

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 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 75 refereed publications yearly. The total average research expenditure over 3 years is \$1.89 million.

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.

The Materials Characterization Facility is where researchers and industry partners advance their work, increase competitiveness and boost the region's economy. It provides classroom education and hands-on training on state-of-the-art equipment, and user-friendly support services with expert advice and data interpretation.

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 SAY

"At UCF, I've learned cutting-edge science and used the latest equipment, which has helped my thesis and dissertation work. The professors are knowledgeable and supportive. I also coached new graduate and undergraduate students."

– Le Zhou, Ph.D., '16

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

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

"The education and research experience I gained at UCF has allowed me to move into a faculty position at Donghua University in China."

– Jinan Ding, Ph.D., '17





FACULTY FACTS

Prof. Sudipta Seal and fellow UCF researchers are collaborating with Nemours Children's Hospital to study how attaching curcumin (found in turmeric) to nanoparticles can be used to target and destroy neuroblastoma tumor cells, the most common infant cancer.

A proposal to the Joint NSF/SRC program "Energy Efficient Computing: from Devices to Architectures (E2CDA)" has been recommended for funding of \$1 million over three years. It involves multi-disciplines - physics, materials and chemistry - and researchers at Columbia University, MIT and Rensselaer Polytechnic Institute.

Assistant Prof. Kristopher Davis will receive \$1.58 million to develop high-speed measurement techniques that can identify potential sources of power degradation in photovoltaic modules, focusing on the metal contacts that carry current.

Assistant Prof. Tengfei Jiang and collaborators' research, published in *MRS Bulletin*, examines fast data collection with state-of-the-art area detectors that make it possible to obtain quantitative images of microstructures in near real-time.

Assistant Prof. Lorraine Leon and team's article, in the journal *Advances in Colloid and Interface Science*, highlights the advantages of polypeptides, versus synthetic polymers, to form polyelectrolyte complexes at varying length scales. With potential for numerous delivery applications, the research emphasizes heterogenous complexes formed using nucleic acids.



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
- prosthetics
- energy
- 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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