UCF Engineering & Computer Science

UNIVERSITY OF CENTRAL FLORIDA | ORLANDO

Opportunity Starts Here >>>

UCF Named National Center of Academic Excellence in Cyber Defense Education

The National Security Agency and Department of Homeland Security honored UCF with the distinction that recognizes the strength of the university's cyber defense programs, curriculum, faculty and students.

The designation brings UCF prestige and additional access to scholarships and research grants, and comes under a federal program meant to reduce the vulnerability of America's information infrastructure by strengthening higher education and research in cyber defense.

By producing top-notch graduates, the UCF College of Engineering & Computer Science is addressing the critical shortage of professionals with the skills to defend against hackers and cyber attacks.

UNIVERSITY OF CENTRAL FLORIDA
has been designated as a
National Center of Academic Excellence
in Cyber Defense Education

The quality of students is evident in UCF's three-time national champion Collegiate Cyber Defense Competition Team (see story at right).

"The national designation recognizes the success and expertise of our students and faculty, and our focus to stay on the cutting edge of this changing field," said Michael Georgiopoulos, dean. "It will open many educational and research doors for us."

Georgiopoulos credited college faculty for bringing the honor to UCF, including computer science professor Mostafa Bassiouni who led the "Herculean effort" to meet stringent criteria for the federal program.

"It's a noteworthy and unique achievement for an engineering and computer science college to lead such a significant effort that benefits the whole university," Bassiouni said.

UCF also has established the university-wide Cyber Security and Privacy research cluster. Led by Department of Computer Science Chair Gary Leavens, the cluster will span multiple disciplines: computer science, computer engineering, industrial engineering and management systems, legal studies, mathematics, optics and photonics, philosophy, political science, psychology and statistics.

A cyber operations lab is under construction and is set to open in the summer of 2017.

Three-Time National Champions: UCF Cyber Defense Team

UCF locked up an unprecedented three-peat victory at the 2016 National Collegiate Cyber Defense Competition in San Antonio and brought the contest's Alamo Cup home to Orlando.

The student team beat nine other teams – each of them the best from their region of the country – to earn the victory.

"It was surprising and fantastic," team captain Jonathan Lundstrom said of the moment the students learned they won. "One teammate checked his pulse and it was over 100. The anticipation was extreme."

More than 180 college and university teams vied to win the contest sponsored by Raytheon, the Department of Homeland Security, Accenture, Walmart and others. The competition is modeled after real-world scenarios, to prepare students to strengthen the nation's network infrastructure in a time of relentless attacks by hackers.

UCF
Named One of Nation's
Most Innovative Universities
U.S. News & World Report

UCF COLLEGE OF ENGINEERING & COMPUTER SCIENCE

THANK YOU DONORS

We ended our fiscal year with some big numbers.

The college directly received more than $15 million in philanthropic gifts from many generous donors, and that support is benefitting students, faculty and programs.

For example, Alan Eustace '79, '81 '84, and his wife Kathy Kwan, have supported the UCF Computer Programming Team for several years. Alan's competitive nature (detailed on Page 4) drives him to give to one of UCF's most winning teams that now ranks third in the nation and 28th in the world. Alan's support helps make long hours of practice possible for the team's students and coaches.

On Page 3, you'll read how the modeling and simulation software donated by Presagis, a strong industry partner that employs several of our graduates, is the backbone of important work to aid in disaster preparedness and response, and augments classroom learning in a variety of disciplines.

Michael Georgiopoulos, Ph.D.
Dean

In research funding, CECS faculty helped leverage $35.6 million, 14 percent higher than last year. I congratulate our faculty for this level of success and for continuing to do great work to solve the world's most challenging problems. I also thank the funders, such as National Science Foundation, U.S. Department of Energy and many industry partners who help drive our research endeavors forward.

In the new fiscal year, I hope we will be even more successful. With your help, anything is possible.

On behalf of the UCF College of Engineering & Computer Science, I sincerely thank you.

Michael Georgiopoulos, Ph.D.

Three New Master's Degree Programs to Begin Fall 2016

The new programs strengthen UCF's major initiative to increase graduate enrollment to 10,000 by 2020, to meet the university's goal to advance research that will have major societal and economic impact.

M.S. BIOMEDICAL ENGINEERING
The 30-credit-hour program will offer three tracks: biofluids, biomechanics, or the biomedical engineering track for UCF's M.D. program. Housed in the Department of Mechanical and Aerospace Engineering, the program is intended to build upon robust research areas already at UCF, and in concert with researchers in the UCF College of Medicine. Collaborative research areas include smart prosthetics, nanoscale medical devices and systems, medical robotics, bioinformatics, assistive devices, and advanced modeling and simulation.
Program director: Alain Kassab, Ph.D. Alain.Kassab@ucf.edu

M.S. DATA ANALYTICS
The 30-credit-hour, 20-month program is designed to prepare students to develop algorithms and computerized systems to manage and interpret large amounts of data. Offered jointly by the UCF Departments of Computer Science and Statistics, the program will focus on algorithm design, programming, acquisition, management, mining, analysis, and interpretation of data. Associated high-demand, high-wage job titles include data scientist, data architect, data mining specialist and more. The cohort-style classes are held evenings and weekends to accommodate working professionals.
Program director: Ivan Garibay, Ph.D. IGaribay@ucf.edu

M.S. HEALTHCARE SYSTEMS ENGINEERING
Fully online, the 30-credit hour program focuses on the optimization of healthcare systems. Offered by the Department of Industrial Engineering and Management Systems, the program is tailored for working professionals who want to become leaders in the field. Courses include advanced industrial engineering classes – systems theory, economics, statistics, risk management, quality, MIS and data analytics – each with a healthcare sector focus. The degree can be completed in two years, and is designed for students worldwide, as there are no residence or citizenship requirements.
Program director: Richard E. Biehl, Ph.D. Richard.Biehl@ucf.edu

STUDENT SUCCESSES

Third in Nation; 28th in World: UCF Programming Team
A team of UCF computer science students – Evan Dorundo, Stephen Royal and Michael Kirsche (pictured below) – placed third among U.S. teams, and 28th in the world, after competing in the Association of Computing Machinery's International Collegiate Programming Contest. Only 128 teams competed after advancing from a pool of 13,000 regional teams from 2,700 universities and 90 countries. The UCF team advanced by winning the U.S. Southeast region. For 34 consecutive years, UCF has achieved a top-three regional rank.

UCF's Society of Sales Engineers Named Best in Nation
Twelve student club members earned the title after competing in the National Sales Engineers Competition, hosted by California Polytechnic State University. In the contest, teams are introduced to a high-tech product only two days before they have to sell it to a panel of judges. Competitors must learn all product aspects and prepare for the technical questions that customers might ask. With 30 members, UCF's club is among the largest in the nation. Sales engineers combine technical acumen with interpersonal communication, creativity and presentation "soft" skills that are emphasized in UCF engineering courses.

Team members, alphabetical order:
Samuel Belcastro, James Briggs, Andres D'Elia, Hamilton Ervin, Nick Ghaneie, Matt Heimann, Brett Jennings, Jean Joseph, Ted Kursevicius, Jarrid Perusse, Daniel Sosa, and Kyle Williams.

UCF RANKS
19th in nation*
and 40th in world
for number of patents secured.
National Academy of Inventors
among public universities

OUR STARS

OUR PEOPLE DOING GREAT WORK

STUDENT

Heather Lawrence, '15
Cyber Champ, Leader,
Navy Veteran

The computer engineering graduate student, who competed on UCF's 2016 national champion Cyber Defense Competition Team, was awarded one of only seven scholarships from the Student Veterans of America and Raytheon. Lawrence is president of the 280-member UCF Collegiate Cyber Defense Club. Before attending UCF, she served six years in the U.S. Navy as a nuclear engineering technician, including four years on the aircraft carrier USS Carl Vinson (CVN-70). Her UCF doctoral work will focus on ways to apply machine learning to prevent computer intrusions.

FACULTY

Haitham Al-Deek, Ph.D.
Transportation Safety
Researcher

With a goal to save lives, the professor of Civil, Environmental & Construction Engineering has done extensive wrong-way driving research. His work plays a key role in a $2 million Central Florida Expressway Authority project to identify areas of highest wrong-way incidents where alert signs equipped with special light-flashing technology have been installed. When sensors detect wrong-way vehicles, the signs' lights flash to alert drivers. In 18 months, no incidents have been reported at five signage locations. Another 34 locations will get the signs by 2017. The project serves as a national model for road safety.

ALUMNA

Catherine Felter, '15
Civil Engineer, UCF
Fund Raiser

The recent civil engineering graduate is leading a UCF Foundation campaign for a 3,200-square-foot facility so UCF's American Society of Civil Engineering students can build steel bridges, concrete canoes and other projects safely and comfortably. The prefabricated facility would replace the existing outdoor wooden pavilion. "The current space is too small, and working with welders and power tools in a wooden structure with little protection from inclement weather is not ideal," she said. Felter works as an engineer at CivilCorp Engineering in Maitland, Fla.

A $6.9 Million Gift From Presagis Advances Modeling and Simulation Research

Nuclear Power Plant Simulations Created at UCF Intended to Aid Disaster Preparedness and Response

When a major disaster happens, first responders must quickly assess all aspects of the emergency to know how to respond to it. But responding to nuclear power plant disasters can be deadly for emergency personnel who face radiation exposure and the unknowns of complicated plant infrastructure.

So researchers at UCF are creating precise models of nuclear power plants, and developing realistic simulations of a variety of emergency scenarios and responses, using high-tech modeling and simulation software donated by Presagis.

The Canadian company's two-year gift – valued at $6.9 million – opens the door for more graduate-level research by donating the licensing for its modeling, simulation and virtual reality operating systems used at UCF, and brings their in-kind gift value to $17,518,096 since 2012.

The software benefits students in a variety of disciplines at UCF, including graduate students who work with Michael Proctor, associate professor, Industrial Engineering and Management Systems, and co-founder of UCF's Modeling and Simulation graduate program.

Matt Davis, industrial engineering doctoral student, is using Presagis software to simulate disaster response scenarios with models of nuclear power plants that he developed at UCF.

"My work may sound boring to some people, but I'm motivated to think that my simulations may help save lives, protect the public and help reduce the environmental impact of a nuclear disaster," Davis said.

Industrial engineering doctoral student Buder Shageer is researching the radiation impact on electronics based on models and simulations of the March 2011 nuclear meltdown at the Fukushima plant in Japan that was triggered by a devastating earthquake and tsunami.

"When officials tried to go back into the containment building in Fukushima, there was a lot of electronic failure," Shageer said. "I want to shed light on the need for testing and analysis of electronics in a radiated environment so that we may fill a research gap. The Presagis software brings us one step closer to doing that and more."

UCF is located next to Central Florida Research Park, which has the nation's highest concentration of simulation and training companies, military and government agencies, and is home to UCF's Institute for Simulation and Training. UCF's modeling and simulation master's and doctoral programs help meet industry need by supplying a pipeline of highly-skilled employees.

"We thank Presagis for their ongoing commitment to UCF," said Michael Georgiopoulos, dean, UCF College of Engineering & Computer Science. "The software propels our students into cutting-edge research and enriches their educational and professional experience."

To learn more about UCF's Modeling and Simulation graduate program, visit http://www.ist.ucf.edu/grad.

Matt Davis uses Presagis software to simulate disaster response scenarios with models of nuclear power plants that he developed at UCF.

PRESAGIS Suite 14 in Unmanned System Simulation
• Terrain database development – Terra Vista
• Detailed model development – Creator
• Integrated robust flight models – Flight Sim
• Integrated simulation control – STAGE

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 & COMPUTER SCIENCE

WHY I JUMPED

UCF Computer Science Alumnus Alan Eustace on his world-record-breaking free-fall jump

On the morning of October 24, 2014, I put on a special space suit, attached myself to a huge helium-filled balloon and began my ascent from Roswell, New Mexico. I kept rising through the blue sky until I reached 135,890 feet, where I nudged the darkened edge of space.

No human, without a rocket, has ever been higher. As I floated up there, suspended from the balloon, I could see the curvature of the Earth. And somewhere below, StratEx project flight director Sebastian Padilla began counting down:

5... 4... 3... 2... 1.

I broke free from the balloon, did a slow back roll and headed down, intent on advancing scientific knowledge and setting the world record for free falling.

During my nearly 26-mile drop from the stratosphere, I hit speeds of 822 mph. I broke the sound barrier, though I didn't feel any particular turbulence. But back on the ground, my team heard the thundering sonic boom. Four minutes and 27 seconds later, I opened my parachute and floated the last 10,000 feet in about 10 minutes to a safe landing.

To put that world record into local context, imagine sky diving a distance equivalent to walking from the Student Union on campus, all the way down University Boulevard, past Winter Park, past College Park and Ocoee, and into Winter Garden – in just four and a half minutes.

Why would I — a sane man in his 50s with a loving family and a great job as a vice president at Google — do something that must strike many as crazy? I'm no daredevil or thrill-seeker; I'm a computer scientist with three degrees from UCF. But growing up in Central Florida, I developed a love of space exploration. I saw NASA rockets blasting off from Kennedy Space Center, exciting the nation and leaving white trails in the sky.

I think, in some way, I always wanted to see where those trails led. I'd often wondered about the layers of atmosphere where rockets fly. And I'd become particularly fascinated by the last expanse on the edge of space — the stratosphere. It has surprising properties and temperature variations but is little studied.

Our project started with a simple question: Is it possible to build a scuba diving system for stratospheric exploration? Previous attempts to skydive from high altitudes had always included using a capsule, but capsules are heavy, expensive, complex and dangerous.

After a year of painstaking research, I was convinced there was a simpler, safer way. A smarter person would have declared success, written a paper and moved on, but I wanted to build the new system and, more importantly, I wanted to fly it.

So began a three-year engineering odyssey involving some of the brightest and most supportive people I know. First, I needed to validate my idea — I wanted an expert to confirm it was well-grounded and not a flight of fancy. A close friend suggested I talk to Taber MacCallum from Paragon Space Development Corporation. They make suits for hazardous environments and build environmental systems for spacecraft. MacCallum not only believed it was possible, but he assembled the best talent at his company to develop a plan. Paragon had contacts at ILC Dover, the perfect space suit company for the job. We recruited Mark Procos at United Parachute Technologies to build the parachute systems, world-famous balloonist Julian Nott to consult, Jonathon Clark to serve as flight surgeon, and Don Day as the chief meteorologist.

Over the next three years, we ran more than 250 system tests as we slowly learned to do something no one had ever done before. We redesigned the parachute system 11 times. We completed five airplane tests from 18,000 feet, and three balloon tests from 57,000 feet, 105,000 feet and the record flight at 135,890 feet.

In the end, our team not only set a world record, but we invented several new technologies for stratospheric exploration. Rather than turn our effort into a media event, we invited only one reporter to the recordbreaking attempt, and we worked with Jerry Kolber, the executive producer of the TV series "Brain Games," to produce the documentary "14 Minutes from Earth." It premiered at the Tribeca Film Festival in mid-April in New York.

Our hope is that the film and my jump will excite a new generation of students to challenge themselves, explore their world and redefine what is possible.

Alan Eustace, '79 '81, '84 *graduated from UCF with a bachelor's, a master's and a doctoral degree in computer science. Last year, he retired from Google after serving as senior vice president of engineering and senior vice president of knowledge.*

To hear Eustace's TED Talk describing his free-fall, visit www.ted.com and enter the search term Alan Eustace.

To see "14 Minutes from Earth," visit tribecafilm.com and enter the movie name in the search field.

This article originally ran in the summer 2016 issue of Pegasus magazine. It is reprinted here with permission. Image by Paragon Space Development Corporation.