

QUICKVIEW

2018



FIU

Engineering
& Computing

FLORIDA INTERNATIONAL UNIVERSITY

eMerging INNOVATION



FIU's College of Engineering & Computing (CEC) has consistently played a key role at eMerge Americas, an international exhibition of innovation and entrepreneurship in the tech industry. Researchers who exhibited at FIU's 900-square-foot pavilion demonstrated scientific breakthroughs in prosthetics and chemical testing.

The **neural-enabled prosthetic hand system (NEPH)** is the first fully implantable, wirelessly controlled system that can directly stimulate nerves to restore

sensation to amputees. The FDA has granted an investigational device exemption for the first in-human trial for this system.

Electrical engineers have created a **wearable sensor** that can be worn like a watch to monitor alcohol consumption through the skin. The device will create an alert when the reading is high that will be sent to a designated friend or family member via an app.

Student Profile



Liliana Rincon Gonzalez is a research scientist and research coordinator for Ranu Jung's amputee trial. She works with all the regulatory aspects of the project, ensuring compliance, writing grants and obtaining approvals from the Institutional Review Board (IRB). She also

mentors undergraduate students in the lab, and is currently recruiting people for the clinical study.



ERC Principal Investigators

- PATHS-UP: Jessica Ramella
- CELL-MET: Arvind Agarwal
- ASSIST: Shekhar Bhansali

FIU part of two new national **ERCs**

FIU belongs to two new National Science Foundation (NSF) Engineering Research Centers (ERC). **PATHS-UP** (Precise Advanced Technologies and Health Systems for Underserved Populations) aims to develop affordable health devices and systems for underserved communities. Texas A&M University is the lead university; institutional partners include FIU, Rice University and the University of California at Los Angeles. **CELL-MET** (Nanosystems Engineering Research Center for Cellular Metamaterials) hopes to transform cardiovascular care by synthesizing personalized heart tissue for clinical use. CELL-MET is led by Boston University in partnership with FIU, the University of Michigan and six affiliate institutions. Each of the ERCs are five-year awards for approximately \$20 million, and are renewable for 10 years and \$40 million. These two new grants bring FIU's participation in ERCs to three projects.

NSF's Science and Technology Center (STC)

FIU joins researchers from the University of California-Berkeley, Massachusetts Institute of Technology, Stanford University, University of Texas at El Paso in the NSF's **STC for Energy-efficient Electronics Science**. FIU's role is to study spintronics to enable leapfrog advances in information data rates in memory towards the realization of quantum computing. By the end of the five-year project in 2020, FIU's funding amount in this project will be approximately \$900,000.



Home to **INNOVATIVE BREAKTHROUGHS**

Researchers at the **Advanced Materials Engineering Research Institute (AMERI)** are working to create the next generation of advanced materials to power new technology, such as nanoparticle synthesis and characterization for drug delivery and disease treatment and nanofabrication techniques to create lightweight and more reliable glucose sensors.

The **Applied Research Center (ARC)**, housed at the Engineering Center, focuses on solving real-world problems through multidisciplinary research collaborations with academia, government, the private sector and industry partners. ARC is organized into three core research areas – environment, energy and information technology.

From fixing cell phones in his dorm to Capitol Hill



Gene Yllanes is an undergraduate student studying electrical engineering in the College of Engineering & Computing. Coming from a family of 15 kids, he made money for college by repairing broken cellphones out of his college dorm. Gene is a Department of Energy (DOE) fellow in the Applied Research Center (ARC). Recently, he got to brief the U.S. Secretary of Energy Ernest Moniz as part of National Lab Day on the Hill.

Ensuring tomorrow's workforce is **COMPETITIVE AND JOB-READY**

CEC will be the first university in the nation, starting in the spring of 2018, to offer a **bachelor's degree in the Internet of Things (IoT)**. The new degree will address the four major areas of IoT — hardware, software, communication and cybersecurity. The 120-credit hour offers hybrid courses, combining in-person and online learning.

The first-of-its-kind **master of science in logistics engineering** is designed to give students the skills they need to meet industry needs. Most logistics degrees currently offered nationwide focus on supply chain management. This degree incorporates various aspects that affect the global community, from different products and methods of transporting them to the software, hardware and engineering components involved in doing so. Contributing companies include UPS (NYSE: UPS), Interport Logistics, Magaya Corporation, FedEx, Maersk and PriceSmart.



Pioneering faculty are **LEADERS IN THEIR RESEARCH AREAS**



CEC faculty consist of leading researchers in their respective fields, and include **five endowed chairs**:

- Malek Adjouadi — Ware Foundation Professor
- Atorod Azizinamini — Vasant Surti Professor of Civil Engineering
- Shekhar Bhansali — Alcatel-Lucent Professor
- S.S. Iyengar — Ryder Professor of Computer Science
- Ranu Jung — Wallace H. Coulter Eminent Scholars Chair in Biomedical Engineering

The **School of Computing & Information Sciences** also has **four Eminent Scholar Chair Professorships**:

- Shu-Ching Chen
- Niki Pissinou
- Naphtali Rische
- Mark Allen Weiss

Over **30** percent of our **faculty** are **fellows**

10 have received prestigious **National Science Foundation CAREER Awards**

2 are members of the **National Academy of Inventors**

Our alumni and students are **MAKING AN IMPACT**



Tariq King, '09, earned both his master's and Ph.D. in computer science from FIU's School of Computing and Information Sciences (SCIS). Today, he is the director of quality engineering at **Ultimate Software**, a leading provider of cloud-based human capital management solutions.

In his role, King is in charge of high-level strategies to oversee software testing and performance at the company, which also includes research and tools used for testing. King first learned about Ultimate Software, a university partner, while a student. It's one of the things he liked about being at FIU. "You have access to industry partners and a support system to help you bridge the gap between what you learn in school and what happens in the industry," he said.

King also believes in giving back. He's an adjunct professor at SCIS, teaching software engineering, and through Ultimate Software, also supports collaborative research projects at the school. "FIU is a university with high research activity, especially its School of Computing and Information Sciences," said King. "If you want to grow and innovate, this is one of their key areas."



Doctoral student, **Homa Fartash**, is moving traffic forward. Fartash's research centers around **Intelligent Transportation Systems**, mechanisms which drive innovative services to improve traffic management and alleviate traffic. She is working on a project funded by the Florida Department of Transportation

that involves installing ramp signals in Broward County to respond to traffic in real time. A ramp signal, also known as a metering light, is a device resembling a basic traffic light that regulates the flow of traffic entering expressways to adjust to current traffic conditions. If a particular expressway, for example, is congested, a ramp signal would signal cars to regulate entry onto the highway during that crunch time, therefore controlling traffic flow.



Largest alumni gift ever: **\$10 MILLION**

Alumnus Chad Moss '94, executive vice president of Moss & Associates, announced a **\$10 million gift through Moss Foundation, Inc.** to CEC — the largest donation by an alumnus to date.

In recognition of his gift, CEC renamed the construction school as the **Moss School of Construction, Infrastructure and Sustainability**. With more than half of the world's population living in urban environments, the school's naming coincides with the academic reorganization of the school, reflecting a broader view of the industry and new approaches and methods for building sustainable urban infrastructure.

Moss' gift will fund scholarships for first-generation students, veterans and disadvantaged youth; faculty and postgraduate research initiatives; continuing professional education and industry programs; and more.

Meet some of CEC'S RESEARCHERS

CEC has
22
patents



Jorge Riera Diaz (*Biomedical Engineering*): As the director of the Neuronal Mass Dynamics Laboratory, Riera Diaz's research focuses on the development of methods for the integration of different brain imaging modalities. His current work in epilepsy, funded by the National Institutes of Health (NIH), centers on researching focal cortical dysplasia in rats. The goal is to understand the inflammatory process and neurovascular coupling to help localize the specific area where epilepsy occurs in the brain. In the future, this information could help surgeons pinpoint the area in the brain and target surgical interventions in humans. He also has a National Science Foundation grant to study cortical spreading depression in migraines.



Selcuk A. Uluagac (*Electrical & Computer Engineering*): Uluagac leads the Cyber-Physical Systems Security Lab (CSL), where the focus of his research is on cybersecurity with an emphasis on its practical and applied aspects. Some of his current projects include fingerprinting IoT devices and applications, designing novel algorithms and tools against sensitive information leakage from IoT devices and building privacy-aware multi-factor authentication mechanisms.



Focus on Innovation

Stavros Georgakopoulos holds a patent for "origami antennas." Inspired by the Japanese art of paper folding, his lightweight version of the traditionally bulky equipment has huge implications. For example, soldiers in the field have for years shared intelligence with base stations by relying on heavy, cumbersome metal antennas that often must be transported by hand or in backpacks over rough terrain. At a fraction of the weight, the model made possible by Georgakopoulos can be stowed compactly, opened easily and collapsed quickly. The launching of satellite antennas during space missions would likewise be improved. The invention, research for which was supported by a grant from the National Science Foundation and the Air Force Office of Scientific Research, is now being brought to market via his startup company and has generated talks with the military and a private aerospace firm.

PREEMINENT Programs



A Preeminent Program at FIU is a collaborative endeavor that demonstrates extraordinary success in providing unique learning opportunities, pioneering research and engagement while expanding the university financial base. The **Accelerated Bridge Construction — University Transportation Center (ABC-UTC)**, one of the university's Preeminent Programs, aims to reduce the societal costs of bridge construction by reducing the duration of work zones, focusing special attention on the preservation, service life, construction costs, education of the profession and development of a next-generation workforce fully equipped with ABC knowledge. ABC-UTC focuses on three key areas: research, education and workforce development, and technology transfer. In December 2016, the U.S. Department of Transportation awarded the ABC-UTC its second round of funding.

State-of-the-art-facilities for **GROUNDBREAKING RESEARCH**

CEC is housed at FIU's Engineering Center in West Miami-Dade, with its School of Computing & Information Sciences located at Modesto A. Maidique Campus, just minutes away. The college's research facilities include:

- **Solar Research Facility:** A commercial-scale solar installation consisting of more than 4,400 solar panels powers research initiatives that will help further advance solar generation in Florida.
- **Tech Station:** A \$3 million, 8,000-sq.ft. hub for technology innovation, training and community engagement built to attract the next generation of top computing talent. It exposes students to collaborative thinking in a modern tech office and lab setting.
- **Wall of Wind (WOW):** WOW is among eight labs in the country with the designation of "Experimental Facilities" under the Natural Hazards Engineering Research Infrastructure (NHERI) program, and one of only two nationwide dedicated to studying extreme wind events. WOW's 12-fan is the largest and most powerful university research facility of its kind.
- **Discovery Lab:** An innovation station for students that challenges them to use creativity in solving real-world challenges, while providing hands-on experiences and fostering entrepreneurial skills. The lab enables rapid prototyping of new products for the marketplace, among them, FIU TeleBot, a telepresence robot enabling disabled police and military personnel to continue serving as patrol officers.



CEC at a Glance

5,500
STUDENTS

Master's Degrees

15

Undergraduate
Degrees

11

2

SCHOOLS

- Moss School of Construction, Infrastructure and Sustainability
- School of Computing and Information Sciences

4

DEPARTMENTS

- Biomedical Engineering
- Civil and Environmental Engineering
- Electrical and Computer Engineering
- Mechanical and Materials Engineering

6

Doctoral
Degrees

PROGRAMS

Biomedical Engineering
Civil Engineering
Computer Engineering
Computer Science
Construction Management
Electrical Engineering
Enterprise and Logistics Engineering
Environmental Engineering
Information Technology
Material Science and Engineering
Mechanical Engineering
Telecommunications and Networking

#1 Highest
Percentage of
Doctoral Degrees
to **Foreign
Nationals**
by School*¹

ASEE
2016

Bachelor's Degrees
Awarded to
Hispanics
by School*²

*¹ Minimum of 25 doctoral degrees
awarded. 116 schools fit this criterion.
*² 300 schools reported.