

Graduate Programs in Materials Science and Engineering

ABOUT

Materials science and engineering centralizes multiple disciplines: materials science, metallurgy, physics, biology, chemistry, nuclear engineering and mechanical engineering. UCF researchers in the field have contributed to scientific advances as diverse as medicine and space exploration.

THE UCF DIFFERENCE

HIGH-IMPACT RESEARCH

The department's robust research activities (\$2.4 million in funding in 2014) address a wide variety of topics, including bioengineering, magnetics, nanotechnology, semiconductor interconnects, structural materials and more.

WORLD-CLASS FACULTY

Graduate students work alongside and publish with distinguished researchers internationally renowned for their contributions to science. They publish approximately 140 refereed publications and conference presentations. Faculty average \$350,000 yearly in external funding.

POWERFUL PARTNERSHIPS

Our faculty work with numerous industry and government agencies, including Lockheed Martin, Siemens, National Science Foundation, National Institutes of Health, National Cancer Institute, U.S. Departments of Agriculture and Defense, NASA, and many more.

REPUTATION OF EXCELLENCE

The National Research Council, a part of the National Academy of Engineering and the National Academy of Science, ranked UCF among the top MSE programs in the country in their 2010 assessment of research doctoral programs at U.S. universities.



PRIME LOCATION

UCF is a large metropolitan institution located in Orlando, a regional economic powerhouse surrounded by industry. Research opportunities, jobs and internships are plentiful. The Central Florida Research Park, adjacent to UCF, is the nation's 7th largest with more than 120 companies and 10,000 employees.

With UCF as a founding partner, the Florida High Tech Corridor Council has, since 1996, generated more than \$1.3 billion to the Florida economy and 4,000 new jobs.

FACTS OF INTEREST

The Advanced Materials Processing and Analysis Center (AMPAC) began in 1998 to promote research, education and economic growth in central Florida and has built a national reputation of research excellence. AMPAC's ongoing success led to the creation of the Department of Materials Science and Engineering in 2012.

Interim Chair Sudipta Seal is the director of AMPAC and UCF's NanoScience Technology Center. His work includes ways to use nanotechnology to aid in the prevention of retinal degeneration and other conditions; and creating a nano-engineered material that can remove large volumes of oil from seawater in an environmentally-friendly way.

GRADUATE DEGREES OFFERED

MASTER'S

Materials Science and Engineering

DOCTORAL

Materials Science and Engineering

FACULTY HONORS

Our faculty are members and fellows of scientific societies that recognize distinguished achievement, including National Academy of Inventors, American Association for the Advancement of Science, ASM International, American Ceramic Society, SPIE, American Vacuum Society, The Electrochemical Society, the American Institute for Medical and Biological Engineering, and more.

Our faculty also include NSF CAREER and ONR Young Investigator Awardees.

ALUMNI AND STUDENTS SAY

"At UCF, I've had the chance to learn cutting-edge science and use state-of-the-art equipment, which has helped my thesis and dissertation work. The professors are knowledgeable and supportive. I've also had the opportunity to coach new graduate and undergraduate students."

– Le Zhou, doctoral student

"I have been able to make an immediate impact at my company, and I owe that opportunity to the lessons I learned while at UCF."

– Catherine Carlisle Kammerer, Ph.D., '13, '15, principal engineer, Aerojet Rocketdyne



FACULTY FACTS

Assistant Prof. Jayan Thomas and his team have developed nanowisker technology which transforms a standard copper wire into a super capacitor capable of storing and delivering large amounts of power.

Associate Prof. Jiyu Fang's research examining light-harvesting j-aggregate nanotubes for sensing dopamine was featured in the Global Medical Discovery Series as a Key Scientific Article. His work with super-hydrophobic and super-oleophilic 'sponge-like' aerogels for oil/water separation was featured on the cover of the *Journal of Materials Science*.

A test that costs less than \$1, developed by Associate Prof. Qun "Treen" Huo, has been shown to be more sensitive and exact than the standard test for early-stage prostate cancer. The test is undergoing clinical trials and may be used by physicians in 2-3 years.

Associate Prof. Swadeshmukul Santra has been awarded a \$4.6 million grant from the U.S. Department of Agriculture to test a bactericide that he invented in the fight against citrus greening.

Prof. Kathleen Richardson, Prof. Yongho Sohn and Assistant Prof. Romain Gaume landed a \$1 million grant from the Defense University Research Instrumentation Program to develop a state-of-the-art diffractometer.



RESEARCH FOCUS AREAS

Our research is broad-based and explores a wide spectrum of topics in the properties and structure of hard and soft matter, including:

- electronic materials
- semiconductor interconnects
- nanomaterials
- magnetics
- biological materials
- organic and molecular engineering
- bioengineering
- novel materials
- shape-memory alloys
- structural materials

MSE LABORATORIES

- Ceramic Processing and Analysis
- Thin Films
- NanoFAB and BioMEMS
- Corrosion/Electrochemistry
- Nano-Bio-Materials
- Processing and Microstructural Characterization
- Biomaterials
- Computational Materials
- Surface Engineering/Nanomaterials Processing and Plasma
- Nanomanufacturing
- Materials and Coatings for Extreme Environments

Advanced Materials Processing and Analysis Center

AMPAC is home to two university-wide user facilities that enable cutting-edge research. Facilities feature ultra-modern equipment for characterization and processing, and provide students training and education opportunities. Collaborations with other universities, government agencies and private industry are encouraged.

Materials Characterization Facility

The user-friendly facility occupies 7,000 square feet and is supported by three research engineers and a faculty coordinator. It houses an impressive array of materials characterization equipment.

Advanced Microfabrication and Clean Room Facility

The 3,000-square-foot space supports research activities including miniaturization, nanomaterials fabrication and applied acoustoelectronics technology. The class 100 and 1,000 clean rooms contain assorted lithography and device fabrication equipment.

ALUMNI STARS

CATHERINE CARLISLE KAMMERER, Ph.D., '13, '15

Works at Aerojet Rocketdyne as a principal engineer specializing in materials and processes. She supports the design and manufacturing of rocket engines, and provides direction on materials selection and process development.

STEVEN SCHWARZ, PH.D., '02
Started the Orlando-based company NanoSpective, Inc., in collaboration with three other UCF alumni. UCF resources, such as the AMPAC Materials Characterization Facility, have played an instrumental role in the company's success in overcoming the market-entry barrier.

VINOD PHILIP, '00
Chief Technology Officer, Power and Gas Division, Siemens AG.

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