

UCF Engineering & Computer Science

UNIVERSITY OF CENTRAL FLORIDA | ORLANDO

Opportunity Starts Here >>>

Assistant Professor Lands \$1.1 Million Grant for Pioneering Power Plant Technology

UCF is one of only two universities to land a federal grant that could revolutionize the technology used to run power plants.

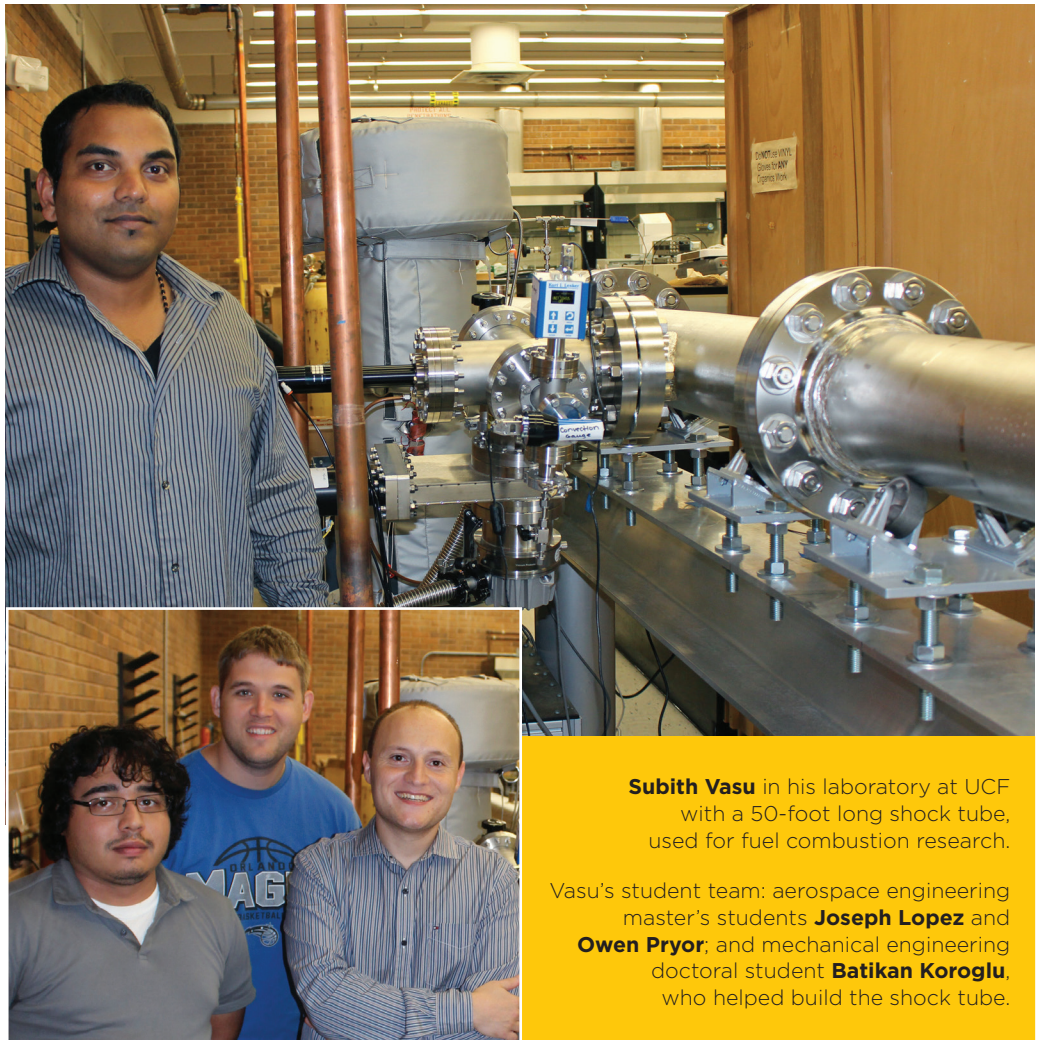
The U.S. Department of Energy awarded Mechanical and Aerospace Engineering Assistant Prof. Subith Vasu \$1.1 million to investigate how power plants might be able to abandon the use of water to generate energy from steam and instead use supercritical CO₂, a fluid state of carbon dioxide.

Supercritical carbon dioxide is an attractive alternative to steam. If the technology can be developed to make the switch, it could mean less use of water – a natural resource in short supply in some parts of the nation. Supercritical CO₂ is more efficient at transporting heat – a key principle for power plants in generating energy. And, power plants can significantly reduce the size of turbomachinery.

“We’re working diligently on turbine technology and Florida is a major hub for the industry. Our goal is to maximize power-generation efficiency, reduce emissions and become world leaders in this area,” Vasu said.

UCF already partners with most key industry players through its Center for Advanced Turbomachinery and Energy Research.

Vasu is developing a computer model for the design of combustors, where fuel is burned at power plants. The model will provide insights into the processes that occur during the burning stage. Once a model is verified, he and his team will disseminate this tool to industry so they can design optimum supercritical CO₂ combustors.



Subith Vasu in his laboratory at UCF with a 50-foot long shock tube, used for fuel combustion research.

Vasu's student team: aerospace engineering master's students **Joseph Lopez** and **Owen Pryor**, and mechanical engineering doctoral student **Batikan Koroglu**, who helped build the shock tube.

UCF is Nation's #1 Workforce Supplier for Aerospace and Defense Industry

The majority of A&D workers hold degrees from the University of Central Florida, according to a recent *Aviation Week* survey.

“It says something about your graduates,” said Carole Rickard Hedden, executive editorial director for *Aviation Week*. “There are certain institutions, like UCF, that are really great at producing engineers of all disciplines who meet the needs of industry.”

The College of Engineering & Computer Science, which awarded 1,644 degrees in the past academic year, offers innovative programs and strong industry ties to prepare its 9,000+ students for professional success. Programs

include the Engineering Leadership & Innovation Institute (eli²), nationally funded STEM retention and diversity programs, and a new Maker Space lab complex focused on creativity, teamwork and prototyping.

“As a large metropolitan institution, UCF provides a high-quality education inside and outside the classroom,” said Michael Georgiopoulos, dean. “We are located in Orlando, a regional economic powerhouse, surrounded by industry. Our students have easy access to research experiences, internships, entrepreneurial resources, service learning and jobs.”

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Michael Georgiopoulos, Dean

At UCF, Our Innovation is Proven

In September, UCF was recognized along with Harvard, MIT, Stanford and Duke as one of the nation's most innovative universities in *U.S. News & World Report's* Best Colleges 2016 guide. And a front page *Washington Post* story Sept. 20 noted that UCF is "storming higher ed" as a model for "a nation in desperate need of a better-educated workforce."

The proof of our innovation is everywhere. It's in our provost's investment in research clusters (see below). The proof is knowing that UCF is the nation's No. 1 workforce supplier to the aerospace and defense industry, according to *Aviation Week* (Page 1).

The proof is in our STEM retention programs, such as EXCEL. Since 2006, STEM retention has increased at UCF by more than 40 percent and at higher percentages for women and Hispanics. Our innovative peer mentoring programs for women within EXCEL (GEMS and WISE) can be credited for our remarkable success in retaining women.

The proof is in our Engineering Leadership & Innovation Institute (eli²), which is delivering curriculum around creativity, emphasizing the delivery of world-changing solutions with accountability, and distinguishing our students from others in the workplace.

The proof is hearing what our alumni and industry friends tell us. For example, Facebook leaders recently told me how impressed they were with how UCF is pioneering innovative STEM programs to increase the success of diverse students.

The best proof of our innovation is our students' success, such as our national champion Cyber Defense Team, the UCF Programming Team, and Limbitless Solutions, a team providing free 3D-printed bionic limbs for children worldwide.

In our college, we push the envelope every day on behalf of our more than 9,000 engineering and computer science students.

We continue to rise to the great challenge of addressing the needs of UCF's diverse student population. As dean, my belief is that if we create the right environment that fosters pockets of excellence, then those successes will flourish and inspire our entire student body. The ultimate result will be that our students will get the outstanding education that they deserve and their professional success will impact the good fortune of many more generations of students that matriculate through our great institution.

Michael Georgiopoulos, Dean

STUDENT SUCCESSES



Repeat National Champs: UCF Collegiate Cyber Defense Team

The team bested nine other teams to win the competition sponsored in-part by Raytheon. Team members and coaches were treated to a summer VIP tour of national security hotspots in and around Washington, D.C., including the White House and the National Security Agency.

UCF Rocket Wins NASA Competition

A UCF mechanical engineering student-made rocket won "Maximum Altitude" in the Hybrid Motor Rocket Competition earlier this year, sponsored by NASA's Florida Space Grant Consortium. The rocket achieved a 3,042 altitude (or 134 feet higher than two Empire State Buildings stacked), easily outdistancing the second-place height of 700 feet (about half of one Empire State Building).

ASHRAE: Consistently in Nation's Top 3

Students in the American Society of Heating, Refrigeration and Air Conditioning Engineers at UCF design and build energy-efficient systems for buildings. For seven of the past nine years, UCF designs have placed in the top three in ASHRAE national contests. In 2015, they achieved second place – and in 2014 first-place – in the "Design Calculations" category.

Six Research Faculty Clusters Established at UCF

The provost's Faculty Cluster Initiative is designed to leverage UCF's existing strengths and foster interdisciplinary teams to solve society's most challenging problems. Of the 100 new faculty lines that UCF has allocated in 2015, 33 will go toward advancing these clusters.

College of Engineering & Computer Science faculty work in all six clusters and lead three.

Cyber Security and Privacy – to develop world-class scholarship on the security and privacy for the Internet of Things and create tools and methods for preventing, discovering and mitigating security and privacy breaches, while cultivating highly-skilled graduates for this growing field.

Energy Conversion and Propulsion – to develop stronger ties among mechanical engineering, computer science, chemistry, physics and the Florida Solar Energy Center at UCF, and local-regional partnerships, while achieving international prominence in energy and propulsion research.

Genomics and Bioinformatics – to create a genomics and bioinformatics cluster that will

advance UCF's life sciences infrastructure, focusing on biodiversity, including health-related research, and integrating genomics and bioinformatics into curricula at all levels.

Prosthetic Interfaces – to establish a critical mass of dedicated faculty to enable a viable interdisciplinary bio-medical engineering program at UCF with core competency in prosthetic interfaces for implantable devices and systems.

Resilient, Intelligent and Sustainable Energy Systems – to advance UCF's work in smart energy systems and sustainable energy storage, while developing and deploying distributed renewable energy resources and resilient communication networks.

Sustainable Coastal Systems – to lead a world-class effort to understand ecosystem health and function and assess natural and human-related impacts to coastal ecosystems, with the goal of creating decision-support models for planners, policymakers and stakeholders.

Questions? Email Dr. Christopher L. Parkinson – Parkinson@ucf.edu

Texas Instruments Exec Establishes Fund for Student-Athlete Engineering Majors

Brian Crutcher, '95, knows what it takes to succeed in academics and sports. He played defensive back for the Knights while pursuing his electrical engineering degree, and is now executive vice president of business operations for Texas Instruments.

"Athletes are really competitive. You don't go out there to be second, third or fourth. You want to win. And we need that exact same trait in the business world," he said.

It's why he helped establish the UCF College of Engineering & Computer Science Student Athletes Program with a five-year, \$200,000 commitment through his Crutcher Family Foundation Fund.

The program will help student-athletes persevere through their rigorous engineering curriculum while balancing the intense demands of sports competition. Crutcher wants student-athletes to realize their engineering career goals and then bring their leadership and teamwork skills – and their fierce competitive nature – to the workplace.

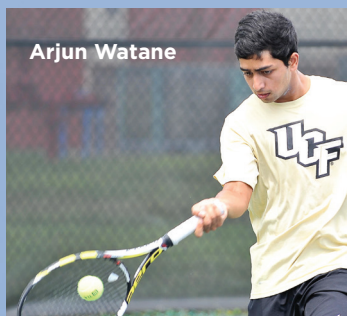
UCF's graduation rate for student-athletes is No. 1 in the nation among NCAA Division I public institutions. Even so, athlete-engineering majors often switch to less demanding majors during their time at UCF. This program provides one-on-one graduate advisor math tutoring and mentoring, and undergraduate research experiences and scholarships for all qualifying athlete-engineering students.

Tennis player Arjun Watane, an honors student in his junior year studying computer science and bioengineering, credits UCF's strong support structure as a main reason he chose UCF. The new program, he said, will help even more students like him.

"With our days packed with classes, practices and workouts, student-athletes in engineering and computer science rely on this kind of support. We greatly appreciate Mr. Crutcher's gift. It inspires us to continue working hard, to not give up, on and off the court or field," said Watane, who serves on the UCF Student-Athlete Advisory Council and met with Crutcher this past summer.

Crutcher's core message to engineering student-athletes: "Don't quit. I guarantee you it will be worth it."

The Texas Instruments Foundation has committed an additional \$50,000 for the program through its Employee Matching Gift Program, and Crutcher hopes other UCF friends and alumni — especially athletes-turned-engineers — will consider donating. To learn how, contact Robin Knight at 407-823-2241.



Arjun Watane



**"Don't quit.
I guarantee
you it will
be worth it."**

— Brian Crutcher, '95

OUR STARS

OUR PEOPLE DOING GREAT WORK

STUDENT

Brandon Naims, '14 Entrepreneur, Startup Winner

The industrial engineering master's student means business when it comes to simulation and training.

In just one year after he graduated from UCF in mechanical engineering, Naims, '14, and his teammates transformed their senior design project – a high-tech virtual reality flight simulator – into Talon Simulations, a business that seeks to bring affordable training and entertainment solutions to various industries. Naims won two UCF business competitions in 2015: the Business Model Competition with a \$1,000 prize; and the Joust New Venture Competition with a prize of \$10,000 in startup funding and services. "We are very grateful to take home first place," Naims said. "It's going to open a lot of doors for us to deliver our first products."



ALUMNUS

Mark Blue, '89, '08, '10 Student Mentor

The manager of new ventures and energy solutions at Harris Corporation in Melbourne, Fla., was recognized by the UCF Alumni

Association as College Chapter Volunteer of the Year. Three years ago, Blue helped create what has become the CECS Alumni chapter's signature event, Career Kickoff, where students meet with alumni professionals in mock interviews, networking and more. (See Page 4.) He also mentors senior design students with their projects funded by Harris. Blue holds a bachelor's degree in mechanical engineering, and master's degrees in business administration and engineering management. "Time at UCF is a guilty pleasure," he said, noting that alumni who give back to the college will get more in return.



UCF

**Named One of Nation's
Most Innovative Universities**

U.S. News & World Report



**UCF COLLEGE OF ENGINEERING
& COMPUTER SCIENCE**

Two Faculty Serve Nation in Key Advisory Roles

Pamela McCauley, professor, Industrial Engineering & Management Systems, is one of only 11 in the nation awarded a 2015-16 U.S. Jefferson Science Fellowship. In



this role, she is engaged in the formulation of U.S. foreign policy by providing advice that helps policy makers understand rapidly evolving technology, science and engineering advancements. McCauley's recent work involves the global ergonomics of treating Ebola and other infectious diseases.

Gita Sukthankar, associate professor, Computer Science, will help inform the Defense Advanced Research Projects Agency on new research breakthroughs in computer science.



She was appointed to DARPA's Information Science and Technology 30-member study group. Sukthankar specializes in robotics and giving computer-based agents human-like levels of decision making.

UCF Researcher Performs World's First Automated Mass-Crowd Count

Haroon Idrees, post-doctoral associate, has used software developed in the UCF Center for Research in Computer Vision (CRCV) to scan aerial photographs by computer and conduct the world's first automated mass-crowd count. The task took 30 minutes, whereas by hand the process typically takes a week.

Until now, counting large-scale crowds (in the hundreds of thousands) has been a tedious process involving people examining aerial photographs divided into sections and counting the number of heads per inch.

UCF was asked to perform an automated count of a crowd that had gathered in September along a 3.2 mile stretch of Barcelona, Spain to rally for the independence of the province of Catalonia.

Idrees put UCF's computer vision software to the test. The software scanned and analyzed 67 aerial images, and came up with a total count in 30 minutes. The images and calculations were then sent to Pomeu Fabra University in Spain where a team confirmed UCF's count at about 530,000 – well below the count claimed by rally organizers, according to Idrees.

"Automated computer analysis of such large-scale and dense crowds has never been done before," said Mubarak Shah, UCF Trustee Chair Professor of



"We will continue to push the envelope in state-of-the-art crowd analysis to help authorities manage real-time safety of large crowds and perform post-event analysis of such gatherings."

— Mubarak Shah, Director, CRCV

computer science and director of the CRCV. "We will continue to push the envelope in state-of-the-art crowd analysis to help authorities manage real-time safety of large crowds and perform post-event analysis of such gatherings."

Alumni Help Students at Career Kickoff

September's event was the most successful to date, with 75 students and 35 engineering and computer science alumni who volunteered their time to help. Alumni conducted mock interviews with students, gave feedback on their resumes, and offered advice and networking. Career Kickoff, now in its third year, is the flagship event of the CECS Alumni Chapter.



(left) "It's great to see the future—to help them be successful the first time in front of an employer."

—Linda Flannery, '86, '93, CpE, president, Imagine Solutions, a software development company based in Winter Park, Fla.

"I learned a lot about where I could improve. This day was motivating and encouraging, and I really appreciate that the advice comes from UCF alumni."

—Sindhu Muttineni, master's student, CpE, who met with Flannery in a mock interview.

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.

OPPORTUNITY STARTS HERE >>>

For more information about the COLLEGE OF ENGINEERING & COMPUTER SCIENCE see <<<cecs.ucf.edu>>>

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