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

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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 (integrated optics, silicon photonics, optical communications systems and microwave photonics)

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

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

James C. Earthman (biomaterials, compositionally complex materials, nanocrystalline alloys, quantitative percussion diagnostics, 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)

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

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)

John C. LaRue (heat transfer, turbulence)

Abraham Lee (integrated point-of-care diagnostics, engineered "theranostic" vesicles and particles, active cell sorting microdevices, microphysiological microsystems, and high throughput droplet bioassays)

Chin C. Lee (electronic packaging, bonding technology, metallurgy, thermal design, semiconductor devices, electromagnetic theory, acoustics and optoelectronics)

Jaeho Lee (heat transfer, thermal management, thermoelectronics, phononics, nanomaterials)

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

Guann Pyng Li (micro/nano technology for sensors and actuators, internet of things (IoT), smart manufacturing, biomedical devices and millimeter wave wireless communication)

Michael McCarthy (design of mechanical systems, computer aided design, kinematic theory of spatial motion)

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

Martha L. Mecartney (ceramics for energy applications and for use in extreme environments, flash sintering, interfacial design of thermal conductivity, transmission electron microscopy)

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, diagnostic/prognostic structural health monitoring techniques, 3D printing in construction and sustainable and green building technology)

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)

Andrei M. Shkel (design and advanced control of micro-electro-mechanical systesm (MEMS); high precision micro-machined gyroscopes; MEMS-enhanced optical systems, tools and prosthetic appliances; electromechanical and machine-information systems integration)

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

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 microwave magnetics, ultrasonic atomization for nanoparticles synthesis, silicon photonics)

Lorenzo Valdevit, Director (architected materials, mechanical metamaterials, additive manufacturing, optimal design)

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

Albert Yee (materials science aspects of polymers and soft materials, particularly on how they are used to impact nanotechnology)