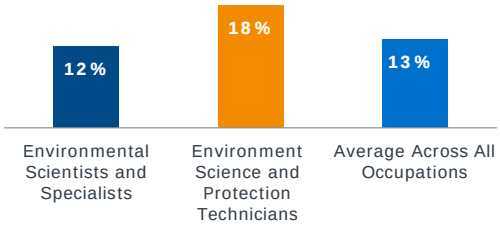
Statewide and Local Employer Demand Increased from September 2016 to September 2018

Bureau of Labor Statistics
Bureau of Labor Statistics
EAB, 2015, Designing Programs for the Millennial Workforce
EAB, 2017, Critical Disciplines to Grow Employer Partnerships

From September 2016 to September 2018, statewide demand for bachelor's-level environmental chemistry professionals increased 70 percent (i.e., from 498 to 847 job postings) and local demand increased 48 percent (i.e., from to 138 job postings). In the last months, statewide employer demand increased 30 percent from 654 to 847 job postings) local employer demand increased percent (i.e., from 118 to 138 postings). Between September 2016 and September 2018, statewide employer demand for bachelor's-level environmental chemistry professionals increased an average of six job postings per month. However, local demand for bachelor's-level environmental chemistry professionals increased an average of just half a job posting per month.

Projected Employment Growth in Occupations Related to Environmental Chemistry

2016-2026, Statewide Data[5]



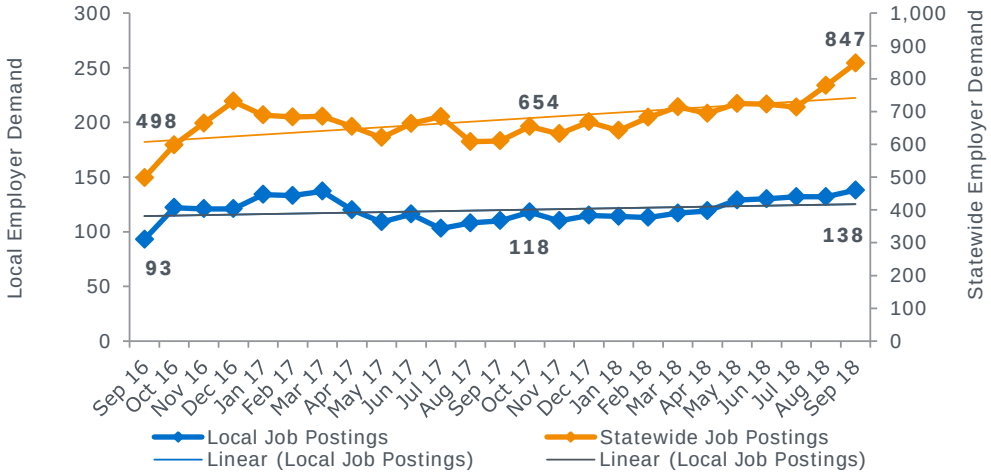
93
12
(i.e., and 17 job

High projected growth in employment of "environmental science and protection technicians," an occupation available to bachelor's-level environmental chemistry professionals, also indicates the proposed program aligns well with employer needs.[6] Emsi Analyst™ projects statewide employment of "environmental science and protection technicians" to grow 18 percent from 2016 to 2026, faster than the 13 percent growth projected for all occupations statewide.[7] The Bureau of Labor Statistics (BLS) projects growth in national employment for "environmental science and protection technicians" and attributes this projected growth to heightened public interest in the environment and increased demand placed on the environment by population growth.[8]

Linear trend lines represent the average monthly change in statewide and local employer demand for bachelor's-level environmental chemistry professionals.

Employer Demand over Time for Bachelor's-Level Environmental Chemistry Professionals

September 2016-September 2018, Statewide and Local Data[9]



Emsi Analyst™
Emsi Analyst™
Emsi Analyst™
Bureau of Labor Statistics
Emsi Analyst™

Top Skills

Include Courses in Closely Related Scientific Disciplines in the Bachelor's-Level Environmental Chemistry Program to Align with Employer Demand

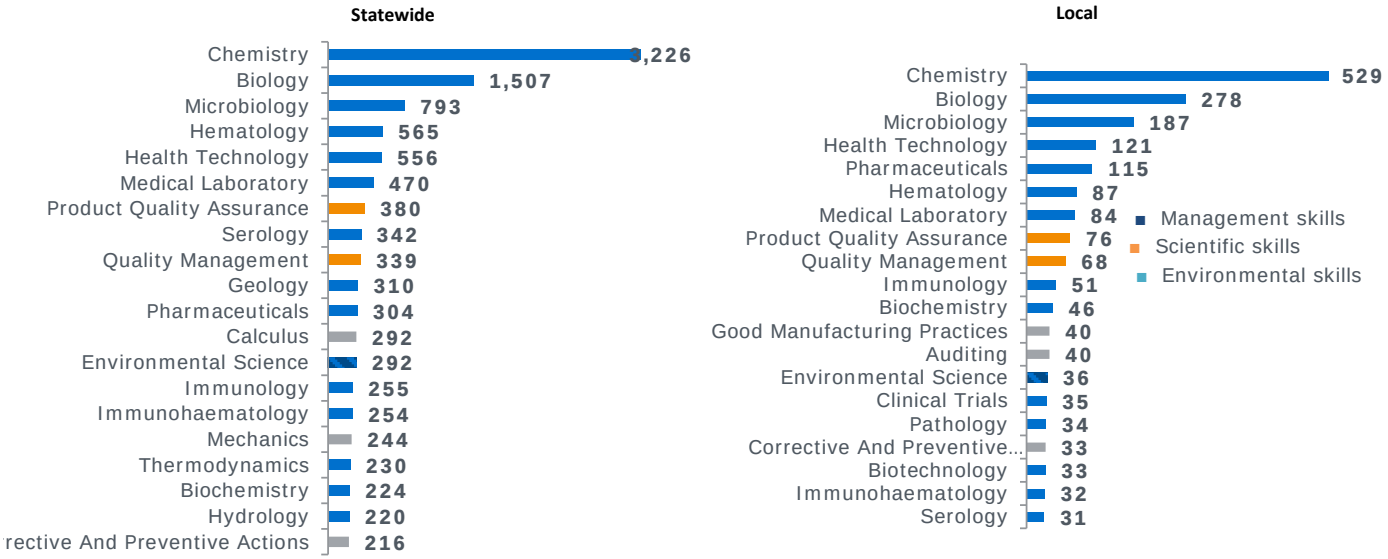
The American Chemical Society states environmental chemists often use knowledge from other disciplines (e.g., biology, geology, ecology) due to the interdisciplinary nature of the field.[10] This suggests courses which confer scientific skills across a range of disciplines will equip environmental chemistry students with skills necessary to succeed in their careers. Scientific skills (e.g., 'chemistry') account for 15 of the top 20 skills statewide and local employers seek for bachelor's-level environmental chemistry professionals. As expected, 'chemistry' accounts for the top skill local and statewide employers seek for bachelor's-level environmental chemistry professionals in the last 12 months. Administrators should note only one environmental skill (i.e., 'environmental science') ranks among the top 20 skills statewide and local employers request for bachelor's-level environmental chemistry professionals.

Further, ensure a bachelor's-level environmental chemistry program confers in-demand management skills. Management skills (e.g., 'quality management') account for two of the top 20 skills statewide and local employers seek for bachelor's-level environmental chemistry professionals. The inclusion of management courses in the curriculum of the proposed bachelor's-level environmental chemistry program will position students to meet statewide and local demand. When marketing the environmental chemistry program to prospective students, administrators should highlight how the skills conferred in the program align with demonstrated employer demand.[11]

Top Skills for Bachelor's-Level Environmental Chemistry Professionals

October 2017-September 2018, Statewide and Local Data[12]

N (statewide) = 3,251 job postings; n (local) = 538 job postings



American Chemical Society, Environmental Protection
EAB, Competing on Student Outcomes to Attract Today's Career Changer, 2017
Emsi Analyst ™

Top Titles

EAB research indicates student outcomes–centered marketing serves as an effective recruitment tool because it enables career-focused students to visualize program outcomes.

Advertise the Wide Range of Careers Available to Graduates of the Bachelor's-Level Environmental Chemistry Program to Attract Prospective Students

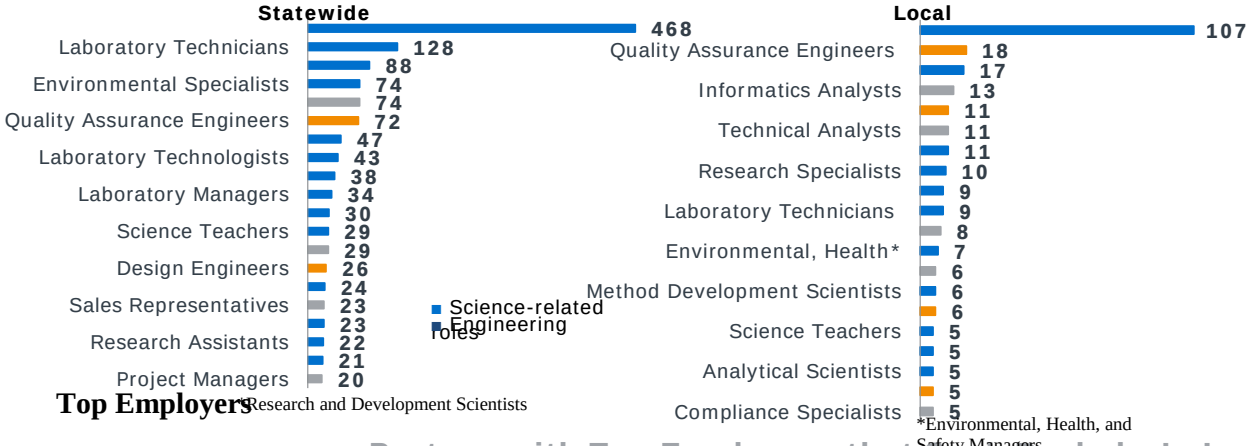
Reference in-demand roles for environmental chemistry professionals in program marketing to secure enrollments. Science-related roles (e.g., 'laboratory technicians,' 'chemists') represent 14 of the top 20 titles statewide employers post for environmental chemistry professionals in the last 12 months. 'Medical technologists' represents the most commonly posted job title statewide and locally (i.e., 468 and 107 job postings, respectively). Highlight the diversity of possible positions in marketing messages to attract enrollments from career-minded students. The inclusion of career-related data (e.g., job placement rates, salary information) in marketing materials can lead to growth in applications and enrollments.[13] As the prospective environmental chemistry program prepares graduates for both environmental chemistry and more general chemistry roles, the inclusion of labor market data will help demonstrate the variety of career opportunities available to graduates.

Additionally, engineering positions (e.g., 'quality assurance engineer') represent two of the top 20 job titles statewide and four of the top 20 titles locally for bachelor's-level environmental chemistry professionals. Job postings for 'quality assurance engineers' represent two percent of relevant statewide demand (i.e., 72 of 3,251 job postings) and three percent of relevant local demand (i.e., 18 of 538 job postings) for bachelor's-level environmental chemistry professionals. Administrators should note employers do not necessarily require an engineering degree to fill these positions. Employers seek professionals with relevant chemistry skills and list degrees in a variety of related fields (e.g., chemistry, biology, engineering) as acceptable qualifications.

Top Titles for Bachelor's-Level Environmental Chemistry Professionals

October 2017-September 2018, State and Local Data[14]

n (statewide)= 3,251 job postings; n (local)= 538 job postings



*Environmental, Health, and Safety Managers

Top Employers

Partner with Top Employers that Seek Bachelor's-Level Environmental Chemistry Professionals to Enhance Career Opportunities for Enrolled Students Across Fields

Partner with top employers across fields to offer experiential learning opportunities (e.g., internships) which help students gain real world experience, acquire networking contacts, and build their resumes. Use these partnerships to develop recruitment pathways into

EAB's "Competing on Student Outcomes to Attract Today's Career Changer" (2017).
Emsi Analyst ™

Administrators should note The Staffing Resource Group, Inc.; Kelly Services, Inc.; Sunbelt Staffing, LLC; Human Edge Inc.; and Kforce Inc. post job openings for multiple employers.

postgraduate positions for students. Top fields for bachelor's-level environmental chemistry professionals include technology (e.g., Oracle Corporation), government (e.g., United States Department of the Navy), and health care (e.g., Adventist Health System). Oracle Corporation demonstrates the greatest demand for bachelor's-level environmental chemistry professionals statewide with 143 postings. Other employers with high demand for bachelor's-level environmental chemistry professionals in the last 12 months include companies in the defense and energy industries. Prioritize partnerships with employers such as Adventist Health that demonstrate high demand in the local area, as they may offer unique opportunities for long term relationships due to their close proximity. Adventist Health demonstrates the second highest level of demand for bachelor's-level environmental chemistry professionals locally (i.e., 27 postings).

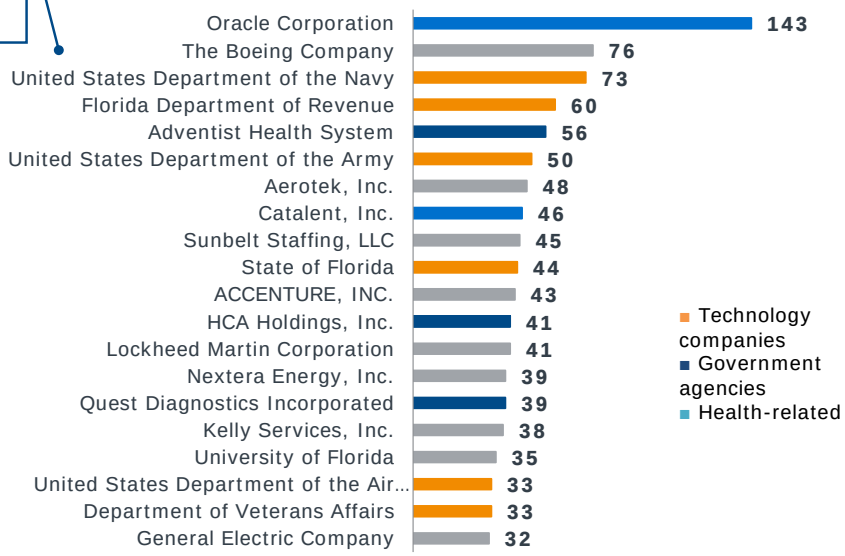
For more information on establishing and growing impactful employer partnerships, please see EAB's Critical Disciplines to Grow Employer Partnerships research.[15]

Administrators should note Aerotek, Inc.; Sunbelt Staffing, LLC; The Staffing Resource Group, Inc.; and Kelly Services, Inc. post job openings for multiple employers.

Top Statewide Employers for Bachelor's-Level Environmental Chemistry Professionals

October 2017-September 2018, State Data[16]

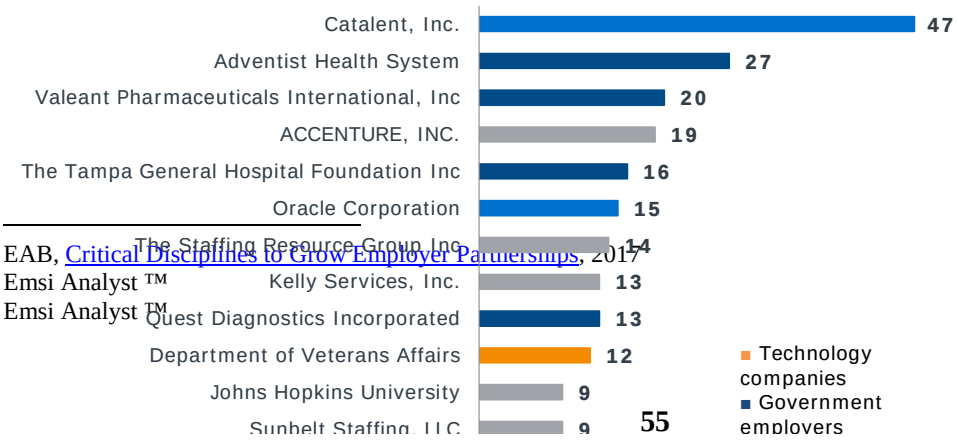
n=3,251 job postings



Top Local Employers for Bachelor's-Level Environmental Chemistry Professionals

October 2017-September 2018, Local Data[17]

n=538 job postings



EAB, Critical Disciplines to Grow Employer Partnerships, 2017

Emsi Analyst ™

Emsi Analyst ™

Salary

Include Salary Information in Marketing Materials to Convey Return on Investment to Prospective Students

Include information on the salary ranges of common occupations available to bachelor's-level environmental chemistry professionals to attract outcomes focused students to the prospective program. 'Clinical laboratory technologists and technicians,' 'chemists,' 'industrial engineers,' 'environmental scientists and specialists,' and 'environmental science and protection technicians' account for five of the top 10 occupations available to bachelor's-level environmental chemistry professionals in Florida. The reported national median hourly earnings for these occupations exceed the reported statewide median hourly earnings. For example, Emsi Analyst™ reports $28.63 as the median statewide hourly earnings and $30.18 as the median national hourly earnings for 'clinical laboratory technologists and technicians.' The national annual median earnings for these occupations range from $45,000 to $85,000. The BLS notes the median wages for "environmental scientists and specialists" varies by field. For example, those who work in local government, excluding education and hospitals, earn a median annual wage of $69,440, whereas those who work in federal government, excluding postal service, earn a median annual wage of $101,400.[18]

Further, the Hamilton Project reports those with a bachelor's-level degree in chemistry who work as "chemist and material scientists" earn an average $73,791 annually.[19] As expected, professionals with a bachelor's degree in chemistry who work as "other managers" (unspecified management type) often receive higher salaries, with reported annual median wages of $106,531.[20]

Earnings for Bachelor's-Level Environmental Chemistry Professionals

October 2017-September 2018, National and Statewide Data[21]

n=3,251 job postings

Administrators should note various factors including licensing laws, job descriptions, employer makeup, and occupational popularity can affect wages and may account for some of the disparity between statewide and national averages.

upation	Sample Job Titles	Statewide Median Hourly Earnings*	National Median Hourly Earnings*	National Median Annual Earnings[22]
ical Laboratory hnologists and Technicians	Chief Medical Technologist; Histology Technician	$28.63	$30.18	$51,770
mists	Research Chemist; Senior Chemist	$28.85	$35.94	$76,280
Industrial Engineers	Process Engineer; Senior Research Associate	$33.79	$41.29	$85,880
Environmental Scientists and Specialists	Environmental Analyst; Staff Climate Scientist	$23.66	$33.37	$69,400
Environmental Science and Protection Technicians	Water Quality Analyst; Environmental Specialist	$18.90	$21.87	$45,490

*The Forum used Emsi Analyst™ to identify reported national and statewide median hourly earnings and occupational outlook data from the BLS to gather

Bureau of Labor Statistics
The Hamilton Project
The Hamilton Project
Emsi Analyst ™
Bureau of Labor Statistics

Appendix: Reported Bachelor's-Level Environmental Chemistry Degree Completions

Only one institution in the South outside of Florida (i.e., Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Oklahoma, and Tennessee) reports bachelor's-level degree completions with the classification of instructional programs (CIP) code for environmental chemistry (i.e., 40.0509).

Reported Completions of Bachelor's-Level Environmental Chemistry Programs

CIP Code 40.0509, 2015-2016 Academic Year, Regional Data[23]

Institution	Completions
University of Georgia	4

IPEDS, Regional data includes Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Oklahoma and Tennessee

APPENDIX F: Letters of Support from Community Partners & USFSP

UNIVERSITY OF CENTRAL FLORIDA

Department of Chemistry
P.O. Box 162366 Orlando, FL 32816-2366

October 26, 2018

Magali Cornier Michael
Dean, College of Arts and Sciences University of South
Florida St. Petersburg Davis 100

Dear Dr. Michael,

I read the proposal for development of an Environmental Chemistry B.S. degree program at University of South Florida St. Petersburg. I find this to be a very useful proposed program and support the creation of this degree at USFSP. As a scientist who has focused on environmental chemistry my entire academic career, I am keenly aware of the need for professionals who have a cross-disciplinary education. This type of education will provide students with this knowledge for both direct transition into industry or for graduate education in many areas of environmental science.
Our greatest environmental challenges are those that cross traditional academic silos. Solving these challenges will require scientists who use an approach that draws from physical and social sciences (including business and economics) and are capable of communication with experts from other disciplines.
I support the development of this degree program. I am confident the graduates of this degree program will find gainful employment in the Southeast and Coastal United States.

Sincerely,

Cherie L. Yestrebsky

Cherie L. Yestrebsky, Ph.D.
Pegasus Professor and Department Chair Chemistry
Department
Associate Director, National Center for Integrated Coastal Research 407.823.2135
Cherie.Yestrebsky@ucf.edu

Phone: 407.823.2246 • Fax: 407.823.2252 • Web: sciences.ucf.edu/chemistry

Dr. Wayne C. Guida
Professor and Chair
Department of Chemistry

October 29, 2018

Dr. Magali Cornier Michael
Dean, College of Arts and Sciences
University of South Florida St. Petersburg

Dear Dean Michael,

I am writing this letter to support your initiative at USF St. Petersburg to develop a program in environmental chemistry. I have examined the curriculum and I also had our Undergraduate Council in the Department of Chemistry here in Tampa, examine it as well. We all agree that it appears to be an excellent program.

We do have a few suggestions. The first is that we recommend that you make CHM 4411 (Physical Chemistry II) and elective and CHM 4130C (Methods of Instrumental Analysis) a requirement. We note, though, that Methods has a prerequisite of CHM 4060 (Chemical Literature) which is also an elective in your current curriculum.

In summary, I support the development of an environmental chemistry program at USFSP.

Best wishes.

Wayne C. Guida, Ph. D.

Department of Chemistry • College of Arts & Sciences • University of South Florida

4202 East Fowler Avenue - CHE205 • Tampa, FL 33620-5250
813.974.2144 • FAX 813.974.3203 • http://chemistry.usf.edu/

The University Of
TAMPA
401 W. Kennedy Blvd., Tampa, Florida 33606-1490 U.S.A.

November 25, 2018

RE: Environmental Chemistry program proposal

Dear Dr. Michael:

I am writing this letter to express my support of the new Bachelor of Science (B.S.) in Environmental Chemistry program under development at the University of South Florida, St. Petersburg. I have reviewed the program, including the proposed curriculum, and have concluded that the program would be sufficient in providing a bachelor's degree level introduction to the field.

As noted in the provided rationale, there is a growing need for well-trained scientists in the area of Environmental Chemistry. This emphasis comes from increasing concern for the environment in modern society, largely due to the significant impact of humankind and population growth. The impact of modern technological and industrial advances on our earth is well documented, and a program such as the one proposed by USF-SP should help in producing the next generation of scientists capable of addresses these issues.

Specifically, the proposed Environmental Chemistry B.S. degree includes a curriculum with a heavy emphasis on the core areas of chemistry that are important for understanding basic chemical principles relevant to Environmental science (e.g., inorganic and physical chemistry). With the additional proposed Business and other Environmental coursework, a student completing this program will receive further insight into areas that are also vital in approaching current and future environmental issues with a broad perspective.

In closing, let me again express my support of the recently proposed Environmental Chemistry B.S. program at USF-SP. If I can be of further assistance in any way, please do not hesitate to call my office at (813)257-6340 or email me at ewerner@ut.edu.

Sincerely,

Eric J. Werner, Ph.D.
Chair, Department of Chemistry, Biochemistry and Physics
Associate Professor of Chemistry
The University of Tampa

October 18, 2018

Nevein Narouz, M.S.
Environmental Compliance Division
Water Resources Department
City of Saint Petersburg
1635 3rd Ave N
St Petersburg, FL 33713

Dear Dr. Toler,

As a Lead Chemist in the Environmental Compliance Division of the City of Saint Petersburg, I am delighted to write this letter of support for the proposal of developing a degree program in Environmental Chemistry at the University of South Florida Saint Petersburg. This program will be a great addition to the College of Arts and Sciences as an applied science program which will help to address and resolve environmental issues that continuously challenge our population.

In the past few decades, industries which produce fertilizers, processed food, plastics, etc., exclusively introduced harmful chemicals into the environment. This in turn affects our population on a global level and further influences the human health and biological balance in nature. This results in a huge demand for more Environmental Scientists who can identify, address, and resolve these issues in order to find ways to protect our environment.

I believe that the initiative of starting an Environmental Chemistry program at the College of Arts and Science at USFSP will adequately prepare the students to close the gap which currently exists in the world of environmental chemistry. A strong curriculum and exposure to real life experience by partnering with the City of Saint Petersburg Environmental Compliance Division will enable the students who successfully complete this degree to feed the growing job market.

Thank you for your consideration. Please let me know if you have further questions.

Sincerely,
Nevein Narouz

Nevein Narouz, M.S.
Lead Chemist
Environmental Compliance Division
Water Resources Department
City of Saint Petersburg, Florida
Email: Nevein.Narouz@stpete.org
Phone: 727-892-5690

BOARD OF COUNTY COMMISSIONERS
Jay J. Beyrouti
Dave Eggers
Pat Gerard
Charlie Justice
Janet C. Long
Karen Williams Seel
Kenneth T. Welch

Pinellas County PUBLIC WORKS

October 22, 2018

To whom it may concern,

Pinellas County is dedicated to practicing superior environmental stewardship and recruiting the most diverse and talented individuals to create a quality workforce. Meeting these goals are easily achieved as academic institutions like the University of South Florida continue to develop curriculum based on the current and future needs of community, business, and government employers and partners.

The Environmental Management Division recognizes a number of benefits to offering a degree in Environmental Chemistry as students prepare for environmental careers. For example, there are growing needs for specialized environmental skills and understanding in biochemical relationships, applied chemistry, contaminant hydrology, and molecular chemistry within Pinellas County. Additionally, the Tampa Bay area is home to a competitive internship, capstone, and/or directed study market because there are a number of academic institutions that require these credit courses for graduation. Coursework in environmental chemistry is likely to make USF-SP students more qualified for existing opportunities and potentially expand the University's ability to partner with organizations that might not have considered student interns in the past. Furthermore, specialized science degrees continue to make entry-level applicants "stand out" in highly competitive local, State, and Federal environmental job markets.

Pinellas County's Environmental Management Division is reputable for mentoring students pursuing a variety of environmental degrees from local, state, and national academic programs and we look forward to the opportunity to share our expertise and expand the interest in environmental chemistry applications and careers.

Sincerely,

Kelli Hammer Levy, Division Director
Pinellas County Environmental Management

nad

Pinellas County Public Works - Environmental Management
22211 U.S. Hwy. 19 North • Bldg. 10
Clearwater, FL 33765
Main Office: (727) 464-4425
V/TDD: (727) 464-4062

www.pinellascounty.org

ZOO TAMPA AT LOWRY PARK

October 17, 2018

Dear Board of Trustees,

Future generations depend on the plans and decisions we make today. At ZooTampa, animal and environmental conservation and sustainability are the cornerstones of our mission, providing knowledge so everyone we touch is motivated to join us in taking action to protect and preserve wildlife. ZooTampa is a Seafood Watch partner and is committed to serving only sustainable seafood in our restaurants, as well as feeding only sustainably sourced seafood to our animals. In addition, we sell only candy that is made with sustainable palm oil in our retail locations and at our themed events.

At ZooTampa, we fully support USFSP moving forward with the environmental sustainability studies and the Environmental Chemistry Program. We look forward to further providing input on curriculum and influencing the progress of the degree as well as its learning outcomes and objectives.

Best Regards,

Michelle Coleman

Michelle Coleman, MBA, SHRM – SCP
Vice President of Human Resources
Michelle.coleman@zootampa.org

USFSP
UNIVERSITY OF SOUTH FLORIDA
ST. PETERSBURG

March 15, 2019

To Whom It May Concern;

The University of South Florida St. Petersburg is approved to implement a new degree program in Environmental Chemistry. This program aligns with university priorities and its distinctive identity. The university will provide one-time funds to support creation of the teaching lab needed for the program along with necessary equipment. We anticipate those costs to be $750,000, which will come from Education and General carry-forward funds.

Thank you for final approval of this new program.

Regional Chancellor
USF St Petersburg

USFSP
COLLEGE OF ARTS & SCIENCES

November 28, 2018

Dear Dr. Susan Toler,

On behalf of the College of Arts and Science Academic Program Committee (APC), I am delighted to write this letter in support of the Bachelor of Science degree program in Environmental Chemistry. The proposal of this major was anonymously approved by the attending APC committee members on November 26. Please let me know if you have any questions. Thank you.

Sincerely,

Dr. Suganthi Sridhar

Suganthi Sridhar
Co-Chair, Academic programs committee
College of Arts and Science

220 A Davis Hall, University of South Florida St. Petersburg
140 7th Avenue South • St. Petersburg, FL 33701-5016
office (727) 873-4776 • Fax: (727) 873-4526

November 27, 2018

Dear Members of the Academic Review Committees,

I write this letter in strong support of the Bachelor of Science degree program in Environmental Chemistry. The substantial growth in the number of students choosing STEM majors at USFSP over the past ten years indicates a clear interest in and need for such degree programs. The launching of the new STEM degree in Environmental Chemistry will strengthen offerings in the natural sciences, building on existing course offerings in Chemistry as well as in Environmental Science, Data Analytics, and Business. Indeed, the program offers a strong general Chemistry foundation with a focus on environmental studies and supplemented with practical scientific skills to meet a variety of employer needs—e.g. skills in data analysis, programming, business.

The Environmental Chemistry degree aims to prepare students to apply basic chemistry skills to address critical problems connected to the environment and human health. The demand for such skills is growing in the region and state of Florida as well as nationally and internationally, so the employment outlook for graduates of this degree program is projected to grow at a rapid pace. As the only such degree program in Florida, the new degree will offer a distinct experience for students with interests that align with its unique curriculum and goals.

The College of Arts and Sciences is well-positioned to launch this program, building on existing faculty resources and course offerings and supplementing these by redirecting College funds for additional faculty and course development. Moreover, the University has made a commitment to fund an additional teaching Chemistry laboratory by year five.

I wish to thank Dr. Susan Toler in particular for her dedication and collegial approach to pulling together this exceptional proposal in record time.

Sincerely,

Magali C. Michael

Magali Cornier Michael, Ph.D.
Dean, College of Arts and Sciences

USFSP
KATE TIEDEMANN
COLLEGE OF BUSINESS

December 18, 2018

Dear Dr. Susan Toler,

On behalf of the USFSP Undergraduate Council, I would like to express our support for the Bachelor of Science degree program in Environmental Chemistry. The program received unanimous support from the committee.

Sincerely,

Mike Sinclair
Chair, USFSP Undergraduate Council

KATE TIEDEMANN COLLEGE OF BUSINESS
University of South Florida St. Petersburg, 140 7th Avenue South, LPH 319G, St. Petersburg, FL 33701
(727) 873-4297 • FAX (877) 358-7062 • www.usfsp.edu

USFSP
UNIVERSITY OF SOUTH FLORIDA
ST. PETERSBURG

December 12, 2018

The Bachelor of Science (B.S) in Environmental Chemistry proposal responds to a critical STEM need, and reflects USFSP's strategic priorities. Furthermore, the proposed program is consistent with the Florida State University System Strategic Planning Goals as they pertain to scholarship, research, and innovation; teaching and learning; business and community engagement. USFSP will be the first institution in the state of Florida to offer a full degree in Environmental Chemistry under IPEDs definition. As evident in the submission, the proposal has a broad support from our community and industry partners. The proposal would enrich the program portfolio of USFSP, and has my unequivocal support.

Thank you for your kind consideration.

Sincerely,

Olufunke A Fontenot

Dr. Olufunke A. Fontenot
Interim Regional Vice Chancellor for Academic Affairs

From: **Kirchman, Paul** pkirchman@sar.usf.edu
Subject: Environmental Chemistry
Date: March 13, 2019 at 2:56 PM
To: Michael, Magali mcmichael2@mail.usf.edu

Hi Magali,

I had a look at the Environmental Chemistry degree proposal. It seems like a good fit for the St. Petersburg campus, with your focus on environment and sustainability. I think it is also a good complement to what is offered on other campuses. We do not have a short term plan for any chemistry major on the Sarasota-Manatee campus and our long term plan is for general chemistry or some other specialization, not environmental chemistry. However, we do offer all of the prerequisites you list on the USFSM campus and would certainly direct any students interested in Environmental Chemistry your way for their upper-level courses if you were to have that degree.

Let me know if I can be of any further assistance.
Best Regards,
Paul

Paul Kirchman, Ph.D.
Dean, College of Science & Mathematics
University of South Florida Sarasota-Manatee
8350 N. Tamiami Trail B320 I Sarasota, FL 34243
Office: 941-359-4437

University of South Florida
Sarasota-Manatee

I usfsm.edu

Records of the University of South Florida are subject to disclosure under the Florida Public Records law unless exempt by law.

UNIVERSITY OF SOUTH FLORIDA

Dean
College of Marine Science

DATE: March 7, 2019

TO: Dr. Magali Michael
Dean, College of Arts and Sciences
University of South Florida St. Petersburg

FROM: Dr. Jacqueline Dixon
Dean, College of Marine Science
University of South Florida

RE: Proposed Bachelor of Science in Environmental Chemistry

I would like to express my full support for the proposed Bachelor of Science degree in Environmental Chemistry at the University of South Florida St. Petersburg. The College of Marine Science is located on the Bayboro Peninsula on the USF St. Petersburg campus. However, because the College of Marine Science is a research-focused, Ph.D.-granting college, we are administratively a part of the University of South Florida, Tampa campus. In spite of this, we already have a close working relationship with the Biology program at USFSP. We currently teach at least two elective courses per year to undergraduate Biology students at USFSP. We anticipate extending this arrangement to include offering our lower level graduate courses in chemical oceanography to USFSP undergraduate Environmental Chemistry majors. The presence of a world-class oceanographic research college in close proximity to USFSP provides opportunities for undergraduates to participate in cutting-edge research projects with our faculty. We currently provide research internships to 20 to 30 undergraduates per year. We look forward to working with USFSP to ensure the success of the proposed Environmental Chemistry degree.

University of South Florida
140 Seventh Avenue South, KRC3109, St. Petersburg, Florida 33701
(727) 553-1634 • Fax (727) 553-3968
USF is an Equal Opportunity/Equal Access/Affirmative Action Institution

APPENDIX G
Faculty Curriculum Vitae

Henry A. Alegria Ph.D.
University of South Florida St. Petersburg, DAV 2216, 140 7th Ave. S., 33701
Tel. (727)873-4777 Email:halegria@mail.usf.edu

EDUCATION

University of South Carolina, Columbia, SC
Ph.D. in Environmental Organic Chemistry, August 1998.

University of South Carolina, Columbia, SC
M.S. in Organic Chemistry, August 1993.

Harding University, Searcy, AR
B.S. in Chemistry (*Magna Cum Laude*), May 1990.

PROFESSIONAL EXPERIENCE

08/10 – 07/11: Galen University, Belize, Central America
President & Provost (leave of absence from USF St Petersburg)

09/06 – present: Dept. of Environmental Science, Policy & Geography, USF St Petersburg
Assistant to Associate Professor of Chemistry

09/02 – 08/06: Department of Chemistry, California Lutheran University
John Stauffer Endowed Professor of Analytical Chemistry (Associate Professor), promoted to Professor in May 2006

09/96 - 08/02: Dept. of Biology, Chemistry, & Veterinary Technology, Newberry College
Assistant Professor of Chemistry, tenured 2001

ACADEMIC RECORD

Administrative Positions

(08/2010 – 05/2011): President & Provost of Galen University (Belize, Central America). Responsible for managing a private institution of ~400 students and 10 undergraduate and 3 graduate programs. Significant accomplishments:

- increased enrollment from ~275 to ~400 students
- led restructuring of the university into coherent programs with directors
- led revamping of curricula of all programs
- spearheaded successful efforts to maintain accreditation of 9 undergraduate programs via the University of Indianapolis during a complicated take-over of the institution
- consolidated successful off-campus programs in business administration and social sciences
- led accreditation of the accounting and professional MBA program via partnership with the University of Indianapolis
- introduced accredited graduate program in secondary education via partnership with UNC - Wilmington

(08/2011 – 12/13): Department of Environmental Science, Policy & Geography - USF St Petersburg. Significant accomplishments:

- successfully led redesign of undergraduate curriculum and introduction of a new Concentration in Sustainability
- led efforts to redesign departmental ALCs
- introduced a non-thesis M.A. in Environmental Science

(01/2004 - 05/2006): Chair of the University Honors Program – California Lutheran University. Significant accomplishments:

- led the program as it redesigned its curriculum
- introduced more science courses, a thesis requirement and a service component

(08/2002-05/2006): Director of Environmental Science Program – California Lutheran University. Founding director of the program. Significant accomplishments:

- led its increase in enrollment from 12 to over 100 majors and over 75 minors in four years
- instituted a successful internship requirement in partnership with area companies
- led successful fundraising efforts that generated over $1M in endowments for the program

Student Research:

- Supervised 1 Ph.D. and 9 M.S. students as Thesis Advisor
- Supervised over 40 undergraduate students, leading to over 15 Senior/Honor Theses, 24 conference presentations

Courses taught:

Chemistry courses

- Organic Chemistry, Analytical Chemistry, Instrumental Methods, General Chemistry, Special Topics in Analytical Chemistry, Advanced Organic Chemistry, Chemistry for Non-Majors, Environmental Chemistry (graduate & undergraduate), Atmospheric Chemistry (graduate & undergraduate), Senior Capstone in Chemistry

Environmental Science courses

- Introduction to Environmental Science, Fate and Transport of Environmental Pollutants, Environmental Philosophy and Ethics, Society and the Environment, At Home in the Universe (team-taught foundation honors science course), Environmental Protection in Developing Countries (study abroad course), Rainforests to Reefs (study abroad field course course), Field Methods in Tropical Terrestrial and Marine Ecosystems (study abroad course), Environmental Science Internship Coordinator

Committees:

- Tenure & Promotion, Admissions, Safety, Institutional Review, Academic Programs, Education Planning & Policy, Graduate Program, Graduate Admissions, Faculty Council

Outreach/Service:

- Served as External Opponent for two doctoral defences at Tallinn University of Technology
- Served as Chair of Doctoral Defence for two students in Marine Science
- Mentor in the STREAMS (Supporting Talented and Remarkable Environmental and Marine Science Students) Scholarship Program – program to attract and retain historically under-represented groups in the sciences (2007-2011)
- Organized departmental Colloquium (2007-2010 and 2015-2016)
- Reviewer for several journals (including: Environmental Science and Technology, Chemosphere, Environmental Pollution, Atmospheric Environment, Environmental Technology, Soil and Sediment Contamination An International Journal, Environmental Science and Pollution Research, Atmospheric Pollution Research, and African Journal of Environmental Assessment and Management)
- Editor of The Scientific World Journal (2009-2016)
- Co-founded and co-organized the Annual Student Research Symposium at CLU (2003 - 2006)
- Organized and hosted yearly science activities for elementary school children (2002 – 2006)
- Volunteered as chemistry instructor for Upward Bound and Math/Science Upward Bound (2002 – 2006)
- Instructor for the Amgen Summer Science Institute, to train high school teachers on pedagogical methods to teach chemistry and environmental science (2003, 2004)
- Volunteered as mentor to students of color in the "FOCUS" Mentoring Program sponsored by the Office of Multicultural and International Programs (2002 – 2006)

RESEARCH/CONSULTING EXPERIENCE AND INTERESTS

- Fate and transport of pollutants in air, soil and water; modeling and determination of the impact of pollutants on sensitive ecosystems and on human health; chiral analysis of pesticides
- Developing analytical methodology for emerging contaminants in surface waters
- Pedagogical methods to improve science education, especially development of interdisciplinary approaches to teaching Environmental Chemistry and Environmental Science
- Consulting experience: sound management of chemicals (SMOC), fate and transport of pollutants, EIAs, alternative sources of energy

PUBLICATIONS

Articles

In Preparation:
Solanke, A. and Alegria H.A. "Calculating exposure to selected organophosphate ester flame retardants in indoor dust in the Tampa Bay area." To be submitted to *Environment International*.

Talalaj, L. and Alegria, H.A. "Preliminary assessment of levels and sources of PCBs and PBDEs in ambient air of Tampa Bay." Submitted to *Air Pollution Research*.

Alegria, H. A.; Martinez-Colon; M., Huber, A.; Kurt-Karakus, P.B. "Assessing bioconcentration of persistent organic pollutants in Uca Rapax in Jobos Bay, Puerto Rico." Submitted to *Environmental Pollution*.

Published:

Galindo-Reyes, J.G and Alegria, H.A.* "Toxic effects of pesticide contamination in farmworkers of Novolato, Sinaloa (Mexico)." *Revista Internacional de Contaminacion Ambiental* 2018, 34(3), 505-516. DOI: 10.20937/RICA.2018.34.03.12

Kurt-Karakus, P.B*.; Ugranli-Cicek, T.; Sofouglu, S.C.; Celik, H.; Gungormus, E.; Gekik, K.; Soflouglu, A.; Okten, H.E.; Birgul, A.; Alegria, H.; Jones, K.C. "The first countrywide monitoring of selected POPs: Polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs) and selected organochlorine pesticides (OCPs) in the atmosphere of Turkey." *Atmospheric Environment* 2018, 177, 154-165. doi:10.1016/j.atmosenv.2018.01.021.

Kurt-Karakus, P.; Alegria, H.*; Birgul, A.; Gungormus, E.; Jantunen, L. "Organophosphate ester (OPEs) flame retardants and plasticizers in air and soil from a highly industrialized city in Turkey." *Science of the Total Environment* **2018**, 625, 555-565.

Kurt-Karakus, P*.; Alegria, H.; Jantunen, L.; Topcu, A.; Jones, K.; Torgut, C. "Polybrominated diphenyl ethers (PBDEs) and alternative flame retardants (NFRs) in indoor and outdoor air and indoor dust from Istanbul – Turkey: Levels and assessment of human exposure." *Atmospheric Pollution and Research* **2017**, 8, 801-815. http://dx.doi.org/10.1016/j.apr.2017.01.010

Emrich, K.; Martinez-Colon, M*.; Alegria, H.A. "Is untreated sewage impacting coral reefs of Caye Caulker, Belize?" *Journal of Foraminiferal Research* **2017**, 47, 1-14.

Birgul, A.; Kurt-Karakus, P.B*.; Alegria, H.; Gungormus, E.; Celik, H.; Cicek, T.; Can Guven, E. "Polyurethane foam (PUF) disk passive samplers derived polychlorinated biphenyls (PCBs) concentrations in the ambient air of Bursa-Turkey: Spatial and temporal variations and health risk assessment." *Chemosphere* **2017**, 168, 1345-1355.

Alegria, H.*; Martinez-Colon; M., Kurt-Karakus, P.; Brooks, G.; Hanson, L.; Birgul, A. "Historical sediment record and levels of PCBs in sediments and mangroves of Jobos Bay, Puerto Rico." *Science of the Total Environment* **2016**, 573, 1003-1009.

Ugranli, T.; Celik, H.; Gungormus, E.; Can-Guven, E.; Birgul, A.; Gedik, K.; Okten, E.; Sofuoglu, S.C.; . Sofuoglu, A.; Alegria, H.; Jones, K.C.; Kurt-Karakus, P.B.* "Passive sampling of PCBs and PBDEs in Turkey's atmosphere." *Organohalogen Compounds* **2016**, 78, 564.

Kurt-Karakus, P.B.*; Jantunen, L.M.; Topcu, A.; Yalcin, M,; Alegria, H.A.; Turgut, C,; Jones, K.C. "Brominated and phosphated flame retardants in indoor dust from Istanbul: Occurrence and human exposure assessment." *Organohalogen Compounds* **2015**, 77, 43.

Ugranli, T.; Celik, H.; Gungormus, E.; Kurt-Karakus, P.B.*; Gedik, K.; Okten, E.; Sofuoglu, S.C.; Sofuoglu, A.; Alegria, H.; Jones, K.C. "Passive sampling of PBDEs in Turkey's atmosphere: Preliminary results." *Organohalogen Compounds* **2015**, 77, 51.

Alegria, H.* and Nei, L. "Chemistry content in environmental science curricula." *European Scientific Journal* **2014**, 22, 89-94.

Jaward, F.M.*; Alegria, H.A.; Galindo-Reyes, J.G.; Hoare, A. "Levels of PAHs in the waters, sediments and shrimps of Estero de Urias, an Estuary in Mexico and their toxicological effects." *The Scientific World Journal*, vol. 2012, Article ID 687034, 9 pages, **2012**. doi:10.1100/2012/687034.

Gevao, B.*; Alegria, H.; Jaward, F.M.; MacLeod, M.; Jones, K.C. "Diurnal fluctuations in polybrominated diphenyl ether concentrations during and after a severe dust storm episode in Kuwait City, Kuwait." *Environmental Science and Technology* **2010**, 44, 8114-8120.

Wong, F.*; Alegria, H.A.; Bidleman, T.F. "Organochlorine pesticides in soils of Mexico and the potential for soil-air exchange." *Environmental Pollution* **2010**, 158, 749-755.

Wong, F.; Alegria, H.A.; Bidleman, T.F*.; Alvarado, V.; Angeles, F.; Avila Galarza, A.; Bandala, E.R.; de la Cerda Hinojosa, I.; Galindo Estrada, I.; Gold-Bochot, G.; Macias Zamora, J.V.; Murguia-Gonzalez, J.; Ramirez Espinoza, E. "Passive air sampling of organochlorine pesticides in Mexico." *Environ. Sci. Technol.*, **2009**, 43, 704-710.

Wong, F.*; Alegria, H.A.; Jantunen, L.M.; Bidleman, T.F.; Salvador, M.; Gold-Bouchot, G.; Waliszewski, S.; Ceja-Moreno, V.; Infanzon, R. "Organochlorine pesticides in soils and air of southern Mexico: Chemical profiles and potential for soil emissions." *Atmospheric Environment.*, **2008**, 42, 7737-7745.

Alegria, H.A.; Wong, F.; Jantunen, L.M.; Bidleman, T.F.*; Salvador, M.; Gold-Bouchot, G.; Waliszewski, S.; Ceja-Moreno, V.; Infanzon, R. "Organochlorine pesticides and PCBs in air in southern Mexico:2002-2004." *Atmospheric Environment.*, **2008**, 42, 8810-8818.

Bidleman, T.F*; Kurt-Karakus, P.B.; Wong, F.; Jantunen, L.M.; Alegria, H.A.; Jones, K.C. "Soil-air exchange of organochlorine pesticides." *Geochem. Cosmochim. Acta*, Aug. **2007** (Conference Paper).

Alegria, H.A.*; Salvador, M.; Bidleman, T.F. "Organochlorine pesticides in the ambient air of Chiapas, Mexico." *Environmental Pollution,* **2006**, 140, 483-491.

Bidleman, T.*; Wong, F.; Alegria, H.A. "New DDT in North America? A perspective 20 years later." *Organohalogen Compounds* **2005**, 67, 1163.

Wong, F.; Bidleman, T.F.*; Alegria, H.; Salvador-Figueroa, M.; Jantunen, L.M.; "Soil-air exchange of pesticides in southern Mexico." *Organohalogen Compounds* **2005**, 67, 1141.

Alegria, H.A.*; d'Autel, J.P.; Shaw, T.J. "Offshore transport of pesticides in the South Atlantic Bight: Preliminary estimates of export budgets." *Mar. Pollut. Bull.* **2000**, 40, 1178.

Alegria, H.A.*; Bidleman, T.F.; Shaw, T.J. "Ambient air levels of organochlorine pesticides in Belize, Central America." *Environ. Sci. Technol.* **2000**, 34, 1953.

Bidleman, T.F.*; Leone, A.D.; Hamer, T.; Jantunen, L.M.M.; Alegria, H.; Falconer, R.L.; Wiberg, K. "Organochlorine pesticides in the atmosphere: Current usage or ghosts of the past? "*Organohalogen Compounds* **2000**, 47, 382.

Alegria, H.A*. and Shaw, T.J. "Rain deposition of pesticides in coastal waters of the South Atlantic Bight." *Environ. Sci. Technol*. **1999**, 33, 850.

Bidleman, T.F.*; Jantunen, L.M.; Harner, T.; Wiberg, K.; Wideman, J.L.; Brice, K.; Su, K.; Falconer, R.L.; Aigner, E.J.; Leone, A.D.; Ridal, J.J.; Kerman, B.; Finizio, A.; Alegria, H.; Parkhurst, W.J.; Szeto, S.Y. "Chiral pesticides as tracers of air-surface exchange." *Environmental Pollution* **1998**, 102, 43.

Bidleman, T.F.*; Alegria, H.; Ngabe, B.; Green, C. "Trends of chlordane and toxaphene in ambient air of Columbia, South Carolina." *Atmos. Environ.* **1998**, 32, 1849.

Falconer, R.L.; Leone, A.; Bodnar, C.; Wiberg, K.; Bidleman, T.; Jantunen, L.M.; Harner, T.; Parkhurst, W.; Alegria, H.; Brice, K.; Su, K. "Using Enantiomeric Ratios to Determine Sources of Chlordane to Ambient Air." *Organohalogen Compounds* **1998**, 35, 331.

Wiberg, K.; Jantunen, L.M.; Harner, T.; Wideman, J.L.; Bidleman, T.F.*; Brice, K.; Su, K.; Falconer, R.L.; Leone, A.D.; Parkhurst, W.J.; Alegria, H. "Chlordane enantiomers as source markers in ambient air." *Organohalogen Compounds* **1997**, 33, 209.

Book Chapters

Bidleman, T.*; Kurt-Karakus, P.; Wong, F.; Alegria, H.; Jantunen, L.; Hung, H. "Is there still "new" DDT in North America? An investigation using proportions of DDT compounds" in *Occurrence, fate and impact of atmospheric pollutants*. ACS Books, bk-**2013**-00119a.R2.

Gevao, B*.; Alegria, H.A.; Jaward, F.; Beg. M.U. "Persistent organic pollutants in the developing world." Chapter contributed to *Persistent Organic Pollutants*. Stuart Harrad (ed.), Blackwell Publishing Ltd, pp 135-167, **2009**.

Bidleman, T.F.*; Wong, F.; Alegria, H.A.; Kurt-Karakus, P.; Jones, K.C. "Contemporary sources of DDTs in North American air." Chapter contributed to *Persistent Organic Pollutants (POPs) in the European Atmosphere: An Updated Overview*. J. Castro-Jimenez, S.J. Eisenreich, I. Vives (eds.), European Commission Joint Research Centre – Institute for Environment and Sustainability, Luxembourg, **2007**.

Alegria, H.A.*; Bidleman, T.F.; Wong, F.; Salvador, M.; Gold Bouchot, G.; Waliszewski, S. "Atmospheric transport of organochlorine pesticides in southern Mexico." Chapter contributed to *Golfo de Mexico, Contaminacion e Impacto Ambiental: Diagnostico y Tendencias.* Alfonso Vazquez Botello, Jaime Rendon von Orsten, Claudia Agraz Hernandez, Gerardo Gold Bouchot (eds.), Impresora Univesidad Autonoma de Campeche, **2006**.

Coleman, R.S.* and Alegria, H.A. "1,3-Butadiene," in *Encyclopedia of Reagents for Organic Synthesis*; Paquette, L. A., ed.; John Wiley & Sons, **1995**.

TECHNICAL REPORTS

Alegria, H.A. "Development of a National Air Quality Monitoring Protocol and Programme and Strengthening of the DOE Capacity in Air Quality Monitoring & Analysis." Final report submitted to the Belize Department of the Environment, August 17, **2018**.

Alegria, H.A. "Development of a medical waste management and disposal plan for the Western Corridor of Belize." Final report submitted to UNIDO, August 14, **2018**.

Alegria, H.A. and Alegria, V. "Quantification of PCB levels in oil stored at ADM Mills and repackaging for final disposal." Final report submitted to ADM Mills, April 15, **2016**.

Alegria, H.A., Alegria, V., Carrias, A. "Verification, classification and inventory of existing stockpiles of Persistent Organic Pollutants (POPs), Pesticides and Polychlorinated Biphenyls (PCBs) and other chemicals to enable Belize to fulfill

its obligations under the Stockholm Convention on POPs." Final report submitted to Belize Department of the Environment, January 11, **2016**.

Alegria, H.A. "Developing Terms of Reference for a consultancy to carry out a nutrient fate and transport study in the Placencia peninsula, Belize." Final report submitted to Belize Water Services Ltd., June 30, **2015**.

Alegria, H.A. "Environmental assessment of the road-widening project, mile 3-14 of the Northern Highway, Belize." Final report submitted to Young Engineering Consultants, **2013.**

Alegria, H.A. "Mainstreaming into Development Plans: Sound Management of Chemical (SMC) Priorities for Key Development Sectors in Belize and Associated SMC Governance." Final report submitted to UNEP Belize, March 15, **2011**.

Alegria, V.E.; Alegria, H.A.; Carvalho-Knighton, K. "Assessment of land-based sources of pollutants in coastal waters of southern Belize." Final report submitted to NOAA, August 29, **2009**.

Bidleman, T.F.; Alegria H. A.; Wong, F. "Organochlorine pesticides in the ambient air and soil of southern Mexico." Final report submitted to USEPA, September **2007**.

Alegria, H.A. "Evaluating Kuwait's strategy to develop a National Implementation Plan for POPs under the Stockholm Convention." Final report submitted to Kuwaiti EPA, August 12, **2006**.

Alegria, H.A. "Status of streams and coastal waters in southern California with respect to nutrients, heavy metals and petroleum products." Final report submitted to the Los Angeles Metropolitan Water Treatment District, February **2004**.

Shaw, T. and Alegria H.A. "Impact of an oil spill on Winyah Bay, South Carolina." Final report submitted to the South Carolina Department of Health and Environmental Control, August 12, **2000**.

PATENTS

Ram, M.; Alegria, H.A.; Pandey, M.; McColgan, T. "Dichalcogenide titanium oxide nanomaterials for disinfection." Filed 8/27/18.

PRESENTATIONS AND INVITED LECTURES

Conferences

Alegria, H.A. "Cycling of legacy and emerging flame retardants in the Tampa Bay area." Presented at the 38th Annual Meeting of the SETAC, Minneapolis, Minnesotta, November 12-16, 2017.

Alegria, H.A. "Levels of organophosphate ester flame retardants in indoor dust in the Tampa Bay area." Presented at the 37th Annual Meeting of the SETAC, Orlando, Florida, November 6-10, 2016.

Alegria, H.A. "Estudios sobre contaminantes persistentes organicos." Encuentro nacional de respuestas al cambio climatico: Calidad del aire, mitigacion y adaptacion, Mexico City, June 27-July 1, 2016.

Alegria, H.A. "Movimiento de sustancias organicas y sus efectos en arrecifes de corales." Plenary lecture delivered at the X Congreso de Biotecnologia, Chiapas, Mexico, May 29, 2015.

Alegria, H.A. "The Stockholm Convention – Mechanism for Listing of POPs." Presented at the Awareness-Raising Workshop: Pesticide Residues in Closed-Cropping and Persistent Organic Pollutants in the Turkish Environment, Kusadasi, Turkey, March 10-13, 2014.

Alegria, H.A. "Atmospheric Levels of POPs and PBDEs in Tampa Bay." Presented the 2nd International Conference on Environmental Science and Technology, Side, Turkey, May 14-17, 2014.

Alegria, H.A. "The importance of STEM education for the development of Belize." Invited talk presented at the Annual Association of Tertiary Level Institutions of Belize (ATLIB) Meeting, Placencia, Belize, March 3, 2011.

Alegria, H.A. "Belize's forestry policies as related to climate change." Presented at the Central American Commission of Environment and Development (CCAD) Meeting on Climate Change, Belize City, November 10-11, 2010.

Alegria, H.A.; Jaward, F.; Galindo-Reyes, J.G. "Pesticide levels in farmworkers in Sinaloa, Mexico and possible indicators of toxicological effects." Presented at the 30th Annual Meeting of the SETAC, New Orleans, LA, November 19-23, 2009.

Alegria, H.A. and Jaward, F.M. "Determination of Potential Exposure of Office Workers in Tampa Bay Area to polybrominated diphenyl ethers." Presented at the 29th Annual Meeting of the SETAC, Tampa, Florida, November 16-20, 2008.

Hoare, A.; Garibova, L.; Yonikova, A.; Cjetkovic, V.; Le, L.; Alegria, H. "Current-use pesticides in air in southern Mexico." Presented at the 28th Annual North American Meeting of SETAC, Milwaukee, November 11-15, 2007.

Hoare, A.; Garibova, L.; Yonikova, A.; Cjetkovic, V.; Le, L.; Alegria, H. "POPs in sediment and water of Tampa Bay." Presented at the 28th Annual North American Meeting of SETAC, Milwaukee, November 11-15, 2007.

Alegria, H.A. "Setting up a country-wide atmospheric monitoring system: Lessons learned from passive samplers." Invited talk at the Workshop to develop Mexico's Environmental Monitoring and Assessment Program (PRONAME), Cuernavaca, Morelos, Mexico, February 13-15, 2007.

Alegria, H.A. "Organising the tri-national interlaboratory calibration study: lessons learned." Presented at the Trinational Inter-Agency Calibration Workshop, organized by CEC, Egbert, Ontario, Canada, January 23 – 25, 2007.

Alegria, H.A. "Perspectives on the Stockholm Convention on Persistent Organic Pollutants (POPs) and the Status of Mexico With Respect to POPs." Invited lecture presented at the VI Congreso de Toxicologia, Universidad Nacional Autonoma de Mexico, July 6-7, 2006.

Alegria, H.A. "Contaminantes Persistentes Organicos en Mexico: Datos Recientes." Invited lecture at the 2o Foro Annual Sobre COPs en Mexico, Mexico City, May 15- 17, 2006.

Alegria, H.A. "Ambient air concentrations of organochlorine pesticides in southern Mexico." Presented at the 25th Annual DIOXIN Meeting, Toronto, Ontario, Canada, August 21-26, 2005.

Alegria, H.A. "A tale of two institutions: Integrating environmental chemistry and toxicology into the chemistry curriculum." Presented at the 25th Annual SETAC North America meeting, Portland, OR, Nov. 14-19, 2004.

Alegria, H.A.; Wong, F.; Harner, T.; Bidleman, T.; Salvador Figueroa, M. "Ambient air levels of pesticides in southern Mexico." Poster presented at the 25th Annual SETAC North America meeting, Portland, OR, Nov. 14-19, 2004.

Alegria, H.A. "Organochlorine pesticides in North America: Old vs New Sources." Invited presentation at the 38th Western Regional Meeting of the American Chemical Society, Long Beach, CA, Oct 16, 2003 (Session: Legacy Chemicals of the 20th Century)..

Alegria, H.A. "POPs measurements and transport in Mexico and Central America." Invited presentation at the Long-Range Transport Workshop (organized by USEPA and Environment Canada), Ann Arbor, MI, Sept. 16-17, 2003.

Alegria, H.A.; Salvador, M.; Bidleman, T.F. "Pesticide levels in air and soil in Chiapas, Mexico." Poster presented at the 22nd Annual SETAC meeting, Baltimore MD, Nov. 11-15, 2001.

Jantunen, L.J.; Harner, T.; Bidleman, T.F.; Wideman, J.; Alegria, H. "Sources and air-water exchange of toxaphene to Lake Superior." 18th Annual Meeting, Society of Environmental Toxicology and Chemistry, San Francisco CA, Nov. 16-20, 1997.

Alegria, H.A.; Bidleman, T.F.; Shaw, T.J. "Ambient air levels of organochlorine pesticides in Belize, Central America," 17th Annual Meeting, Society of Environmental Toxicology and Chemistry, Washington D.C., Nov. 17-21, 1996.

Invited lectures

Alegria, H.A. "Case studies on cycling of new flame retardants in indoor and outdoor environments." Tartu University, December 6, 2017.

Alegria, H.A. "Case studies on progress in implementation of the Stockholm Convention on Persistent Organic Pollutants." Invited lecture delivered at Universidad Autonoma Metropolitana, Mexico City, July 6, 2016.

Alegria, H.A. "Sustainability in civil engineering." Invited lecture delivered at Tartu University, Estonia, February 25, 2015.

Alegria, H.A. "Environmental cycling of persistent organic pollutants." Invited lecture delivered at Tallinn University of Technology, Estonia, February 10, 2015.

Alegria, H.A. "Persistent Organic Pollutants in Developing Countries." Invited lecture delivered at Istanbul Technical University, February 21, 2014.

Alegria, H.A. "Fate and Transport of Flame Retardants in the Environment." Invited lecture delivered at Uludag University, March 3, 2014.

Alegria, H.A. "Is DDT Detected in North America of recent origin?" Invited lecture delivered at Akdeniz University, April 11, 2014.

Alegria, H.A. "Historical analysis of POPs input into Jobos Bay, Puerto Rico." Invited lecture presented at the University of Rhode Island, November 14, 2014.

Alegria, H.A. "Prioritizing environmental research needs for GEF funding." Invited talk at the 5th Annual UNDP Meeting, Belmopan, Belize, April 8, 2011.

Alegria, H.A. "Sound management of chemicals: the CEC experience." Invited presentation at The University of Toronto, August 12, 2009.

Alegria, H.A. "Tracing fate and transport of molecules via chiral analysis." Invited lecture presented at the Annual Environmental Research Interdisciplinary Colloquium (ERIC), University of South Florida, September 17, 2008.

Alegria, H.A. "Chiral analysis of pesticides: Applications." Invited lecture presented at Rhodes College, Memphis, TN, April 17, 2008.

Alegria, H.A. "Persistent Organic Pollutants in Mexico: Current state of knowledge." Invited lecture at the Centro de Investigacion en Materiales Avanzados – Division de Cienca e Ingenieria Ambiental, Chihuahua, Mexico, May 23, 2005.

Alegria, H.A. "The Stockholm Convention on Persistent Organic Pollutants: Impact on developing countries." Invited lecture at California State University Los Angeles, March 15, 2005.

Alegria, H.A. "The effects of petroleum activities on coastal waters of southern California." Invited lecture at the Bren School of Environmental Science and Management, University of California - Santa Barbara, September 20, 2004.

Alegria, H.A. "Movilidad atmosferica de pesticidas: El caso de Tapachula, Chiapas." Invited lecture presented at Universidad Autonoma de Chiapas, Tapachula, Chiapas, Mexico, May 23, 2003.

Alegria, H.A. "Metodos pedagogicos para la enseñanza de ciencias del medio ambiente a nivel universitario." Invited lecture presented at the Universidad Autonoma Metropolitana de Mexico, Mexico City, May 29, 2003.

Alegria, H.A.; Salvador, M.; Bidleman, T.F. "Organochlorine pesticides in ambient air: Belize, C.A. and Chiapas, Mexico." Invited presentation at workshop on *Sources of Persistent Organic Pollutants*, Meteorological Service of Canada, June 18-20, 2001.

Alegria, H. "Offshore transport of pesticides and PAHs in the southeastern United States." Invite lecture presented at Wofford College, Spartanburg, SC, March 15, 2000.

Alegria, H. "Long-range transport of pesticides." Invited lecture presented at Arkansas State University, Jonesboro, AR, March 5, 1998.

STUDENT PRESENTATIONS

Solanke, A. and Alegria, H.A. "Calculating exposure to organophosphate ester flame retardants in indoor environments in the Tampa Bay area." Presented at the 38th Annual Meeting of the SETAC, Minneapolis, Minnesotta, November 12-16, 2017.

Lazcano, G. and Alegria, H.A. "Optimization of a method QuEChErs method to extract pesticides from vegetables." Presented at the 71st SWRM/67th SERMACS Meeting of the ACS, Memphis, TN, Nov 4-7, 2015.

Porto, J. and Alegria, H.A. "Developing an experiment to measure levels of selected pharmaceuticals in tap water for integration in the chemistry curriculum." Poster presented at the 71st SWRM/67th SERMACS Meeting of the ACS, Memphis, TN, Nov 4-7, 2015.

Emrich, K. and Alegria, H.A. "Assessing the impact of untreated sewage on coral reefs off Caye Caulker, Belize: Applying the FORAM Index." Presented at the ERIC seminar series, University of South Florida Tampa, November 7, 2014.

Warner, S.; Pandey, M.; Alegria, H.A. "Improved synthesis of biodiesel." Presented at the 77th Anniversary Meeting of the Florida Academy of Sciences, FIT, Melbourne, FL, March 8, 2013.

Schmidt, L.; Martinez-Colon, M.; Alegria, H.A. "Determining temporal levels of POPs in sediments and bioaccumulation in mangroves." Presented at the USF Annual Student Research Symposium, March 2013.

Hossain,T. and Alegria, H.A. "Examining attitudes of beachgoers in Pinellas County to chemical usage in coastal areas." Presented at the USF Annual Research Symposium, March 15, 2012.

Goc, N.C.; Talalaj, L.; Carvalho-Knighton, K.; Alegria, H.A. "Polycyclic aromatic hydrocarbon levels in Tampa Bay, Florida." Presented at the 75th Anniversary Meeting of the Florida Academy of Sciences, FIT, Melbourne, FL, March 11-12, 2011.

Talalaj, L.; Carvalho-Knighton, K.; Alegria, H.A. "Polychlorinated biphenyl and polybrominated diphenyl ether levels in Tampa Bay, Florida." Presented at the 75th Anniversary Meeting of the Florida Academy of Sciences, FIT, Melbourne, FL, March 11-12, 2011.

Bengston, C. and Alegria, H.A. "Assessing levels of pesticides in blood of farm workers in Mexico." Presented at the Annual USF Undergraduate Research Symposium, April 12, 2009.

Alegria, V.E.; V. Gustainyte; H. Alegria; K. Carvalho-Knighton "Pesticides in coastal waters of southern Belize - Comparison of predictive model and monitoring data." Presented at the 29th Annual Meeting of the SETAC, Tampa, Florida, November 16-20, 2008.

Yonikova, A.; Garibova, L.; Alegria, H.A. "Developing methods to analyze PAHs in fruits." Presented at the USF Annual Student Research Symposium, March 2007.

Garibova, L.; V. Cjetkovic; Alegria, H.A. "Developing methods to extract pesticides from fruits." Presented at the USF Annual Student Research Symposium, March 2007.

Carlson, M. and Alegria, H.A. "Development of methodology to determine pesticide residues in fruits and vegetables from Ventura County, California." Presented at the 15th. Annual Southern California ACS Undergraduate Research Conference, Pepperdine University, Malibu, CA, April, 2006.

Thomas, K. and Alegria, H.A. "Chiral analysis of o,p'-DDT in breast milk from farm workers in Chiapas, Mexico." Presented at the Annual Meeting of SCCUR, Whittier College, Whittier, CA, November 2004.

Kocher, K. and Alegria, H.A. "Levels of current-use pesticides in Chiapas, Mexico during a sampling campaign in 2000-2001." Presented at the Annual Meeting of SCCUR, Whittier College, Whittier, CA, November 2004

Oakman, J, West, M.G. and Alegria, H.A. "Trace residues of DDTs in soil from the CLU campus, Thousand Oaks, California." Presented at the 13th. Annual Southern California ACS Undergraduate Research Conference, Loyola Marymount University, Los Angeles, CA, April, 2004.

Fountain, C. and Alegria, H.A. "Nutrient levels in coastal waters of southern California as an indication of agricultural impact." Presented at the 38th Western Regional Meeting of the ACS, Long Beach, CA, Oct 16, 2003

Morgan, A. and Alegria, H.A. "Development of methodology to measure current-use pesticides in ambient air in Mexico." Presented at the 12th Annual Southern California ACS Undergraduate Research Conference, California Lutheran University, Thousand Oaks, CA, April, 2003.

Monahan, E. and Alegria, H.A. "Pesticide levels in a coral reef patch: possible sources." Presented at the 56th SW Regional Meeting of the ACS, New Orleans, LA, Nov. 7-9, 2000.

Smelcer, P. and Alegria, H.A. "Analysis of two aquifers for MTBE." Presented at the Annual Meeting of the Carolina Chapters of the Society of Environmental Toxicology and Chemistry, Columbia, SC, April 12-13, 1999.

D'Alessandro, T. and Alegria, H.A. "Transport of atrazine metabolites into Winyah Bay, South Carolina." Annual Meeting of the Independent Colleges & Universities of South Carolina, Spartanburg, SC, Feb. 3, 1999.

Allen, J.; Alegria, H.A.; Russ, J. "Characterizing paleo-organic matter in biogenic rock crusts." Annual Meeting of the Independent Colleges & Universities of South Carolina, Furman University, Greenville, SC, Nov. 19, 1997.

In addition, student research collaborators have presented over 20 talks at in-house research symposia.

GRANTS AND CONTRACTS

Alegria, H. "Development of a National Air Quality Monitoring Protocol and Programme and Strengthening of the DOE Capacity in Air Quality Monitoring & Analysis." $17,000USD, Department of the Environment (Belize), April 22, 2018.

Alegria, H. "Consultancy to develop a Medical Waste Disposal Plan." $25,000USD, Department of the Environment (Belize), November 15, 2017.

Alegria, H., and Alegria, V. "Quantification of PCB levels in oil stored at ADM Mills and repackaging for final disposal." $20,000USD, ADM Mills, January 2015.

Alegria, H., Alegria, V., Carrias,, A "Verification, classification and inventory of existing stockpiles of Persistent Organic Pollutants (POPs), Pesticides and Polychlorinated Biphenyls (PCBs) and other chemicals to enable Belize to fulfill its obligations under the Stockholm Convention on POPs." $27,500BZD, GEF, November 2015.

Alegria, H. "Acquisition of a GC-MS." $298,000USD, USF One-To-One Matching Program, April 2015.

Alegria, H. and Martinez-Colon, M. "Determining levels of persistent organic pollutants and meals in Fiddler Crabs in Jobos Bay, Puerto Rico." $10,000USD, USFSP Internal Awards Program, May 2015.

Alegria, H.A. "Levels of OP and novel flame retardants in soil and air of Bursa, Turkey." National Scientific and Research Council of Turkey, $72,000TL ($36,000USD), visiting fellowship awarded December 12, 2013.

Nickle, U. and Alegria, H.A. "Measuring levels of pyrethroids in storage depots, work vehicles and clothes of lawn applicators and assessing the take-home potential." CSPACE (USFSP) Mini-grant, $1,000USD, October 2013.

Schmidt, L. and Alegria, H.A. "Assessing temporal levels of persistent organic pollutants and nutrients in Jobos Bay, Puerto Rico and their potential correlation with mangal coverage." CSPACE (USFSP) Mini-grant, $1,000USD, October 2013.

K. Emrich and Alegria, H.A. "Assessing the Impact of Sewage Discharge from Caye Caulker on the Belize Barrier Reef – Application of the FORAM Index." and CSPACE (USFSP) Mini-grant, $1,000USD, October 2013.

Alegria, H.A. "Environmental assessment of the road-widening project, mile 3-14 of the Northern Highway, Belize." $15,000USD, Young Engineering Consultants, 2013**.**

Alegria, H.A. "Assessing the Impact of Sewage Discharge from Caye Caulker on the Belize Barrier Reef – Application of the FORAM Index." USF Internal Grant, $8,000USD, awarded December 15, 2012.

Alegria, H.A. "Developing a sound strategy for minimizing the threat of chemical spills in Belize." Belize National Emergency Management Organization, $5,000USD, consultancy awarded January 15, 2011.

Alegria, H.A. "Formulation of a National Energy Plan for Belize." Belize Public Utilities Commission, $20,000USD, consultancy awarded March 15, 2011.

Alegria, H.A. "Mainstreaming into development plans the sound management of chemicals (SMC) priorities for key development sectors in Belize and associated governance project." UNDP, $20,000USD, consultancy awarded August, 2010.

Carvalho-Knighton, K; Pyrtle, A.; Alegria, H.A.; Fanning, K. "STREAMS-Supporting Talented and Remarkable Environmental And Marine Science students." NSF, $541,796.00USD, awarded August 2007.

Alegria, H.A. and Carvalho-Knighton, K. "Assessing the Impact of Land-Based Sources of Pollution on Coral Reefs of Southern Belize." NOAA, $35,000USD, grant awarded July 2007.

Alegria, H.A. "Evaluating Kuwait's strategy to develop a National Implementation Plan for POPs under the Stockholm Convention." $45,000USD, consultancy awarded January 15, 2006.

Alegria, H.A. "Development of a Low-cost and Low-technology Method for the Analysis of Mangoes for Pesticide Residues." NIRG (USF), $6385.40USD, grant awarded November 2006.

Alegria, H.A. "Niveles de pesticides en agua, aire y trabajadores agricolas en Sinaloa. " Universidad Autonoma de Sinaloa – Mazatlan, $12,000USD, consultancy awarded June 2006.

Alegria, H.A. "Persistent Organic Pollutants (POPs): Sources, Environmental Cycling, Toxicology and Fate." External instructor contracted by the Kuwaiti Institute for Scientific Research, $28,000USD, workshop May 20-24, 2006.

Alegria, H.A. "Measuring soil-air exchange of persistent organic pollutants." Hewlett Foundation, $18,250USD, grant awarded April 2006.

Alegria, H.A. "El Convenio de Estocolmo y Mexico: Planes para implementacion nacional." External advisor to Mexican task force on NIP for Stockholm Convention, $35,000USD, Instituto Nacional de Ecologia, Mexico City, February 12-16, 2006.

Galindo-Reyes, J.G. and Alegria H. A. "Utilizacion de organismos para remediar efluentes de granjas camaroneras." Camaroneras del Noroeste, $15,000USD, January 15, 2006.

Alegria, H.A. "Transport patterns of pesticides in California." Amgen Foundation, $25,000USD, grant awarded November 2005.

Alegria, H.A. "Measuring POPs: Analytical methodology." Co-instructor (with Professor Crispin Halsall) of workshop to train graduate students and research staff at government laboratories, $10,000USD, Lancaster University, United Kingdom, July 10-16, 2005.

Alegria, H.A. "Reviewing content of science textbooks for California middle schools." Holt, Rinehard and Winston, $13,600USD, contract awarded July 2005.

Bidleman, T.F.; Alegria H. A.; Wong, F. "Organochlorine pesticides in the ambient air and soil of southern Mexico." USEPA, $150,000USD, grant awarded July 2005.

Alegria, H.A. "Developing a new research-based curriculum in Analytical Chemistry." Hewlett Foundation, $53,450USD, grant awarded February 2005.

Alegria, H.A. "Establishing a network of passive samplers to measure ambient air levels of organic pollutants in Mexico." North American Commission for Environmental Cooperation, $135,100USD, grant awarded January 2005.

Alegria, H.A. "Organic pollutants in air along an urban-rural transect in southern California." Community Leaders Association, $5,500USD, grant awarded January 2005.

Shaw, M.; Alegria, H.; Revie, D.; Richards, R. "Funding to Establish the Keck Institute for Bioengineering Design and Integrated Science at California Lutheran University." W.M. Keck Foundation, $200,000USD, grant awarded July 2004.

Alegria, H.A. "Designing a seminar series on contributions of non-Caucasians to scientific advancement." Irvine Foundation, $2,000USD, grant awarded May 2004.

Alegria, H.A. "Chiral analysis of o,p'-DDT in breast milk." Hewlett Foundation, $24,200USD, grant awarded April 2004.

Alegria, H.A. "Acquisition of equipment for research in environmental chemistry." Community Leaders Association, $14,500USD, grant awarded January 2004.

Alegria, H.A. "Transboundary transport of organic pollutants in coastal waters of the U.S. and Mexico." Stauffer Trust, $795,000USD, grant awarded May 2003.

Zheng, E. and Alegria, H.A. "Status of surface waters of southern California: Effects of agricultural and petroleum-related activities." L.A. Metropolitan Water Treatment District, $75,000USD, contract awarded November 2002.

Bidleman, T.F. and Alegria, H.A. "Pesticides in Air and Soil in Mexico." United States Environmental Protection Agency, $150,000USD, grant awarded September 2002.

Alegria, H.A. "Acquisition of equipment for a trace organic analytical laboratory." Community Leaders Association, $7,000USD, grant awarded November 2002.

Scrivens, W.A; Alegria, H.A.; Moeller, P.; Morgan, S. "Specialty polymeric materials for use in the purification and detection of harmful algal bloom toxins." SCEPA/EPSCoR Program, $199,305USD, grant awarded in October 2001.

Shaw, T.J.; Alegria, H.A.; Scott, G. "Determination of environmental effects of an oil spill in Georgetown, South Carolina." South Carolina Department of Health and Environmental Control, $102,000USD, contract awarded June 2001.

Alegria, H.A. "Designing an undergraduate chemistry programme for the University of Belize." University of Belize, $5000USD, consultancy awarded April 2001.

Alegria, H.A. "Airborne pesticides in the Mexico-Central America region." Environment Canada, TSRI#11, $42,080CAD, contract awarded June 1, 2000.

Alegria, H.A. "Determination of the potential impact of pesticides on a coral reef tract." Sustainable Universities Initiative, $10,000USD, grant awarded May 1999.

Alegria, H.A. and D'Alessandro, T.L. "Impact of acetochlor in surface waters of Winyah Bay, South Carolina." Consortium for Undergraduate Research, grant awarded May 1998, $2,389USD.

Alegria, H.A. "Study of airborne pesticides in Belize. Phase II." Environment Canada, awarded May 1996, $13,700CAD.

Alegria, H.A. "Study of airborne pesticides in Belize." Environment Canada, contract awarded August 1995, $13,700CAD.

Alegria, H.A. "Temporal trends in chlordanes and toxaphene in ambient air in Columbia, South Carolina." Atmospheric Environment Services (Canada), contract awarded August 1994, $3,500 USD.

HONOURS AND SOCIETIES

Fulbright Specialist to Estonia – CIEES (2015)
TUBITAK Visiting Scholar Fellowship - National Scientific and Research Council of Turkey (2014)
USF Ambassadors Outstanding Teacher Award (2007 and 2008)
Appointed Board Member of the Patel Center for Global Solutions (2007-2010)
Appointed as expert consultant to the PRONAME project by Instituto Nacional de Ecologia (Mexico) - air monitoring section (2007)
Appointed to the task force on Sound Management of Chemicals (SMOC) – Commission for Environmental Cooperation (2006)
Appointed to North American Regional Action Plan task force on pesticides (2004).
Bouknight Award for Outstanding Graduate Teaching Assistant (1992, 1995)
Harding University Top Science Graduate Award (1990)
NSF Science Alliance Undergraduate Fellowship – Univ. of Tennessee (1989)
Harding University American Studies (now Honors College) Outstanding Student (1989)
Alpha Chi National Honour Scholarship Society (1988)
Dean's List (1987-90)
Walton Foundation Scholar (1987-90)
Shell Corporation Scholarship (1984-86)

Yasin F. Elshorbany

Assistant Professor of Chemistry, Environmental Sustainability and Climate Change, College of Arts & Sciences, University of South Florida St. Petersburg 140 7th Avenue South, DAV 234, St. Petersburg, FL 33701

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http://www.scopus.com/authid/detail.url;jsessionid=F91BCF2BC1EB147A8A9AFB2B2CF66311.zQKnzAySRvJOZYcdfIziQ?authorId=16444177900

ORCID ID: http://orcid.org/0000-0001-8883-3522

Education:

- **Max-Planck Institute for Chemistry**, Mainz, Germany: *Postdoctoral fellowship*, from 04/2011 to 04/2014
- **University of Wuppertal,** Wuppertal, Germany: *PhD* with Excellent grade *(Summa Cum Laude)*, Physical Chemistry, January 2010.
    - o Title of the PhD thesis: Investigating the Tropospheric Oxidation Capacity and Ozone Photochemical Formation in the city of Santiago de Chile, Field Measurements and Modeling Study.

Awards and Honors:

- **PhD *with Excellent grade (Summa Cum Laude),*** *Physical Chemistry, University of Wuppertal, January 2010, Germany*.
- ***Best PhD Thesis Award, 2010***, University of Wuppertal, Germany.
- **International Travel Award** to participate in the GEOS-Chem meeting at Harvard University, Cambridge, USA, 2011.
- **International Postdoctoral Fellowship** for 3 years (2011-2014) at the Max-Planck Institute for Chemistry in Mainz, Germany.
- **National Science Foundation (NSF) Award:** AGS 1826956, 2018 to investigate the day time HONO chemistry in the marine boundary layer.

Employment History.

8/2018 – current:
Assistant Professor of Chemistry, Environmental Sustainability and Climate Change, College of Arts & Sciences, University of South Florida St. Petersburg

7/2017 – 7/2018:
Research Scientist I at NSIDC/CIRES, University of Colorado-Boulder.

05/2014 – 6/2017:
Research Scientist at NASA GSFC and University of Maryland-College Park.

04/2011 – 05/2014:
Postdoctoral Fellow at Max-Planck institute for Chemistry, Mainz, Germany.

1/2010 – 03/2011:
Postdoctoral Research Associate at the University of Wuppertal, Germany.

08/2004 – 01 2010:
Research Assistant at the University of Wuppertal, Germany.

01/2004 - 2014:
National Research Center, Cairo, Egypt, Research scientist.

1996 - 08/2004:
Cairo University, Egypt, Environmental scientist, Calibration and maintenance manager at the Center of Environmental Hazards Mitigation (**CEHM**).

Scientific Community Services:

- Leading the working group on Africa and Middle East within the Tropospheric Ozone Assessment Report (TOAR), http://www.igacproject.org/TOAR.
- Co-lead of Chapter 1 of the TOAR report.
- Primary convener and chair of 3 sessions on the "Atmospheric Oxidation Capacity Constraints" at the AGU 2015-2017 fall meetings.
- 2015-2016, Chair of the atmospheric chemistry and carbon affinity group at the Earth System Science Interdisciplinary Center (ESSIC) of the University of Maryland (http://essic.umd.edu/joom2/index.php/research-tasks/affinity-groups/atmospheric- chemistry).
- Professional Reviewer:

1. Via Nominations

- Nominated to participate in the 2017 Decadal Survey for Earth Science and Applications from

Space.

2. Journals

- Atmospheric Chemistry and Physics
- Atmospheric Environment
- Journal of Geophysical Research
- Environmental Science and Pollution Research (ESPR)
- Environmental Science & Technology

3. Funding agencies

- NASA Scientific Reviewer
- External reviewer for the Chilean Government Commission for Scientific Development (CONICYT).
- Reviewer of the AGU 2015-2016 student travel grants.

In-Review articles:

- Yumashev, D., Hope C., Schaefer, K., Riemann-Campe, K., Iglesias-Suarez, F., Jafarov, E., Whiteman, G., Young, P., **Elshorbany, Y**.: Climate policy implications of nonlinear decline of Arctic land permafrost and sea ice, Nature Communications, in review, 2018.

Peer reviewed articles:

- Overeem, I., E. Jafarov, K. Wang, K. Schaefer, S. Stewart, G. Clow, M. Piper, and **Y. Elshorbany**, A modeling toolbox for permafrost landscapes, Eos, 99, *https://doi.org/10.1029/2018EO105155*, 2018.
- Yumashev, D., Hope C., Schaefer, K., Riemann-Campe, K., Iglesias-Suarez, F., Jafarov, E., Whiteman, G., Young, P., **Elshorbany, Y**.: Climate policy implications of nonlinear decline of Arctic land permafrost and sea ice, Nature Communications, in review, 2018.
- Schultz, M.G., Schröder, S., Lyapina, O., Cooper, O., Galbally, I., Petropavlovskikh, I., von Schneidemesser, E., Tanimoto, H., **Elshorbany, Y**., et al..: Tropospheric Ozone Assessment Report: Database and Metrics Data of Global Surface Ozone Observations, Elem Sci Anth. 2017;5:58. doi: http://doi.org/10.1525/elementa.244, 2017.
- Meusel, H., **Elshorbany, Y.**, Kuhn, U., Bartels-Rausch, T., Reinmuth-Selzle, K., Kampf, C. J., Li, G., Wang, X., Lelieveld, J., Pöschl, U., Hoffmann, T., Su, H., Ammann, M., and Cheng, Y.: Light-induced protein nitration and degradation with HONO emission, Atmos. Chem. Phys., 17, 11819-11833, https://doi.org/10.5194/acp-17-11819-2017, 2017.
- **Elshorbany, Y. F**., Duncan, B. N., Strode, S. A., Wang, J. S., and Kouatchou, J.: The description and validation of the computationally Efficient CH4–CO–OH (ECCOHv1.01) chemistry module for 3-D model applications, Geosci. Model Dev., 9, 799-822, doi:10.5194/gmd-9-799-2016, 2016.
- **Elshorbany, Y. F**., Crutzen, P. J., Steil, B., Pozzer, A., Tost, H., and Lelieveld, J.: Global and regional impacts of HONO on the chemical composition of clouds and aerosols, Atmos. Chem. Phys., 14, 1167-1184, doi:10.5194/acp-14-1167-2014, 2014.
- **Elshorbany, Y. F**., Steil, B., Brühl, C., and Lelieveld, J.: Impact of HONO on global atmospheric chemistry calculated with an empirical parameterization in the EMAC model, Atmos. Chem. Phys., 12, 9977-10000, doi:10.5194/acp-12-9977-2012, 2012b.
- **Elshorbany, Y. F**., Kleffmann, J., Hofzumahaus, A., Kurtenbach, R., Wiesen, P., Dorn,H.-P., Schlosser, E., Brauers, T., Fuchs, H., Rohrer, F., Wahner, A., Kanaya, Y., Yoshino, A., Nishida, S., Kajii, Y., Martinez, M., Rudolf, M., Harder, H., Lelieveld, J., , Elste, T., Plass-Dülmer, C., Stange, G., and Berresheim, H.: HO_x Budgets during HOxComp: a Case Study of HO_x Chemistry under NO_x limited Conditions, J. Geoophys. Res., 117, D03307, doi: 10.1029/2011JD017008, 2012a.
- Kanaya, Y., Hofzumahaus, A., Dorn, H.-P., Brauers, T., Fuchs, H., Holland, F., Rohrer, F., Bohn, B., Tillmann, R., Wegener, R., Wahner, A., Kajii, Y., Miyamoto, K., Nishida, S., Watanabe, K., Yoshino, A., Kubistin, D., Martinez, M., Rudolf, M., Harder, H., Berresheim, H., Elste, T., Plass-Dülmer, C., Stange, G., Kleffmann, J.,
- **Elshorbany, Y**., and Schurath, U.: Comparisons of observed and modeled OH and HO2 concentrations during the ambient measurement period of the HOxComp field campaign, Atmos. Chem. Phys., 12, 2567-2585, doi:10.5194/acp-12-2567-2012, 2012.
- Niedojadlo, A.; Kurtenbach, R.; Becker, K.-H.; Wiesen, P.; Schady, A.; Sowka, I.; **Elshorbany, Y.**; Zwozdziak,

A.; Zwozdziak, J.: Volatile organic compounds in Wroclaw, Poland, Gefahrstoffe- Reinhaltung der Luft, 1/2, 39-47, 2012.

- **Elshorbany, Y. F**, Barnes, I., Becker, K. H, Kleffmann, J., and Wiesen, P.: Sources and Cycling of Tropospheric Hydroxyl Radicals-An Overview, *Zeitschrift für Physikalische Chemie*, 224, 967-987, DOI:10.1524/zpch.2010.6136, 2010b.
- **Elshorbany, Y. F**, Kleffmann, J., Kurtenbach, R., Rubio, R., Lissi, E., Villena, G., Rickard, A.R. and Pilling, M. J., Wiesen, P.: Seasonal dependence of the oxidation capacity of the city of Santiago de Chile, *Atmospheric Environment*, 44, 5383-5394, a special issue dedicated for the Atmospheric Chemical Mechanism conference, ACM- 2009, Davis, US, 2010a.
- **Elshorbany, Y. F.**, Kurtenbach, R., Wiesen, P. Lissi, E., Rubio, M., Villena, G., Gramsch, E., Rickard, A. R., Pilling, M. J., Kleffmann. J.: Oxidation capacity of the city air of Santiago, Chile, *Atmospheric Chemistry and Physics*, **9**, 2257-2273, 2009a.
- **Elshorbany, Y. F**, Kleffmann, J., Kurtenbach, R., Rubio, R., Lissi, E., Villena, G., Rickard, A.R. and Pilling, M. J., Wiesen, P.: Summertime Photochemical Ozone Formation in Santiago de Chile, *Atmospheric Environment*, **43**, 6398-6420, 2009b.
- Bartels-Rausch, T., Brigante, M., **Elshorbany, Y. F**., Ammann, M., D'Anna, B., George, C., and Kleffmann, J.: Humic acid in ice: Photo-enhanced conversion of nitrogen dioxide into nitrous acid, *Atmospheric Environment*, 40, 5443-5450, 2010.
- Maria A. Rubio, Valeria Vilches, Eduardo Lissi, Guillermo Villena, **Yasin F. Elshorbany**, Jörg Kleffmann, Ralf Kurtenbach, and Peter Wiesen Rate of nocturnal ozone depletion in downtown Santiago, Chile, Fresenius environmental Bulletin 20, (5) 1277-1282, 2010.
- Rubio, M., Lissi, E., Villena, G., **Elshorbany, Y. F.**, Kleffmann. J., Kurtenbach, R., Wiesen, P.: Simultaneous measurements of formaldehyde and nitrous acid in dews and gas phase in the atmosphere of Santiago, Chile, *Atmospheric Environment*, **43**, 6106 - 6109, 2009.
- Metzger, A., Dommen, J., Gaeggeler, K., Duplissy, J., Prevot, A. S. H., Kleffmann, J., **Elshorbany, Y.**, Wisthaler, A. and Baltensperger, U.: Evaluation of 1,3,5 trimethylbenzene degradation in the detailed tropospheric chemistry mechanism, MCMv3.1, using environmental chamber data. *Atmospheric Chemistry and Physics*, **8**, 6453-6468, 2008.
- Stemmler, K., Ndour, M., **Elshorbany, Y.**, Kleffmann, J., Ammann, M., D'Anna, B., George, C., and Bohn, B.: Induced conversion of nitrogen dioxide into nitrous acid on submicron humic acid aerosol, *Atmospheric Chemistry and Physics*, **7**, 4237- 4248, 2007.
- Kleffmann J., Gavriloaiei T., **Elshorbany Y.**, Ródenas M., Wiesen P.: Detection of nitric acid (HNO3) in the atmosphere using the LOPAP technique, *Journal of Atmospheric Chemistry*, **58** (2), 131-149, 2007.
- Bejan, I., **Abd El Aal, Y. (Elshorbany Y)**, Barnes, I., Benter, T., Bohn, B., Wiesen, P. and Kleffmann, J.: The Photolysis of ortho-nitrophenols: a new phase source of HONO, *Physical Chemistry physics*, **8** (17): 2028-2035, 2006.
- Shawali, A. S., Abdallah, M. A., Mosselhi, M. A. N., **Mohamed, Y. F**. (**Elshorbany, Y. F.**): Synthesis and tautomeric structure of 1,2-bis(7-arylhydrazono-7H- [1,2,4]triazolo[3,4-b][1,3,4]thiadiazin-3-yl)ethanes; *Zeitschrift für Naturforschung Section B-A J. of Chemical Sciences*, **57** (5), 552-556, 2002.
- Mosselhi, M. A. N., Abdallah, M. A., **Mohamed, Y. F.** (**Elshorbany, Y. F.**), Shawali, S.: Synthesis and tautomeric structure of 7-arylhydrazono-7H-[1,2,4]triazolo[3,4- b][1,3,4]thiadiazines, *Phosphorus Sulfur and Silicon and the Related Elements*, **177** (2), 487-496, 2002.

Books:

- Yasin Elshorbany: Tropospheric Oxidation Capacity and Ozone Photochemical Formation, Südwestdeutscher Verlag für Hochschulschriften AG Co. KG, ISBN 978- 3-8381-1638-9, 2010.
- Niedojadlo, A., Becker, K. H., **Elshorbany, Y. F.**, Kurtenbach, R., Wiesen, P., Schady, Zwozdziak, A., and Zwozdziak, J.: Non-Methane Volatile Organic Compound Measurements in the city centre of Wroclaw, Poland. 2007, NATO science series. Volume 79, 181-196. doi: 10.1007/978-1-4020-6429-6_13, 2010.

Teaching Experiences at the University of Wuppertal:

Starting from winter semester 2005/2006, I started to have assisting teaching duties at the University:

- Exercises of Kinetics (winter semester, 2005/2006)

- Exercises of Statistical thermodynamics (summer semester, 2006)
- Exercises of Structure of Materials and Spectroscopy (winter semester, 2006/2007)
- Laboratory experiments of the Physical chemistry 1 course (2007-2011)
- Laboratory experiments of the Physical chemistry 2 course (2007-2011)

Computer Skills:

1. PC User: Microsoft office and windows
2. Power User: UNIX/LINUX environments
3. Programmer and Earth system Modeler: familiar with Fortran, Facsimile, Ferret, IDL
   A. Box modeling using Facsimile and Fortran models based on the Master Chemical Mechanism, MCM.
   B. Regional-Global modeling using the GEOS-CHEM model.
   C. 3D Climate-Chemistry modeling, EMAC model, NASA GEOS5-CCM model.

Field and Laboratory Research Projects:

10.10.04 - 21.10.04

- Measurements campaign in **EUPHORE** (European photo reactor)-smog chamber in **Valencia-Spain** for the evaluation and validation of the new developed HNO3 LOPAP instrument.

16.01.05-30.01.05

- Measurements campaign in **EUPHORE** -smog chamber in **Valencia-Spain** for the evaluation of the health effects of the Diesel exhausts of a newly developed Ford- made motor in cooperation with Prof. Barbara Zielneska from the Desert Research Institute (DRI) in USA in addition to the validation of the new developed NO2 Denuder.

06.03.05-22.03.05

- **DAAD** funded field-project for the evaluation of the **oxidation capacity** during summer in **Santiago de Chile** including measurements all the sources and sinks of the OH radicals in the troposphere.

23.05.05-09.06.05

- **DAAD** funded field-project in **Santiago de Chile** for the evaluation of the oxidation capacity during winter in the city, Henry law constants in dew for HONO and HCHO and the evaluation of the emission indices.

21.08.05-05.09.05

- **DBU** funded field-project in Breslau-**Polen** in cooperation with Breslau University for the evaluation of the solvents sources in the city.

26.09.05-07.10.05

- Laboratory HONO - Aerosol measurements joint campaign at Paul-Scherer-Institute (**PSI**) in Villigen-**Switzerland**.

09.04.07-21.04.07

- Laboratory HONO – Ice measurements joint campaign at Paul-Scherer-Institute (**PSI**) in Villigen-**Switzerland**.

18.06.07-11.07.07

- Filed campaign for the Investigation of the oxidation capacity in the rural Area of Grignon, Paris, **France.**

10.06.10-28.06.10

- International **FIONA** Measurements campaign at the EUPHORE -smog chamber in **Valencia-Spain** for the validation of HONO different measurements techniques, **Valencia, Spain**.

15.06.10-01.08.10

- International **ECATS** Measurements campaign to investigate the emissions from different newly developed Jet-engine fuels and to determine their impact on the atmosphere.

Appendices: More details

Attended Workshops and Conferences:

1. 12-13 Dec 2006: **DBU**-Project final seminar on Source identification and Quantification of Anthropogenic **VOC** Emissions in German and Polish Cities. Osnabrück, **Germany**.

2. 18-19 Jan, 2007: **EUROCHAMP** Workshop in Leeds University on the use of Master Chemical Mechanism model (**MCM**) in Chamber studies related to air quality, Leeds, **England**.

3. 24-25 Sep, 2007: **EUROCHAMP/ACCENT** workshop on the "Volatile Organic Compounds (**VOC**) in the urban atmosphere of Europ-sources, transformation and impacts in Breslau, **Poland**.

4. 03-05 March, 2008: **EUROCHAMP/ACCENT Invited Expert Workshop** on **Nitrous acid:** Tropospheric Chemistry, Measurement Methods and Future Directions held at the Bergische Universität Wuppertal (BUW), **Germany**.

5. 27-29 March 2007, 6th International conference on Urban Air Quality, Limassol, **Cyprus**.

6. 11-19 April, 2008, **EGU 2008** Conference in Vienna, **Austria**.

7. December 10-12, 2008. **Atmospheric Chemical Mechanisms Conference (ACM- 2009) held at the University Of California, Davis, USA.**

8. September 23 – 25, 2009. The specialized meeting of the German chemical society (**GDCh Fachgruppentagung), Trier, Germany**.

9. October 6 - 7, 2009. **Multiphase Reactivity of Atmospheric VOCs and its Impact on Climate, Health and Materials, Paris, France**.

10. February 16-17, 2010. **Workshop on Modeling Smog-chamber experiments using AtChem-MCM, Leeds, UK.**

11. October 6 – 7, 2010**. Utilization of NASA satellite data for air quality applications. UC Davis, CA, USA.**

12. October 8 – 10, 2010. **The international conference on Atmospheric Chemical Mechanism (ACM 2010), UC Davis, CA, USA.**

13. 03-08 April 2011, **EGU 2011** Conference in Vienna, **Austria**.

14. **30 April - 5 November, GEOS-Chem meeting at Harvard University, Cambridge, USA, 2011.**

15. 09-13 October 2011, **NATO** Advanced Research Workshop in **Gdansk, Poland**.

16. 14-16 February 2012, **2nd Annual EMAC Symposium, MPIC, Mainz, Germany**

17. 22-27 April 2012, **EGU 2012** Conference in Vienna, **Austria**.

18. September 17-21, 2012, **IGAC2012 Conference in Beijing, China.**

19. 12-14 June 2013, **3rd Annual EMAC Symposium, KIT, Karlsruhe, Germany.**

20. 22-26 September 2014, **13th International Global Atmospheric Chemistry (IGAC) conference, Natal, Brazil.**

21. 28-30 April, 2015, **TOAR Workshop 1.02, Madrid, Spain**

22. 14-19 December 2015, **American Geophysical Union, San Francisco, CA, USA.**

23. 23-27 January 2016, **Tropospheric Ozone Assessment Report (TOAR) workshop in Beijing China.**

24. 12-16 December 2016, **American Geophysical Union, San Francisco, CA, USA.**

25. 10-16 December 2017, **American Geophysical Union, New Orleans, LA.**

Posters and Talks (conference papers):

1. The Oxidation Capacity of the city Air of Santiago, Chile., **Yasin Elshorbany**, Jörg Kleffmann, Peter Wiesen, Ralf Kurtenbach, Guillermo Villena, 6th International conference on Urban Air Quality, Limassol, Cyprus, 27-29 March 2007.

2. Examining the Oxidation capacity in Santiago De Chile City. Ralf Kurtenbach, Peter Wiesen, Jörg Kleffmann, **Yasin Elshorbany.** The German Chemical Society (GDCh) yearly conference 2006 in Environmental chemistry and Biology 4.- 6. October, 2006, Martin-Luther-Universität, Halle-Wittenberg.

3. *Balance of the radical sources in the photochemical smog in Santiago De Chile.* M Angélica Rubio, Guillermo Villena, Alvaro Ruiz, Eduardo Lissi, Peter Wiesen, Jorg Kleffmann, Ralf Kurtenbach and **Yasin Elshorbany**. XXVI Chilean Conferences of Chemistry, Concepción, Chile. 10-13 January 2006.

4. *Chemistry of the Dew and its relationship with the photochemical smog in Santiago de Chile,* M Angélica Rubio, Guillermo Villena, Alvaro Ruiz, Eduardo Lissi, Peter Wiesen, Jorg Kleffmann, Ralf Kurtenbach and **Yasin Abdelaal**. XXVI Chilean Conferences of Chemistry, Concepción, Chile. 10-13 January 2006

5. *The photolysis of ortho-nitrophenols: A new gas phase source of HONO*. General Assembly, 2006, European Geosciences Union, Geophysical Research Abstracts, Vol 8, 06160, http://www.cosis.net/abstracts/EGU06/06160/EGU06-J-06160.pdf ISSN:1029-7006, SRef-ID: 1607-7962/gra/EGU06-A-06160, 02 - 07 April 2006, Vienna, Austria, AS0 Open Session on the Lower, Middle, and Upper Atmosphere; April 2006, Vienna, Austria; Bejan, I., I. Barnes, T. Benter, B. Bohn, **Y. Elshorbany**, P. Wiesen and J. Kleffmann.

6. INTROP/EUROCHAMP/ACCENT Joint Workshop on Organics; 8-11 January 2006, Alpe d'Huez, France Alp d-huez, http://www.eurochamp.org/workshops_meetings /Alpe%20d'Huez/Alpe%20d'Huez _welcome.html. Bejan, I., **Y. Elshorbany**, I. Barnes, Th. Benter, B. Bohn, P. Wiesen and J. Kleffmann, *The photolysis of ortho- nitrophenols: A new gas phase source of HONO*.

7. The photolysis of ortho-nitrophenols: A new gas phase source of HONO; Jörg Kleffmann 1 , Iustinian Bejan 1 , **Yasin Abd El Aal** 1 , Ian Barnes 1 , Thorsten Benter 1 , Peter Wiesen 1 , Birger Bohn 2. Bunsentagung 2006 in Erlangen from 25-27 May, 2006. Deutschen Bunsen-Gesellschaft für Physikalische Chemie.

8. Non-Methane Volatile Organic Compound Measurements in the City Centre of Wroclaw, Poland. A. Niedojadlo, K. H. Becker , Y. Elshorbany, R. Kurtenbach, P. Wiesen, A. Schady, A. Zwozdziak and J. Zwozdziak. NATO conference on Regional Climate Variability and its Impacts in The Mediterranean Area. DOI: 10.1007/978-1-4020-6429-6_13.

- **IGAC : 10th International Conference, Annecy, France, 2008-09-07 :**

9. Fast Photochemistry of OH and RO2 radicals during the field campaign near Paris, Kukui, A. ; Ancellet, G. ; Afif, C. ; Quivet, E. ; Wortham, H. ; Cellier, P. ; Nguyen, M. L. ; Brogniez, C. ; Buchard, V. ; Auriol, F. ; Bohn, B. * ; Bonsang, B. ; Gros, V. ; **Elshorbany, Y. F.** ; Kleffmann, J.; Colomb, A. ; Borbon, A. ; Kerdouci, J. ; Madec, P., IGAC : 10th International Conference Annecy, France.

- **EUROCHAMP/ACCENT Invited Expert Workshop** on **Nitrous acid:** Tropospheric Chemistry, Measurement Methods and Future Directions held at the Bergische Universität Wuppertal (BUW), Germany:

10. Increased HONO formation in smog chamber photo-oxidation experiments of 1,3,5 trimethylbenzene. J. Dommen, A. Metzger, K. Gaeggeler, **Y. Elshorbany**, J. Kleffmann.

11. Use of on-line LOPAP monitor to measure HONO concentrations from diesel exhaust emissions. Esther Borras-Garcia, Luis. A. Tortajada-Genaro, Brbara Zielinska, **Yasin Elshorbany**, Jörg Kleffmann.

12. HONO in Santiago de Chile dews. M. Angelica Rubio, Gullermo Villena, Eduardo Lissi, **Y. Elsorbany**, Jörg Kleffmann, Ralf Kurtenbach, Peter Wiesen.

13. Photochemical Production of HONO by Humic Acid in Ice. T. Bartels-Rausch, J. Kleffmann, **Y. Elshorbany**, M. Brigante, B. D Anna, C. George, M. Amman.

- **EGU 2008** Conference in Vienna:

14. Explicit analysis and simulation of an ozone photochemical episode in Santiago, Chile. **Y. Elshorbany**, P. Wiesen, J. Kleffmann, R. Kurtenbach, M. Rubio, E. Lissi,
G. Villena, A. R. Rickard, M.J. Pilling.

15. The oxidation capacity of the city air of Santiago, Chile. **Y. Elshorbany**, P. Wiesen, J. Kleffmann, R. Kurtenbach, M. Rubio, E. Lissi, G. Villena, A. R. Rickard, M.J. Pilling.

16. Formaldehyde source apportionment and photochemical simulation in the city air of Santiago, Chile. **Y. Elshorbany**, P. Wiesen, J. Kleffmann, R. Kurtenbach, M. Rubio,
E. Lissi, G. Villena, A. R. Rickard, M.J. Pilling.

- **EGU 2009** Conference in Vienna:

17. Effects of seasonal changes on the Oxidation capacity of the city of Santiago, Chile,
Y. F. Elshorbany, J. Kleffmann, R. Kurtenbach, E. Lissi, M. Rubio, G. Villena, E. Gramsch, A. R. Rickard, M.J. Pilling and P. Wiesen.

18. Emission indices and characterization of the NMHCs and trace gases in the city air of Santiago de Chile. Y. F. Elshorbany, R. Kurtenbach, J. Kleffmann, M. Rubio, E. Lissi,
G. Villena, E. Gramsch, P. Wiesen.

19. Summertime photochemical ozone formation in Santiago, Chile December 10-12, 2008. Atmospheric Chemical Mechanisms held at the University Of California, Davis, USA.

20. Seasonal Dependence of the Oxidation Capacity of the City of Santiago de Chile September 23 – 25, 2009. The specialized meeting of the German chemical society (GDCh Fachgruppentagung), Trier, Germany

21. Summertime photochemical ozone formation in Santiago, Chile, October 6 - 7, 2009. Multiphase Reactivity of Atmospheric VOCs and its Impact on Climate, Health and Materials, Paris, France.

- **ACM2010** Conference in Davis, CA, US:

22. Ródenas M., Muñoz A., Alacreu F., Dorn H-P., Brauers T., Kleffmann J., Mikuška P., Večeřa Z., Häseler R., Ye

C., Ruth A., Dixneuf S., Venables D., Darby S., Chen J., Ashu-ayem E., **Elshorbany Y**., Voigt C., Jessberger P., Kaufmann S., Schäuble D., Mel- louki A., Cazaunau M., Grosselin B., Colomb A., Michoud V., Miet K., Ball S., Daniels M., Goodall I., Tan D., Stickel R., Case A., Rappenglück B., Croxatto G., Percival C., Bacak A., Mcguillen M., Dibb J., Scheuer E., Zhou X., Ferm M., Varma R., Pilling M., Clemente E., Porras R., Vera T., Vázquez M., Borrás E., Valero J., Bloss W. (2010), Formal Intercomparisons of Observations of Nitrous Acid (FIONA),

- Atmospheric Chemical Mechanisms Conference, University of California Davis, 6- 10.12.2010.

- **EGU 2011** Conference in Vienna:

23. HOx Budgets during HOxComp: a Case Study of HOx Chemistry under NOxlimited Conditions, Y. F. Elshorbany, J. Kleffmann, R. Kurtenbach, P. Wiesen, A. Hofzumahaus, H.-P. Dorn, E. Schlosser,Y. Kanaya, A. Yoshino, S. Nishida, Y.Kajii. Geophysical Research Abstracts, 13, EGU2011-13573, 2011.
24. Ródenas M., Muñoz A., Alacreu F., Dorn H-P., Brauers T., Kleffmann J., Mikuška P., Večeřa Z., Häseler R., Ye C., Ruth A., Dixneuf S., Venables D., Darby S., Chen J., Ashu-ayem E., Elshorbany Y., Voigt C., Jessberger P., Kaufmann S., Schäuble D., Mel- louki A., Cazaunau M., Grosselin B., Colomb A., Michoud V., Miet K., Ball S., Daniels M., Goodall I., Tan D., Stickel R., Case A., Rappenglück B., Croxatto G., Percival C., Bacak A., Mcguillen M., Dibb J., Scheuer E., Zhou X., Ferm M., Varma R., Pilling M., Clemente E., Porras R., Vera T., Vázquez M., Borrás E., Valero J., Bloss W. (2011), The FIONA campaign (EUPHORE): Formal Intercomparison of Observations of Nitrous Acid, EGU Joint Assembly, Vienna/Austria,03.-09.04.2011.

- 09-13 October 2011, **NATO** Advanced Research Workshop in Gdansk,Poland.

25. HOx Budgets during HOxComp: a Case Study of HOx Chemistry under NOxlimited Conditions, 09-13 October 2011, **NATO** Advanced Research Workshop in Gdansk, Poland.

- **EGU 2012** Conference in Vienna:

26. Impact of HONO on global atmospheric chemistry calculated with an empirical parameterization in the EMAC model, **Elshorbany, Y. F**., Steil, B., Brühl, C., and Lelieveld, J., EGU2102, Vienna.

- 12-14 June 2013, **3rd Annual EMAC Symposium, KIT, Karlsruhe, Germany.**

27. Global and Regional Impact of HONO on aerosol and cloud composition, **Elshorbany, Y. F.**, Crutzen, P., Steil, B., Pozzer, A., Tost, A., Lelieveld, J.

28. 22-26 September 2014, **13th International Global Atmospheric Chemistry (IGAC) conference, Natal, Brazil:** Global and Regional Impact of HONO on aerosol and cloud composition, **Elshorbany, Y. F.**, Crutzen, P., Steil, B., Pozzer, A., Tost, A., Lelieveld, J.

29. 14-19 December 2014, **American Geophysical Union (AGU), San Francisco, CA, USA:** Model analysis of the factors regulating trends and variability of methane, carbon monoxide and OH, **Elshorbany, Y. F**., et al., 2014.

30. 10-16 December 2017, **American Geophysical Union, New Orleans, LA.,** Evaluation of the Committed Carbon Emissions and Global Warming due to the Permafrost Carbon Feedback, Elshorbany, Y.F., Schaefer, K., et al., 2017.

John P. Osegovic, Ph.D.

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Profile Brief: experienced educator and research manager. Managed multi-million dollar research programs, teams of up to 40 individual, and multi-section classes up to 800 students. Experience in natural gas processing and petroleum geochemistry.

Professional Experience

Present	Instructor, University of South Florida St. Petersburg	General and Physical Chemistry Instruction.
Present	Consultant	Consulting on patents, research reviews, geochemical opinion, natural gas and natural gas hydrates
2011-2013	Visiting Instructor, University of South Florida Department of Chemistry	Taught Analytical Chemistry lecture and labs, General Chemistry I & II, General Chemistry II labs, and Chemistry for Engineers
2003-2010	Vice President, Chief Chemist	Project management, IPR management, catalyst development, pilot plant construction, managed team of 5 scientists and engineers. Negotiated with customers and other stakeholders.
2001-2003	Visiting Assistant Professor	Taught all levels of chemistry classes. Managed 35 instructors and 1300 student laboratory classes.

Education

1999-2000	Postdoctoral Fellow - SUNY Stony Brook	Shape selective catalysis. Advanced battery materials. Solid state NMR.
1995-1999	Ph.D. - University of Florida Dissertation: "New Methods for Characterizing Solid Acidity." Advisors: R. S. Drago and R. S. Bowers	Synthesis and characterization of solid acid catalysis. NMR, solid state NMR, FTIR, and Raman spectroscopy. Chromatography, calorimetry, and microscopy.
1990-1995	University of West Florida	Bachelor of Science in Chemistry (ACS)

Patents

Osegovic, John, *et al.* "Accelerated Hydrate Formation and Dissociation." US Patent 8,334,418 30 October issued December 18, 2012.

Osegovic, John, *et al.* "Seawater-base Carbon Dioxide Disposal." US Patent 8,048,309 issued November 1, 2011.

Max, Michael; Osegovic, John. "Hydrate-based reduction of fluid inventories and concentration of aqueous and other water-containing products." US Patent 7,255,792 issued August 14, 2007.

Papers

Sheps, K. M., Max, M. D., Osegovic, J. P. (2009) "A case for deep-ocean CO_2 Sequestration" *Energy Procedia*, **1**(1), 4961-4968.

Waite, W.F., Osegovic, J.P., Winters, W.J., Max, M.D., Mason, D.H. (2008) "Seeding hydrate formation in water-saturated sand with dissolved-phase methane obtained from hydrate dissolution: a progress report" 6th International Conference on Gas Hydrates, Vancouver, Canada, July 6-10, 2008,
Proceedings, paper #5341.

Osegovic, J. P., Tatro, S. R., Holman, S. A., Ames, A. L., Max, M. D. (2007) Growth kinetics of ethane hydrate from a seawater solution at an ethane gas interface" *J. of Pet. Sci. and Eng.*, 56(1-3), 42-46.

Osegovic, J. P., Tatro, R. S., Holman, S. A. (2006) "Physical Chemical Characteristics of Natural Gas Hydrates" p. 45-104 in "Economic Geology of Gas Hydrate" Max, M. D., Johnson, A. H., Dillon, W. P. (eds.) Springer, Dordrecht, Netherlands, DOI: 10.1007/1-4020-3972-7_3.

Max, M. D., Tatro, S. R, Osegovic, J. P., Brazel, L. A., Sheps, K. M. (2006) "New Method for Extraction of Water From Natural Gas" Offshore Technology Conference, 17771.

Osegovic, J. P., and M. D. Max (2005), Compound clathrate hydrate on Titan's surface, *J. Geophys. Res.*, 110, E08004, doi:10.1029/2005JE002435.

Paik, Y., Osegovic, J. P., Wang, F., Bowden, W., Grey, C. P. "^{2}H MAS NMR Studies of the Manganese Dioxide Tunnel Structure and Hydroxides Used as Cathode Materials in Primary Batteries" **123**(38), 2001, 9367-9377.

Osegovic, J. P., Drago, R. S., "Measurement of the Global Acidity of Solid Acidity by ^{31}P MAS NMR of Chemisorbed Triethylphosphine Oxide" *J. Phys. Chem. B*., 2000 104(1) 147-154. DOI: 10.1021/jp992907t.

Dias, J. A, Osegovic, J. P., Drago, R. S. "The Solid Acidity of 12-Tungstophosphoric Acid" *J. Catal.* **183**(1), 1999, 83-90. DOI: 10.1006/cat.1998.2389.

Webster, C. E., Osegovic, J. P., Scott, B. J, Dias, S. C. "Thermodynamic Analysis of the Cal-Ad Method with Respect to Gas-Solid Calorimetry" *Micro. and Meso. Mat.* **31**(1-2), 1999, 205-209.

Osegovic, J. P., Drago, R. S. "A Solid Acidity Scale Based on the ^{31}P MAS-NMR Shift of Chemisorbed Triethyphosphine Oxide" *J. Catal.* **182**(1), 1999, 1-4.

Kob, N., Drago, R. S., Young, V., Osegovic, J. P. "Regeneration Studies of Solid Acids for Batch Reactor. Alkylation of Isobutane with 2-butene" *Reaction Kinetics And Catalysis Letters* **66**(2), 1999, 205-210. DOI: 10.1007/BF02475791.

Osegovic, J. P. "Gas Hydrates" *Google Knol* http://knol.google.com/k/gas-hydrates# accessed 4 March 2010.

Presentations

Nucleation and growth constraints and outcome in the natural gas hydrate system OS53D-04. 2016 Fall AGU Meeting, San Francisco, CA. to session OS53D Experiments, Modeling, and Field Studies on Gas Hydrate Formation II.

Growing Gas Hydrates. Invited presentation to the MIGHTY Conference, University College, Dublin, Ireland 5 December 2016.

Modeling Heat and Mass Flows due to Clathrate Hydrate Processes in Planetary Systems. P43C- 2019 presented at 2013 Fall AGU Meeting, San Francisco, CA 12 December 2013.

Innovating with Gas Hydrates. USF Department of Chemical Engineering, Tampa, Florida, Invited, 22 January 2010.

Steady State CO_2 Sequestration Rate for CO_2 Storage in Methane Hydrate with Methane Production. (2009) *Eos Trans. AGU*, 90(52), *Fall Meet. Suppl. Abstract* OS33A-1223.

Gas Hydrates and Industry: Historical Development to Modern Applications. The 24th Annual regional Phosphate Conference 15 October 2009.

Hydrates for Gypsum Stack Water Purification. AIChE Central Florida Clearwater Meeting. AIChE Clearwater Meeting, 13 June 2009.

Uncertainty Analysis of Gas Hydrate Gas Handling Applications. American Chemical Society Spring Meeting, Salt Lake City, Utah, 24 March 2009.

An Introduction to the Significance and Application of Gas Hydrates. Society of Mechanical Engineers Florida Section, 6 January 2009.

The Impact of Supersaturation on the Evolution of Gas Hydrate Growth. (2008) *EOS Trans. AGU,* 89(53) Fall Meet. Suppl., OS41D-1245.

Mixed Gas Clathrates and Planetary Dynamics. Science of Solar System Ices, Oxnard, California, #9037, 6 May 2009.

Impact of Compound Hydrate Phase Parameters on Formation/Dissociation Dynamics. (2007) *Eos Trans. AGU.* 88(52), Fall Meet. Suppl, OS23A-1032, 10-14 December 2007.

Making GHASTLI – HIDEOUS. USGS St. Petersburg Brown Bag Presentation. 28 June 2007.

Removal of Water from Well-head Natural Gas: Implications for Gas Separation and Compound Hydrate Formation and Dissociation. OTC-18534-PP. 2007 Offshore Technology Conference, Houston, Texas, 30 April–3 May 2007 (paper).

On-Site Freshwater Production for Offshore Facilities. 106197-MS International Symposium on Oilfield Chemistry, 28 February-2 March 2007, Houston, Texas, 28 February – 2 March 2007.

Impact of Compound Hydrate Phase Parameters on Formation/Dissociation Dynamics. (2006) *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., MR43A-1064.

Conditions for Formation of Oceanic Natural Gas Hydrate Deposits. (2005) *EOS Trans. AGU*, 86(52), Fall Meet. Suppl., OS43A-0606.

Gas Hydrates: Desalination Through Crystallization. American Association of Crystal Growth, ACCGE-16, Big Sky, Montana, 12 July 2005.

Growing Gas Hydrates. (2005) 5th International Conference on Gas Hydrates, Trondheim, Norway. Paper 4017.

Growing Gas Hydrate. ACS National Meeting Spring Meeting, San Diego, CA. 14 March 2005. (Poster and *in promtu* invited presentation)

Treatment Process for Dewatering Pond Water. Presentation to the Florida Institute of Phosphate Research Process Water TAC, 12 October 2004.

Accelerated Ethane Gas Hydrate Formation in Seawater. Geological Society of America *Abstracts with Programs*, **35**(6), September 2003, p. 534, 5 November 2003.

Professional Memberships: American Chemical Society and American Geophysical Union.

Technical Reports and Manuscripts

1. 2015. Dixon, B., Osegovic, J.P., Emrich, K. "Self-Study Report. Environmental Science, Policy, and Geography (ESPG). Program to be evaluated: BS in Environmental Science and Policy (CIP code – 03.0104)" for the University of South Florida St. Petersburg.
2. October 2011. Osegovic, JP "Hagfish and Chemical Adversarial Threat to Reverse Osmosis Operations" prepared and presented under contract.
3. April 2011. Osegovic, JP "Review of Marine Desalination Systems, LLC's Intellectual Property, Data, and Files" prepared and presented under contract.

Hosted Visitors and Organized Events

1. November 2014. Former President Mohamed Nasheed of the Maldives. "The Island President." Organized with Dona Stewart with support from Frank Diafora (Dean USFSP College of Arts and Sciences) and Mathew Morin (Director USFSP Student Government). Involved organizing event location, security, a film screening, food, advertising, and coordination. Event attracted ~200 students, faculty, and members of the public.
2. November 2014. Sir Robert Swan. Came to USFSP to discuss climate and environmental activism. Organized an informal meeting between him and several undergraduate and graduate students over coffee and an open event for all students. Short notice (~3 days): performed marketing, organization, and escort duties. Coffee meeting had 6 students and 1 faculty member. About 35 students, faculty, and staff attended the main lecture.
3. September 2014. Faculty Perspectives on Climate Change. Organized to discuss the events of the UN New York Climate Summit. Organized speakers, food, advertising, location. Attended by approximately 40 students and faculty.
4. April 2015. *USFSP Haiku-a-Palooza*. A contest for students to write about their classes and earn prizes. Founding organizer.
5. October 2015. Science Tools Workshops. Hosted in the Student Success Center.

6.	March 2016. 2nd *Annual USFSP Haiku-a-Palooza*. Co-organizer.
7.	April 2017. 3rd Annual USFSP *Haiku-a-Palooza*. Co-organizer.

Courses Taught or Managed

General Chemistry I	Quantum mechanical model of the atom, the electromagnetic spectrum, periodic properties, chemical bonding, state of matter, solutions
General Chemistry II	Calorimetry, thermodynamics, kinetics, equilibrium chemistry, electrochemistry, radiochemistry, descriptive inorganic chemistry
General Chemistry Laboratory Coordinator	Laboratory Manager (General Chemistry I and II). 50 TAs. Instructed new TAs on lab requirements and teaching strategies.
Chemistry for Engineers	Covers the topics of General Chemistry I and II in one semester.
Organic Chemistry Laboratory Coordinator	Laboratory manager (Organic I and II): 40 TAs. Instructed new TAs on lab requirements and teaching strategies. Presented laboratory lecture.
Analytical Chemistry	Quantitative analysis, statistical analysis, calibration, volumetric analysis, electrochemistry, spectroscopy, chromatography, gravimetric analysis
Physical Chemistry I	Thermodynamics, kinetics, chemical potential, equations of state, Laws of Thermodynamics, mechanics of thermodynamics
History of Chemistry	Explores the history of chemistry from the thought experiments of the ancients through the discovery of conservation of mass and energy into the modern quantum age.
English Composition (assisting)	English Composition for Science Majors

University Service

Committees

1. 2015-2016 USFSP ESPG Curriculum Committee (member)
   Charged with reviewing and revising the USFSP ESPG Bylaws. Created outline and documents to facilitate process.

2. 2015-2016 USFSP ESPG Bylaw Committee (member)
   Reviewed and edited course proposals for State of Florida General Education classes.
   Reviewed proposal for Geology Major.
   Reviewed course proposal for re-organization of undergraduate degree programs. Reviewed new courses to support re-organization of undergraduate degrees.

3. 2015 USFSP Student Bold Gold: Student Success Subcommittee (member)
   Investigated the success and failure profile of USFSP undergraduates.
   Discussed and initiated plans for USF student success related engagement activities (one such activity grew to become the CAS Major Declaration Event).
   Debated how to generate a campus-wide culture of success. Committee completed its mandate and was dissolved May 2015.

4. 2015-2016 USFSP General Education Subcommittee (member)
   This committee has been charged with:
   1. Reviewing the general education schedule to determine if it meets the needs of freshmen and sophomores (Conclusion: the current schedule is successful).
   2. How to develop and implement an early warning tools to identify students that are in danger of failing a general education course.

5.	2018. Faculty promotion committee. Left committee due to policy limitation on Instructor I service on committee.
6.	2018. Serving on 1 tenure track and 2 instructor line faculty searches.

Other University Service

2018. Working with the Environmental Chemistry CIP Code team. Role unestablished.
2017. Sustainability Studies CIP Code team member. Part of initial leadership, this team created a proposal to bring a Sustainability Studies major CIP code to USFSP campus. (Accepted)
2017. Help develop the Environmental Chemistry new major preproposal. (Accepted)
2016 & 2017. Worked with USF College of Marine Science Machine Shop to develop an internship program for high school students. (2 high school students placed)
2017. Placed an undergraduate student in the College of Marine Science as an intern.
2017 – ongoing. Helping to establish laboratory to support undergraduate research.

Course Development for USFSP

CHM 3030: Chemistry for Sustainability (accepted)
IDS 4942: Practicing Sustainability (under review)
CHM 2020: Chemistry for Liberal Studies (accepted)

Undergraduate Researchers

2017-2018. Stefan Grozlekov. Components of Snake Venom.
2017. Ryan Razavi. Biofuel from Hemp Oil.
2017. J. R. Matthews. Measuring the heat of bioactivity of brewer's yeast.
2017. Jerry Brown. Measuring the heat of bioactivity of brewer's yeast.

Event Photography for USFSP

1.	November 2014. Photography for GIS Day.
2.	November 2014. Honor Society Inductions.
3.	22-23 September 2015. *ICARS*.
4.	December 2015. Honor Society Inductions.
5.	26 March 2016. *Major Declaration Day*. An event for underclassmen to celebrate joining their major program.
6.	25 and 28 March 2016. "A Midsummers Night's Dream." A staged play by the USFSP Shakespeare Society.
7.	5 March 2016. "Cymbeline." A staged play by the USFSP Shakespeare Society.
8.	13-14 September 2016. *ICARS*.
9.	25 Feb 2017 "Twelfth Night" A play staged by the USFSP Shakespeare Society. Images used by the Crow's Nest.
10.	5 March 2017 "Hamlet" A play staged by the USFSP Shakespeare Society.
11.	4-5 October 2017, *ICARS*.
12.	5 November 2017, "Julius Caesar" A play staged by the St. Petersburg Shakespeare Festival.

Travel for USFSP

May – June 2018: visiting instructor at Changzhi University, Changzhi China. Presented General Chemistry in English, Solar System Ices, and a review of clathrate hydrates. Mentored several Chanzhi University students. Participated in inaugural interdepartmental tug of war competition.

Managed Contracts

Date	Contract Number	Amount	Role
31 January 2003	NBCHCO10003[a]	$2,116,671[b]	Scientist
3 March 2004	N00014-D4-C-0237 AA[c]	$2,348,732	Scientist
18 May 2004	N00014-D4-C-0237 AB[c]	$1,882,065	Chief Scientist
3 July 2006	N00014-D4-C-0237 AC[c]	$1,330,646	Chief Scientist
8 January 2006	N00014-D4-C-0237 AD[c]	$949,354	Chief Scientist
12 June 2007	N00014-D4-C-0237 AC[c]	$70,000	Chief Scientist
6 June 2007	N00014-D4-C-0237 AE[c]	$1,309,053	Chief Scientist

a. DARPA
b. $5,337537 in prior funding
c. Office of Naval Research

MADHU PANDEY, PhD
2168 Greenbriar Blvd., Clearwater, FL, 33763
Phone: (727) 241-8593 (Cell); (727) 733-3623 (Home)
E-Mail: mp.fl@yahoo.com

SUMMARY

- Over 25 Years' Experience **teaching Chemistry** in colleges in USA and INDIA
- Over 10 Years' Experience teaching **Chemistry Labs with supervisory experience**
- Over 4 Years' Experience working in Research Lab at Tata Iron and Steel Company, Jamshedpur, India.
- Over 2 Years' Experience working in Research Lab of Geo Pharma /Belcher Pharmaceutical, Largo, FL

EDUCATION

- **MST (MS in Teaching) in Chemistry** from **FAU** (Florida Atlantic University), in 2003.
- **PhD** in **Inorganic Chemistry** from Ranchi University, **INDIA** in 1998.
- **MS in Chemistry** from Ranchi University**, INDIA**, in 1988
- **BS in Chemistry & Biology** from Ranchi University**, INDIA,** in 1986

TRAINING, CERTIFICATIONS, PROFESSIONAL ORGANIZATIONS

- Completed training for **Web Development** using **MS FrontPage, Acrobat Professional, BlackBoard**, **WEBCT, ANGEL (Pathway to eLearning),CANVAS**.
- Completed "**Excellence in Academic Instruction**" (online course developed by SPC).
- American Chemical Society, NGO

WORK EXPERIENCE

University of South Florida St. Petersburg,
08/2013 – present Chemistry Instructor
Teaching assignments: General Chemistry I and II lecture classes, Organic Chemistry I and II lecture classes, Analytical Chemistry Lecture and Lab Classes, Supervising Organic Chemistry Labs and Analytical Chemistry labs.

University of South Florida St. Petersburg,
01/2009 – 05/2013 Visiting Instructor
Teaching assignments: General Chemistry I and II lecture classes, Organic Chemistry Lab and Lecture Classes, Supervising General Chemistry Labs and Organic Chemistry Labs, Lab Instructor for Organic Chemistry Labs

St. Petersburg Community College,
(e-Campus, Seminole Campus, 05/2004 – 05/2011 Clearwater Campus), FL
Adjunct Chemistry Instructor
Teaching assignments: CHM 1025 lecture and lab, General Chemistry, Introductory Chemistry Lab, (CHM1025L) and Blended Introductory Chemistry, On-line CHM 1025 lecture and lab, Organic I and Organic II Lab,

St. Petersburg Collegiate High School, St. Petersburg, FL
07/2006 – 06/2009 Chemistry Instructor.
Teaching assignments: Chemistry Honors classes and Lab, Introductory Chemistry (CHM1025 And CHM1025L). Advisor to National Honor Society and Engineering Club.

Geo Pharmaceutical Inc., Largo, FL
04/2004 – 06/2006 Chemist
Responsibilities: Drug chemical analysis on finished products and raw materials using wet chemistry, UV- VIS, HPLC, dissolution apparatus, etc. Wrote SOPs about GMP regulations, Writing Investigations, Method Development, Validation of Protocols and Stability Profiles.

Envirodyne Inc, Boca Raton, FL
05/2003 – 08/2003 Analyst.
Responsibilities: **Analysis of Water and Soil** samples by **GC** and **HPLC**. **EPA 8015**.

Florida Atlantic University, FL
08/2001 – 05/2003
Position: Graduate Teaching Assistant - **General Chemistry Classes** for undergraduates. Assisted in **Lab Classes for** undergraduate students. Involved in running **HPLC, IR, UV-Visible, GC, TLC**, Rota-Vap, **Silica Column**, **Isolation of Compound**.

MAPIE, Ft. Lauderdale, FL **06/2002 – 08/2002**
Worked as **Quality Control Chemist** for **Cement, Grout, and Adhesive**.

Graduate School & College for Women, INDIA **02/1989 – 04/2000**
Worked as **Lecturer** for Undergraduate and Graduation.
Responsible for teaching General Chemistry, Organic Chemistry, Inorganic Chemistry. Involved in Demonstration and maintenance of **Lab Equipment and Lab Instruments**.

City-Soft Tutoring Center, India **02/1992 - 04/1999**
Part-time
Tutored Pre-med and Pre- Engineering students in all levels of Chemistry.

PEER-REVIEWED PUBLICATIONS

1. **Fresenius J Anal Chem (1994) 394:478-481 - Springer-Verlag 1994**
   Extraction-spectrophotometric determination of nickel as Ni-(PAR)2-(CTAB)2complex in polymetallic sea-bed nodules and steels
   S.N,Bhadani[1], Madhu Tewari[1], Archana Agrawal[2], K.Chandra Sekhar[2]
   [1]Department of Chemistry, Ranchi University, Ranchi, India
   [2]Analytical Chemistry Division, National Metallurgical Laboratory, Jamshedpur 831007, Bihar State, India

2. **Mikrochimica Acta Springer-verlag 1994**
   Spectrophotometric Determination of Fe(III) with Tiron in the presence of Cationic surfactant and its Application for the Determination of Iron in Al-Alloys and Cu-Based Alloys
   S.N,Bhadani[1], Madhu Tewari[1], Archana Agrawal[2], K.Chandra Sekhar[2]
   [1]Department of Chemistry, Ranchi University, Ranchi, India
   [2]Analytical Chemistry Division, National Metallurgical Laboratory, Jamshedpur 831007, Bihar State, India

3. **J. Indian Chem. Soc, Vol. 75, March 1998, pp.176-177**
   Extractive-Photometric Determination of Cobalt (II) in Steel using 4-(2-Pyridylazo)resorcinol and Xylometazoline Hydrochloride
   S.N,Bhadani[1], Madhu Tewari[1], Archana Agrawal[2], K.Chandra Sekhar[2]
   [1]Department of Chemistry, Ranchi University, Ranchi, India
   [2]Analytical Chemistry Division, National Metallurgical Laboratory, Jamshedpur 831007, Bihar State, India

(Please note: Madhu Tewari is the maiden name of Madhu Pandey)

AWARDS

1. Received Chancellor's Awards for **Teaching 2011**

2. **Won the 1st best poster award** for "Characterization of Chlorophyll in Invasive Plant Species in West Central Florida for use in Hybrid Photosynthetic Electricity Production", Florida Academy of Science

3. **Service Award for 2014-2015 from Environmental Science, Policy and Geography Department.**

4. Received **USF World Faculty Travel Mobility Grant Award 2015-2016**

5. Received **VIVA Teaching Award** for working with students with Disability.

GRANTS

Received USF World Faculty Travel Grant 2015-2016.

Received **CSPACE grant** approximately $ 4700 for undergraduate research. Received small portion of NSF grant money with USF TAMPA for Biodiesel from Waste Oil project (main PI, Dr. Sunol from Tampa College of engineering).

Conference and Presentation:

1. Presented Lecture Seminar Series on Traditional Classroom vs Online Learning System" at Tathagat BEd College, Dhanbad, August 2014

2. Presented "Production of Energy from Waste" at College of Mechanical Engineering, ISM Dhanbad, August 2014

3. Participated in Nano Technology Seminar at USF Tampa, 2012

4. Participated in North America Pesticide Residue Conference 2015

5. Participated in Piezoelectric workshop at Benette University 2018

INVOLVED IN FOLLOWING RESEARCH PROJECTS

Continuous Production of Biodiesel from Waste Oil using Supercritical Alcohol Zachary Cerniga, Eilis McGranahan, Dr. Aydin Sunol, Dr. Madhu Pandey, Dr. George Philippidis, Department of Chemical and Biomedical Engineering University of South Florida, Tampa, University of South Florida, Saint Petersburg

Biodiesel Shelf Life: Orange Peels Not Effective in Removing Metal Contamination Doug Borgman,

Dr. Madhu Pandey, Aaron Burnham, University of South Florida, Saint Petersburg

Characterization of Chlorophyll in Invasive Plant Species in West Central Florida for use in Hybrid Photosynthetic Electricity Production
Sharon Warner, Dr. Madhu Pandey, University of South Florida, Saint Petersburg

To develop MEMS based acoustic absorber for harvesting of Acoustic Energy
Dr. Vinayak Ranjan (Indian Scholl of Mines, ISM, Dhanbad, India), Dr. Madhu Pandey (University of South Florida, Saint Petersburg)

Enhanced Photocatalytic Inactivation of E. coli in Water Using Nanocomposite Graphene-Titanium dioxide
Hazel Anderson, Dr. Madhu Pandey, University of South Florida, Saint Petersburg

Enhanced Photocatalytic Inactivation of E. coli in Water Using Nanocomposite MOS2- Titanium dioxide
Timothy McColgan, Dr. Madhu Pandey, University of South Florida, Saint Petersburg

Service Activity

ESPG Undergraduate Coordinator, June 2015-November 2015.

ESPG Undergraduate Co-coordinator, November 2015 to Summer 2016. Club Advisor of Environmental Science and Sustainability Club.

Club Advisor of South Asian Association Club.

Member of faculty search committee (chemistry), summer 2014, spring 2018. Member of USFSP Scholarship Committee.

Member of St. Petersburg Science Festival Committee Summer 2013 to present.

Judging Member – Florida Science and Engineering Fair 2014 to present.

Graduate Students Supervised (thesis track)

Hazel D.Anderson. 2015. M.S. (Environmental Science and Policy). Enhanced Photocatalytic Inactivation of E. coli in Water Using Nanocomposite Graphene-Titanium dioxide.

Julie Earls, 2017. PhD student (Environmental Science and Policy). Analysis of metals and pesticides residue in Organic fruits and vegetables.

Timothy Spencer McColgan. 2017. M.S. (Environmental Science and Policy). Enhanced Photocatalytic Inactivation of E. coli in Water Using Nanocomposite Molybdenum-Titanium dioxide.

Course Development

Developed Study Abroad India program and established collaboration with Indian School of Mines Dhanbad India.

Developed Study Abroad India program with Bennett University India. EDUCATION

PHILOSOPHY

Sa' Vidya' Ya' Vimuktaye (KNOWLEDGE THAT LIBERATES) - Sanskrit hymns from ancient Indian texts (Education is for all round liberation presents a renewed attempt to remove the imbalance between intuition and science; between formal and non-formal education; between globalization and localization.)

I want my students to enjoy chemistry and see through the practical applications of chemistry in day to day life. I encourage critical thinking and help them come up with innovative ideas.

I strongly believe in classroom democracy and promote it by actively engaging the students in an honest and open dialogue. I try to promote interactivity amongst students by using group discussion, assignments, quizzes, think pair and share, bonding, and other learner-centered activities. By using these methods students will capture the essence of the lesson and will engage into the collaborative classroom activity to retain the concepts.

My teaching methods include new technologies related to their subjects such as Internet, power point, educational shows, eBooks, Black-board, CANVAS etc. I keep myself up-to-date with better teaching skills and strategic quality planning, flexible scheduling, classroom management, through evaluation and suggestions.

XueFeng (Bob) Wang

Environmental Science, Policy and Geography
University of South Florida St. Petersburg
St. Petersburg, FL 33701

Phone: (727) 873-4869
Email: wangx@usfsp.edu

Education

1998	Ph.D. Chemistry, Weizmann Institute of Science, Rehovot, Israel
1988	M.S. Soil Science, Institute of Soil Science, Academia Sinica, Nanjing, China
1985	B.Eng. Agricultural Engineering, Shenyang Agricultural University, Shenyang, China

Employment

08/2018

Instructor of Chemistry, University of South Florida St. Petersburg, St. Petersburg, Florida

2003 – 07/2018

Lab Manager / Adjunct Chemistry Instructor, University of South Florida St. Petersburg, St. Petersburg, Florida

- Teach chemistry courses and labs (CHM 2045, CHM 2046, CHM 2045L and CHM 2046L)
- Coordinator for Teaching and Research labs (Chemistry, Biology, Geology, etc.)
- Supervise TAs in the ESPG and Biology Labs and CAS Teaching labs
- Maintain lab instruments and materials, such as GCMS, HPLC, Gamma Detector, Nutrient Analyzer, Water Quality Checker
- Design and maintain departmental website, conference websites, e-commerce
- Maintain the computers and servers in the geospatial lab
- Write scientific proposals for applications of exterior funding
- Order supplies and equipment for research labs and teaching labs
- P-card reconciler and verifier, using GEMS and FAST
- Proficient in use of Banner, Blackboard, and Canvas

2001-2002 Senior Software Developer, GotMarketing Inc., Ottawa, Ontario

- Using programming codes in Java, JSP, Servlet, HTML, JavaBean, Applet, , Oracle, MS SQL, PHP3
- Designing Java API in NAS, iPlanet, VisualCafe, Solaris, NT
- Responsible for online transactions design and implementation

2000 Research Associate, Canada Center for Remote Sensing, Ottawa, Ontario

- Developing partial-differential mathematical models for soil surface temperature simulation across Canada
- Simulating energy balance via satellite remote sensing data across Canada.

1997-1999 Post-doc Fellow, Dept. of Earth Science, University of Ottawa, Ontario
- Temporal and spatial variations in the hydrological and carbon cycle in aquatic ecosystems, by sampling and analyzing water samples in Ottawa River, Meech Lake and a swamp Creek in the Ottawa area.

Selected Publications:

1. Cassill, D.L., Anthony Greco, Rajesh Silwal and Xuefeng Wang. 2007. Opposable spines facilitate fine and gross object manipulation in fire ants. *Naturwissenschaften* 94: 326-332
2. Wang X.F. and Veizer J. (2000) Respiration/photosynthesis balance of terrestrial aquatic ecosystems, Ottawa area, Canada. *Geochimica et Cosmochimica Acta* 64, 3775-3786.
3. Wang X.F. and Yakir D. (2000) Using stable isotopes of water in evapotranspiration studies. *Hydrological Processes* 14, 1407-1421.
4. Wang X.F., Yakir D. and Avishai M. (1998) Non-climatic variations in the oxygen isotopic composition of plants. *Global Change Biology* 4, 835-849.
5. Yakir D. and Wang X. F. (1996) Fluxes of CO_2 and water between terrestrial vegetation and the atmosphere estimated from isotope measurements. *Nature* 380, 515-517.
6. Wang X.F., Xu F.A. and Shani U. (1996) Evaporation from bare soil in an extremely arid environment in southern Israel. *Pedosphere* 6, 139-146.
7. Wang X. F. and Yakir D. (1995) Temporal and spatial variations in oxygen-18 content of leaf water in different plant species. *Plant, Cell and Environment* 18, 1377-1385.
8. Wang X.F., Xu F.A. and Shani U. (1994) Corn growth as affected by plastic cover under drip irrigation condition. *Pedosphere* 4, 243-249.
9. Wang X.F., You W.R. and Wang Z.Q. (1991) Salt-water dynamics in highly salinized topsoil of salt-affected soil during water infiltration. *Pedosphere* 1, 315-323.

Courses taught

General Chemistry I, CHM 2045
General Chemistry II, CHM 2046
General Chemistry I Lab, CHM 2045L
General Chemistry II Lab, CHM 2046L
Chemistry for Liberal Studies, CHM 2020
Introduction to Environmental Science, EVR 2001
Intro to Environmental Science Lab, EVR 2001L

Synergistic Activities

Panelist: National Science Foundation (NSF)/GEO Division, May 2009
Safety officer: University Laboratory and Field Safety Committee, since 2006
Judge: Pinellas County History Fair, 2009 – 2012
Serving as a contact person for GIS Day event at USF St. Petersburg since 2005

Honors

Employee of the Month, University of South Florida St. Petersburg, September 2018
Employee of the Month, University of South Florida St. Petersburg, June 2010
Outstanding Employee of the Year, University of South Florida (system wide), 2009
Outstanding Employee of the Year, University of South Florida St. Petersburg, 2009
Outstanding Employee of the Year, University of South Florida St. Petersburg, 2007

Varol O. Kayhan, Ph.D.
Associate Professor - Information Systems & Decision Sciences
Office: LPH 428
Phone: 727-873-4006
Fax: 727-873-4571
Email: vkayhan@usfsp.edu

Academic Background

Ph.D. University of South Florida, Business Administration - Information Systems, 2010
M.S. University of South Florida, Management Information Systems, 2008

Professional Certifications

Microsoft Professional Program Certification for Artificial Intelligence, ba5289f3-b75c-4573-8858-d5228fbf0963, 2018 (Present)

AWS Certification (Solutions Architect - Associate), 13GVRWR2CNF11Y9J, 2017 (2017-2019)

Professional Memberships

Association of Information Systems (AIS),Current Decision Sciences Institute, 2014-2015

Work Experience Academic

Associate Professor, Kate Tiedemann College of Business, USF St. Petersburg (August, 2016 - Present), St. Petersburg, Florida.

Assistant Professor, Kate Tiedemann College of Business, USF St. Petersburg (August, 2010 - July, 2016), St. Petersburg, Florida.

Graduate Assistant, University of South Florida, College of Business (2006 - 2010), Tampa, Florida.

Non-Academic

Business Analyst, BNP-Ak-Dresdner Bank A.S. (1999 - 2004), Istanbul, Turkey.

Teaching Courses Taught

Courses from the Teaching Schedule: Business Intelligence (ISM6930), Database Administration (ISM6217), Database Design/Administration (ISM4212), Information Systems In Organizations (ISM3011), ST: Data Analysis (ISM6930), ST: Fund of Data Mngmt&Analysis (ISM6930-FDMA), ST: Predictive Analytics (ISM6930)

Intellectual Contributions Intellectual Contributions

Grid

Category	BDS	AIS	TLS	Total
Articles in Refereed Journals	4			4
Presentations of Refereed Papers	3			3

Articles in Refereed Journals

Basic or Discovery Scholarship

Kayhan, V. O., Cheng, Z., French, K., Allen, T., Salomon, K., & A. Watkins (2018). How honest are the

signals? A protocol for validating wearable sensors.*Behavior Research Methods, 50 (1)*, 57-83. [February]

Kayhan, V. & Davis, C. J. (2016). Situational privacy concerns and antecedent factors. *Journal of Computer Information Systems, 56 (3)*, 228-237. [Spring]

Kayhan, V. O. (2015). The nature, dimensionality, and effects of perceptions of community-governance. *Information and Management, 52 (1)*, 18-29. [January]

Kayhan, V. O. & Bhattacherjee, A. (2014). The salience of governance mechanisms in contributing to electronic repositories. *Data Base for Advances in Information Systems, 45 (2)*, 32-44. [May]

Presentations of Refereed Papers

Basic or Discovery Scholarship

Kayhan, V. O., Watkins, A., Kazanski, Z., & Padmanabhan, B. (2016-2017, December). *Predicting the winner of a NBA game in real-time: A data snapshot approach (Best Prototype Award).* Workshop on Information Technology and Systems (WITS), Dublin, Ireland.

French, K., Allen, T., Chen, Z., Kayhan, V. O., & Salomon, K. (2015-2016, April). *Understanding couple negotiations using sociometric badges.* The 31st Annual Conference of the Society for Industrial and Organizational Psychology (SIOP), Anaheim, California.

Kayhan, V. O. (2015-2016, December). *Confirmation bias: Roles of search engines and search contexts.* International Conference on Information Systems (ICIS), Ft. Worth, Texas.

Books, Monographs, Compilations, Manuals

Kayhan, V. O. (2016). *SAS Enterprise Miner Exercise and Assignment handbook for Higher Education* Self-Published.

Grants & Gifts

Research

2016-2017: Kayhan, V. O. Internal Research Grant, USF St Petersburg, Principal Investigator.

2015-2016: Kayhan, V. O. Internal Research Grant, USF St. Petersburg, Co-Principal Investigator.

2014-2015: Kayhan, V. O. nternal Research Grant, USF St. Petersburg, Principal Investigator.

Honors and Awards

2017-2018: Quality Matters (QM) Re-Certification of ISM 3011 online course, USF St Petersburg.

2016-2017: Best Prototype Award for Predicting the Winner of a NBA Game in Real-Time: A Data Snapshot Approach, Workshop on Information Technology and Systems (WITS), Dublin, Ireland.

2015-2016: Bank of America Endowed Professor, Kate Tiedemann College of Business, USF St. Petersburg. 2012-2013: Quality Matters Certification for ISM 3011 online course, USF St. Petersburg.

2011-2012: College of Business, Award for Teaching Excellence, USF St. Petersburg. 2011-2012: The Chancellor's

Award for Teaching Excellence, USF St. Petersburg.

Service

2011-2012: Decision-Making Under Uncertain Online Information: The Role of Web Governance, International

Association for Development of the Information Society - Best Paper Award.

Service to the Institution

College Assignments

Chair:

2016-2017 – 2017-2018: COB Faculty Standards Task Force (Co-Chair)
2016-2017 – 2017-2018: COB Annual Review and Assessment Committee (Co-Chair)

Member:

2017-2018: COB Undergraduate Curriculum and Assessment Committee 2016-2017 – 2017-2018: COB Tenure and Promotion
2015-2016: COB Annual Review and Assessment Committee
2014-2015: COB Faculty Development Committee
2014-2015: College Web Design Committee

Service to the Profession

Chair: Conference / Track / Program

2014-2015: Decision Sciences Institute Annual Meeting, Tampa, Florida (National).

Reviewer - Article / Manuscript

2016-2017: Big Data (International). Reviewer.

Reviewer: Ad Hoc Reviewer for a Journal

2015-2016: Information & Management (National).

University of South Florida
A Preeminent Research University

Agenda Item: III.f.

USF Board of Trustees
June 6, 2019

Issue: Faculty Nominations for Tenure

Proposed action: Approval of Nominees for Tenure, USF Tampa

Executive Summary:

Attached is the USF Tampa's list of faculty nominees for tenure for review and approval by the USF Board of Trustees. President Judy Genshaft has certified that the nominations for tenure have met the requirements and conditions contained in USF Regulations, Policies, and Procedures. She is satisfied that the nominees will make a significant professional contribution to USF and the academic community in general. If approved, tenure will be awarded effective August 7, 2019.

Financial Impact:

USF Tampa faculty granted tenure and promotion will receive a 9% salary increase and $5000 to Associate Professor and $7000 to Professor in special achievement. Faculty granted tenure only will not receive a monetary award.

Strategic Goal(s) Item Supports:
USF Strategic Plan 2013-2018, Goal II
Workgroup Review Date:
Academic and Campus Environment Work Group – May 14, 2019
Supporting Documentation Online (*please circle*): **Yes** **No**

- Memorandum to Jordan B. Zimmerman, Chair, USF Board of Trustees
- Tenure Nominations as a Condition of Employment
- Faculty Profiles

USF System or Institution specific: USF Tampa
Prepared by: Dwayne Smith, Senior Vice Provost & Dean, Graduate Studies, 813-974-2267

University of South Florida

A Preeminent Research University

MEMORANDUM

DATE: June 6, 2019

TO: Jordan B. Zimmerman, Chair

FROM: Judy Genshaft, President

SUBJECT: Faculty Nominations for Tenure, USF Tampa

I am requesting approval by the USF Board of Trustees of the enclosed Faculty Nominations for Tenure at USF Tampa. In nominating these faculty members for tenure, I certify that the requirements and conditions contained in USF Regulations, Policies, and Procedures for the granting of tenure have been met. I am satisfied that the nominees will make a significant professional contribution to USF Tampa and the academic community.

Enclosures

Faculty Nominations for Tenure, USF Tampa - 2018-19 Effective 2019-20
USF Board of Trustees Meeting – June 6, 2019

College	First Name	Last Name	Rank Upon Tenure	Department/ School	Degree of Effort*
Arts & Sciences	Padmaja	Ayyagari	Associate Professor	Economics	1.0
Arts & Sciences	Gil	Ben-Herut	Associate Professor	Religious Studies	1.0
Arts & Sciences	Chad	Dube	Associate Professor	Psychology	1.0
Arts & Sciences	Alon	Friedman	Associate Professor	School of Information	1.0
Arts & Sciences	Ioannis	Gelis	Associate Professor	Chemistry	1.0
Arts & Sciences	Jason	Gulley	Associate Professor	School of Geosciences	1.0
Arts & Sciences	Robert	Hoy	Associate Professor	Physics	1.0
Arts & Sciences	Amanda	Huensch	Associate Professor	World Languages	1.0
Arts & Sciences	Mile	Krajcevski	Associate Professor	Mathematics & Statisitcs	1.0
Arts & Sciences	Marleah	Kruzel	Associate Professor	Communication	1.0
Arts & Sciences	Quynh Nhu	Le	Associate Professor	English	1.0
Arts & Sciences	Xiaopeng	Li	Associate Professor	Chemistry	1.0
Arts & Sciences	Evangeline	Linkous	Associate Professor	School of Public Affairs	1.0
Arts & Sciences	Stephen	Neely	Associate Professor	School of Public Affairs	1.0
Arts & Sciences	Jianjun	Pan	Associate Professor	Physics	1.0
Arts & Sciences	Luanna	Prevost	Associate Professor	Integrative Biology	1.0
Arts & Sciences	Jeffrey	Raker	Associate Professor	Chemistry	1.0
Arts & Sciences	David	Rubin	Associate Professor	Women's and Gender Studies	1.0
Arts & Sciences	Mor	Segev	Associate Professor	Philosophy	1.0
Arts & Sciences	Davide	Tanasi	Associate Professor	History	1.0
Arts & Sciences	Kimberly	Walker	Associate Professor	Zimmerman School of Advertising & Mass Communications	1.0
Arts & Sciences	Jongseok	Woo	Associate Professor	School of Interdisciplinary Global Studies	1.0
Behavioral & Community Sciences	Bryanna	Fox	Associate Professor	Criminology	1.0
Behavioral & Community Sciences	Khary	Rigg	Associate Professor	Mental Health Law & Policy	1.0
Education	Amber	Dumford	Associate Professor	Leadership, Counseling, Adult, Career & Higher Education (LCACHE)	1.0
Education	Sanghoon	Park	Associate Professor	Education & Psychological Studies	1.0

Faculty Nominations for Tenure, USF Tampa - 2018-19 Effective 2019-20
USF Board of Trustees Meeting – June 6, 2019

College	First Name	Last Name	Rank Upon Tenure	Department/ School	Degree of Effort*
Education	Sarah	VanIngen	Associate Professor	Teaching & Learning (T&L)	1.0
Education	Nathaniel	von der Embse	Associate Professor	Education & Psychological Studies	1.0
Engineering	Ismail	Uysal	Associate Professor	Electrical Engineering	1.0
Morsani College of Medicine	Xingman	Sun	Associate Professor	Molecular Medicine	1.0
Morsani College of Medicine	Vladimir	Uversky	Professor	Molecular Medicine	1.0
Morsani College of Medicine	Hana	Totary-Jain	Associate Professor	Molecular Pharmacology & Physiology	1.0
Muma College of Business	Diana	Hechavarria	Associate Professor	Marketing	1.0
Muma College of Business	Jung-Chul	Park	Associate Professor	Finance	1.0
Nursing	Harleah	Buck	Associate Professor	N/A	1.0
Pharmacy	Kamila	Dell	Associate Professor	Pharacotherapeutics & Clinical Research	1.0
Pharmacy	Aimon	Miranda	Associate Professor	Pharacotherapeutics & Clinical Research	1.0
Pharmacy	Erini	Serag	Associate Professor	Pharacotherapeutics & Clinical Research	1.0
Pharmacy	Sheeba	Varghese Gupta	Associate Professor	Department of Pharmaceutical Sciences	1.0
Public Health	Dinorah	Martinez Tyson	Associate Professor	N/A	1.0
Public Health	Cheryl	Vamos	Associate Professor	N/A	1.0
Public Health	Janice	Zgibor	Professor	N/A	1.0
The Arts	Ezra	Johnson	Associate Professor	School of Art & Art History	1.0
The Arts	Joo Yeon	Woo	Associate Professor	School of Art & Art History	1.0

*If Less than 1.0 FTE

Prepared by:	Rosie Lopez
Title:	Executive Administrative Specialist
Phone Number:	(813) 974-2267
Date:	4/24/19

University of South Florida

FACULTY NOMINATIONS FOR TENURE

2018-19 effective 2019-20

HSC NOT INCLUDED

Sex, Race/Ethnicity	Applied	Deferred	Withdrawn	Denied	Nominated
MALES					
American Indian or Alaskan Native	0	0	0	0	0
Asian or Pacific Islander	6	0	0	0	6
Black, Not Hispanic	1	0	0	0	1
Hispanic	0	0	0	0	0
White, not Hispanic	18	0	1	2	15
Other	0	0	0	0	0
Total Male	**25**	**0**	**1**	**2**	**22**
FEMALES					
American Indian or Alaskan Native	0	0	0	0	0
Asian or Pacific Islander	3	0	0	0	3
Black, not Hispanic	0	0	0	0	0
Hispanic	1	0	0	0	1
White, not Hispanic	8	0	1	0	7
Other	0	0	0	0	0
Total Female	**12**	**0**	**1**	**0**	**11**
GRAND TOTAL	***37***	***0***	***2***	***2***	***33***

Eligible: Data is only from departments that have applicants applying during the current process.

APPLIED= Faculty whose names have been submitted for tenure review.
DEFERRED= Faculty for whom tenure was deferred during the review process.
WITHDRAWN= Faculty who withdrew from tenure consideration after applying for review.
DENIED= Faculty for whom tenure was denied during the review process.
NOMINATED= Faculty for whom tenure is being recommended by the University.

For out-of-unit faculty, pursuant to Rule 6C-5.940(1)(e), the decision to recommend an employee for tenure shall be made no later than the sixth year of continuous full-time service or equivalent part-time service in a tenure-earning position.

For in-unit faculty, pursuant to Article 15 of the BOR-UFF Agreement, an employee shall normally be considered for tenure during the sixth year of continuous service in a tenure-earning position including any prior service credit granted at the time of initial employment. An employee's written request for early tenure consideration is subject to the university written agreement.

Notes: The numbers provided should not include tenure nominations as a condition of employment.
Once having applied for tenure review, faculty may generally only be withdrawn from, denied, or nominated for tenure.
The sums of those withdrawn, denied, or nominated for tenure should equal the number of those who applied for tenure review. (Please explain any discrepancies.)

Tenure Attachment B rev.

Prepared by:	Rosie Lopez
Title:	Executive Administrative Specialist
Phone Number:	(813) 974-2267
Date:	4/24/19

University of South Florida

FACULTY NOMINATIONS FOR TENURE

2018-19 effective 2019-20

Tampa & HSC Included

Sex, Race/Ethnicity	Applied	Deferred	Withdrawn	Denied	Nominated
MALES					
American Indian or Alaskan Native	0	0	0	0	0
Asian or Pacific Islander	6	0	0	0	6
Black, Not Hispanic	1	0	0	0	1
Hispanic	0	0	0	0	0
White, not Hispanic	19	0	1	2	16
Other	1	0	0	0	1
Total Male	**27**	**0**	**1**	**2**	**24**
FEMALES					
American Indian or Alaskan Native	0	0	0	0	0
Asian or Pacific Islander	5	0	0	0	5
Black, not Hispanic	0	0	0	0	0
Hispanic	2	0	0	0	1
White, not Hispanic	12	0	1	0	12
Other	2	0	0	0	2
Total Female	**21**	**0**	**1**	**0**	**20**
GRAND TOTAL	***48***	***0***	***2***	***2***	***44***

Eligible: Data is only from departments that have applicants applying during the current process.

APPLIED=	Faculty whose names have been submitted for tenure review.
DEFERRED=	Faculty for whom tenure was deferred during the review process.
WITHDRAWN=	Faculty who withdrew from tenure consideration after applying for review.
DENIED=	Faculty for whom tenure was denied during the review process.
NOMINATED=	Faculty for whom tenure is being recommended by the University.

For out-of-unit faculty, pursuant to Rule 6C-5.940(1)(e), the decision to recommend an employee for tenure shall be made no later than the sixth year of continuous full-time service or equivalent part-time service in a tenure-earning position.

For in-unit faculty, pursuant to Article 15 of the BOR-UFF Agreement, an employee shall normally be considered for tenure during the sixth year of continuous service in a tenure-earning position including any prior service credit granted at the time of initial employment. An employee's written request for early tenure consideration is subject to the university written agreement.

Notes: The numbers provided should not include tenure nominations as a condition of employment.
Once having applied for tenure review, faculty may generally only be withdrawn from, denied, or nominated for tenure.
The sums of those withdrawn, denied, or nominated for tenure should equal the number of those who applied for tenure review. (Please explain any discrepancies.)

Tenure Attachment B rev.

University of South Florida
A Preeminent Research University

Agenda Item: III.g.

USF Board of Trustees
June 6, 2019

Issue: Faculty Nominations for Tenure as a Condition of Employment

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Proposed action: Approval of Nominees for Tenure as a Condition of Employment, USF Tampa

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Executive Summary:

Administrators such as the President, Provost, Deans, Chairs, and senior faculty who are recruited to USF Tampa are normally awarded tenure as a condition of employment. These highly qualified individuals usually have earned tenure at their previous institutions, which makes them attractive candidates to USF. In order to attract them, USF must provide a package that is competitive with other nationally and internationally ranked institutions. Tenure upon appointment for qualified candidates, among other things, is a term and condition of the employment package that makes USF an institution of choice.

Financial Impact:

Strategic Goal(s) Item Supports:
USF Strategic Plan 2013-2018, Goal II
Workgroup Review Date:
Academic and Campus Environment Work Group – May 14, 2019
Supporting Documentation Online (*please circle*): **Yes** **No**

- Memorandum to Jordan B. Zimmerman, Chair, USF Board of Trustees
- Tenure Nominations as a Condition of Employment
- Faculty Profiles

USF System or Institution specific: USF Tampa
Prepared by: Dwayne Smith, Senior Vice Provost & Dean, Graduate Studies, 813-974-2267

University of South Florida

A Preeminent Research University

MEMORANDUM

DATE: June 6, 2019

TO: Jordan B. Zimmerman, Chair

FROM: Judy Genshaft, President

SUBJECT: Faculty Nominations for Tenure as a Condition of Employment, USF Tampa

I am requesting approval by the USF Board of Trustees of the enclosed Tenure as a Condition of Employment Nominations at USF Tampa. In nominating these faculty members for tenure, I certify that the requirements and conditions contained in USF Regulations, Policies, and Procedures for the granting of tenure have been met. I am satisfied that the nominee will make a significant professional contribution to USF Tampa and the academic community.

Enclosures

Faculty Nominations for Tenure as a Condition of Employment, USF-Tampa
USF Board of Trustees Meeting – June 6, 2019

College	Name	Rank	Department/ School	Degree of Effort*	Previous Institution	Tenure at Previous Institution
Marine Science	Alastair Graham, PhD	Associate Professor	Geography	1.0	Exeter University	Yes
Muma College of Business	Steven C. Currall, PhD	President & Professor	Provost's Office	1.0	Southern Methodist University	Yes
Muma College of Business	Douglas Hughes, PhD	Chair & Professor	Marketing Department	1.0	Michigan State University	Yes
Muma College of Business	Dejun (Tony) Kong, PhD	Associate Professor	Information Systems & Decision Sciences	1.0	University of Houston	Yes
Muma College of Business	Mark H. Taylor, PhD	Director & Professor	Lynn Pippenger School of Accountancy	1.0	Case Western Reserve University	Yes
Morsani College of Medicine	Liwang Cui, PhD	Professor	Internal Medicine	1.0 .5 TE	The Pennsylvania State University	Yes
Morsani College of Medicine	Ji Li, PhD	Professor	Surgery	1.0 .5 TE	The University of Mississippi Medical Center	Yes
Morsani College of Medicine	David Lominadze, PhD	Professor	Surgery	1.0 .5 TE	University of Louisville	Yes
Morsani College of Medicine	Gopal Thinakaran, PhD	Professor	Molecular Medicine	1.0 .7 TE	The University of Chicago	Yes
Morsani College of Medicine	Lianchun Wang, MD	Professor	Molecular Pharmacology & Physiology	1.0 .7 TE	University of Georgia	Yes

*If less than 1.0 FTE

College of Marine Science

Alistair Graham, PhD

Dr. Alistair Graham will join the faculty at the College of Marine Science (CMS) on August 7, 2019 as Associate Professor. Dr. Graham received his Ph.D. in 2007 in Marine Geophysics from Imperial College (UK) working jointly with the British Geological Survey. Most recently, he has served as a Senior Lecturer (equivalent of a tenured Associate Professor) at the University of Exeter in the Geography Department. He is an established scholar with 53 peer-reviewed scientific publications (including 16 first author and 9 student-led), an h-index of 24, and 1,764 citations. Since 2012, Dr. Graham has obtained ~£700,000 in UK NERC funding and is presently involved in a three-year $2,000,000 NERC/NSF initiative to characterize ongoing glacial retreat in the Amundsen Sea, Antarctica. Dr. Graham is an internationally-recognized, sea-going, process-based geophysicist and sedimentologist. His recent work utilizes innovative sub-ice geophysical techniques to understand the past and present response of the West Antarctic Ice Sheet in a warming world. This research is essential for improving future sea level rise predictions and urban planning in Florida. Additionally, Dr. Graham identified potential collaborations with CMS researchers working in the Gulf of Mexico. Specifically, he is interested in pursuing funding that would make CMS unique within the context of existing academic research programs in Florida, provide additional support to usage of Florida Institute of Oceanography vessels and the autonomous underwater vehicles operated by the CMS Ocean Technology Group, and create Gulf of Mexico-based learning and research opportunities for USF CMS students. Finally, Dr. Graham is committed to improving diversity in Geosciences and Higher Education. At Exeter University, he served as the departmental Diversity Officer, working with University administration, faculty, and students to improve diversity of Exeter's faculty and student body. The College of Marine Science Promotion and Tenure Committee recommends Dr. Graham for tenure at the rank of Associate Professor. Dr. Jacqueline Dixon, Dean of the College of Marine Science, along with Provost Ralph Wilcox and President Judy Genshaft, concur with this recommendation for tenure upon appointment.

Muma College of Business

Steven C. Currall, Ph.D.

Dr. Steven C. Currall is being hired as the President of the University of South Florida at the rank of Professor in the Information Systems and Decision Sciences Department beginning in July 2019. He is currently the Provost and Vice President for Academic Affairs at Southern Methodist University and has previously served as Dean of the Graduate School of Management at the University of California – Davis. He has also held faculty and administrative positions at the University College of London and at Rice University. Dr. Currall earned his Doctor of Philosophy in organizational behavior from Cornell University. He holds a master's degree in social psychology from the London School of Economics and Political Science, and a bachelor's degree from Baylor University. Dr. Currall has an extensive research record, having published in several high-quality journals including *Organizational Behavior and Human Decision Processes*, *Organization Science*, *Journal of International Business Studies*, and *Personnel Psychology*. His works have generated over 4,900 citations (as per Google Scholar), and he has received a number of national and institutional awards for his research efforts. In addition to his published works, Dr. Currall has worked on grant projects totaling over $21 million, 78% of which were from refereed grants such as the National Science Foundation and the National Institutes of Health. The impact of his research has led to Dr. Currall being named as an American Association for the Advancement of Science Fellow and asked to serve as a member of the U.S. Nanotechnology Advisory Group. Dr. Currall has worked with students at all degree levels and taught numerous executive education courses. The faculty of the Information Systems and Decision Sciences Department recommends tenure upon hire at the rank of Professor, a recommendation strongly supported by the Muma College of Business Promotion and Tenure Committee as well as the Dean of the College. This recommendation is strongly supported by Provost Ralph Wilcox and President Judy Genshaft.

Muma College of Business

Douglas Hughes, Ph.D.

Dr. Douglas Hughes is being hired as the Chair of the Marketing Department at the rank of Professor. He is currently Professor and Chair of the Department of Marketing in the Eli Broad College of Business at Michigan State University, which is an AAU member. Prior to going into academia, he held several leadership positions in Fortune 100/500 companies. In 2008, Dr. Hughes earned his Doctor of Philosophy in marketing from the University of Houston, and holds an MBA degree from Michigan State University. Although serving as a department chair for the past three years, Dr. Hughes maintains an active research agenda. He has 14 published articles in refereed journals, seven of which are on the prestigious *Financial Times* list of 50 influential journals, including *Journal of Marketing, Journal of Marketing Research* and the *Journal of the Academy of Marketing Science*. In addition to his excellent research record, Dr. Hughes is a skilled teacher, having taught at all degree levels and serving as a regular guest lecturer at the Vienna University of Economics and Business. His background and experience in industry will allow Dr. Hughes to build on the strong relationships the department has with the Tampa Bay business community. The faculty of the Marketing Department unanimously recommends tenure upon hire at the rank of Professor, a recommendation strongly supported by the Muma College of Business Promotion and Tenure Committee as well as the Dean of the College. This recommendation is strongly supported by Provost Ralph Wilcox and President Judy Genshaft.

Muma College of Business

Dejun (Tony) Kong, Ph.D.

Dr. Dejun Kong is being hired at the rank of Associate Professor in the Information Systems and Decision Sciences Department. He is currently a tenured Associate Professor of Management and Leadership at the C. T. Bauer College of Business, University of Houston. In 2012, Dr. Kong earned his PhD in Business Administration (Organizational Behavior) at Washington University, St. Louis, Missouri. In his relatively short time as an academic, Dr. Kong has published or had accepted for publication 35 refereed journal articles. A significant number of the articles have been published in highly ranked journals such as the *Academy of Management Journal*, the *Journal of Applied Psychology*, and the *Journal of Business Ethics*. Dr. Kong has over 500 citations of his published research and an h-index of 14 based on Google Scholar. In addition to his research, Dr. Kong has a strong and diverse teaching background, having taught at all program levels. Most recently, Dr. Kong has been named by *Poets&Quants* as one of this year's 40 best business school professors under the age of 40 in its annual 40 under 40 best b-school professors. The faculty of the Information Systems and Decision Sciences Department recommends tenure upon hire at the rank of Associate Professor, a recommendation strongly supported by the Muma College of Business Promotion and Tenure Committee as well as the Dean of the College. This recommendation is strongly supported by Provost Ralph Wilcox and President Judy Genshaft.

Muma College of Business

Mark H. Taylor, Ph.D.

Dr. Mark H. Taylor is being hired as Director of the Lynn Pippenger School of Accountancy at the rank of Professor. He is currently the Andrew D. Braden Professor of Accounting and Auditing and for the past six years has served as Chair of the Department of Accountancy at the Weatherhead School of Management, Case Western Reserve University, an AAU member. In 1994 Dr. Taylor earned his Doctor of Philosophy with an emphasis in accounting from the University of Arizona. He holds a Master of Accountancy degree from Brigham Young University. Dr. Taylor has over 30 published/ forthcoming articles in refereed journals, many of which are in high quality accounting journals. The impact of his research publication record is reflected in Dr. Taylor's appointments with businesses and professional organizations such as the Securities and Exchange Commission, the Auditing Standards Board of the American Institute of Certified Public Accountants, and as an independent trustee and audit committee chair of the Northern Lights Fund Trust. The faculty of the Lynn Pippenger School of Accountancy recommends tenure upon hire at the rank of Professor, a recommendation strongly supported by the Muma College of Business Promotion and Tenure Committee as well as the Dean of the College. This recommendation is strongly supported by Provost Ralph Wilcox and President Judy Genshaft.

USF Health, Morsani College of Medicine

Liwang Cui, PhD

Dr. Liwang Cui joined the faculty at USF Health, the Morsani College of Medicine (MCOM), on October 1, 2018 as Professor with the Department of Internal Medicine. His primary responsibility is research, with a second area of focus in teaching. Dr. Cui is an internationally recognized scientist and researcher and teacher who holds a high profile in his area of research. He comes to USF from Pennsylvania State University where he was Professor in the Department of Entomology. Dr. Cui was funded by multiple NIH grants and served as PI for a Fogarty International Center award, an U19 Research Center award that runs through 2024, two active R01 awards as well as a R21 grant. Dr. Cui's research focuses on the molecular biology of malaria parasites and the transmission of these parasites by the mosquito vector. He has published 215 peer-reviewed articles, and has served on multiple NIH, Dept. of Defense, and USDA grant review panels. Dr. Cui's graduate training includes two doctoral degrees, a PhD in Biology from Moldova Agricultural University in the former USSR in 1991 and a PhD in Molecular Virology from the University of Kentucky in 1996. He followed with his post-doctoral training at Walter Reed Army Institute of Research and was appointed as Research Asst. Professor in the Dept. of Preventive Medicine, Edward Hebert School of Medicine, Uniformed Services University of the Health Sciences. Dr. Cui was appointed Assistant Professor in the Dept. of Entomology at Pennsylvania State University in 2000, was promoted to Associate Professor with tenure in 2006 and Professor in 2009. In addition to his numerous research accomplishments, Dr. Cui has positively influenced the education of graduate and post-graduate trainees. Dr. Cui is mentoring 18 postdoctoral and visiting scholars, and 15 graduate students. Dr. Cui exceeds the criteria for Professor with tenure. He has gained the highest respect within the scientific community, is a well-established and successful researcher committed to serving his profession and the university community. The MCOM Appointment, Promotion and Tenure Committee, and the chair of the Department of Internal Medicine recommend Dr. Cui for tenure at the rank of Professor. Dr. Charles J. Lockwood, Senior Vice President of USF Health, and Dean, MCOM along with Provost Ralph Wilcox and President Judy Genshaft, concur with this recommendation for tenure upon appointment.

USF Health, Morsani College of Medicine

Ji Li, PhD

Dr. Ji Li will join the faculty at USF Health, the Morsani College of Medicine (MCOM), on July 1, 2019 as Professor with the Department of Surgery. His primary responsibility is research, with secondary and tertiary areas of focus of teaching and service. Dr. Li is an internationally recognized scientist and researcher and teacher who holds a high profile in his area of research. He was recruited from the University of Mississippi Medical Center (UMMC) where he most recently served as Associate Professor with tenure, and Associate Director of the Mississippi Center or Heart Research. Dr. Li earned a PhD in Cell Biology in 1998, and a MS degree in Biophysics in 1992 from Lanzhou University, Lanzhou, Gansu Province, China. He completed a postdoctoral fellowship in 2000 at Sichuan University, China; was a Visiting Fellow with the NIA/NIH from 2000-2002, and completed a second postdoctoral fellowship in Physiology at Yale University in 2003. Dr. Li has secured NIH funding since 2008. He brings to USF $3.4 million in grant funding. He is the Principal Investigator on two NIH R01 grants, and one American Diabetes Association grant. He is Co-PI on another R01 grant, and has several R01/R21 applications pending. Dr. Li's research focuses on the metabolic parameters associated with myocardial ischemia associated with environmental stress, with particular emphasis on the signal transduction pathways in the regulation of cardiac metabolism. He currently sits on 10 Editorial Boards, and serves on 16 grant review panels. Dr. Li is an active member of many professional societies and recently served as the President for the Chinese American Diabetes Association. He has mentored hundreds of undergraduate and graduate students, supervised 24 Visiting Scholars, sat on 11 Thesis Committees, and three T32 Grant Mentoring Committees.
Dr. Li exceeds the criteria for Professor with tenure. He has gained the highest respect within the scientific community, is a well-established and successful researcher committed to serving his profession and the university community. The MCOM Appointment, Promotion and Tenure Committee, and the chair of the Department of Surgery recommend Dr. Li for tenure at the rank of Professor. Dr. Charles J. Lockwood, Senior Vice President of USF Health, and Dean, MCOM along with Provost Ralph Wilcox and President Judy Genshaft, concur with this recommendation for tenure upon appointment.

USF Health, Morsani College of Medicine

David Lominadze, PhD

Dr. David Lominadze will join the faculty at USF Health, the Morsani College of Medicine (MCOM), on August 16, 2019 as Professor with the Department of Surgery. His primary responsibility is research. In addition, he will teach medical students, graduate students, residents and fellows. Dr. Lominadze is internationally recognized for his research on microvascular and neurovascular biology with emphasis on neurodegeneration and brain injury. He comes to USF from the University of Louisville Medical School, Louisville, KY where he served as Professor with tenure in the Department of Physiology. He has secured continuous NIH funding since 2002, and brings to USF more than $4 million in funding through 2023. He currently serves as PI on two R01 awards, as Co-PI on two additional R01 awards, and as a Mentor for a R25 Research Training Project. Dr. Lominadze has published 69 peer-reviewed articles with 42 as first or senior author in prestigious journals, 9 invited book chapters, and 100 scientific abstracts. He received his Master's degree in Physics and Biophysics from the Tbilisi State University, Tbilisi, Georgia, and his PhD in Biology and Human and Animal Physiology from the I. Beritashvili Institute of Physiology, Tbilisi, Georgia. After serving in multiple leadership positions, such as the Head of the Microrheology Section, Microcirculation Research Center, and the Assistant Head of the Microcirculation Research Center, I. Beritashvili Institute of Physiology, Georgian Academy of Sciences, Dr. Lominadze transitioned to the University of Louisville. In addition to his numerous research accomplishments, Dr. Lominadze has a strong track-record of service, both nationally and internationally. He serves as a frequent peer reviewer, and sits on numerous national and international advisory councils, and steering committees. Dr. Lominadze exceeds the criteria for Professor with tenure. He has gained the highest respect within the scientific community, is a well-established and successful researcher committed to serving his profession and the university community. The MCOM Appointment, Promotion and Tenure Committee, and the chair of the Department of Surgery recommend Dr. Lominadze for tenure at the rank of Professor. Dr. Charles J. Lockwood, Senior Vice President of USF Health, and Dean, MCOM along with Provost Ralph Wilcox and President Judy Genshaft, concur with this recommendation for tenure upon appointment.

USF Health, Morsani College of Medicine

Gopal Thinakaran, PhD

Dr. Gopal Thinakaran will join the faculty at USF Health, the Morsani College of Medicine (MCOM), on August 1, 2019 as Professor with the Department of Molecular Medicine. His primary responsibility will be research and administration. In addition to his academic appointment, Dr. Thinakaran will serve as Associate Dean of Neuroscience research at the Neuroscience Institute at USF. Dr. Thinakaran is an internationally recognized Alzheimer's research scientist. He comes to USF from the University of Chicago where he most recently served as tenured Professor during his 20-year tenure there. Dr. Thinakaran completed his PhD in Molecular Biology and Genetics from the University of Guelph, Guelph Ontario in 1992. He then completed a Postdoctoral Fellowship in the Department of Pathology at Johns Hopkins University School of Medicine. He has been continuously funded for more than 20 years and brings to USF more than $9 million in NIH funding that will continue through 2023. He is regarded as one of the top researchers in the country who studies the molecular pathogenesis of Alzheimer's disease. Dr. Thinakaran's superior expertise in developing and applying groundbreaking research methodologies has fostered new ways to study Alzheimer's disease. He has 136 publications with an h-index of 52 and has been cited 11,560 times. He currently holds three R01 grants and is expecting an additional award for a multi-PI R01 soon. Dr. Thinakaran serves as a permanent member on NIH study sections and other grant funding agencies, as well as serving on the editorial boards of several national and international major neuroscience journals. Dr. Thinakaran exceeds the criteria for Professor with tenure. He has gained the highest respect within the scientific community, is a well-established and successful researcher committed to serving his profession and the university community. The MCOM Appointment, Promotion and Tenure Committee, and the chair of the Department of Molecular Medicine recommend Dr. Thinakaran for tenure at the rank of Professor. Dr. Charles J. Lockwood, Senior Vice President of USF Health, and Dean, MCOM along with Provost Ralph Wilcox and President Judy Genshaft, concur with this recommendation for tenure upon appointment.

USF Health, Morsani College of Medicine

Lianchun Wang, MD

Dr. Lianchun Wang joined the faculty at USF Health, the Morsani College of Medicine (MCOM), on November 1, 2018 as Professor with the Department of Molecular Pharmacology and Physiology. His primary responsibility is research, with secondary and tertiary areas of focus of teaching and service. Dr. Wang is an internationally recognized researcher and teacher who holds a high profile in his area of research. He comes to USF from the University of Georgia (UGA) where he was Professor with tenure in the Department of Biochemistry and Molecular Biology. Dr. Wang has sustained continuous grant funding since 2006 and most recently brings to USF nearly $3 million in funding from the National Cancer Institute, with an additional $3.8 grant pending from the National Institute on Aging. His research focuses on heparan sulfate proteoglycan in cardiovascular biology, cancer, and Alzheimer's disease. He has 63 peer reviewed publications. His teaching expertise includes cardiovascular physiology, biochemistry, and cell communication and regulation. Dr. Wang earned a Master's of Science degree in Physiology and Clinical Biochemistry at the Hunan Medical University, China, in 1993. He earned a MD at Heidelberg University, Germany in 1999, and completed a post-doctoral fellowship in Cellular and Molecular Medicine at the University of California San Diego School of Medicine, La Jolla, CA in 2004. Dr. Wang was appointed as Assistant Professor at UGA in 2006, was promoted to Associate Professor with the award of tenure in 2013, and to Professor in 2018. In addition, Dr. Wang has trained 7 graduate students, 11 postdocs, numerous undergraduate students, and has served on 23 Graduate Advisory Committees. He has been the invited speaker at 25 national and/or international conferences, and has presented 21 academic seminars throughout the United States, and China. Dr. Wang exceeds the criteria for Professor with tenure. He is a well-established and successful researcher committed to serving his profession and the university community. The MCOM Appointment, Promotion and Tenure Committee, and the chair of the Department of Molecular Pharmacology and Physiology recommend Dr. Wang for tenure at the rank of Professor. Dr. Charles J. Lockwood, Senior Vice President of USF Health, and Dean, MCOM along with Provost Ralph Wilcox and President Judy Genshaft, concur with this recommendation for tenure upon appointment.

University of South Florida
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Agenda Item: III.h.

USF Board of Trustees
June 6, 2019

Issue: Faculty Nominations for Tenure

Proposed action: Approve USF St. Petersburg Faculty Nominees for Tenure

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Background Information:

Attached is USF St. Petersburg list of faculty nominees for tenure for review and approval by the USF Board of Trustees. President Judy Genshaft has certified that the nominations for tenure have met the requirements and conditions contained in USF Regulations, Policies, and Procedures. She is satisfied that the nominees will make a significant professional contribution to USF St. Petersburg and the academic community in general. If approved, tenure will be awarded effective August 7, 2019.

Strategic Goal(s) Item Supports:
USF St. Petersburg Strategic Plan 2014-2019, Goal 3
USF Strategic Plan 2013-2018, Goal 1

BOT Committee Review Date:
Academic and Campus Environment Committee **– May 14, 2019**

Supporting Documentation: Yes

USF System or Institution specific: USF St. Petersburg

Prepared by: Dr. Allyson Watson, Interim CAO of Academic Affairs, 727-873-4290

University of South Florida

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MEMORANDUM

DATE: June 6, 2019

TO: Jordan Zimmerman, Chair

FROM: Judy Genshaft, President

SUBJECT: Faculty Nominations for Tenure, USF St. Petersburg

I am requesting that the enclosed Faculty Nominations for Tenure at USF St. Petersburg submitted to the USF Board of Trustees be approved. In nominating these faculty members for tenure and promotion, I certify that the requirements and conditions contained in USF Regulations, Policies, and Procedures for the granting of tenure and promotion have been met. I am satisfied that the nominees will make a significant professional contribution to USF St. Petersburg and the academic community.

Thank you for your consideration of this request. Please call me if you have any questions.

Enclosures

Faculty Nominations for Tenure, USF St. Petersburg Effective 2018/19 USF Board of Trustees Meeting – June 6, 2019

College	Name	Rank Upon Tenure	Discipline	Degree of Effort*
College of Arts and Sciences	**Hossam Ashour**	Associate Professor	Biological Sciences	1.0
College of Arts and Sciences	**Casey Frechette**	Associate Professor	Journalism & Media Studies	1.0
College of Arts and Sciences	**Heather Judkins**	Associate Professor	Biological Sciences	1.0
College of Arts and Sciences	**Maria Leitte**	Associate Professor	Biological Sciences	1.0
College of Arts and Sciences	**Frederic Leveziel**	Associate Professor	Society, Culture & Language	1.0
College of Arts and Sciences	**Richard Mbatu**	Associate Professor	History & Politics	1.0
College of Education	**David Rosengrant**	Associate Professor	College of Education	1.0

* If Less than 1.0 FTE

Florida Equity Reports
University of South Florida St. Petersburg
2018- 2019
PART VII: Protected-class Representation in the Tenure Process, 2018-2019

Sex, Race/Ethnicity	*Applied	*Withdrawn	*Denied	*Deferred	*Nominated
MALES					
American Indian or Alaskan Native	0	0	0	0	0
Asian	0	0	0	0	0
Black or African American	1	0	0	0	1
Hispanic	0	0	0	0	0
Native Hawaiian/Other Pacific Islander					
Two or More Races	0	0	0	0	0
White	4	0	0	0	4
Other, Not Reported	0	0	0	0	0
Total Male (include Other, Not Reported)	**5**	**0**	**0**	**0**	**5**
FEMALES					
American Indian or Alaskan Native	0	0	0	0	0
Asian	0	0	0	0	0
Black or African American	0	0	0	0	0
Hispanic	0	0	0	0	0
Native Hawaiian/Other Pacific Islander					
Two or More Races	0	0	0	0	0
White	2	0	0	0	2
Other, Not Reported	0	0	0	0	0
Total Female (Number and Percent) (include Other, Not Reported)	**2**	**0**	**0**	**0**	**2**
GRAND TOTAL	**7**	**0**	**0**	**0**	**7**

*APPLIED: Faculty whose names have been submitted for tenure review. Sum of Withdrawn, Denied, and Nominated (or provide explanation).

*WITHDRAWN: Faculty who withdrew from tenure consideration after applying for review.

*DENIED: Faculty for whom tenure was denied during the review process.

*NOMINATED Faculty for whom tenure is being recommended by the University.

Florida Equity Reports
University of South Florida St. Petersburg
2018-2019
PART VIII: Tenure and Promotion Committee Composition, AY 2018-2019

Type of Committee		Black, not Hispanic		American Indian/ Alaskan Native		Asian or Pacific Islander		Hispanic		White, not Hispanic		Other, Not Reported		Total including Other, Not Reported	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F
University Committee	E	0	0	0	0	0	0	1	1	5	0	0	0	6	1
	S	0	0	0	0	0	0	1	1	5	0	0	0	6	1
College of Business	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
College of Arts & Sciences	E	0	0	0	0	0	0	2	0	9	16	0	0	11	16
	S	0	0	0	0	0	0	2	0	9	16	0	0	11	16
College of Education	E	0	0	0	0	0	0	0	0	2	1	0	0	2	1
	S	0	0	0	0	0	0	0	0	2	1	0	0	2	1

E = Eligible to serve
S = Actually served (may include faculty from other USF campuses, who are not counted in eligible to serve)

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Agenda Item: III.i.

USF Board of Trustees
June 6, 2019

Issue: Tenure Nomination as a Condition of Employment

Proposed action: Approve Tenure as a Condition of Employment, USF St Petersburg

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Executive Summary:

USF St. Petersburg (USFSP) administrators such as the Regional Chancellor, Regional Vice Chancellors, Deans, and senior faculty are commonly awarded tenure as a condition of employment. Typically, these highly accomplished and qualified individuals have earned tenure at their previous institution (s), which makes them desirable candidates to USFSP. In order to attract them, USFSP must provide a package that is competitive with other nationally and internationally ranked institutions. Tenure upon appointment, among other things, is a term and condition of the employment package that makes USFSP an institution of choice.

Financial Impact:
Faculty granted tenure only will not receive a monetary award.

Strategic Goal(s) Item Supports:
USF St. Petersburg Strategic Plan 2014-2019, Goal 3
USF Strategic Plan 2013-2018, Goal 1

BOT Committee Review Date:
Academics and Campus Environment Committee – May 14, 2019

Supporting Documentation Online (*please circle*): (Yes) **No**
USF System or Institution specific: USF St. Petersburg

Prepared by: Dr. Allyson Watson, Interim CAO of Academic Affairs, 727-873-4290

University of South Florida
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MEMORANDUM

DATE: June 6, 2019

TO: Jordan Zimmerman, Chair

FROM: Judy Genshaft, President

SUBJECT: Tenure as a Condition of Employment Nominations, USF St. Petersburg

I am requesting that the enclosed Faculty Nominations for Tenure as a condition of Employment at USF St. Petersburg submitted to the USF Board of Trustees be approved. In nominating these faculty members for tenure, I certify that the requirements and conditions contained in USF Regulations, Policies, and Procedures for the granting of tenure have been met. I am satisfied that the nominees will make a significant professional contribution to USF St. Petersburg and the academic community

Thank you for your consideration of this request. Please call me if you have any questions.

Enclosures

Faculty Nominations for Tenure as a Condition of Employment, USF-St. Petersburg
USF Board of Trustees Meeting – June 6, 2019

College	Name	Rank	Department/ School	Degree of Effort*	Previous Institution	Tenure at Previous Institution
Kate Tiedemann College of Business	Tianxia (Tina) Yang	Associate Professor	Finance	1.0	Villanova University	Yes

*If less than 1.0 FTE

University of South Florida St. Petersburg
Tenure Nominations as a Condition of Employment

Kate Tiedemann College of Business

Tianxia (Tina) Yang, Ph.D.

Dr.Yang will join the faculty at Kate Tiedemann College of Business on August 9, 2019 as Associate Professor with the Department of Finance, Economics, and Entrepreneurship.

Biography of Dr. Tianxia (Tina) Yang

Tianxia (Tina) Yang graduated with a Ph.D. in Finance from the University of Georgia in 2005. She also holds an M.B.A. and an M.S. in International Business from the University of Miami and a B.S. from the University of International Business and Economics in Beijing, China.

Tina comes to USF St. Petersburg from Villanova University. She joined Villanova University as an Assistant Professor of Finance in 2009 and received tenure in 2015. She also held the appointment of Assistant Professor of Finance at Clemson University from 2006 to 2009 and the appointment of Visiting Assistant Professor of Finance at the University of South Florida from 2005 to 2006. Tina has taught a large number of undergraduate and graduate level courses at Villanova University, Clemson University, the University of South Florida, and the University of Georgia, including corporate finance, financial management, financial markets and valuation, and international finance. Tina served as Faculty Director of the Villanova School of Business Honors Program. Tina is particularly passionate about elevating Villanova's research culture and developing undergraduate students' research skills.

Dr. Yang's research interests span a wide range of corporate finance topics including corporate governance, sustainability, risk management, financial institutions, and mergers and acquisitions. She has published 12 articles in high quality peer-reviewed journals. Three of her articles are on the University of Texas at Dallas Premier Journal list and the Financial Times Top 50 journal list. Her co-authored 2012 article published in *American Business Law Journal* won the Journal's 2013 Hoeber Outstanding Article Award. Her 2008 co-authored article published in *the Journal of Financial Economics* is the Journal's third most cited paper for the period of 2008–2013. Her forthcoming article in *Management Science* is the Semifinalist for the Best Paper Award in Corporate Finance at the 2013 Financial Management Association (FMA) Annual Conference. Her co-authored 2015 article published in *the Journal of Corporate Finance* is the Finalist for the Best Paper Award at the 2015 FMA European Conference. She is the recipient of the Financial Services Exchange Research Award, an Oxford-Yale Research Grant, and a China National Natural Science Foundation research grant. She has made numerous presentations at premier national and international conferences.

Dr. Yang has served in multiple university level committees, including the University Board of Trustees Investment Committee at Villanova. Her service to the profession includes serving on the Board of Directors of Southern Finance Association. She also serves as discussant, session chair, and program committee member at conferences such as FMA, EFA, Northern Financial Association (NFA), and SFA. She has also served as an Ad Hoc reviewer for over 17 journals including *Review of Financial Studies*, *Journal of Financial and Quantitative Analysis*, and *Journal of Financial Intermediation.*

The Kate Tiedemann College of Business Tenure and Promotion Committee, the chair of the Department Finance, Economics, and Entrepreneurship, and Tenured Faculty of the Kate Tiedemann College of Business recommend Dr. Yang for tenure at the rank of Associate Professor. Dr. Sridhar Sundaram, Dean of the Kate Tiedemann College of Business, along with Interim Chief Academic Officer, Dr. Allyson Watson, and President Judy Genshaft, concur with this recommendation for tenure upon appointment.

Agenda Item: III.j.

USF Board of Trustees
June 6, 2019

Issue: Faculty Nomination for Tenure

Proposed action: Approve USF Sarasota-Manatee Faculty Nominee for Tenure

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Background information:

Attached is USF Sarasota-Manatee's list of faculty nominees for tenure for review and approval by the USF Board of Trustees. President Judy Genshaft has certified that the nominations for tenure have met the requirements and conditions contained in USF Regulations, Policies, and Procedures. She is satisfied that the nominees will make a significant professional contribution to USF Sarasota-Manatee and the academic community in general. If approved, tenure will be awarded effective August 7, 2019.

Financial Impact:

USF Sarasota-Manatee faculty granted tenure and promotion will receive a 9% salary increase and $5000 to Associate Professor and $7000 to Professor in special achievement. Faculty granted tenure only will not receive a monetary award.

Strategic Goal(s) Item Supports:
USF Sarasota-Manatee Strategic Plan 2015-2020, Goals 4 and 5
USF Strategic Plan 2013-2018, Goal 1

Workgroup Review Date:
Academic and Campus Environment Committee – May 14, 2019

Supporting Documentation Online (*please circle*): **Yes** **No**
Memorandum to Jordan Zimmerman, Chair, USF Board of Trustees
Faculty Nomination for Tenure

USF System or Institution specific:
USF Sarasota-Manatee

Prepared by: Karen Holbrook, Regional Chancellor, 941-359-4340

MEMORANDUM

DATE: June 6, 2019

TO: Jordan Zimmerman, Chair

FROM: Judy Genshaft, President

SUBJECT: Faculty Nominations for Tenure, USF Sarasota-Manatee

I am requesting that the enclosed Faculty Nominations for Tenure, USF Sarasota-Manatee, submitted to the USF Board of Trustees, be approved. In nominating these faculty members for tenure, I certify that the requirements and conditions contained in the USF Regulations, Policies, and Procedures, for the granting of tenure have been met. I am satisfied that the nominees will make a significant professional contribution to USF Sarasota-Manatee and the academic community.

Nominees for tenure:

Kelly Cowart, Marketing

Anthony Coy, Psychology

Timothy Turner, English

Thank you for your consideration of this request. Please call me if you have any questions.

Faculty Nominations for Tenure, USF Sarasota-Manatee- Effective 2019/2020
USF Board of Trustees Meeting- June 6, 2019

College	Name	Rank Upon Tenure	Discipline	Degree of Effort*
College of Business	Kelly Cowart	Associate Professor	Marketing	
College of Science and Math	Anthony Coy	Associate Professor	Psychology	
College of Liberal Arts and Social Sciences	Timothy Turner	Associate Professor	English	

*If less than 1.0 FTE

Florida Equity Reports
University of South Florida Sarasota-Manatee
2018- 2019

PART VII: Protected-class Representation in the Tenure Process, 2018-2019

Sex, Race/Ethnicity	*Applied	*Withdrawn	*Denied	*Deferred	*Nominated
MALES					
American Indian or Alaskan Native	0	0	0	0	0
Asian	0	0	0	0	0
Black or African American	0	0	0	0	0
Hispanic	0	0	0	0	0
Native Hawaiian/Other Pacific Islander	0	0	0	0	0
Two or More Races	0	0	0	0	0
White	2	0	0	0	2
Other, Not Reported	0	0	0	0	0
Total Male (include Other, Not Reported)	**2**	**0**	**0**	**0**	**2**
FEMALES					
American Indian or Alaskan Native	0	0	0	0	0
Asian	1	0	1	0	0
Black or African American	1	0	0	0	1
Hispanic	0	0	0	0	0
Native Hawaiian/Other Pacific Islander	0	0	0	0	0
Two or More Races	0	0	0	0	0
White	0	0	0	0	0
Other, Not Reported	0	0	0	0	0
Total Female (Number and Percent) (include Other, Not Reported)	**2 50.0%**	**0 0.0%**	**1 100.0%**	**0 0.0%**	**1 33.3%**
GRAND TOTAL	**4**	**0**	**1**	**0**	**3**

*APPLIED: Faculty whose names have been submitted for tenure review. Sum of Withdrawn, Denied, and Nominated (or provide explanation).
*WITHDRAWN: Faculty who withdrew from tenure consideration after applying for review.
*DENIED: Faculty for whom tenure was denied during the review process.
*NOMINATED Faculty for whom tenure is being recommended by the University.

Agenda Item: III.k.

USF Board of Trustees
June 6, 2019

Issue: Faculty Nomination for Tenure as a Condition of Employment

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Proposed action: Approve Tenure as a Condition of Employment for USF Sarasota-Manatee

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Executive Summary:

USF Sarasota-Manatee (USFSM) administrators such as the Regional Chancellor, Regional Vice Chancellors, Deans, and senior faculty are commonly awarded tenure as a condition of employment. Typically, these highly accomplished and qualified individuals have earned tenure at their previous institution (s), which makes them desirable candidates to USFSM. In order to attract them, USFSM must provide a package that is competitive with other nationally and internationally ranked institutions. Tenure upon appointment, among other things, is a term and condition of the employment package that makes USFSM an institution of choice.

Financial Impact:
Faculty granted tenure only will not receive a monetary award.

Strategic Goal(s) Item Supports:
USF Sarasota-Manatee Strategic Plan 2015-2020, Goals 4 and 5
USF Strategic Plan 2013-2018, Goal 1

BOT Committee Review Date:
Academic and Campus Environment Committee – May 14, 2019

Supporting Documentation Online: Yes
Memorandum to Jordan Zimmerman, Chair, USF Board of Trustees
Tenure Nomination as a Condition of Employment
Faculty Profile

USF System or Institution specific: USF Sarasota-Manatee

Prepared by: Karen Holbrook, Regional Chancellor, 941-359-4340

MEMORANDUM

DATE: June 6, 2019

TO: Jordan Zimmerman, Chair

FROM: Judy Genshaft, President

SUBJECT: Faculty Nomination for Tenure as a Condition of Employment
USF Sarasota-Manatee

I am requesting that the enclosed Faculty Nomination for Tenure as a Condition of Employment, USF Sarasota-Manatee, submitted to the USF Board of Trustees, be approved. In nominating this faculty member for tenure, I certify that the requirements and conditions contained in the USF Regulations, Policies, and Procedures, for the granting of tenure have been met. I am satisfied that the nominee will make a significant professional contribution to USF Sarasota-Manatee and the academic community.

Nominee for tenure as a condition of employment:

Steven Miller, Risk Management and Insurance

Thank you for your consideration of this request. Please call me if you have any questions.

Faculty Nominations for Tenure as Condition of Employment, USF Sarasota-Manatee
USF Board of Trustees Meeting- June 6, 2019

College	Name	Rank Upon Tenure	Discipline	Degree of Effort*	Previous Institution	Tenure at Previous Institution
College of Business	Steven Miller	Associate Professor	Risk Management and Insurance		Saint Joseph's University	Tenured Associate Professor

*If less than 1.0 FTE

University of South Florida Sarasota-Manatee
Tenure as a Condition of Employment
College of Business

Dr. Steve Miller will join the College of Business at USFSM as an Associate Professor of Risk Management & Insurance in August 2019. Dr. Miller is currently a tenured, Associate Professor at Saint Joseph's University and has been a member of the faculty at Saint Joseph's University since 2009. Dr. Miller holds a PhD in Risk Management & Insurance from the University of Georgia in Athens, GA, and a BA in Risk Management & Insurance and a BA in Finance, Investment, and Banking, both from the University of Wisconsin.

Dr. Miller has taught Corporate Risk Analysis on the graduate level, and various undergraduate courses such as Corporate Risk Management, Alternative Risk Financing, Natural Disasters and Community Recovery, Introduction to Insurance, Introduction to Finance, Property and Casualty, and Principles of Reinsurance. Prior to his academic career, Dr. Miller gained deep industry experience between 1994 and 2004 as a financial and actuarial consultant, regional manager of a team implementing large scale RMIS systems, and as practice leader / business development lead in Asia, South America and Central America.

Dr. Miller's research has so far yielded six articles in peer-reviewed journals (3 in premier and 3 in top journals in RMI) and twelve conference proceedings/presentations. Dr. Miller's research has been cited 168 times.

Dr. Miller received recognition for his academic accomplishments with an honorable mention, development fellowship, outstanding paper award, and outstanding teaching assistant award.

Dr. Miller has been instrumental in leading and developing the Saint Joseph's University Risk Management & Insurance program to be one of the best programs in the nation.

Agenda Item: IV.a.

USF Board of Trustees

June 6, 2019

Issue: Academic Profile, Performance, and Success of USF Student-Athletes

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Proposed action: Informational

Executive Summary:

The profile for student-athletes continues to match the profiles for students in general. The FTIC and transfer profiles are generally enhanced in both groups. Student-athletes are taking more credit hours than the previous year and staying on track for timely graduation. Yearly retention rates for student-athletes continue to lag behind non-student-athletes at all time points; but, four-year graduation rates, there is a close match with the general FTIC population. Finally, an analysis of admissions data for the last five years reveals no evidence of students coded as athletes and admitted with the special talent admissions process who are not subsequently participating in athletics.

Financial Impact:

Strategic Goal(s) Item Supports: Goal One
BOT Committee Review Date: ACE May 14, 2019
Supporting Documentation Online (*please circle*): **Yes** **No**
USF System or Institution specific: USF Tampa
Prepared by: Dr. Paul Atchley – Dean of Undergraduate Studies

Academic Profile, Performance, and Success of USF Student-Athletes

REPORT SUMMARY

ACADEMICS AND CAMPUS ENVIRONMENT COMMITTEE

SPRING 2019

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Student-Athlete Academic Profile

All FTICs	n	HS GPA	SAT**	ACT
Athletes	479	3.42	1112	22.9
Non-Athletes	22,490	3.86	1232	26.2
Male FTICs Only				
Athletes	260	3.20	1099	21.7
Non-Athletes	9,649	3.78	1254	26.7
Female FTICs Only				
Athletes	219	3.68	1126	24.4
Non-Athletes	12,841	3.92	1213	26.0

All Transfers	n	Incoming GPA	Incoming Credit Hours
Athletes	186	2.97	59.11
Non-Athletes	28,150	3.13	67.35
All Lower Level Transfers*			
Athletes	64	2.93	37.97
Non-Athletes	5,797	3.18	40.76
All Upper Level Transfers**			
Athletes	122	2.99	70.20
Non-Athletes	22,353	3.12	74.25

University of South Florida

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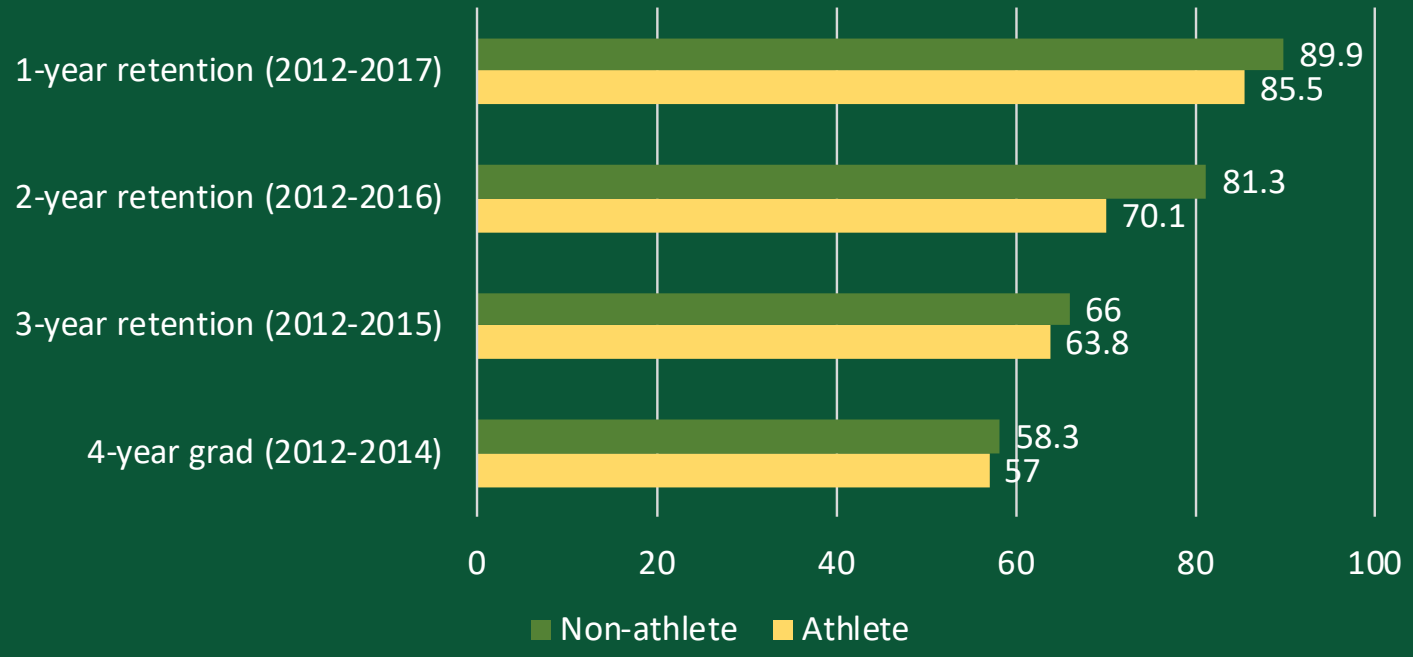
Retention, progression and graduation



University of South Florida

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Student-athlete academic trends

- Top degrees
  - Athletes: Health Sciences, Communication, Criminology
  - Non-athletes: Health Sciences, Biomedical Sciences, Nursing

Table 6. Comparison of Traditional, Online and Hybrid Education of Athletes and Non-Athletes

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Athletes					
HYBRID	7%	7%	3%	1%	2%
ONLINE	37%	40%	43%	44%	45%
TRADITIONAL	56%	53%	54%	54%	53%
Non-Athletes					
HYBRID	9%	12%	4%	1%	2%
ONLINE	42%	41%	46%	48%	48%
TRADITIONAL	48%	47%	50%	51%	50%

Table 10a. Comparison of Average Student Credit Hours (SCH) – Academic Year

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
All Student Athletes	30.5	29.9	30.9	30.3	31.2
All Non-Athletes	26.5	26.8	27.0	26.7	26.7

University of South Florida

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Integrity of student-athlete admissions

- Within 48 hours of awareness of the national "Varsity Blues" scandal, an analysis of participation in athletics by students admitted with a Banner code of "ATHL" was begun
  - 749 records between Summer 2014 and Spring 2019 were examined
  - Students were coded based on participation (including graduated, eligibility exhausted, transferred, drafted, withdrew, quit, cut, or on roster)
- Six records were identified of "ATHL" coded admits who did not participate in any way
  - Five enrolled at USF
  - All were admissible without special talent admissions
- There is no indication of impropriety in the admissions process associated with athletics

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Agenda Item: IV.b.

USF Board of Trustees
June 6, 2019

Issue: Youth Mental Health Awareness & Training (YMHAT) Grant
FDOE funded through USFSP/Division of K-16 Educational Initiatives

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Proposed action: Informational

Executive Summary:

Senate Bill 7026: Florida legislation as a result of the Parkland tragedy.

Section 1012.584, F.S.; Continuing education and in-service training for youth mental health awareness and assistance:

(1) Beginning with the 2018-2019 school year, the Department of Education shall establish an evidence-based youth mental health awareness and assistance training program to help school personnel identify and understand the signs of emotional disturbance, mental illness, and substance use disorders and provide such personnel with the skills to help a person who is developing or experiencing an emotional disturbance, mental health, or substance use problem.

(2) The Department of Education shall select a national authority on youth mental health awareness and assistance to facilitate providing youth mental health awareness and assistance training, using a trainer certification model, to all school personnel in elementary, middle, and high schools. Each school safety specialist shall earn, or designate one or more individuals to earn, certification as a youth mental health awareness and assistance trainer. The school safety specialist shall ensure that all school personnel within his or her school district receive youth mental health awareness and assistance training.

July 1, 2018: USFSP, Division of K-16 Educational Initiatives was awarded $2.2 million to implement Youth Mental Health First Aid Activities (**YMHAT Project**).

- Pursuant to Senate Bill 7026 and subsequent FDOE Chancellor's Memorandum (June 29, 2018), since August 2018:
    - YMHAT has been centered on building an infrastructure by strengthening existing capacity through Project AWARE, SEDNET (network) and Youth Mental Health First Aid (YMHFA) trainings.

- District School Safety Specialists (or designee) worked with SEDNET regions to conduct meetings to further identify and designate YMHFA Trainers.
- District School Safety Specialists (or designees) maintained data on all YMHFA trainers and "first aiders" within their respective district.

USFSP/K-16 contracted "Train-the-Trainer" Services from the National Council on Behavioral Health, Washington, D.C.
Overview of Training:

- Introduces participants to the unique risk factors and warning signs of mental health problems in adolescents.
- Builds understanding of the importance of early intervention.
- Teaches individuals how to help an adolescent in crisis or experiencing a mental health challenge.
- The course is designed for adults who regularly interact with adolescents (teachers, school staff, coaches, youth group leaders, parents, etc.).
- Informs on risk factors and warning signs of mental health and substance use problems.
- Provides information on anxiety, depression, psychosis, eating disorders, substance use disorder, ADHD and other disruptive behavior disorders.
- Provides a 5-step action plan to help someone who is developing a mental health problem or is in crisis.
- Provides available evidence-based professional, peer and self-help resources.

Pursuant to Senate Bill 7026, since June 2018 through YMHAT and Project AWARE:
The Florida Department of Education (FLDOE) has invested in 25 instructor certification trainings.
453 YMHFA instructors were certified.
14,224 Certified YMHFA "First Aiders" were certified.
A network of YMHFA hosts, trainers and training locations has been established through collaboration with SEDNET and local school districts.

Through the Youth Mental Health Awareness Training Program and Project AWARE collaboration, **the state of Florida now has**:
779 YMHFA certified instructors
42,876 certified YMHFA "First Aiders"

Youth Mental Health Awareness Training: Kognito: Supplemental Mental Health Training Modules (contract through USFSP/K-16 & Kognito, N.Y.,N.Y.). $1.3 million

- FDOE (through USFSP) has partnered with Kognito Gold Standard Modules to provide supplementary online training.
- Kognito's program provides youth mental health awareness training at elementary, middle and high school levels. The Gold Standard level of implementation includes delivery in a three-step format.
- Training for school and district facilitators is currently being conducted and this will provide **access for all K-12 school employees to begin training shortly thereafter**.

Financial Impact:

Strategic Goal(s) Item Supports:
BOT Committee Review Date: ACE May 14, 2019
Supporting Documentation Online (*please circle*): **Yes** **No**
USF System or Institution specific: USFSP
Prepared by: Regional Chancellor Martin Tadlock