

Excellence in Innovation Awards

The Excellence in Innovation Awards annually recognizes USF faculty who have demonstrated exceptional achievement in innovation and research. Nominations are peer reviewed by members of the USF Academy of Inventors.

2020 for Achievements January 2018 through June 2019

Dr. Venkat R. Bhethanabotla, Professor, Chemical & Biomedical Engineering, College of Engineering, is recognized for his achievements in inventing, patenting and licensing biological and chemical sensor systems for use in a number of fields from health care to computing devices. His research efforts recently resulted in two new patents, seven patent applications and three option-to-license agreements with three separate companies. Dr. Bhethanabotla is the founder and co-founder of several startup companies that have been awarded additional financial support through both USF and federal agencies, such as the National Science Foundation. One of those companies, Path Optical Systems, was a finalist last year for the Cade Museum Prize – one of Florida's top recognitions for new innovations – for its small and affordable fiber optics technology that transport information at the speed of light.

Dr. Kirpal S. Bisht, Associate Professor, Chemistry, College of Arts & Sciences, was nominated for his success in leading a collaboration with colleagues at USF Health's Department of Molecular Medicine in the development of a new ketamine analog drug to treat phantom pain, depression and epilepsy that was licensed in 2019 for commercial development. The analogs can be used at very low doses and demonstrate unique pain-relieving properties effective at one-tenth the induction dose and at a greatly reduced potential for drug abuse and negative side effects.

Dr. Dmitry Goldgof, Distinguished University Professor, Computer Science and Engineering, College of Engineering, was nominated in recognition of his prolific record as an inventor, which included four patents issued during the 18 months in the award period, three patent applications and two technologies licensed for further research and development. Dr. Goldgof is internationally known in the field of computer science and engineering as it applies to biomedical image analysis and its applications in improving the diagnoses of cancer, brain disorders and other medical conditions. In addition to his inventions, Dr. Goldgof was lauded for advancing his projects through successful winning federal grants and continuing to excel in basic research in his field, with 14 articles and dozens of conference papers accepted and published in leading journals during the nomination period.

Dr. Xingmin Sun, Associate Professor, Molecular Medicine, Morsani College of Medicine, is recognized for his research of *Clostridium difficile*, a toxin-producing bacteria that causes a severe form of diarrhea in people who have taken antibiotics that alter their normal colon bacteria. The infection has become a worldwide public health crisis. Dr. Sun has filed a series of patent applications on vaccines and is moving toward licensing his inventions for development as a potential treatment. Additionally, Dr. Sun is collaborating with USF chemists to develop antimicrobial agents to use against *Clostridium difficile* and continues to publish basic research that guides other scientists in the fight against it.

Dr. Daniel Yeh, Professor, Civil and Environmental Engineering, College of Engineering, is being recognized for his ongoing achievements in developing the NEWgenerator technology – which converts human waste to clean water, energy and nutrients that can be used in sustainable food production. Tested in both India and South Africa and showcased at the Reinvented Toilet Expo in Beijing, China, the NEWgenerator has received nearly \$2 million in funding support from the Bill & Melinda Gates Foundation and the project has produced a series of new patents during the nomination period. The technology, which has received worldwide news coverage including a segment on *The Daily Show with Trevor Noah*, has been licensed to a commercial partner in India for production in that country and is the subject of other licensing negotiations worldwide.

2018 for Achievements in 2017

Dr. Babu Joseph, Professor, and **Dr. John Kuhn**, Associate Professor, Chemical & Biomedical Engineering, College of Engineering, were lauded for the efforts to advance their startup company, T2C-Energy LLC, which was awarded a U.S. Department of Energy Phase II SBIR grant in 2017 to convert landfill gas to liquid hydrocarbon fuels. This grant followed a successful DOE Phase I award and private investments. The patent for this conversion process was published in 2017. Last year, Joseph and Kuhn were invited to deliver several talks at energy and waste conferences on this subject, and co-authored several peer-reviewed journal articles and a book chapter. Kuhn was funded to participate in the National Science Foundation's I-CORPS program in 2017 and Joseph was named a Fulbright Scholar at IIT/Bombay in 2017.

Dr. Stephanie Carey, Assistant Research Professor, Mechanical Engineering, College of Engineering, received a patent for a prosthesis slip detection sensor and was invited to present her research at the World Congress of the International Society for Prosthetics and Orthotics in Cape Town, South Africa. The technology she developed provides dynamic feedback to adjust the prosthetic socket to fit better. Additionally, Carey's efforts to secure two grants from NASA to optimize student designs of a geological sample procurement device and an exercise device for astronauts were noted in her nomination, as well as her success in winning a NSF I/University Cooperative Research Center planning grant to be create an iPerform Center – which integrates academia, government and industry partners to develop assistive technologies – at USF. Carey was also noted for being selected for a NSF I-Corps Team for her work with a wireless hands-free wheelchair control kit and for mentoring a student design team that was a finalist at the NAI conference in Washington, D.C., where they presented a patent-pending wrist-hand orthosis and provisional patent on/off stand.

Dr. Subhra Mohapatra, Professor, Molecular Medicine, Morsani College of Medicine, USF Health, was recognized for her successful efforts to secure a National Cancer Institute-SBIR Phase-2 funding of \$1.49 million to work in collaboration with the USF startup company she co-founded, Transgenex Nanobiotech Inc. Last year, Mohapatra earned six new U.S. patents and submitted four other patent applications in the area of cancer nanotechnology, including two “pioneer patents” – which cover a major technological advance that has never before been introduced. Mohapatra also was recognized for her entrepreneurial achievements, including a licensing agreement and commercialization of a line of cell biology products, including 3D nano fiber discs, Tumor microtiter Plates, and customized 3D Tumors for research use in Japan, India and the United States. Additionally, her efforts were instrumental in advancing personalize breast and colorectal cancer treatment platforms at USF Health and area veterans hospitals. She also compiled a stellar list of academic publications, with articles published in such high-impact journals as Cell Transplantation, Critical Review Therapeutic Drug Carrier System, Anticancer Research, Digestive Diseases and Sciences, J Drug Delivery Science and Technology.

Dr. Yu Sun, Associate Professor, Computer Science & Engineering, College of Engineering, was selected in recognition of five inventions granted U.S. patents in 2017, all where he served as the lead inventor: Generating Robotic Trajectories with Motion Harmonics, #9,764,469; Techniques to Enable Robot Intention Expression, # 9,744,672; Systems and Methods for Planning a Robot Grasp That Can Withstand Task Disturbances, US patent #9,649,764; Systems and Methods for Providing Augmented Reality in Minimally Invasive Surgery, US patent # 9,646,423; Systems and Methods for Providing Augmented Reality in Minimally Invasive Surgery, US patent # 9,547,940. Additionally, Sun filed patent disclosures in collaboration with researchers at Stanford University, published two peer-reviewed articles, had one paper accepted for publication, edited a book accepted for publication and received a new grant as co-PI.

2017 for Achievements in 2016

Dr. Anna Pyayt, Assistant Professor, Chemical and Biomedical Engineering, College of Engineering, was recognized for her Technology for early detection of pregnancy complications, chosen for USF site I-Corps program, successfully completing the site program and awarded a National NSF I-Corps Team grant. Completed I-Corps program, winner of USF Foundation Bull Ring Accelerator Grant (BRAG) program and received \$25,000 for the commercialization activities in Hemolix LLC, company that she co-founded. Published 7 papers and received award at IEEE Sensors conference.

Dr. Chuanhai Cao, Associate Professor, Pharmaceutical Sciences, College of Pharmacy, was recognized for Neurodegenerative research to the innovative understanding rooted in immunological basis for Alzheimer's and Parkinson's disease. Evaluating the effects of cell phone signal (EMF) and THC (tetrahydrocannabinoid, a major molecule in marijuana) research in neurodegenerative diseases. Publications reported in prestigious national and international news media, including ABC news, BBC, CNN and WSJ. 1 US Patent awarded and 2 US Patents were commercially patents licensed and based on which one is currently approved for clinical trials and another one preparing for investigational new drug application by the commercial entities. Alzheimer's vaccine in 2016 proved to be the only novel and translationally relevant product in the field of Alzheimer's disease.

Dr. Jay Ligatti, Associate Professor of Computer Science and Engineering, College of Engineering, was recognized for Patent Protecting hardware against power-analysis. Patent Enabling users to log in to systems securely, without entering passwords or fingerprints, by having multiple of their devices collaboratively respond to cryptographic challenges, in a technique co-authentication. Two grants totaling \$253,590. One of which led to the development of new methods for generating cryptographic keys, which are now being described in a provisional patent application. Intel's adoption of your control-flow integrity (CFI) technology, for constraining software to execute along well-defined paths.

2016 for Achievements in 2015

Dr. Norma Alcantar, Professor of Chemical and Biomedical Engineering, College of Engineering, was recognized for her prolific research and commercialization endeavors, including two patents received in 2015, one of which was for her development of a method using natural materials extracted from a cactus plant as a non-toxic, renewable procedure to purify water. Alcantar has made significant contributions into several fields, including using natural materials extracted from a cactus plant to separate contaminants such as sediments, bacteria and heavy metals in water purification technologies. Her research in the area of dispersants of crude oils has been funded from the Gulf of Mexico Research Initiative and the National Science Foundation since 2010. She has five patents and several applications in process. Alcantar has been very prolific in her research and innovation's endeavors. She currently has seven awarded patents. She also was awarded two awards from the National Science Foundation, one of which is a NSF I-Corps award to extend her research activities to catalyze the translation of her work into commercialization. Her second award from NSF is a collaborative project with SRI International on interpenetrating polymer networks. Alcantar was also awarded a research grant from the Florida Aquaculture Research Council to build a pilot unit that will be implemented in fishing farms to remove off-flavor compounds.

Dr. Svitlana Garbuzova-Davis, Professor of Neurosurgery and Brain Repair, Morsani College of Medicine, USF Health, was recognized for her technological accomplishments, awarded grants, and issued patents related to identifying disease-related biomarkers. Her research methods have a potential for wide application in the treatment of various spinal cord pathologies, and will be critical to the early diagnosis and treatment of neurodegenerative disorders, such as ALS. In 2015, she was awarded an RO1 Grant for "Re-Establishing Vascular Integrity in ALS via Endothelial Cell Transplantation", a patent for "Method of prenatal administration of mammalian umbilical cord stem cells for the intrauterine treatment of Sanfilippo syndrome", a provisional Patent for "Plasma Derived from Human

Umbilical Cord Blood for the Treatment of Neurodegenerative Disorders”, patent disclosure, “Novel Non-invasive Method for Direct Delivery of Therapeutics to the Spinal Cord in the Treatment of Spinal Cord Pathology”, and was the senior author of “Humoral factors in ALS patients during disease progression.”

Dr. H. Lee Woodcock, Associate Professor, Chemistry, College of Arts and Sciences, received the award for his development of CHARMM interface and graphics (CHARMMing). This web-based educational platform introduces students to computer simulations of biological macro-molecules. Woodcock’s group has been involved in bringing CHARMMing to the masses. Thus, strengthening the use of molecular simulation software in chemical education is a major goal of the current CHARMMing project. Molecular simulations have been shown to be very instructive, but simulation programs can be intimidating for the new user. Furthermore, many methodologies require large amounts of dedicated computational resources. To assist in overcoming these barriers, the Woodcock group has been developing a Web--based user interface (WUI) for the CHARMMing simulation package. This tool provides a user--friendly interface for the preparation, submission, monitoring, and visualization of molecular simulations and recently, his group has implemented web-based “lessons” into CHARMMing with the main goal of enhancing computational pedagogy; particularly useful to institutions that lack dedicated computational facilities. These lessons can be described as interactive step-by-step instructions for performing common molecular simulation tasks. In addition to CHARMMing’s new lessons functionality, web-based graphical capabilities have been overhauled and are fully compatible with modern mobile Web browsers (e.g., phones and tablets), allowing easy integration of these advanced simulation techniques into coursework.

2015 for Achievements in 2014

Dr. Kyle B. Reed, Assistant Professor, Mechanical Engineering, received his Ph.D. in mechanical engineering at Northwestern University in 2007. His innovative research during 2014 resulted in three of his patents being licensed to Moterum, LLC, and five new patent applications submitted. Two of the licensed patents relate to the Gait Enhancing Mobile Shoe that rehabilitates the gait of individuals with stroke. The other licensed patent is for an assistive crutch that provides assistive forces to propel an individual forward while walking on a crutch. Both the shoe and crutch were featured as the cover article of Science News in 2014. He has also published three journal papers and one book chapter, some related to his ongoing NSF-funded project exploring bimanual interactions.

Dr. Yu Chen is Associate Professor of Molecular Medicine. He received his Ph.D. in biochemistry at the University of Chicago in 2002. His patented technology of novel beta-lactamase inhibitors was licensed in 2014 by Gordian Biotechnologies Inc. to develop novel antibiotics against bacterial resistance. He is a founding member of the company and serves as co-chair for the Scientific Advisory Board. He has developed a collaboration with a publicly traded biotechnology company, Achaogen Inc. in San Francisco, to develop novel antibiotics. He has published scientific papers and reviews on novel inhibitor discovery targeting antibiotic resistance and metastatic cancer in top medicinal chemistry journals, such as the Journal of Medicinal Chemistry. His collaborative work led to novel inhibitors targeting Alzheimer’s disease and the Moore AD grant award.

Dr. John H. Paul is a Distinguished University Professor of Biological Oceanography. He received his Ph.D. from the University of Miami in 1980. In 2014, he launched a new company to produce a portable device that would answer the question: Is this really grouper that I am eating? Within six months of receiving his 2013 USF patent, he formed PureMolecular, LLC. His collaborative work led to a submission of a manuscript to Food Control in 2014, a successful proposal to the USF Seed Capital Accelerator Program which received funding from the Florida High Tech Corridor Council in 2014, and a proposal to the National Oceanic and Atmospheric Administration (NOAA) to use his patent to detect the onset of red tides in 2014. His group uses their experience in measuring mRNA as a surrogate for microbial gene expression in the design of hand-held and autonomous sensors for the detection of noxious microorganisms in coastal environments.

Dr. Umesh Jinwal, Assistant Professor of Pharmaceutical Sciences, received his Ph.D. in biotechnology from Barkatullah University in 2003. His research focuses on drug discovery for neurodegenerative diseases using novel tools. In 2014, he filed three patent applications and three disclosures. He received two grants from the Byrd Small Grant Program and from the Florida Health Department in 2014. He has successfully published two manuscripts related to the patent applications. Under his guidance, three students from his lab received awards including an ADDF Young Investigator Scholarship Award from the Alzheimer's Drug Discovery Foundation. Jinwal recently received Best Researcher Award from the USF College of Pharmacy and secured a grant award from the BrightFocus Foundation. He is a member of the Alzheimer's Association International Society to Advance Alzheimer Research & Treatment, American Society for Biochemistry and Molecular Biology, and the Society for Neuroscience, among others.

Dr. Lindsey Shaw is associate professor in the Department of Cell Biology, Microbiology and Molecular Biology. He received his Ph.D. at the University of Sheffield. The Shaw Lab at USF focuses on the pathogenic and drug resistance mechanisms of antibiotic resistant bacteria. Shaw's team was awarded a U.S. patent for novel antibacterial therapeutics designed to treat drug resistant bacterial infections in 2014. This was featured on television and aired in 20 different states, reaching over two million people and generating significant media attention. His group filed a provisional U.S. patent application for a different class of antibacterial agents, which resulted in a research contract with Adynnx Pharmaceuticals. His group also had a research cooperativity agreement with Cubist Pharmaceuticals focused on a project to generate new antibiotic treatments. He has also worked with Zimek Systems developing touchless disinfection systems.

2014 for Achievements in 2013

Dr. Michael Fountain, Director of the Center for Entrepreneurship in the Muma College of Business and professor of Industrial and Management Systems Engineering, as well as Psychiatry and Behavioral Medicine, received the award for his pioneering work in the field of micro- and nano-lipid encapsulation technologies for commercial applications; for bringing two landmark liposomal products to the market; and for his role in launching the USF Student Innovation Incubator and providing business and technical guidance to startup companies.

Dr. Daniel Yeh, Associate Professor of Civil and Environmental Engineering, received the award for his development of waste resource recovery technologies, including the NEWgenerator, which converts waste into nutrients, energy, and water; and ICARUS (Isolated Cultivation of Algal Resource Utilization Sewage), which aims to produce a beneficial product while decreasing the cost of wastewater treatment.

Dr. Subhra Mohapatra, Associate Professor of Molecular Medicine, Morsani College of Medicine, USF Health, was selected for her development of innovative platforms for anti-cancer drug discovery and personalized cancer therapy through growth of new intellectual property, a licensing agreement, the transition from preclinical discovery to the clinic, for funding obtained through federal programs such as SBIR, and for significant publications in technology.

Dr. Shufeng Zhou, Professor, Associate Vice President of Global Medical Development, Associate Dean of International Research, and Chair of Pharmaceutical Sciences in the College of Pharmacy and the Morsani College of Medicine, USF Health, received the award for his development of patent pending nano-formulated tobacco oil for electric cigarettes on porous polymers and cyclodextrin, a technology that provides a healthier alternative to traditional cigarettes and is more environmentally friendly; and for his continued development towards patents in stem cell therapy, potential treatment in tumors, Alzheimer's disease, liver injury protection, and pain reduction.

2013 FOR ACHIEVEMENTS IN 2012

Dr. Babu Joseph and Dr. John N. Kuhn, Chemical and Biomedical Engineering, were recognized for their

innovative work in the field of clean energy. Together, they have had tremendous success in translating their research for commercial application. They have developed the USF start-up company, Trash 2 Cash Energy, to commercialize their inventions in the area of liquid fuels production from landfill gases.

Dr. Mark L. McLaughlin, Professor of Chemistry, has a joint appointment as Professor of Interdisciplinary Oncology at Moffitt Cancer Center, in addition to being Executive Vice President and Treasurer of Modulation Therapeutics, Inc. McLaughlin received the Excellence in Innovation Award for his innovative work in the development of MTI-101, a second-generation anti-cancer drug used in the treatment of multiple myeloma. He has over 100 peer-reviewed publications in chemistry and its applications to human disease and cancer, and has received funding from the National Institute of Health and National Science Foundation.

Ms. Merry Lynn Morris, an Instructor in the School of Theatre and Dance, received the Excellence in Innovation award for her innovative work leading to the development of the Rolling Dance Chair. Her wheelchair addresses the performance needs for differently-abled dancers and re-imagines mobility through the lens of dance. Her technological achievements are being recognized for a truly innovative approach to mobility and the far-reaching benefits of this invention both within and beyond the field of dance.

Dr. Meredith A. Rowe, Professor and Endowed Chair of Nursing, received the Excellence in Innovation Award for her innovative work in the development of the CareAlert System, an integrated home-monitoring system that assists caretakers of dementia sufferers. The CareAlert System uses a system of bed sensors, motion sensors, and door-opening sensors to keep track of the whereabouts of a person with dementia and reduce the constant vigilance that is currently demanded of caregivers.

2012 FOR ACHIEVEMENTS IN 2011

Dr. Dennis E. Kyle, Distinguished University Health Professor of Global Health, College of Public Health, and **Dr. Roman Manetsch**, Associate Professor of Chemistry, College of Arts and Sciences, are recognized for their innovative work in drug discovery and development for the treatment of malaria. Their work is a striking example of how USF researchers have taken a broad interdisciplinary approach to develop a novel chemotherapeutic agent against malaria.

Dr. Robert H. Byrne, Distinguished University Professor of Seawater Physical Chemistry, College of Marine Science, is recognized for his innovative work leading to the development of a series of instruments that allow scientists to make unprecedented chemical observations from a ship at sea, which is revolutionizing in situ observations in chemical oceanography. The most recent version of this system is, in essence, a very capable chemistry lab in a portable container that successfully operates at sea under harsh conditions.

Dr. Stuart Hart, Assistant Professor of Obstetrics and Gynecology, Morsani College of Medicine, received the Excellence in Innovation Award for his innovative work leading to the development of a number of novel medical devices, including laparoscopic instruments that allow the surgeon to operate using an instrument the size of a needle, so no incision is necessary, and no scar is created; intra-abdominal docking tools to allow attachment and detachment of instruments within the body; a laparoscopic suturing device; and an electronic catheter stethoscope, the "eCath," which non-invasively collects acoustic signatures from within the body.

2011 FOR ACHIEVEMENTS IN 2010

Dr. Huseyin Arslan, Associate Professor of Electrical Engineering, is recognized for research related to advanced signal processing wireless technologies.

Dr. Bill Kearns, Research Associate Professor, Department of Rehabilitation & Mental Health Counseling, is recognized for research that involves the use of advanced tracking technologies and fractal mathematics to detect variations in human movement which may be indicative of cognitive and/or physical decline. Dr. Kearns and his colleagues were awarded a U.S. patent on July 12, 2011 for their invention entitled "Human and Physical Asset Movement Pattern Analyzer."

2010 FOR ACHIEVEMENTS IN 2009

Dr. Donald Haynie, Associate Professor of Physics in the College of Arts and Sciences, is recognized for his entrepreneurial work in multiple patents and the foundation of BioLaminex, Inc., a startup company in USF Connect.

Dr. Patricia Kruk, Professor of Pathology and Cell Biology in the College of Medicine, is recognized for her work in the development of urinary biomarkers for cancer detection. She has a patent pending for her method to detect ovarian cancer, and also generated more than \$1.6 million in research funding.

2009 FOR ACHIEVEMENTS IN 2008

Dr. Ken Christensen, Professor, Computer Science, is recognized for his work in Energy Efficient Ethernet Standards Project that has led to two new standards that have been adopted by the EPA's "Energy Star" program – manufacturing specifications for energy efficient equipment. These manufacturing standards apply to energy usage by computer networks and PCs, thus reducing energy consumption and improved sustainability.

Dr. Abdul Malik, Associate Professor of Chemistry, is recognized for his work in Sol-gel technology in analytical separations methodology that has resulted in 10 issued patents (from 4 countries) and eleven US patents pending. This novel technology will lead to significant advances in rapid diagnostic analysis.

Dr. Roland Shytle, Associate Professor, Center of Excellence for Aging & Brain Repair, received the Excellence in Innovation Award for his discovery of successful clinical uses for mecamlamine, which has led to four issued patents on mecamlamine and its active enantiomer. Shytle's patents have been licensed to the pharmaceutical company, Targacept, Inc.

2008 FOR ACHIEVEMENTS IN 2007 (INAUGURAL)

Dr. Venkat Bhethanabotla, Professor, Chemical and Biomedical Engineering, is recognized for developing and patenting advanced nanomaterial-based surface acoustic wave sensor technologies for hydrogen detection which was licensed in 2007, securing NSF-STTR funding and Florida High Tech Corridor funding with Masscal Scientific Instruments, Inc. in 2007 to develop a nanobalance using a thickness shear mode acoustic wave sensor, with patent pending, and for filing 3 patent applications in 2007 for integrating two sensor functions on a single device using acoustic waves for the detection of biomarkers related to ovarian cancer.

Team of Dr. Miguel Labrador, Computer Science & Engineering and Center for Urban Transportation Research, was recognized as a team for developing software applications and filing two patent applications and an invention disclosure for using new and evolving GPS enabled mobile phones and devices to assist in the real-time communication with and tracking of individuals in transit. This technology will improve the safety, delivery, and

monitoring of people and cargo with applications in fields such as transportation, the military, mobility of the handicapped, law enforcement, and public safety.

Dr. Miguel Labrador, Associate Professor, Computer Science and Engineering

Dr. Rafael Pérez, Professor, Computer Science and Engineering

Mr. Philip Winters, Research Associate in the Center for Urban Transportation Research

Dr. Sean Barbeau, Research Assistant in the Center for Urban Transportation Research

Ms. Nevine Georggi, Research Assistant in the Center for Urban Transportation Research

Dr. Shyam Mohapatra, Professor, Internal Medicine, received the Excellence in Innovation Award for his role in the development and marketing of diagnostic reagents/kits for the detection of viral infections, including AIDS, and the early detection of cancers. His translational research has yielded multiple invention disclosures, patent applications, and patents — resulting in licenses to pharmaceutical companies for devices such as transdermal drug delivery systems

Team of Tom Pruitt, Institute for Research in Art, Graphicstudio, was recognized as a team for demonstrating exceptional achievement and innovation within this unique research program in the College of The Arts.

Mr. Tom Pruitt, Lecturer/Master Printer/Studio Manager

Ms. Sarah Howard, Research Associate/Printer/Digital Specialist

Mr. Will Lytch, Research Associate/Photographer

Mr. Tim Baker, Research Associate/Printer

Mr. Stephen Sundarrao, Associate Director, Mechanical Engineering, received the Excellence in Innovation Award for demonstrating exceptional achievement and innovation in translation research.

Congratulations, faculty, for your extraordinary achievements!