

UNIVERSITY OF CENTRAL FLORIDA

Opportunity Starts Here >>>

POWERING 'BIG'

Siemens Digital Grid Lab Opens at UCF

The new 660-square-foot lab - one of only a handful across the nation - will give hundreds of undergraduate and graduate students hands-on experience in electrical grid engineering with the same cutting-edge technology used by many private and public utilities.

About 120 students per semester will train with real-world software and hardware to design and manage self-healing power-distribution grids to quickly recover from natural disasters, cyber attacks and other outages. At the same time, students will learn and research ways to integrate renewable energy into the grid, a challenge for engineers due to the intermittent nature of solar and wind.

Engineering Professor Wei Sun leads the lab, working with Zhihua Qu, chair of UCF's Department of Electrical and Computer Engineering.

Qu emphasized the many challenges ahead for the nation's grid engineers, which go beyond making it more efficient and incorporating renewables. "We need to make the system smart, so it knows what customers want and how to efficiently deliver it. And we must make the entire system resilient." That means if a storm or a human attack takes out part of the grid, it doesn't result in entire communities left without power for days or weeks.





College of Engineering and Computer Science UNIVERSITY OF CENTRAL FLORIDA

4000 Central Florida Blvd. Orlando, FL 32816



The lab will feature software platforms that map out simulated models of the UCF campus power system where students can design and test selfhealing distribution systems. They can conduct tests on the simulated system to offer analyses to UCF staff who manage the university's power system. This function is key as UCF builds a high-capacity on-campus solar farm, and its downtown Orlando campus.

The lab can also be used to conduct simulations for commercial customers.

Longtime partners UCF and Siemens believe the lab will equip students with the latest skills needed to land jobs in the evolving energy field, an industry currently facing a skills gap. The U.S. Department of Energy recently found that the country does not have enough workers to fill 1.5 million energy jobs by 2030 and that 75 percent of companies have challenges in hiring qualified candidates.

"The power grid is getting smarter, yet it will never be smart enough to run without workers who can manage it," said Mike Carlson, president of Siemens Digital Grid in North America. "The energy jobs of today and tomorrow require the skills to match the new technologies that are moving our grid into the 21st century. We're thrilled that this partnership with UCF will help further close the energy skills gap and give these students the experience that will strongly position them, and our country, for success."

The lab adds to the growing hub of grid expertise at UCF, including its leading role in the national FEEDER Consortium with 50 university and industry partners. UCF also continues to build its Renewable Energy Systems faculty research cluster.

For more than three decades, Siemens has called the Orlando area home, with nearly 5,000 employees in power generation, transmission and distribution, energy-efficient buildings and infrastructure, medical imaging and healthcare diagnostics. Siemens recently provided UCF with an in-kind grant of product lifecycle management software valued at \$68 million, a milestone in its 25+ year partnership with UCF.



2017 International Collegiate Programming Contest



Michael Georgiopoulos, Ph.D.

Dean

SCALE X EXCELLENCE =

Released earlier this year, UCF's Collective Impact Strategic Plan identifies how the university will use its significant scale to maximize its impact on the community, the region, the nation and the world.

Among the nation's largest universities, UCF promises to harness the power of scale to transform lives and livelihoods; attract and cultivate exceptional and diverse faculty, students and staff; deploy its distinctive assets to solve society's greatest challenges; create robust partnerships to maximize societal impact; and transform higher education through innovative academic, operational and financial models.

Progress will be measured by meeting 5- and 20year objectives in areas such as increasing graduate enrollment and research awards.

Our college's strategic plan mirrors the university's. At 10,000 students, we've got the scale. And excellence is found everywhere throughout our college. For example, read about our national champion Programming Team on Page 4.

Our impact can be seen in our dynamic industry partnerships that benefit students, employers and the community. A perfect example is the recentlylaunched Siemens Digital Grid Lab described on Page 1. The historic event demonstrates what can be achieved when we work together towards a common goal.

Our impact is illustrated with national rankings, such as *Aviation Week*'s 2015 and 2016 finding that UCF is the nation's number-one workforce supplier to the aerospace and defense industry; and UCF's latest position in the nation's top 25 for success in developing academic research into new technologies, products and companies. UCF also ranks 5th in the U.S. for number of patents, according to a 2017 Milken Institute report.

I look forward to working together with you as we strive to maximize our impact to solve society's most pressing needs.

Michael Georgiopoulos, Dean

Human Factors and Ergonomics Pioneer Honored **Waldemar Karwowski**

The Pegasus Professor and Chair, Department of Industrial Engineering & Management Systems, received the prestigious William Floyd Award on April 26 from the Chartered Institute of Ergonomics & Human Factors. This field of engineering involves human-centered design of systems, processes and equipment developed to fit people's natural capabilities and limitations.

Karwowski is globally recognized for his significant contributions to industrial engineering, human factors engineering, safety of advanced manufacturing, industrial ergonomics, and fuzzy systems theory and applications. His research has focused on human-systems integration in complex technological systems. His contributions with the highest societal impact are the introduction, development and use of neuro-fuzzy models (simulations of human-like reasoning style) which provide a more accurate representation of complex human-system behaviors than was previously possible. His pioneering work in introducing and using nonlinear dynamics measures and models of muscular performance has resulted in better understanding of human performance in physical work.

The results of his work have influenced workplace design for health and safety, with the potential impact on millions of workers around the world.



Waldemar Karwowski Pegasus Professor

Meet Our National Academy of Engineering Faculty Members



OUR PEOPLE DOING GREAT WORK

STUDENT

Ryan Shamet, '14, Sinkhole Scholar

The master's degree student received central Florida's American Society of Civil Engineering's Geo-Institute

Graduate Scholarship for his sinkhole research, which involves detecting and assessing construction risk using "subsurface cone penetration testing" – a way to determine the strength of soil layers at hundreds of feet deep. He also studies groundwater flow characteristics and monitoring. Recently, his research on the long-term performance of recycled concrete aggregate for subsurface drainage was published in the *Journal of Performance of Constructed Facilities*. Shamet interned at Terracon Engineering Consultants where he collected soil samples to help with bridge safety and sinkhole analysis for central Florida's massive I-4 Ultimate Improvement Project – a 21-mile overhaul of one of Florida's most-traveled interstates.

FACULTY

Shawn Putnam, Heat Expert, NSF CAREER Awardee

The mechanical and aerospace engineering assistant professor landed

the prestigious award for his work that may revolutionize the way electronic devices use and dissipate heat. His research addresses the physics of heat transfer and the development of new cooling technologies to keep up with the demand for faster, more powerful and smaller devices. The NSF CAREER program allows Putnam to focus on prominent cooling methods based on evaporation and flow boiling in micro-channel devices. "The holy grail for thermal management is an accurate, predictive understanding of the heat-transfer coefficient for a broad range of conditions," he said. Putnam joined UCF in 2013 and holds a doctoral degree from Penn State.

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.



Engineering and Art Orlando Utilities Commission Sponsors Student-Designed Solar Sculptures

A team of UCF students who designed a solarpowered art sculpture celebrated after the Orlando Utilities Commission and Tavistock Development selected their project to be built and installed in an Orlando-area community later this year.

OUC sponsored four teams of senior-level undergraduate students in mechanical engineering, electrical and computer engineering, computer science and art to create four solar-sculpture designs.

OUC's goal: a beautiful, interactive sculpture to give the public an opportunity to learn about solar power and its importance as a renewable energy source; and at the same time give residents an engaging community centerpiece that can power itself and contribute to a local power grid.

The students worked together for a year, starting with hundreds of sketches, thumbnails and ideas. After considering the ideas, refining the art, testing the engineering, and fine-tuning the features, four final sculptures emerged: Sundial, High Five, Solar Kites and Dandelions.

The winning sculpture Sundial was praised for its combination of artistry and sound engineering.

"This beautiful combination of functioning solar and thought-provoking art prompts our customers to learn more about the innovative programs we offer," said Linda Ferrone, OUC vice president of Strategy, Sustainability and Emerging Technology. "By bringing future engineers and artists together, UCF has done a tremendous job of giving us an opportunity to showcase the next generation of top talent."

The winning team wanted to embody the spirit of the community where the sculpture will be installed – Lake Nona – which is traditional and community-oriented, and at the same time modern and new.

Sundial features built-in sensor plates, interactive LED lights and musical sounds that are powered by solar panels. Created in the spirit of London's Big Ben, Sundial serves as a public clock by casting shadows created by the gnomon (the triangular shape that rises from the circular base) and also with LED lights. At full scale, it will measure 14 feet tall and 22 feet in diameter.



"By bringing future engineers and artists together, UCF has done a tremendous job of giving us an opportunity to showcase the next generation of top talent."



"It's surreal to think that we won, after all the challenges we faced every day," said Dominique Russell, a senior in mechanical engineering who graduated in May. "We'd work so hard to refine a feature, but then the next day we'd have to change it. We had to remain flexible."

Marie-Jo Gordo, a junior in studio art, noted the unique challenges that arise when artists work with engineers. "As artists, we often want to create things that are not physically achievable. We had many great ideas but the engineers kept bringing us back to reality."

The projects represent a culmination of work between the College of Engineering and Computer Science, and the School of Visual Arts & Design. Classes were held in SVAD's AdLab. They also served as the engineering and computer science students' final senior project, a requirement for graduation.

Overseeing the projects were engineering faculty Robert Hoekstra, Mark Steiner, Lei Wei, and Mark Heinrich; and SVAD's Robert Reedy.

College of Engineering and Computer Science



National Champions and 13th in World UCF PROGRAMMING TEAM

A team of three computer science students earned the title of national champions and finished 13th in the world in the Association of Computing Machinery's International Collegiate Programming Contest in Rapid City, SD.

In the elite competition known as the "Battle of the Brains," the UCF trio – Alex Coleman and Timothy Buzzelli, both sophomores studying computer science; and Josh Linge, who earned a master's degree in computer science in December – beat teams such as the University of California at Berkeley, Massachusetts Institute of Technology, Princeton, Cornell and the University of Texas at Austin.

ITMO University in St. Petersburg, Russia, won the world contest. Last year's UCF team placed third in the nation and 28th in the world.

More than 12,000 teams from 103 countries vied regionally last fall for a chance to be one of only 133 teams to compete in the world contest. UCF earned its spot by winning the U.S. Southeast Regional competition, where UCF teams also placed 2nd, 3rd and 4th out of 65 teams that competed. That contest also represented UCF's fifth consecutive regional win.

For **35 consecutive years, UCF** has placed in the **top three in the region**, a record **unmatched by any team** in the nation.

The secret to UCF's success is devoted practice, which is usually up to 20 hours a week, including a seven- to eight-hour practice session every Saturday, said computer science Professor Ali Orooji and faculty advisor for the team.

"Using a sports analogy, imagine how hard a football team has to work to win a national championship. This is the same thing. You have to work very hard to put yourself above the others," he said.

The contest challenges teams with complex, real-world problems under a grueling five-hour deadline. Huddled around a single computer, each team's three competitors race in a battle of logic, strategy and mental endurance, as they collaborate to build software systems that solve the problems. The team that solves the most problems in the fewest attempts in the least cumulative time is declared the winner.

For 35 consecutive years, UCF has placed in the top three in the region, a record unmatched by any team in the nation.

"UCF is a powerhouse at the ICPC," said contest director Jeff Donahoo, a computer science professor at Baylor University. "Virtually every year UCF has very competitive teams, and their region is extremely competitive. So just to make it to the world finals each year is amazing but to make it with the regularity that they do demonstrates the support of the university. I applaud UCF for getting behind their students and enabling them to be the best problem solvers by fostering competition."

"I was definitely nervous going into the world finals for the first time, but I was happy that we were able to represent UCF well," said Coleman, at age 18 the youngest competitor UCF has sent to the world finals.

Buzzelli added: "We not only exceeded our coaches' expectations, we also exceeded those we had for ourselves."

"With world-level competition experience, the sophomores are well-positioned to succeed next year," said Arup Guha, an instructor in the UCF Department of Computer Science and a team coach.

Linge, who graduated in December, will head to Seattle to begin his job at Facebook after delaying his January start date to compete in the World Finals. "This was my last year to participate in the ICPC and I'm glad I had Timothy and Alex as my teammates," he said.







Timothy Buzzelli, Josh Linge and Alex Coleman, "Team Badlands," continue UCF's long-standing tradition of theme-based contest team names. This year's teams were named after national parks.



For more information about the COLLEGE OF ENGINEERING & COMPUTER SCIENCE see <<< cecs.ucf.edu >>> Connect with us on social media:

