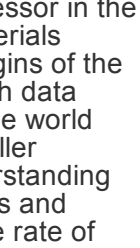




December 2019

RESEARCH



Faculty Exploring the Evolution of the Universe Brings research to the UofM



Dr. Francisco Muller Sanchez, assistant professor in the Department of Physics and Materials Sciences, is peering into the origins of the universe. Using multi-wavelength data from the largest telescopes in the world and several NASA missions, Muller Sanchez is advancing our understanding of the co-evolution of black holes and galaxies. His work compares the rate of flow of material toward areas surrounding an active galactic nucleus, and compares this with the inflow of material around black holes. His work is contributing to a major, ongoing debate in astrophysics around the evolution of galaxies.

Muller Sanchez, who received his PhD in Physics and Astronomy from the Ludwig Maximilians University in Munich, working at the Max-Planck Institute for Extraterrestrial Physics, joined the University of Memphis in fall 2018. This work is a continuation of his prior appointments at the Instituto de Astrofísica de Canarias in Spain, the University of California Los Angeles (UCLA) and the University of Colorado, Boulder.

For more information on his research, contact Muller Sanchez at f.muller.sanchez@memphis.edu.

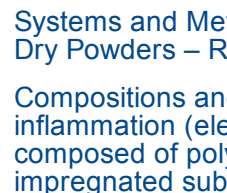
Mathematical Sciences Faculty Named Eisenbud Professor UofM's Lasiecka receives prestigious honor

Distinguished University Professor and chair of the Department of Mathematical Sciences, **Dr. Irena Lasiecka** has been selected to be an Eisenbud Professor in the program Mathematical Problems in Fluid Dynamics during the spring 2021 semester. This will be held at the Mathematical Sciences Research Institute (MSRI) at the University of California, Berkeley. The Eisenbud Professorship is funded by an endowment from the Simons Foundation in support of the MSRI's scientific programs.

As a part of the program, Lasiecka will be conducting collaborations with other researchers at UC Berkeley in the area of fluid dynamics and applications, as well as mentoring postdoctoral fellows.

For more information on this appointment, contact Lasiecka at lasiecka@memphis.edu.

Boosting Brain Development Highlights collaboration with Porter-Leath

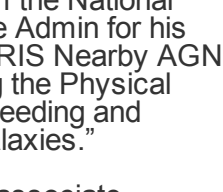


Dr. Susan Elswick, associate professor in the School of Social Work, and **Dr. Laura Taylor**, assistant professor in the School of Social Work, have partnered with Porter-Leath Children's Center to develop an infant mental health consultation program. Elswick was awarded the \$91,888 grant from the State of Tennessee for this collaboration.

The goal of infant mental health consultation is to support the healthy social and emotional development of young children in early childhood education and primary care settings through relationship-based, culturally-competent, developmentally-appropriate and trauma-informed practices. While healthy childhood social and emotional development is the targeted outcome of this program, the consultation model focuses on promoting early childhood educators' and primary care staff's capacity to reflect, problem solve and intervene in ways that will help them be more effective in their roles and supporting children with whom they work. Elswick and her team will organize and manage training opportunities for utilizing assessment tools and provide ongoing consultation with targeted childcare centers and primary care offices.

For more information on this project, contact Elswick at selswick@memphis.edu.

Tech Grants Announced Awards \$200,000 in seed funding



As the applied research arm of the University, the FedEx Institute of Technology is committed to the commercialization of inventions developed by the world-class faculty and researchers at the UofM. The purpose of these tech grants is to enable the development of the most commercially promising technologies like applications, software and inventions. Twenty projects were chosen for funding in the 2020 cycle.

Projects Selected:

Novel Design of Grid-Connected Solar Photovoltaic System – Mohd Hasan Ali;

Method and System for Real-Time Control of Defects Distribution and Characteristics in Powder-Bed Fusion Processes – Ebrahim Asadi;

Dual-Fitting Schemes for Learning Systems against Adversarial Attacks – Dipankar Dasgupta;

Systems and Methods for Dispersion of Dry Powders – Ranga Gopalakrishnan;

Compositions and methods for inhibiting inflammation (electrospun template composed of polydioxanone (PDO) and/or impregnated substrates) – Ryan Hughes;

Signal: Portable 3D Scanner – Eddie Jacobs;

Fingerprint detection: Qualitative and Chemical recognition – Sanjay Mishra;

Inkjet printed flexible and stretchable dry impedimetric electrodes – Bashir Morshed;

Geohelth Segment Locator – Esra Ozdenoro;

My-Commencement.Com - An Enterprise Management System – Radesh Palakurthi;

Multi-focal light-sheet structured illumination fluorescence microscopy: illumination module, method and software for obtaining super-resolved images with optical-sectioning capability – Chrysanthos Petru;

In Situ Polymerization of Guanidinium-Based Ionic Covalent Organic Framework on Polyacetylene Nanoribbons for Rapid and Selective Cr(VI) Oxidation/Removal from Water – Maryam Salehi;

Eating Healthy Conveniently – Marie van der Merwe;

Novel Methods and Devices for Auditory Rehabilitation for Interaural Asymmetry (ARIA) – Deborah Moncrieff;

Portable/wearable device for estimating the state of environment from multiple sensors – Bonny Banerjee.

For more information on these tech grants, contact Dr. Hai Tieu at htieu@memphis.edu.

Research Awards November 2019

Dr. Vasile Rus, professor in the Department of Computer Science, and faculty affiliate in the Institute for Intelligent Systems, was awarded \$2,584,309 from the National Science Foundation for his project "The Learner Data Institute: Designing the Data Revolution to Make the Learning Ecosystem More Effective, Efficient, and Engaging."

Dr. Francisco Muller Sanchez, assistant professor in the Department of Physics and Materials Science, was awarded \$416,574 from the National Aeronautics and Space Administration for his project "The KICK QSIIRS Nearby AGN Survey: Characterizing the Physical Mechanisms Driving Feeding and Feedback in Active Galaxies."

Dr. Alistair Windsor, associate professor in the Department of Mathematical Sciences and director of the Institute for Intelligent Systems, was awarded \$186,660 from the U.S. Testing Service (ETS) for his project "ETS Sponsored Research Agreement."

Dr. Brian Waldron, associate professor in the Department of Engineering and director of the Center for Applied Earth Science and Engineering, was awarded \$140,000 from the City of Memphis for his project "BCS 2.0." Waldron was also awarded \$9,500 from the City of Collierville for his project "Collierville GW Support."

Dr. Susan Elswick, associate professor in the School of Social Work, was awarded \$91,888 from the State of Tennessee in collaboration with Porter-Leath Children's Center, for her project "Building Strong Brains Proposal."

Dr. R. Eric Platt, interim chair and associate professor in the Department of Leadership, was awarded \$61,790 from the State of Tennessee in collaboration with Shelby County Schools, for continuation of his project "Principal Pipeline."

Dr. Shahram Pezeshk, chair and professor in the Department of Civil Engineering, was awarded \$55,070 from the Arkansas Department of Transportation in collaboration with Arkansas State University, for continuation of his project "Spatial Analysis of Benefits."

Dr. Debra Bartoli, research associate professor in the Division of Epidemiology, Biostatistics, and Environmental Health, was awarded \$55,000 from The Urban Child Institute for her project "Evaluation of Shelby County Schools' School Nurse Pilot Project."

Dr. Eddie Jacobs, professor in the Department of Electrical and Computer Engineering, was awarded \$54,592 from the U.S. Army Corps of Engineers Research and Development Center for his project "IPA Assignment."

Dr. Carolyn Kaldon, research associate professor in the Center for Research in Education Policy, was awarded \$48,307 from the National Science Foundation in collaboration with Indiana University-Purdue University Indianapolis, for her project "Project EPIAC (Evidence-Informed Promotion of Inclusive Climate)."

Dr. Stephanie Ivey, associate dean for research in the College of Engineering and professor in the Department of Civil Engineering, was awarded \$41,372 from the Tennessee State Board of Education in collaboration with Battelle for her project "West TN STEM Hub." Ivey was also awarded \$11,500 from Green Dot Public Schools for her project "Green Dot STEM Ambassadors."

Dr. Xianggen Hu, professor in the Department of Psychology and faculty affiliate in the Institute for Intelligent Systems, was awarded \$30,000 from the National Institutes of Health in collaboration with New York University, for his project "Developing Clinical Translational Research to Mitigate Genetic Risk to Individuals who are at Clinical High Risk for Psychosis."

Dr. Arthur Graesser, emeritus professor in the Department of English and faculty affiliate in the Institute for Intelligent Systems, was awarded \$20,500 from the U.S. Department of Education in collaboration with Georgia State University, for continuation of his project "Understanding the Cognitive and Motivational Profiles of Struggling Adult Readers and Developing Effective and Engaging Literacy Programs to Address Their Literacy Learning Needs."

Dr. Andrew Guthrie, assistant professor in the Department of City and Regional Planning, was awarded \$10,000 from Hennepin County in collaboration with the Regents of the University of Minnesota for his project Value of Transitways Multi-Region Accessibility Analysis."

Dr. Jeffrey Marchetta, associate professor in the Department of Mechanical Engineering, was awarded \$10,000 from the U.S. Department of Energy in collaboration with Tennessee Technological University, for continuation of his project "Tennessee 3-Star Industrial Assessment Center."

Dr. Erin Nelson, assistant professor in the Division of Public and Nonprofit Administration, was awarded \$9,116 from United Way of Greater Memphis in collaboration with Momentum Non-Profit Partners aka Alliance for Nonprofit Excellence, for continuation of her project "Asset Mapping."

Dr. J. Daniel Strahl, associate director in the Center for Research in Educational Policy, was awarded \$8,481 from Tennessee Alliance for Legal Services for his project "Memphis Area Legal Services Family Advocacy and Case Management Instrumentation."

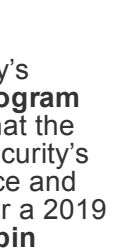
Dr. Deborah Leslie, assistant professor in the Department of Earth Sciences, was awarded \$8,117 from the U.S. Department of Agriculture for her project "Investigating the Managed Aquifer Recharge in the Lower Mississippi River Basin."

Dr. Douglas Powell, assistant professor in the School of Health Studies, was awarded \$2,991 from Sheri Inc. for his project "Interaction of breast size and support on lower extremity biomechanics associated with anterior cruciate ligament rupture."

Tracy Robinson, director of the Center for Innovative Teaching and Learning, was awarded \$2,500 for her project "CAEL WICHE PLA Impact Study."

* Data is reported on the 18th of each month. Any awards finalized after the 18th of each month will be reported in the following month's report.

INNOVATION



UofM's STEP Program will receive DHS Under Secretary's Award Science and Technology



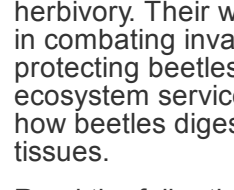
The FedEx Institute of Technology's **Systems Testing Excellence Program (STEP)** is pleased to announce that the U.S. Department of Homeland Security's (DHS) Under Secretary for Science and Technology has selected STEP for a 2019 Under Secretary's Award! **Dr. Robin Poston**, dean of the Graduate School and director of STEP, will accept the award at a ceremony on Friday, Dec. 6, at the National Association of Home Builders auditorium in Washington, D.C.

STEP's work with DHS has included conducting a workforce skills and competencies study, building customized training programs targeted to reduce knowledge gaps and working with DHS training staff to combine our training with current DHS testing and evaluation training offerings. **Dr. Mark Gillenson**, associate director of STEP and a professor in the Fogelman College of Business & Economics who has been instrumental in managing the work effort, stated, "We are thrilled to partner with the Department of Homeland Security to help our nation create high-quality, state-of-the-art software systems that work because of the rigorous testing and evaluation protocols that we teach in our educational programs." DHS personnel have indicated the highest level of satisfaction with our training.

STEP was founded in 2006 by **Dr. Jasbir Dhalliwal**, executive vice president for Research and Innovation, in a partnership with FedEx Corp. STEP is the country's largest, research-based academic research and training program in the important field of software testing. Several STEP programs, led by Gillenson, have trained well over 1,000 software testing and software development professionals in many Memphis-area companies. STEP has also conducted training programs for the U.S. Department of Defense, as well as the U.S. Department of Homeland Security. STEP-affiliated faculty at the University of Memphis and other leading U.S. universities have conducted leading-edge research in software testing, which is used to inform the coursework designs for the STEP training programs. STEP has also conducted an annual research workshop in software testing.

For more information on STEP, contact Poston at rposton@memphis.edu, or Gillenson at mgillens@memphis.edu.

Biology Professor Publishes in National Academy of Sciences Journal



Genomic Basis of Insect Biodiversity

Dr. Duane McKenna, William Hill Professor of Biological Sciences, has authored a paper published in the journal *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*. His article "The Evolution and Genomic Basis of Beetle Diversity" details how ancient horizontal transfers of microbial genes to beetle genomes set the stage for beetle diversification.

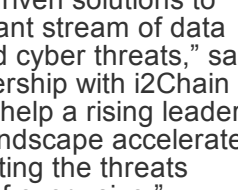
Beetles (with more than 400,000 species) arguably comprise the most diverse group of animals on Earth. Most beetle species are herbivores and feed on plants. Consequently, some beetles are pests of agriculture or forestry, or play important roles as pollinators or decomposers. In this study, funded in part by the U.S. National Science Foundation, McKenna and his colleagues used genomic data on an unprecedented scale to reconstruct the family tree of beetles and trace the evolution of beetle genes enabling herbivory. Their work will aid researchers in combating invasive beetle species, protecting beetles that perform important ecosystem services, and understanding how beetles digest wood and other plant tissues.

Read the full article [here](https://doi.org/10.1073/pnas.1911111116). Read the full press release [here](https://www.memphis.edu/newsroom/2019/12/06/duane-mckenna-pnas/).

BBC Interview: Study says beetles steal genes from bacteria and fungi

**Silicon Valley
Cybersecurity
Startup
Licenses
Patent from
UofM**

**Plans for its own
applications
and
service**



The University of Memphis Research Foundation (UMRF) has signed an agreement to license a U.S. patent for an innovative multi-factor authentication system, invented and developed by a team led by **Dr. Dipankar Dasgupta**, professor of Computer Science, director of the Center for Information Assurance and co-director of the Cluster to Advance Cyber Security & Testing (CAST). The patent pertains to i2Chain, a San Francisco area cybersecurity startup, which plans to evolve adaptive authentication for its own applications as well as offer the technology as a service to other industry partners.

Ajay Jotwani, co-founder and CEO of i2Chain, is upbeat about engaging the University of Memphis' industry-leading cybersecurity research expertise. "Digitalization and new privacy laws are forcing companies to enact creative and proven solutions to secure their identity and information," he said. "This invention allows us to improve the identity defense as well as build research collaboration with Dr. Dasgupta and the Center for Information Assurance at the UofM."

"The future of business is defined by creating cybersecurity solutions that use innovative, research-driven solutions to reduce a nearly constant stream of data breaches, hacking and cyber threats," said Dasgupta. "Our partnership with i2Chain is a great opportunity to help a rising leader in the cybersecurity landscape accelerate its growth while mitigating the threats faced by businesses of every size."

"The Adaptive-MFA significantly enhances i2Chain's capability to defend identity and enable secure information access," adds Sanjay Jain, co-founder and CTO. "In addition, this patent is an indispensable invention in the process of continuous and biometric identity validation."

For more information on this development, read the full release [here](https://www.memphis.edu/newsroom/2019/12/06/silicon-valley-cybersecurity-startup-licenses-patent-from-uofm/).

SMART Cities Research Cluster 2019 Accomplishments

Innovative companies can only happen through innovative partnerships.

Working with the City of Memphis, University of Memphis researchers are pioneering the evolution of SMART Cities technologies – improving the lives of Memphians and creating dynamic new business frontiers.

Research Projects Leveraged from FIT Seed Funding

Characterizing Community Exposure to Polycyclic Aromatic Hydrocarbons in a Tri-State Area, Public Health, Shelby County and National Institute of Health, \$594,407;

Evaluating Compliance and Refining Enforcement of the Fair Housing Policy in Low-Income Multiple Unit Housing, US Housing and Urban Development, \$30,000;

JPB Environmental Health Fellowship, JPB Foundation, Harvard University, \$350,000;

The Impacts and Adoption of Connected and Automated Vehicles in Tennessee, Tennessee Department of Transportation, \$300,000, 2018-20;

Work Zone Alert Systems, Tennessee Department of Transportation, \$175,000;

Modeling Adoption of Autonomous Vehicle Technologies by Freight Organizations, U.S. Department of Transportation, \$179,523;

Towards Sustainable Tourism Transportation Systems and Services in Tennessee, Tennessee Department of Transportation, \$150,000, 2019-21;

Connecting Demand Response Transit with Fixed Service Transit, Tennessee Department of Transportation, \$200,000, 2019-21;

Wrong Way Driving Technology Testing, Tennessee Department of Transportation, \$200,000, 2019-21;

The Impacts and Adoption of Connected and Automated Vehicles in Tennessee, Tennessee Department of Transportation, \$200,000, 2019-20;

Understanding Freight Impacts on Tennessee Communities, Tennessee Department of Transportation, \$150,000, 2019-21.

In 2019, the cluster had six publications, four presentations at national/international conferences and was featured in Metrolab Innovation of the Month.

The cluster is led by **Dr. Charlie Plano**, Department of City & Regional Planning, and **Dr. Sabya Mishra**, Department of Civil Engineering. To learn more about SMART Cities, visit the website.

MemDevOps Transformation Panel Discussion

DEC. 4 | 2-4 PM
FedEx Institute of Technology
Room 229

To register, visit <https://www.memphis.edu/newsroom/2019/12/06/memdevops-transformation-panel-discussion/>

Herff College of Engineering Welcomed Tennessee Department of

Transportation Commissioner
Town Hall focused on leadership and career expertise for students

The Herff College of Engineering and the Intermodal Freight Transportation Institute recently welcomed Commissioner Clay Bright to the FedEx Institute of Technology for an afternoon of open house, conversation with students, faculty and staff. He candidly shared his career journey, his leadership over 4,000 TDOT employees and advice for students as they embark on their careers.

For more information on this visit, contact Dr. Stephanie Ivey, associate dean of Research and Innovation in the Herff College of Engineering, at ssalyers@memphis.edu.

LABS AND RESOURCES LIGHTNING TALKS

DEC. 5 | 3-5 PM
FedEx Institute of Technology
Fishbowl (203/205)

To register, visit <https://www.memphis.edu/newsroom/2019/12/06/labs-and-resources-lightning-talks/>

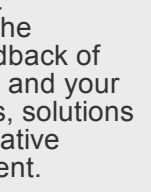
GiveCamp Memphis Hackathon Design for Good 2020 to be held at the FedEx Institute of Technology

GiveCamp Memphis is getting ready for the Design for Good 2020 hackathon and has opened registration for the 2020 weekend! Deadline is Dec. 31. Register [here](https://www.memphis.edu/newsroom/2019/12/06/givecamp-memphis-hackathon/).

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For more information on this training, contact Ramli Lotay rlotay@memphis.edu or 901.678.1041.

CALENDAR



Machine Learning/Data Sciences/R
Meetup
Dec. 3 | 7-8 PM | FIT 225

Agile Coaching
Dec. 3-5 | 8 AM-5 PM | FIT 225

MemDevOps Meetup
Dec. 4 | 2-4 PM | FIT 203/205 (The Fishbowl)

Labs and Resources Lightning Talks
Dec. 5 | 3-5 PM | FIT 203/205 (The Fishbowl)

WordPress Memphis Meetup
Dec. 5 | 6-9 PM | FIT 226

Code Together
Dec. 8 | 1-3 PM | FIT 226

Design Thinking 2-Day Training
Dec. 9-10 | 8 AM-5 PM | FIT 225

Memphis Game Developers
Dec. 11 | 6-8 PM | FIT 225

Memphis Python User Group
Dec. 16 | 6:30-8:30 PM | FIT 225

Organizational Change Management
Dec. 16-18 | 8 AM-5 PM | FIT 203/205 (Fishbowl)

RESEARCH CLUSTERS



ADDITIVE MANUFACTURING

AGRICULTURE & FOOD TECHNOLOGIES

BIOLOGISTICS

CAST

DATA SCIENCE

DRONES

SMART CITIES

Society of Research Administrators International Welcomed participants to campus

On Nov. 14-15, the University of Memphis hosted a two-day biennial conference, led by presenters from the Society of Research Administrators International. Over 75 research administrators attended the conference, which covered topics in pre- and post-award management, budgeting and compliance. The SRA Conference Planning Committee would like to thank the generous sponsors for helping to make this event a tremendous success: **Dr. Thomas Nenon**, executive vice president of Academic Affairs and provost; **Dr. Jasbir Dhalliwal**, executive vice president for the Division of Research and Innovation; **Mr. Raaj Kurepat**, executive vice president for Business and Finance and chief financial officer; and members of the Dean's Council.

Quick Guide available [here](https://www.memphis.edu/newsroom/2019/12/06/society-of-research-administrators-international/).

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U THE UNIVERSITY OF MEMPHIS Research + Innovation

FedEx INSTITUTE OF TECHNOLOGY MEMPHIS

View website here.

Design thinking is an activity-based training course geared toward solving real-world problems rooted in human empathy and conducted by collaborative multidisciplinary teams.

Based on the Stanford D. School Model of Design Thinking, the class will help you learn strategies and implement outcome-based solutions.

Register for the event [here](https://www.memphis.edu/newsroom/2019/12/06/design-thinking-2-day-workshop/).

Organizational Change Management 3-Day Training
Dec. 16-18 | 8AM-5 PM | FIT 203/205

In this interactive training, you will benefit from three days where you will apply Prosci's methodology and ADKAR Model to one of your active projects among like-minded change leaders — from individual practitioners and project managers to IT professionals which permit agile lean thinking and quickly deliver value. A coach must be competent, professional and ethical, having business and technical knowledge and an understanding of change and the impact it has on individuals and organizations.

This course is designed to teach, practice and reinforce the core coaching competencies of the Agile coach, enabling the coach to succeed at reaching agreed-upon team and organizational outcomes.

For more information on this training, contact Ramli Lotay rlotay@memphis.edu or 901.678.1041.

Labs & Resources Lightning Talks
Dec. 5 | 3-5 PM | FIT 203/205 (Fishbowl)

Join us during study day for an overview of the labs and resources. Come learn about the amazing resources open for collaboration on the UofM campus.

Register for the event [here](https://www.memphis.edu/newsroom/2019/12/06/labs-and-resources-lightning-talks/). For more information, contact Ramli Lotay rlotay@memphis.edu | 901.678.1041

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