

UPDATE REPORT

USF TASK FORCE FOR COVID-19 RESEARCH FUNDING

April 27, 2020

INTRODUCTION

The University of South Florida is committed to strengthening the communities it serves, positively shaping the future, and saving lives. Our university mission is relevant now more than ever. That's why USF President Steve Currall recently appointed Senior Vice President Paul Sanberg to lead a task force to create USF's Pandemic Response Research Network™ (PRRN). The task force, composed of faculty, staff, and university leadership, convened three short weeks ago to create a focused plan for using University resources and talents to launch the PRRN. USF is proud to be part of a global community of scientists, scholars and inventors who are working tirelessly to address the current and future global pandemics. Our PRRN serves as an exemplar of how a major metropolitan public research university can utilize its research and innovation to contribute to the health and wellness of society.

Since the original Report of the USF Task Force for COVID-19 Research Funding was completed on April 1, 2020, the 38 members of the Task Force have convened multiple times each week to further develop an infrastructure to nimbly and quickly respond to the pandemic in multiple transdisciplinary areas of impact. Additionally, members of each of the Research and Constituent Hubs met on a weekly basis to further develop specific research clusters of faculty for collaborative projects and funding opportunities.

Moreover, in less than two weeks, **the USF COVID-19 Rapid Response Grant Program** was created through USF Research & Innovation, offering, in an initial round, tenured/tenure-track and full-time research faculty members the opportunity to apply for up to \$25,000 in funds to focus specifically on research that can be immediately initiated, completed within a short time frame (i.e., 3-6 months) and lead to the rapid submission of proposals for external funding.

Faculty had only five days to develop and submit their proposals – and more than **400** of USF researchers responded in **128** proposals matched to the key areas of the PRRN Research Hubs. A peer committee of senior faculty from multiple disciplines quickly reviewed the submissions and selected 14 proposals for funding in the first round (these 14 proposals are summarized in this Report). Information from the non-funded proposals is being reviewed by hub leaders to facilitate potential collaborations and identify extramural funding opportunities.

Because the work of this Task Force is advancing on a near daily basis, we are creating a website which will be continually updated to describe the work of the PRRN and its Research hubs and share success stories, funding opportunities, manuscripts, reports, media highlights, grants funded with PRRN PIs, PRRN workshops and events, etc.

TASK FORCE MEMBERS (as of 4/27/2020)

Paul Sanberg, Chair, Senior Vice President, Research, Innovation & Knowledge Enterprise

Michael Bloom, Vice Chair, Assistant Vice President, Corporate Partnerships and Innovation

Keith Anderson, Assistant Vice President for Research, USF Research & Innovation

Matthew L. Anderson, MD, Director and Associate Professor, Obstetrics & Gynecology, Morsani College of Medicine

Matthew S. Anderson, PhD, Assistant Vice President for Research, USF Health

Hossam M. Ashour, Biological Sciences, St. Petersburg Campus

Kathy Bradley-Klug, Associate Dean of Research, Innovation and Faculty Affairs, College of Education

Christian Brechot, Associate Vice President, International Partnerships & Innovation, Morsani College of Medicine

Andrew 'Drew' Bugajski, Assistant Professor, College of Nursing

Vickie Chachere, Director, Strategic Communications, USF Research & Innovation

David Conrad, Director, Technology Transfer Office, USF Research & Innovation

Ellen Daley, Associate Dean for Research and Practice, College of Public Health

Michael DeJonge, Professor and Chair, Religious Studies, College of Arts and Sciences

Robert Deschenes, Professor and Chair, Molecular Medicine, Morsani College of Medicine

Sidney Fernandes, Vice President and Chief Information Officer

Anne Gallacher, Director, Research Administration, College of Public Health

Julie Gillespie, Associate Vice President, University Development, USF Foundation

Howard Goldstein, Professor and Associate Dean for Research, College of Behavioral & Community Sciences

Yogi Goswami, Distinguished University Professor, College of Engineering

Rays Jiang, Assistant Professor, College of Public Health

Sandy Justice, Senior Research Administrator, Sarasota-Manatee Campus

Eric Kern, Director, Sponsored Research, USF Research & Innovation

Kami Kim, Director, Division of Infectious Disease & International Medicine, Morsani College of Medicine

Kevin Kip, Distinguished USF Health Professor, College of Public Health

Randy Larsen, Professor and Associate Dean for Research, College of Arts and Sciences

Stephen Liggett, Associate Vice President for Research, USF Health

Judy Lowry, Senior Director, Outreach and Engagement, USF Research & Innovation

Fred Mannering, Professor and Associate Dean for Research, College of Engineering

Monica McClanahan, Director, Federal Government Relations

Shyam Mohapatra, Associate Dean of Graduate Programs, Taneja College of Pharmacy and Distinguished Health Professor and Director, Division of Translational Medicine, Morsani College of Medicine

Pritish Mukherjee, Vice Provost & Associate Vice President, Strategic Talent Recruitment, University Reputation and Impact

Matthew Mullarkey, Director, DBA Program, Muma College of Business

Steven Murawski, Downtown Partnership-Peter Betzer Endowed Chair and Professor, College of Marine Science

Arthur Santos, Assistant Director of Development and Alumni Relations, USF Health

Sudeep Sarkar, Professor and Department Chair, Computer Science & Engineering

John Sinnott, Professor & Chair, Internal Medicine, Morsani College of Medicine

Thomas Unnasch, Distinguished ESF Health Professor, College of Public Health

Mark Walsh, Assistant Vice President, Government Relations

EXTERNAL RESEARCH FUNDING OPPORTUNITIES

External funding opportunities are continually updated on USF Research & Innovation's [COVID-19 External Funding website](#) and sent to active investigator and research administrator listservs.

As of April 21, 2020, **12** grant proposals totaling **\$1.97M** in external funding for COVID-19 related research projects had been submitted from **11** unique USF departments, including:

- Psychology
- Integrative Biology
- Sociology

- Chemical & Biomedical Engineering
- Electrical Engineering
- Mechanical Engineering
- Internal Medicine
- Molecular Pharmacology and Physiology
- Molecular Medicine
- Center of Excellence for Aging & Brain Repair
- School of Aging Studies

The USF Institutional Review Board (IRB) continues to receive and review applications for COVID-19 related research. We have developed a mechanism to track COVID-related studies in our electronic regulatory system. To date, the USF IRB has received 20 applications for COVID-related research. Fourteen of the studies have been or will be reviewed for approval by the USF IRB; six have been or will be reviewed for approval by an external IRB. Six of the 20 have already been approved by the reviewing IRB.

RAPID RESPONSE RESEARCH GRANT PROGRAM

The [USF COVID-19 Rapid Response Grant Program](#), administered through USF Research & Innovation, is offering at least two rounds of proposal submission for funding consideration. The first round – with submissions due April 13, and awards announced one week later, on April 20, 2020 – offered tenured/tenure-track and full-time research faculty members the opportunity to apply for up to \$25,000 in funds to focus specifically on research that can be immediately initiated, completed within a short time frame (i.e., 3-6 months) and lead to the rapid submission of proposals for external funding. The Florida High Tech Corridor Council also provided matching funds to six of the projects that are based on intellectual property that may be patented and commercialized through licensing, startups and corporate partnerships.

First Round proposals reflected the unique strengths of USF to contribute to a competitive landscape for funding; promoted a transdisciplinary approach across departments, colleges, and campuses now and/or in the future; and focused on at least one of the key COVID-19 Pandemic Response Research Network™ research areas listed below. Round 2 proposals, to be announced at a later date, will expand transdisciplinary approaches across departments, colleges and campuses. The University of South Florida COVID-19 Rapid Response Research Grants program selected 14 projects to receive initial funding for research on potential treatments, technologies and social mitigation strategies in the wake of the global pandemic.

Of the 128 proposals submitted by more than 400 faculty for the first round, 14 projects were funded – a conversion rate of 10.9%. An aggregate of nearly \$3M in funds was requested by these proposals, detailed by Award Type and College in the following two tables:

Award Type		
Category	Count	Budget
Basic	17	439,858
Behavioral	44	988,002
Clinical	3	74,974
Environmental	2	49,966
Epidemiology	3	67,454
Information	9	194,696
Manufacturing	3	74,814
Microbiome	1	25,000
Multiple	46	1,071,335
Grand Total	128	2,986,099

College Counts & Budget		
College	Count	Budget
Arts & Sciences	31	712,069
Business	5	105,810
CBCS	11	255,249
Education	7	174,884
Engineering	30	719,005
Medicine	17	396,416
Nursing	3	71,344
Patel	1	25,000
Pharmacy	2	50,000
Public Health	12	262,070
The Arts	1	25,000
USFSM	4	99,372
USFSP	4	89,880
Grand Total	128	2,986,099

The 14 Funded Rapid Response Projects

Self-Contained Acoustic Isolation and Detection System (SCAIDS) for SARS-CoV-2 and its Antibodies

PI: Dr. Venkat Bhethanabotla, College of Engineering

The current gold standard for diagnosis is PCR (polymerase chain reaction, which detects viral DNA). However, PCR has several drawbacks including specialized testing facilities and an expensive processing time that can take up to 48 hours, and other methods of testing also have considerable flaws that make widespread testing time consuming and expensive. This project proposes adapting a portable biomarker detection system – now under development by USF and Moffitt Cancer Center researchers to quantify cancer biomarkers in human blood – and adapt to it to detect SARS-CoV-2.

Secure Mobile Contact Tracing App

PI: Dr. Jean-Francois Biasse, College of Arts & Sciences, Director of the Center for Cryptographic Research

The researchers are developing a new approach to contact-tracing via the Bluetooth-LE signal of smartphones that would advance contact tracing for communicable diseases. The first phase of the research would develop a secure system for critical organizations, allowing their members to report their condition and to isolate/test members who have been in contact with confirmed cases. A second phase of the project would allow for volunteer participants to report their condition and learn if they have been in close contact with confirmed cases without revealing their identity.

Rapid Development of COVID-19 Therapies and Evaluation of Side Effects

PI: Dr. Robert Frisina, Department of Medical Engineering

The project would build upon a recently received National Institutes of Health grant to study cellular autophagy pathways in epithelial cells in the cochlea, and how autophagy relates to hearing loss and deafness. The researchers report that the autophagy pathway – a relatively under-studied cellular pathway – is a leading candidate for being involved in killing the COVID-19 virus. The researchers will investigate whether two existing drugs being studied for COVID-19 infections affect autophagic degradation and effects on airway epithelial cells.

Social Closeness Despite Social Distance: A Study of Strategies to Fight Loneliness During the COVID-19 Pandemic

PI: Dr. Fallon R. Goodman, College of Arts and Sciences, Department of Psychology; Director, Emotion and Resilience Laboratory

The COVID-19 pandemic has fractured social support systems and the effects of loneliness will likely be magnified during social distancing, especially among those with pre-existing psychological vulnerabilities, such as depression and anxiety. The project will document and analyze the impact of COVID-19 on psychosocial and physical well-being and work to develop new tools and solutions to help vulnerable people maintain social connections while adhering to social distancing guidelines.

Serological Correlates to Immunity in SARS-CoV-2 Infection

PI: Dr. Kami Kim, Morsani College of Medicine, Director, Division of Infectious Disease & International Medicine

This project would explore the presence of SARS-CoV-2 antibodies and potential immunity using a combination of tests to determine which best neutralize the virus. The research is important to determine whom among the medical staff are potentially immune to SARS-CoV-2, who can return to work safely because they have developed an immunity to the virus, and will allow researchers to recalculate a more accurate fatality rate among the general population.

A 2-in-1 Nano-aerosols Development to Mitigate COVID-19 Spread in Both Humans and PPE

PI: Dr. Alya Limayem, Taneja College of Pharmacy

The project would develop nanocomponents that have demonstrated effects on multi-drug resistance bacteria and are a promising agent against virus replication. The project will explore if the nanocomponents can be coated onto PPE as a preventive measure.

Planning for Hurricane Shelter Operations During a Pandemic

PI: Dr. Jennifer Marshall, College of Public Health

This research will outline key considerations for sheltering and evacuation in the era of COVID-19. The potential risk of COVID-19 infections spreading among shelter residents and between shelter residents and staff increases with proximity. The researchers plan to address these complex concerns by conducting a gap analysis of current shelter plans and available resources that meet national guidelines and best practices.

SARS-COVID-19 Tissue-specific Susceptibility in Different Ethnic backgrounds

PI: Dr. Thomas McDonald, Morsani College of Medicine, USF Health Heart Institute

The project would attempt to understand the disproportionate SARS-CoV-2 disparities among ethnic groups. COVID-19 victims are disproportionately represented by those with pre-existing cardiovascular conditions (hypertension and heart failure) and by specific ethnic groups (African and Hispanic) which have double the infection rates and mortality in some of the disease hotspots. The project would explore important unanswered questions on racial disparities and COVID-19, including whether ethnic differences in infection rates and cardiovascular complications are solely due to socioeconomic disparities, or if there are cellular-level or other medical explanations.

Alternative Processing of Civil and Criminal Justice System Matters for People with Behavioral Health Disorders

PI: Dr. Annette Christy, College of Behavioral and Community Sciences

Social distancing requirements to stem the spread of COVID-19 has had an impact on the legal system, particularly in proceedings which involve persons with mental and substance use disorder who undergo clinical assessments and hearings for involuntary hospitalization under Florida's Baker Act. USF researchers will conduct a six-month study on the use of technology to carry out clinical assessment and justice system hearings in both civil and criminal justice system cases involving people with mental and substance abuse issues.

The USF Rapid-Risk Assessment and Intervention for COVID-19

PI: Dr. Usha Menon, College of Nursing

The human behavioral response during a pandemic illness such as COVID-19 is not well understood, and the abundance of information shared through various channels can reduce the public's ability to identify and adhere to evidence-based guidelines. The project will lead an interdisciplinary study to analyze risk behavior, risk mitigation and chronic disease management and work to deliver tailored messaging to encourage safer behaviors among individuals at risk for infection.

A Novel Therapy for High-risk Critically Ill COVID-19 Patients

PI: Dr. Subhra Mohapatra, Morsani College of Medicine

This proposal focuses on repurposing an anti-diabetic FDA-approved drug pioglitazone as an adjunct therapy to mesenchymal stem cell (MSC) therapy for treating COVID-19. Since coronaviruses are known to affect the brain stem respiratory center, there is an urgent need to find a suitable treatment strategy. Pioglitazone has anti-inflammatory activity while also

increasing the effect of stem cell therapy in traumatic brain injury. Pioglitazone also possesses antiviral properties and provides protection against RNA viruses.

Sniffing Out COVID-19: A Novel Nanofilm Detector System

PI: Dr. Salvatore Morgera, College of Engineering

USF engineers are exploring the concept of developing an “electronic nose” that uses sensor technology to test the breath of potentially infected people for COVID-19 and other coronaviruses when they are exhaled.

Remdesivir Ophthalmic Drops for Prevention of COVID-19 Transmission Via Eye

PI: Dr. Vijaykumar Sutariya, Taneja College of Pharmacy

The Centers for Disease Control and Prevention (CDC) recommends Remdesivir as a therapeutic option for patients with COVID-19. A study from China suggests that up to one third of people hospitalized with coronavirus experienced viral pink eye or conjunctivitis. The virus can spread by touching fluid from an infected person’s eyes, or from objects that carry the fluids. The researchers plan to formulate and characterize Remdesivir ophthalmic drops’ potential for prevention of transmission of the diseases via eye and potential for treatment for conjunctivitis caused by the infection.

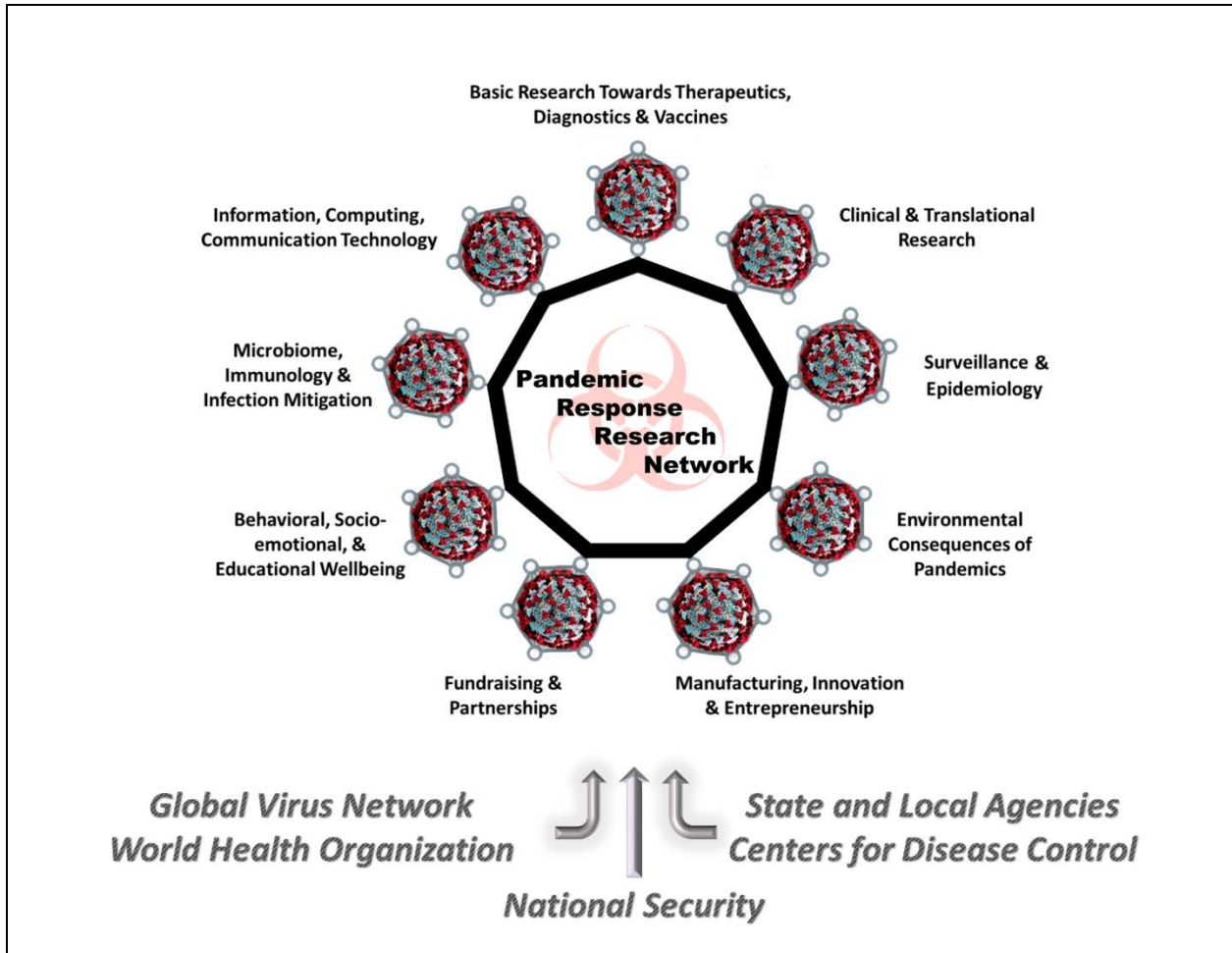
Sterilization Mechanism of Corona Discharge for Masks and Environment to Combat COVID-19

PI: Dr. Ying Zhong, College of Engineering

This team proposes addressing the shortage of N95 masks through the use of newly created technology that can rapidly sterilize and restore the masks’ filtration effectiveness. Using the mechanism of corona discharge, which sterilization mechanism of corona discharge – high energy electrons – the technology is under development to rapidly sterilize PPE for healthcare workers to further resolve shortage issues while protecting the safety of medical personnel. The researchers also are working to develop the technology to offer an efficient sterilization solution for shared surfaces, confined space, and possibly open air to prevent COVID-19 spread. The USF inventors have filed a new patent application on the technology and are working to establish an industry partnership to rapidly advance the research and development of the new tool.

Pandemic Response Research Network™ (PRRN)

In the past three weeks, Research hubs and clusters have been formed, and are meeting weekly (or on a more frequent basis as needed), and a website is being developed at *pandemic-response-research.net*. The name and logo of the PRRN have been submitted for trademark and copyright protection.



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Updates on the research and constituent hubs of the PRRN:

Research Hub: Basic Research Towards Therapeutics, Diagnostics and Vaccines

Hub Coordinators: *Bob Deschenes, Morsani College of Medicine; Sarah Yuan, Morsani College of Medicine; Jim Leahy, College of Arts and Sciences*

Hub Description: Understanding the molecular mechanisms underlying viral infection is critical to the development of therapeutic strategies. The Basic Research Hub will bring together the

considerable strength across the USF colleges in mechanistic biochemistry, genomics and proteomics, X-Ray crystallography, computational biology, and preclinical animal models to understand the function of the virus and its interaction with the host.

Research Cluster Areas, with faculty leaders:

- **Mechanisms of viral invasion, host cell interactions, packaging and export** – *Michael Teng, Morsani College of Medicine; Bala Chandran, Morsani College of Medicine*
- **Structure-based drug discovery** – *Yu Chen, Morsani College of Medicine; Jiangfeng Cai, College of Arts and Sciences*
- **Medicinal Chemistry** – *Jim Leahy, College of Arts and Sciences; Bill Baker, College of Arts and Sciences*
- **Systemic host response to virus – lung, cardiovascular, GI** – *Tom Taylor-Clark, Morsani College of Medicine; Jerry Breslin, Morsani College of Medicine; Sami Noujian, Morsani College of Medicine*
- **Immunological response to virus** – *(TBD)*
- **Therapeutic strategies** – *Hanna Totary-Jain, Morsani College of Medicine; Richard Heller, Medical Engineering*

Research Hub on Behavioral, Socio-emotional, and Educational Wellbeing

Hub Coordinators: *Howard Goldstein, College of Behavioral & Community Sciences; Kathy Bradley-Klug, College of Education; Ellen Daley, College of Public Health; Sandy Justice, USF Sarasota-Manatee; Sudeep Sarkar, College of Engineering; Randy Larsen, College of Arts and Sciences; Michael DeJonge, College of Arts and Sciences; Lyman Dukes, College of Education, USFSP*

Hub Description: The COVID-19 virus is creating an epidemic of illness, but also a wave of psychological and social stress. Researchers have used incidents of unexpected stress in the past (such as hurricanes and 9/11) to examine the impact of stress on health and well-being. Investigators at USF are poised to generate new knowledge that will inform preparedness and responsiveness to the current and future global crises. More than 100 scientists from across the university with expertise in behavioral, socio-emotional, and education wellbeing in diverse individuals, communities, and populations have submitted research ideas that seek to generate such knowledge. We recognize that these complex approaches to addressing these issues have a time element component (i.e., immediate, near-term and long-term) that may influence when these projects should be submitted for funding.

Research Cluster Areas, with faculty leaders:

- **Impact of COVID-19 pandemic on behavioral & mental health** – *Nate von der Embse, College of Education; Shannon Suldo, College of Education*
- **Impact of pandemic on criminal justice system and bioethics** – *Annette Christy, College of Behavioral and Community Sciences*
- **Pandemic effects on food, sleep, and physical activity** – *Marilyn Stern, College of Behavioral and Community Sciences; David Himmelgreen, College of Arts and Sciences*
- **Pandemic effects on health care, health literacy, and health disparities** – *Haywood Brown, Morsani College of Medicine; Stephanie Marhefka, College of Public Health*
- **Caring for adults and seniors during the COVID-19 pandemic** – *Jonathan Rottenberg, College of Arts and Sciences; Patrice Buzzanell, College of Arts and Sciences*
- **Caring for vulnerable children and families during a pandemic** – *Riaan Van Zyl, College of Behavioral and Community Sciences*
- **Effects of rapid transition to remote education & use of educational technology** – *Allan Feldman, College of Education; Ilene Berson, College of Education*

Research Hub: Environmental Health and Resilience

Hub Coordinators: *Steven Murawski, College of Marine Science; Matthew Mullarkey, Muma College of Business; Rays Jiang, College of Public Health; Robert Bertini, College of Engineering, CUTR; Sandy Justice, USF Sarasota-Manatee; Pritish Mukherjee, Office of the Provost and College of Arts and Sciences; Ran Tao, School of Geosciences, College of Arts and Sciences; Drew Kramer, Department of Integrative Biology, College of Arts and Sciences*

Hub Description: Human health is intimately linked to environmental health and sustainability of critical resources. Apart from the direct human health consequences of the COVID-19 epidemic, the significant slowdown in global economic activity is having global secondary impacts on a variety of factors related to environmental health and safety, wildlife populations, urban traffic and related pollution and other consequential factors. Many environmental parameters, including physical and biological factors that change seasonally or abruptly, may have interactions with COVID-19 and either improve or degrade human health exposure to COVID-19 or other stressors. These factors may include temperature, or biological factors such as pollen, flu, red tide, and others. Some interactions may have long-term consequences on ocean chemistry and production that again have direct and indirect impacts on humanity.

Research Cluster Areas, with faculty leaders:

Rob Hooker, Muma College of Business; Seckin Ozkul, Muma College of Business; Donna Davis, Muma College of Business

Research Hub on Microbiome, Immunology and Infection Mitigation

Hub Coordinators: *Christian Brechot, USF Health; Shyam Mohapatra, Morsani College of Medicine and Taneja College of Pharmacy; Wayne Guida, College of Arts and Sciences*

Hub Description: Translating microbiome science, which has a fundamental and continuous impact on human biology, into transformative prophylaxis and therapies requires multidisciplinary collaboration. The Microbiome, Immunology and Infection Mitigation (MIIM) hub in the Pandemic Response Research Network™ (PRRN) will focus on enabling and connecting an interdisciplinary network of scientists at USF and globally and leveraging the most advanced technologies to rapidly realize the biomedical potential of the microbes that live within and upon us. The major goals of the hub are to develop precision therapies and interventions that target the human microbiome to maintain and restore human health against COVID-19 and future pandemics.

Research Cluster Areas, with faculty leaders:

- **Neurosciences** – *Cesar Borlongan, Morsani College of Medicine; David Kang, Morsani College of Medicine*
- **Cardiovascular Sciences** – *Hua Pan, Morsani College of Medicine; Srinu Tipparaju, Taneja College of Pharmacy*
- **Immunology** – *Maureen Groer, College of Nursing; Jolan Walter, Morsani College of Medicine*
- **Infectious disease** – *Kami Kim, Morsani College of Medicine*
- **Cancer** – *Usha Menon, College of Nursing; Subhra Mohapatra, Morsani College of Medicine*
- **Microbiome-related Technology Development** – *John Adams, College of Public Health; Charles Chalfant, College of Arts and Sciences; James Lahey, College of Arts and Sciences*

Research Hub on Information, Computing, and Communication Technology

Hub Coordinators: *Matthew Mullarkey, Muma College of Business; Sudeep Sakar, College of Engineering; Balaji Pabmanhaban, Muma College of Business; Kaushik Dutta, Muma College of*

Business; Shivendu Shivendu, Muma College of Business; Wolfgang Jank, Muma College of Business; Varol Kayhan, Kate Tiedemann College of Business, USF St. Petersburg; Ehsan Sheybani, Muma College of Business; Giti Javidi, Muma College of Business; Bhuvanesh Unhelkar, Muma College of Business; Steve Walczak, College of Arts and Sciences; Kimberly Walker, College of Arts and Sciences; Sandy Justice, USF Sarasota-Manatee

Hub Description: A critical component of pandemic response is the ability to collect, process, and analyze large sets of complex data ranging from GIS surveillance information to viral genomic information. Collection, processing and storage of complex data is only one component of the ICCT hub. The ability to utilize that data for predictive modeling is of further critical importance including pandemic spread models, hot-spot identification, behavioral connections to spread, etc. The ability to utilize pandemic information to inform scientific, community and governmental stakeholders represents an additional component of the ICCT hub that is essential to pandemic mitigation.

Faculty Clusters:

Cluster Coordinators:

Balaji Padmanhaban, Muma College of Business

Kaushik Dutta, Muma College of Business

Shivendu Shivendu, Muma College of Business

Wolfgang Jank, Muma College of Business

Ehsan Sheybani, Muma College of Business

Giti Javidi, Muma College of Business

Bhuvanesh Unhelkar, Muma College of Business

Matthew Mullarkey, Muma College of Business

Lawrence (Larry) Hall, College of Engineering

Sriram Chellappan, College of Engineering

Sidney Fernandes, USF Chief Information Officer

Research Cluster Areas:

- **Data infrastructure to support the network**, which will involve creating data lakes on the cloud in partnership with USF IT that is secure and stores all the relevant clinical, public health, mobility, and any other relevant datasets that are necessary to model present and future pandemic outbreaks
- **Cloud-based analysis infrastructure**, which will involve developing models and methods to generate insights, early warning signals, identifying hotspots, and visualizations using big data technologies.

- **Communications and Policy infrastructure**, which will involve creating forward-looking simulations and analytical modeling tools with a goal of informing various stakeholders, including policymakers.
- **Data Security and Privacy** involving vulnerabilities exposed by the virus and the changing nature of work as well as the deployment and use of surveillance mechanisms (including mobile and platform applications and personally identifiable data).
- **Pandemic mapping & GIS coordination**, which will involve coordinating big data sets with patient and citizen population behaviors to graph hotspots, trends, peaks, outbreaks and other social and behavioral patterns in the spread of communicable disease.
- **Deep learning**, which will include efforts to support teams of natural science researchers seeking to gain insights from massive data to develop detailed understanding of the underlying nature of the disease, its spread, its containment, and its behavior in various human populations.
- **Artificial intelligence and Machine Learning**, which will include the development of algorithms and programs that learn from and automate approaches to make better, more rapid decisions in every sector, including treatment centers, public policy, disease management, experimental analysis, drug discovery, and patient communications.

Research Hub on Clinical and Translational Research

Hub Coordinators: *Kami Kim, Morsani College of Medicine; Shyam Mohapatra, Morsani College of Medicine and Taneja College of Pharmacy; Angela Hill, Taneja College of Pharmacy; Usha Menon, College of Nursing*

Hub Description: A key element in constructively leveraging the impact of a USF-led Pandemic Response Research Network™ will be its ability to connect state of the art science to real world implementation that improves the health and safety of both the Tampa Bay community and the nation. We believe that the university's recognized strengths in medicine, pharmacy, nursing, engineering, public health and social sciences can be successfully leveraged to achieve these goals on multiple levels. Notable strengths include a well-developed platform for the design and operationalization of clinical trials, emerging resources for biorepository activities and newly streamlined regulatory and bioinformatic pathways for managing and mining clinical demographics with an eye towards population science and disease surveillance. Specific strategies for potential research appropriate for each of the three planned tiers of activity include data-centric strategies to enhance our community's response to emerging pandemics; develop

novel diagnostic, prophylactic and therapeutic strategies; improve the engineering and manufacturing responses to these crises; and execute long reaching models of dissemination and implementation of advances.

The goals of this Hub are to:

- Leverage USF's close relationship with Tampa General Hospital to develop a regional pandemic response team.
- Utilize USF's experience with educational and social science research to determine the best ways to communicate with diverse individuals within communities across the region in times of crises with attention to culture and literacy.
- Advance Research and Education in Clinical Translational Sciences

Research Cluster Areas, with faculty leaders:

- **COVID-19 Medical Clinical Research** – *Kami Kim, Morsani College of Medicine*
- **COVID-19 Nursing Research** – *Usha Menon, College of Nursing, with College of Nursing Faculty including: Ponrathi Athilingam, Andrew Bugajski, Elizabeth Jordan, Cecile Lengacher, Victoria Marshall, Kaitlyn Rechenberg, Tracey Taylor, Laura Szalacha*
- **COVID-19 Pharmacy Research** – *Angela Hill, Taneja College of Pharmacy*
- **Translational Research Education** – *Shyam Mohapatra, Morsani College of Medicine and Taneja College of Pharmacy*

Research Hub on Surveillance and Epidemiology

Hub Coordinators: *Ellen Daley, College of Public Health; Janice Zqibor, College of Public Health*

Hub Description: Surveillance is a fundamental component of mounting a public health response to any disease outbreak. The Surveillance and Epidemiology Hub of the USF Pandemic Response Research Network™ (PRRN) brings exceptional research skills to addressing the COVID-19 pandemic. Surveillance activities, which include identifying, tracing, isolating and testing, ideally should be done with multidisciplinary teams that can also plan and execute intervention studies and prevention strategies. We will work with the other PRRN hubs to plan and execute clinical trials and therapeutic studies, employing traditional epidemiological techniques. Equally important are the skills needed to track and predict the impact of pandemics through sophisticated data analytics, which is another element of the Surveillance and Epidemiology Hub of the PRRN. These techniques allow researchers to forecast both health care costs and diseases patterns over time – essential data that help us with pandemic projections.

Preliminary research areas will focus on:

- **Surveillance** – Utilizing these methods to track:
 - Number of cases
 - Impact of an intervention
 - Establish priorities for interventions
 - Level of immunity in communities

- **Data analytics** – Utilizing these methods to:
 - Predict the impact of the epidemic
 - Track patterns of symptoms and disease in a specified space and time
 - Inform policy to promote population health
 - Forecast health care needs
 - Predict costs and utilization of health care resources

- **Standardized epidemiological techniques** – Utilizing these methods to help:
 - Design clinical trials
 - Assess impact of therapeutics
 - Establish parameters for vaccine trials

Research Cluster Areas, with faculty leaders:

- **Epidemiological concentration** – *College of Public Health faculty including: Amy Alman, Chighaf Bakour, Jason Salemi, Skai Schwartz, Ronee Wilson, Janice Zgibor, and Kevin Kip, College of Public Health and College of Nursing*

- **Global Health and Infectious Diseases Research** – *Rays Jiang, College of Public Health; Tom Unnasch, College of Public Health*

- **Data Analytics** – *College of Public Health: Troy Quast, Etienne Pracht, Zach Pruitt; IT: Sidney Fernandes; Muma College of Business: Matt Mullarkey and Data Analytics faculty*

- **Health Policy** – *College of Public Health: Troy Quast, Etienne Pracht, Zac Pruitt*

- **Biostatistics** – *Henian Chen, College of Public Health*

- **Community and Family Health** – *College of Public Health: Ellen Daley, Russ Kirby, Stephanie Marhefka, Tricia Penniecook and Cheryl Vamos*

Constituent Hub on Manufacturing, Innovation and Entrepreneurship

Hub Coordinators: *Yogi Goswami, College of Engineering; David Conrad, Technology Transfer Office; Michael Bloom, Corporate Partnerships and Innovation*

Hub Description: The present COVID-19 pandemic has become much worse due to shortages of personal protective equipment (PPE), and mobile and rapid testing instrumentation. Technological and manufacturing innovations can overcome such shortcomings for this as well as future extreme events. USF has become a national leader in advancing a culture of innovation and entrepreneurship with evidence of technological and manufacturing innovations in the College of Engineering. Development, rapid prototyping and manufacturing of COVID-19 testing swabs and development of Plasmonic PECO integrated respirator/mask prototypes are just two of many examples. The Manufacturing, Innovation and Entrepreneurship Hub will leverage the ongoing work at centers such as the Institute for Applied Engineering funded by SOCOM and the USF Jabil Innovation Institute, funded by Jabil, Inc., and the Entrepreneurship centers at various USF campuses.

Research and Development Cluster Areas, with faculty leaders:

Four research and development clusters have already been organized as part of the Hub, especially focused on advocating for USF researcher access to additional Research & Development (R&D) and manufacturing resources such as: GLP (Good Laboratory Practice regulations) and/or GMP (Good Manufacturing Practice regulations) manufacturing facility; additional BSL-3 (BioSafety Level) facility; chemical synthesis lab; nanomaterial and analytical characterization lab; bioreactors and scaling up facility; small animal imaging facility; aerosol testing; and prototype facility.

These clusters are:

- **Biological/Biomedical Manufacturing** – *Subhra Mohapatra, Morsani College of Medicine*
- **Mechanical/Electrical Manufacturing** – *Jose Zayas-Castro, College of Engineering*
- **Supply Chain** – *Donna Davis, Muma College of Business*

Hub Cluster Faculty and Staff Members:

Yogi Goswami, College of Engineering
Dirk Libaers, Muma College of Business
Jose Zayas-Castro, College of Engineering
Norma Alcantar, College of Engineering
Venkat Bhethanabotla, College of Engineering
Subhra Mohapatra, Morsani College of Medicine
Michael Fountain, Muma College of Business
David Conrad, Technology Transfer Office
Stephen Sadow, College of Engineering
Mark Jaroszelski, College of Engineering

Carol Blair, College of Engineering
Oscar Rios, College of Engineering
Alejandro Castellanos, College of Engineering
Pradeep Haldar, Patel College of Global Sustainability and Muma College of Business
Alya Limayem, Taneja College of Pharmacy
Donna Davis, Muma College of Business,
James Stock, Muma College of Business
Robert Hooker, Muma College of Business
Seckin Ozkul, Muma College of Business
Michael Bloom, Corporate Partnerships and Innovation
Diana Hechavarria, Muma College of Business
Dirk Libaers, Muma College of Business
Jean Kabongo, Muma College of Business
Greg Smogard, USF Sarasota-Manatee

Constituent Hub on Fundraising and Partnerships

Hub Coordinators: *Julie Gillespie, USF Foundation; Michael Bloom, Corporate Partnerships and Innovation; Arthur Santos, USF Health; Carissa Davis, Corporate Partnerships; Peter Trakas, Corporate Relations, USF Foundation; Andrew Farmer, Foundation Relations, USF Foundation; Michele Tyrpak, Technology Transfer Office; Vickie Chachere, Outreach & Engagement, USF Research & Innovation*

Hub Description: We are identifying and inventorying a wide range of potential funding partners, including companies, foundations, organizations and individual donors that can support USF's Pandemic Response Research Network and research hubs. And while federal funding does not seem to apply specifically to support this constituent hub, here, the availability of matching dollars does make applications for federal funding more competitive.

In order to process this support, we have set up a **USF Pandemic Response Research Fund** at the USF Foundation to support any and all operating needs and expenses in support of the PRRN and the projects and programs conducted by USF in the research of and response to pandemics and their effects.

We are also working with PRRN colleagues such as the Manufacturing, Innovation and Entrepreneurship hub to engage corporate partners in collaborative research and development, as appropriate.