

Graduate Programs in Mechanical and Aerospace Engineering

THE UCF DIFFERENCE

CHALLENGING, CUTTING-EDGE RESEARCH

The department's graduate students and undergraduates work alongside and publish with distinguished researchers who are internationally renowned for their contributions to science.

With \$4.3 million in grant funding (2015-16), the department's research activities span a variety of topics: advanced turbomachinery, heat transfer, fluids flow, internal combustion optimization, aerodynamics, rotodynamics, structural integrity of micro systems, nano-manufacturing, sensors and actuators, alternative fuels, biomedical engineering, high-temperature materials and coatings and thermal management of optical/electronic devices, sustainable and advanced energy research, and more.

WORLD-CLASS FACULTY

Our faculty are world-class scholars who perform fundamental and applied research at the forefront of scientific discoveries. Annually they publish approximately 110 journal papers in top-tier journals and about 70 more in international conferences.



PRIME LOCATION

The central Florida region is a world hub for turbine, energy and space technology development, and is home to a unique concentration of large utility turbine manufacturers.

Orlando anchors the I-4 High Tech Corridor with an industrial base that includes defense, space, simulation and training, and more. The Central Florida Research Park, adjacent to UCF, is the nation's 7th largest with more than 10,000 employees and 120 companies. Research opportunities, jobs and internships are abundant.

FACTS OF INTEREST

UCF is the nation's #1 workforce supplier to the aerospace and defense industry (*Aviation Weekly 2015, 2016*). In addition, UCF is the #1 workforce supplier worldwide for Lockheed Martin, Harris Corporation and Siemens Energy.

In Fall 2014, UCF launched its engineering Maker Space Lab Complex (Harris Gathering Lab, Idea Lab, Texas Instruments Innovation Lab, Manufacturing Lab) to spur teamwork, creativity, rapid prototyping and marketable innovations.

UCF students in the American Society of Heating, Refrigeration and Air Conditioning Engineers design and build energy-efficient systems for buildings. In eight of the past 10 years, UCF designs have placed in the top three in ASHRAE national contests. In 2016, a UCF team won the Integrated Sustainable Building Design category. UCF won the Design Calculations category in 2014 and placed 2nd in 2015.

UCF is home to Limbitless Solutions, a team of mechanical engineering students and others who create 3D-printed bionic limbs for children at no cost to families. The group is facilitating similar efforts around the globe. In 2015, they received worldwide media attention when Microsoft featured the team in a video showing world-famous film star Robert Downey Jr. giving a boy a UCF-made Iron Man-styled bionic arm.

GRADUATE DEGREES OFFERED

MASTER'S

Aerospace Engineering
Biomedical Engineering
Mechanical Engineering

DOCTORAL

Mechanical Engineering

FACULTY HONORS

Our faculty are members and fellows of scientific societies, including:

American Institute of Aeronautics and Astronautics, American Society of Mechanical Engineers, American Chemical Society, American Physical Society, ASM International, International Society for Optics and Photonics, Institute of Electrical and Electronics Engineers, American Society for Testing and Materials, American Society of Heating, Refrigeration and Air Conditioning Engineers, International Association for Boundary Element Methods.

ALUMNI AND STUDENTS SAY

"I have learned how to 'dream big dreams' and about global innovation, which has encouraged me to pursue my aerospace and biomedical engineering research on a global scale." – Albert Manero, '12, '14, doctoral student, Fulbright Scholar, Founder, Limbitless Solutions.

"I'd like to use my talents to develop products using methods of energy reclamation to solve problems in developing countries. I stand by my UCF experience and feel truly prepared to handle the future as I move forward in my career." – Daniel Geiyer, doctoral student.

"I chose UCF mostly because of the strength of its College of Engineering & Computer Science – and because of its proximity to Kennedy Space Center – where I hope to work someday." – Leigh Nash, '14, master's student, NASA Fellowship scholar.



FACULTY FACTS

Prof. Suryanarayana Challapalli – ranked among the world’s top materials science engineers – received the Central Florida Engineers Award for Lifetime Achievement in Engineering.

Assistant Prof. Subith Vasu landed a \$1.1 million U.S. Department of Energy grant that could revolutionize the technology used to run power plants. He and his team are investigating how power plants might be able to abandon the use of water to generate energy from steam and instead use supercritical carbon dioxide, a fluid state of carbon dioxide. It could mean power plants would use less water and also reduce the size of turbomachinery.

Prof. Louis Chow was honored with the 2012 American Society of Mechanical Engineers’ Allan Kraus Thermal Management Medal for significant lifetime contributions to science in his field.

Prof. Alain Kassab leads UCF’s new “Prosthetic Interfaces” faculty research cluster initiative at UCF, to advance the field of intelligent prosthetics. It will leverage multi-disciplinary research expertise in biomechanics, biomaterials, cellular and tissue engineering, bio-nano-technology, control systems, human-computer interaction, and intelligent user interfaces and controls.

Prof. Olusegun Ilegbusi is creating a simulated human lung with novel material and 3D printing to assist radiologists in delivering precise treatment to cancer patients. Through a seed grant recently awarded, he is collaborating in research that will study the fundamentals of cough in patients with head and neck cancer.



POWERFUL PARTNERSHIPS

UCF’s historically strong ties with NASA and its close proximity to Florida’s Space Coast fuels its robust partnerships with aerospace-related agencies and industries. Partners include NASA, National Science Foundation, U.S. Department of Energy, U.S. Army, Air Force Research Laboratory, Air Force Office of Scientific Research, Office of Naval Research, Siemens, Lockheed Martin, Boeing, Mitsubishi Power Systems, and many more.

CENTER FOR ADVANCED TURBOMACHINERY AND ENERGY RESEARCH (CATER)

Led by Prof. Jayanta Kapat, the center intersects 10 core technical areas that advance scientific knowledge and innovation in turbomachineries and associated technologies to bring higher reliability, higher efficiency and lower emissions in power generation, aviation and space.

Research areas include fuel flow and combustion; materials, properties and manufacturing; and dynamic systems and control.

Dr. Kapat has more than 22 years of experience and expertise in aerodynamics and heat transfer for gas turbines and turbomachineries, cooling techniques, system calculation and alternative fuels.

RESEARCH GROUPS AND LABORATORIES

The department oversees 16, including: MEMS and Nanomaterials Lab, Ceramic Processing for Energy Applications, Composite Materials and Structures Lab, and CATER (see above).

ALUMNI STARS

JASON DUNN, AE, '07, '09

The first 3D printer in outer space was delivered by Dunn’s company, Made In Space, Inc., with a \$10 million NASA contract. The printer was specially crafted for space flight and first tested in 2014. The first tool manufactured in space by the 3D printer was a wrench used on the International Space Station.

ALBERT MANERO, AE, '12, '14

Current mechanical engineering doctoral student and Fulbright Scholar, Manero is founder and executive director of Limbitless Solutions, (See Pg. 1, Facts of Interest.)

DANIEL RINI, AE, '95, ME, '97, '00

Rini is the founder of RINI Technologies, Inc. The entrepreneur’s company holds numerous patents in miniature refrigeration technology. They develop unique cooling and heating products for the United States military, including a personal cooling system for soldiers operating in hot environments, a personal heating system for divers and a cooling system for military lasers.

CONTACT

DR. YOAV PELES
Chair
Yoav.Peles@ucf.edu

DR. JIHUA “JAN” GOU
Graduate Program Director
Jihua.Gou@ucf.edu

UCF Department of Mechanical & Aerospace Engineering
Engineering I Bldg.
12760 Pegasus Dr., Suite 307
Orlando, FL 32816-2450

Phone: 407-823-2416
Fax: 407-823-0208
Web: <http://mae.ucf.edu>

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