Engineering, Ph.D. (Concentration in Materials and Manufacturing Technology)

Lorenzo Valdevit, Director and Graduate Advisor
204 Rockwell Engineering Center; 949-824-8090
http://engineering.uci.edu/interdisciplinary-graduate-programs/materials-and-manufacturing-technology (http://engineering.uci.edu/interdisciplinary-graduate-programs/materials-and-manufacturing-technology/)

The Ph.D. in Engineering with a concentration in Materials and Manufacturing Technology requires a commitment on the part of the student to dedicated study and collaboration with the faculty. Ph.D. students are selected on the basis of outstanding demonstrated potential and scholarship. Applicants must hold the appropriate prerequisite degrees from recognized institutions of high standing. Students entering with a master's degree may be required to take additional course work, to be decided in consultation with the graduate advisor and the program director. Students without a master's degree may be admitted into the Ph.D. program. However, these students will be required to complete the degree requirements above for the master's degree prior to working on doctoral studies. After substantial academic preparation, Ph.D. candidates work under the supervision of faculty advisors. The process involves immersion in a research atmosphere and culminates in the production of original research results presented in a dissertation.

Milestones to be passed in the Ph.D. program include the following: acceptance into a research group by the faculty advisor during the student's first year of study, successful completion of the Ph.D. preliminary examination during years one or two, development of a research proposal, passing the qualifying examination during year three (second year for those who entered with a master's degree), and the successful completion and defense of the dissertation during the fourth or fifth year. There is no foreign language requirement.

The degree is granted upon the recommendation of the doctoral committee and the Dean of Graduate Division. The normative time for completion of the Ph.D. is five years (four years for students who entered with a master's degree). The maximum time permitted is seven years.

Concurrent Study in the Program in Law and Graduate Studies (PLGS)

Students have the option to pursue a coordinated curriculum leading to a J.D. degree from the School of Law in conjunction with a Master's or Ph.D. in Engineering with a concentration in Materials and Manufacturing Technology. For students pursuing the M.S. thesis option, 8 units of research can be substituted for law electives, and comprehensive exam students can petition two course (non-course or area of emphasis courses) to be substituted by law electives.

Ozdal Boyraz (silicon photonics, nonlinear optics in silicon, cascaded cavity silicon Raman laser)

Peter J. Burke (nano-electronics, bio-technology)

Penghui Cao (fundamental understanding of the mechanisms by which materials plasticly deform and fail, particularly in extreme environments)

Zhongping Chen (biomedical optics, optical coherence tomography, bioMEMS, and biomedical devices)

Camilo Velez Cuervo (micro/nano robotics, micro/nano device fabrication, microfabrication of magnetic microsystems, magnetic micro/nanostructures, selective magnetization of micro patterns, microsystems (MEMS), biomedical microsystems, semiconductor devices and microfluidics)

Franco De Flaviis (microwave systems, wireless communications, electromagnetic circuit simulations)

James C. Earthman (biomaterials, dental and orthopedic implants, green materials, nanocrystalline alloys, deformation and damage processes)

Rahim Esfandyarpour (nanotechnology and nanoscience, flexible electronics, MEMS and NEMS fabrication and modeling, stretchable and wearable bio devices, translational micro/nanotechnologies, biological and chemical sensors, microfluidics, microelectronics circuits and systems, physiological monitoring, Internet of Things(IOT) bio devices, technology development for personalized/precision medicine, and Point of Care(POC) diagnostics)

Manuel Gamero-Castaño (electric propulsion, with emphasis on colloid thruster technology for precision formation flying missions and Hall thrusters, electrohydrodynamic atomization of liquids and related problems like electrospray ionization and technological applications of electrosprays, aerosol diagnostics)

Alon A. Gorodetsky (cephalopods, adaptive materials, camouflage, bioelectronics)

Michelle Khine (development of novel nano- and micro-fabrication technologies and systems for single cell analysis, stem cell research, in vitro diagnostics)

David Kisailus (investigation of synthesis – structure and structure - property relationships in biological and biomimetic materials, development of multifunctional structural materials, synthesis and crystal growth of nanoscale materials for energy conversion, storage and environmental remediation)

Lawrence Kulinsky (micro- and nano-manufacturing, hybrid manufacturing, microfluidics, electrokinetic phenomena, BioMEs, personalized diagnostics, and drug delivery)

John C. LaRue (fluid mechanics, micro-electrical-mechanical systems (MEMS), turbulence, heat transfer, instrumentation)

Enrique J. Lavernia (MSE) (nanostructured materials, additive manufacturing, powder metallurgy, mechanical behavior)

Abraham Lee (Lab-on-a-Chip health monitoring instruments, drug delivery micro/nanoparticles, integrated cell sorting microdevices, lipid vesicles as carriers for cells and biomolecules, high throughput droplet bioassays, microfluidic tactile sensors)

Chin C. Lee (bonding technology, electronic packaging, acoustics, microwaves, semiconductor devices, thermal management)

Henry P. Lee (photonics, fiber-optics and compound semiconductorsphotonics, fiber-optics and compound semiconductors)

Jaeho Lee (Nanoscale heat transfer and materials engineering, targeting impact on semiconductor devices and energy conversion systems via metrology development)

Guann Pyng Li (high-speed semiconductor technology, optoelectronic devices, integrated circuit fabrication and testing)

Marc J. Madou (fundamental aspects of micro/nano-electro-mechanical systems [MEMS/NEMS], biosensors, nanofluidics, biomimetics)

Michael McCarthy (machine design and kinematic synthesis of spatial mechanisms and robots)

Farghalli A. Mohamed (mechanical behavior of engineering materials such as metals, composites and ceramics, the correlation between behavior and microstructure, creep, and superplasticity, mechanisms responsible for strengthening and fracture)

Ayman S. Mosallam (advanced composites and hybrid systems, seismic repair and rehabilitation of structures, blast mitigation and diagnostic/prognostic techniques for infrastructure security)

Daniel R. Mumm (development of materials for power generation systems, propulsion, integrated sensing advanced vehicle concepts and platform protection)

Xiaoqing Pan (atomic-scale structure, properties and dynamic behaviors of advanced materials including thin films and nanostructures for memories, catalysts, and energy conversion and storage devices)

Regina Ragan (exploration and development of novel materials systems for nanoscale electronic and optoelectronic devices)

Timothy J. Rupert (mechanical behavior, nanomaterials, structure-property relationships, microstructural stability, grain boundaries and interfaces, materials characterization)

Frank G. Shi (optoelectronic devices and materials, optoelectronic device packaging materials, optoelectronic medical devices and packaging, white LED technologies, high power LED packaging)

Andrei M. Shkel (design and advanced control of micro-electro-mechanical systems (MEMS), precision micro-sensors and actuators for telecommunication and information technologies, MEMS-based health monitoring systems, disposable diagnostic devices, prosthetic implants)

Lizhi Sun (CEE) (micro- and nano-mechanics, composites and nanocomposites, smart materials and structures, multiscale modeling, elastography)

William Tang (micro-electro-mechanical systems (MEMS) nanoscale engineering for biomedical applications, microsystems integration, microimplants, microbiomechanics, microfluidics)

Chen S. Tsai (integrated and fiber optics, devices and materials, integrated acoustooptics and magnetooptics, integrated microwave magnetics, Ultrasonic Atomization for Nanoparticles Synthesis, silicon photonics)

Lorenzo Valdevit, Director (multifunctional sandwich structures, thermal protection systems, morphing structures, active materials, MEMS, electronic packaging, cell mechanic)

Camilo Velez Cuervo (micro/nano robotics, micro/nano device fabrication, microfabrication of magnetic microsystems, magnetic micro/nanostructures, selective magnetization of micro patterns, microsystems (MEMS), biomedical microsystems, semiconductor devices and microfluidics)

Yoon Jin Won (multi-scale structures for thermal and energy applications, in particular fabrication, characterization, and integration of structured materials)

Albert Yee (nanofabrication of soft materials, physics of polymer thin films, nanomechanical properties of polymers, ultra-low-k dielectrics, fracture and toughening of polymer nanocomposites)

Iryna Zenyuk (CBE) (renewable energy, fuel cells, electrolyzers, batteries, X-ray imaging techniques, multi-scale modeling, transport phenomena)