UCF Engineering & Computer Science

UNIVERSITY OF CENTRAL FLORIDA

Opportunity Starts Here >>>

Smart Cities Transportation Systems
UCF HELPS LEAD $12 MILLION FEDERAL HIGHWAY ADMINISTRATION PROJECT

UCF will help advance several intelligent transportation systems technologies across the region aimed at enhancing pedestrian safety and easing congestion. The Florida Department of Transportation and MetroPlan Orlando are partners.

The work will entail testing several technologies locally and making recommendations, which could lead to national models. Because Orlando is a rapidly-growing region, and one of the world's busiest tourism destinations, it offers an ideal testing ground.

Uniquely positioned, UCF is home to the nationally recognized Center for Advanced Transportation Systems Simulation, which researches traffic safety, intelligent transportation systems, traffic simulation, transportation demand analysis, and planning.

Intelligent transportation systems equipment will be installed on and around UCF's main campus for data collection and analysis. Among the technologies to be tested:

• PedSafe, an innovative pedestrian and bicycle collision avoidance system
• GreenWay, which uses advanced traffic signal technology
• SmartCommunity, for trip planning apps
• SunStore, which integrates FDOT data
• Autonomous and connected vehicles

"Because UCF is a little city, we are well-positioned to test these technologies in real-world situations," said Mohamed Abdel-Aty, chair, UCF Department of Civil, Environmental and Construction Engineering. The renowned transportation engineering expert leads Orlando's Smart Cities initiative at UCF.

Plans call for applying the technology into Orlando's Creative Village, where UCF's downtown campus is set to open in 2019. The Creative Village has facilities for Valencia College and Orange County Public Schools, and caters to high-tech, digital media, and creative companies. It is adjacent to Lynx Central Station and SunRail, and is served by the Lymmo bus rapid transit system.

"This project puts central Florida on the cutting-edge of technology in transportation – and it's only the beginning," said MetroPlan Orlando Executive Director Harry Barley.

UCF NAMED NATION'S

#1

WORKFORCE SUPPLIER
to Aerospace and Defense Industry
2015 • 2016 • 2017 | *Aviation Week*

NEW VIRTUAL, AUGMENTED REALITY LAB

UCF's new Interactive Computing Experiences Virtual Reality Lab offers hands-on experience for students to better prepare them for high-tech jobs in the field, equipped with the same cutting-edge technology used in industry.

Virtual reality immerses people in computer-made simulated environments when they wear a special headset. Augmented reality, a rapidly emerging technology, superimposes virtual content onto images of the real world. Developers build algorithms to support human interactions with the virtual content to create a lifelike experience for the user.

"Diverse industries are investing heavily in virtual and augmented reality, including entertainment, automotive, tourism, real estate, healthcare and others," said Lab Director Joe LaViola, associate professor, UCF Department of Computer Science, and National Science Foundation CAREER Awardee. He is the lead author of the book, *3D User Interfaces: Theory and Practice (2nd Edition)*, published April 2017.

Opening the lab to the entire university invites multidisciplinary projects that can help make non-computer science students more marketable. For example, a business student or entrepreneur could use VR or AR to build and test prototypes or make dynamic product pitches.

Michael Georgiopoulos, Ph.D.
Dean

CHANGING THE WORLD
Meet Our Research Luminaries

Six of our college's faculty were among 45 Luminary Awardees honored by UCF this month as vibrant academic leaders whose research has made significant impact in their disciplines.

George Atia's research to advance the processing of neurological signals for real-time brain computer interfaces holds the promise of enhancing the quality of life of thousands of people with various paralyzing disabilities.

Necati Catbas is an internationally recognized expert in civil engineering and structural integrity. He is a founding director of the Civil Infrastructure Technology for Resilience, an academic-industry-government partnership that develops and applies intelligent monitoring, sensing and material to create safer, more resilient infrastructure.

Hassan Foroosh, an expert in computer imaging, works on multiple NASA and Department of Defense projects that relate to image processing and extracting data from those images.

Jayanta Kapat, director of the UCF Center for Advanced Turbomachinery and Energy Research, is advancing the field's research, working with global industry partners such as Siemens, General Electric and Embraer.

Mubarak Shah is internationally recognized for his work in computer vision, and is among the field's highest-cited authors. His work includes enhancing video surveillance and visual crowd analysis. He oversees the National Science Foundation's longest-running REU site.

Subith Vasu's research focuses on combustion. His 26+ articles this year adds to 50 previous papers, and he has more than $2.5 million in grant funding. He is a Defense Threat Reduction Agency's Young Investigator Awardee.

These six embody the collective excellence of our college's entire faculty, and inspire all of us to push the boundaries as we serve our students and strive to change the world.

STUDENT SUCCESSES

Third in World: UCF Student Cyber Defenders
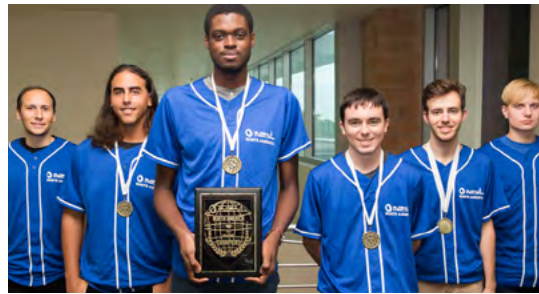
A student team of cyber defense experts took third place in the Global Cyberlympics World Finals in the Netherlands this fall against top teams worldwide. The six teammates – all under 21 years old – faced teams of professionals from major tech companies including Cisco. They finished behind a first-place Netherlands team and second-place Russian team.

Teammates are Matthew St. Hubin, junior, information technology; David Maria, junior, computer engineering; Andrew Hughes and Noah Al Shihabi, juniors, computer science; Ryan Meinke, sophomore, computer engineering; and Robert Tonic, junior, psychology.

They are members of Hack@UCF, a student club that fields teams for cybersecurity competitions, including the National Collegiate Cyber Defense Competition, which UCF has won three consecutive times (2014, 2015 and 2016).

A GoFundMe account helped raise money for the team to travel to the Netherlands. But a donation from Logan Hicks, founder and CEO of the IT engineering company EduArmor, made the trip possible by funding most of the cost.

"Without help from that donor, we would not have been able to travel to compete, so we are very grateful for that," Tonic said.

First in Nation: UCF Sales Engineering Club

The UCF Society of Sales Engineers student club is celebrating a second national title after winning the third annual National Sales Engineering Competition earlier this year.

UCF earned first, second, and third place at the event hosted by Iowa State University. Teams were from the host university, California Polytechnic University, University of Illinois, and University of California, Los Angeles.

The competition mimics what professional sales engineers do – sell complex scientific and technical products or services to an organization facing a technical problem, within limitations such as budget. Competitors are made aware of the problem just two hours before the first round begins.

The UCF team was required to sell a full suite of systems for a factory including heating, ventilation and air conditioning, security, fire, and lighting to an environmentally-conscious buyer with a strict budget. They presented five times during the two-day event to a panel of 15 judges from engineering product companies.

"We put significant effort into preparing our members as individuals and as competitors," said computer engineering student Ted Kursevicius, club vice president. "Our practices bolster communication and presentation skills, and hone-in on how to engage a customer with a complex product in a simple way."

According to the U.S. Bureau of Labor and Statistics, the median annual pay for sales engineers is $100,000.

UCF will host the National Sales Engineering Competition in April 2018.
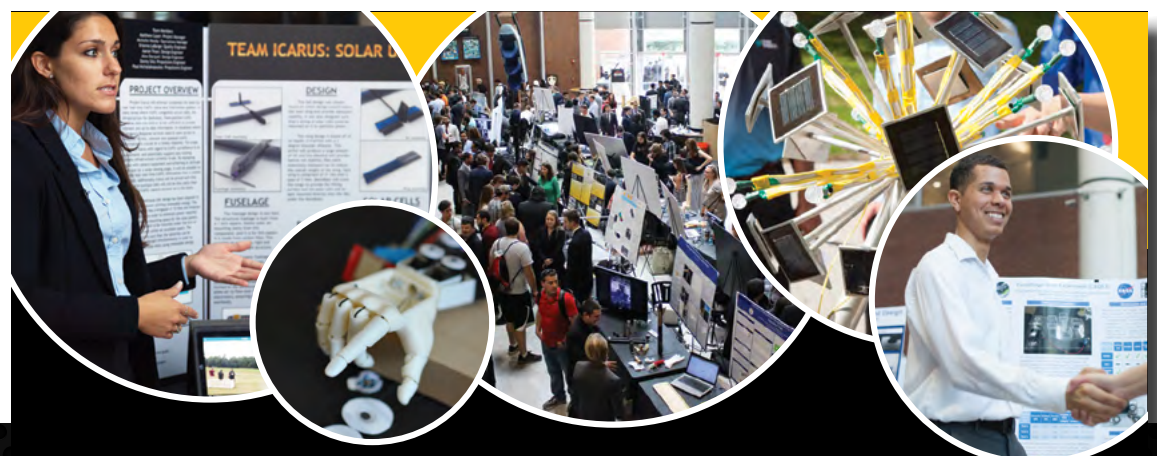
FALL 2017
ENGINEERING AND COMPUTER SCIENCE
SENIOR DESIGN SHOWCASE
NOV. 30

UCF

OUR STARS
OUR PEOPLE DOING GREAT WORK

STUDENT

Gillian Werner, Student Leader, Rocket Scientist

The aerospace engineering honors student is the director of interns for the UCF Engineering Leadership and Innovation Institute (eli²). The UCF Provost Scholar recently interned with Lockheed Martin Missiles and Fire Control under the chief engineer of fixed wing development programs where she coordinated with Air Force Special Operations Forces representatives on C-130 modifications and worked alongside project managers and the chief engineer on upcoming project proposals. She served as fundraising chair of Engineers Without Borders at UCF, and started UCF's student chapter of the American Society for Engineering Education, focused on STEM outreach in the central Florida community.

FACULTY

Helen Huang, Assistant Professor, NIH Research "Millionaire"

She landed a highly-coveted National Institutes of Health R01 Award, more often awarded to later-stage investigators, in her second year in the Department of Mechanical and Aerospace Engineering. The five-year, $1.5 million National Institute on Aging grant, "adaptation of brain and body responses to perturbations during gait in young and older adults," involves collecting brain-wave and muscle activity data to understand how people maintain balance and adapt their movements during walking and exercise. She hopes this knowledge will lead to new approaches for predicting fall risk and balance training programs that will help reduce the growing public health problem and economic burden of falls in aging adults.

ALUMNUS

Phil Dumas, '05 CEO and Founder, UniKey Technologies

You may have seen this UCF electrical engineering alumnus on ABC's *Shark Tank* when he introduced his keyless automation product to a mass audience. Orlando-based UniKey Technologies recently received $5 million in venture capital from existing investors, including Samsung NEXT, and two other strategic investors. "Our business has exploded in the past year and is accelerating at a rapid pace," Dumas said of the smart access control business, which has customers in 65 countries. "We are focused on replacing the entire keychain with your phone." Dumas is a graduate of UCF's Business Incubation Program, a member of UCF's Alumni Association, and serves on the college's Dean's Advisory Board.

LIVING THE DREAM
WITH TWO UCF DEGREES Herb Gingold, '91, '14

From his first taste of the business world as an electrical engineering student taking an introductory entrepreneurial class at UCF, Herb Gingold has dreamed of creating products that people want to buy.

The longtime UCF donor and supporter credits his electrical engineering degree and his more recent UCF Executive Master of Business Administration degree for the success of his newly-launched company, RV Intelligence, which designs and sells electronic products to enhance the recreational vehicle experience.

"Combining my electrical engineering skills with the analytical business skills I gained from UCF's world-class MBA program has helped me understand the market and how our products need to be positioned to be successful," he said. "The real fun part is creating designs and then seeing them on a retail shelf. I'm living the dream!"

Using those combined skills and his relentless entrepreneurial passion, Gingold recently introduced two recreational vehicle products, inspired by his love for camping and tailgating at UCF football games. One is a smartphone remote control for RV jacks, awnings and slides (the "JAS Remote Control"); the other is the "WoBLR," a Bluetooth-enabled bubble-leveler for RVs that works from up to 100 feet away. Gingold is eyeing up to 10 more RV-related electronic products to be on the market next year.

Gingold serves on the advisory board to UCF's Department of Electrical and Computer Engineering and is active on the CECS Alumni Chapter. He routinely encourages fellow alumni to get involved. Alumni can serve as a judge for Senior Design awards, conduct mock interviews to help students polish their interviewing skills at Career Kickoff, or volunteer at the chapter's Boys and Girls Club summer camp to help inspire STEM education in younger students.

Gingold helped establish the CECS Alumni Chapter Endowed Scholarship Fund. He hopes the fund will create a legacy of alumni willing to give back to the school that's given him so much.

"UCF is our school. It's our college. It's our alumni group. Our board is a great way to get involved," he said. "We need you. Giving back and investing in UCF engineering is fulfilling."

GIVE NOW World-class education, innovative programs and pioneering research are the hallmarks of our college. Email Robin.Knight@ucf.edu or call 407-823-2241.

UCF | **College of Engineering and Computer Science**
UNIVERSITY OF CENTRAL FLORIDA

UCF RESEARCHERS ADDRESS
EXTREME WEATHER

POST-HURRICANE STRUCTURAL SURVEILLANCE
**Luis Arboleda-Monsalve,
Assistant Professor**
Civil, Environmental and
Construction Engineering

"When the National Science Foundation asks you to do something, you say yes," said Arboleda-Monsalve, a structural engineering expert who was called to serve on a post-Hurricane Irma surveillance mission throughout Florida's hardest-hit areas.

His research team journeyed from Cape Coral to the Florida Keys searching for water-related issues such as erosion; exposed foundations; bridge, road and other infrastructure damage; drainage issues; and more, while another team surveyed areas in north Florida.

The report is now published by the NSF-funded group, Geotechnical Extreme Events Reconnaissance. GEER comprises engineers who gather knowledge about structural impacts after natural disasters such as storms and earthquakes. GEER provides a national, centralized hub of peer-reviewed post-storm surveillance reports that can help urban planners and developers create or modify building codes.

"We saw collapse of older sea walls. The newer ones did their jobs," he said. The full report is available at www.geerassociation.org, search keyword "Irma."

TEACHING POWER GRID RESILIENCY
**Wei Sun,
Assistant Professor**
Electrical and
Computer Engineering

UCF offers a graduate-level Power System Resilience course to train students in restoring power from outages and blackouts. The course focuses on optimizing and restoring power quickly to recover from natural disasters and malicious attacks; using renewable energy and microgrids to sustain critical electricity service during and after a storm; and enhancing grid resilience through long-term planning and real-time operation and control.

Taught by Wei Sun, the course gives students theory and fundamentals classroom instruction and hands-on training in UCF's new Siemens Digital Grid Lab.

With Siemens software, students can model a power outage based on actual local events, learning how to keep the grid operational in real time. The lab also features the same Siemens hardware used in power substations to create simulations that help locate and isolate system faults that can result in widespread outages.

GLOBAL STORM SURGE PREDICTION
**Thomas Wahl,
Assistant Professor**
Civil, Environmental and
Construction Engineering

Wahl's international research in *Nature Communications* uses newly available data and advanced models to improve global predictions of extreme sea levels.

Because of rising sea levels, extreme events that now happen on average only once every 100 years could occur every decade or even yearly in many places by 2050, the study said. In addition, it takes a less intense storm, such as a Category I hurricane, to inflict as much coastal damage as a Category II or III storm would have inflicted when seas were lower.

Using a representative sample of 20 methods for predicting extreme sea levels, the researchers focused intensely on the measures of uncertainty that accompany any prediction, but are particularly challenging in the analysis of extremes.

MEASURING WIND SPEED AND RAINFALL RATES
**W. Linwood Jones,
Professor**
Electrical and
Computer Engineering

Hurricane surveillance can improve with the help of a microwave remote sensor known as HIRAD, or Hurricane Imaging Radiometer, that can measure ocean surface wind speed and rainfall rates while on-board a high-flying unmanned research aircraft.

The UCF-developed technology can collect and share hurricane data within the entire eye wall of the storm, providing a more accurate way to predict the path and intensity of hurricanes.

HIRAD can fly over hurricanes in partnership with NASA through the agency's Hurricane and Severe Storm Sentinel (HS3) field program. Jones leads the research team that is responsible for data analysis software and validation of data measurements. Two of his doctoral students are working on past hurricane data analysis.

The eye of Hurricane Irma was clearly visible from the International Space Station as it orbited over the Category 5 storm on Sept. 5, 2017. Photo courtesy of NASA.

Pictured above: Assistant Prof. Luis Arboleda-Monsalve and his research team document a severely-exposed foundation of a beach home in Vaca Key, Fla., as part of a post-Hurricane Irma surveillance mission for the National Science Foundation's Geotechnical Extreme Events Reconnaissance program.