



Graduate Program

Industrial Engineering

The Graduate Program in Industrial Engineering and Operations Research (IEOR) at the College of Engineering offers both M.S. and Ph.D. degrees. IEOR is part of the Mechanical and Industrial Engineering Department (MIE), which is actively engaged in teaching, research, and service across a wide spectrum of technical areas. Our distinguished industrial engineering faculty conduct research in such areas as human factors, automation, supply chain management, manufacturing, energy economics and technology management, and health-care systems. IEOR was ranked 35th in the country by the most recent survey of the National Research Council.

Facilities and Research

Graduate students in IEOR have access to a remarkable complex of research and instructional laboratories, featuring state-of-the-art computers, workstations, driving simulators, and industrial simulation facilities. The following examples are representative of the many laboratories in which graduate students conduct their research:

The Human Performance Lab is equipped with state-of-the-art facilities, worth more than \$1 million, that are available to students for their research. The lab features a new state-of-the-art driving simulator, a fully instrumented van for on-the-road studies, a truck simulator with programmable image side-view mirrors, and other equipment such as an advanced eye tracker. Close ties exist between the lab and the Human Factors and Ergonomics Program in MIE, the Transportation Engineering Program in the Department of Civil and Environmental Engineering, and the Cognitive Program in the Department of Psychology. Close links also exist between the Human Performance Lab and private companies such as Amsign, Bose Corporation, Ford Motor Company, Millitech, Motorola, Peter Pan Bus Lines, and Whistler (police radar detectors).

The Center for Energy Efficiency and Renewable Energy (CEERE) seeks solutions to environmental problems resulting from energy production, industrial, manufacturing, and commercial activities, and land-use practices. Our research program is built upon four sub groups with unique abilities to service energy and environmental problems. CEERE offers research, training, and educational experiences for graduate engineers and scientists through such services as the Building Energy Efficiency Program, through which CEERE staff advise the UMass Amherst campus in areas of thermal performance of building envelopes and fenestration systems, simulation of energy use in buildings, energy audits, building commissioning, and retro-commissioning. Another CEERE activity is the Industrial Assessment Center, which does energy assessments for small- and medium-sized companies in the New York and New England area.

The Supply Chain Management Lab takes a holistic approach towards managing the flow of material and information throughout the supply network – including different tiers of suppliers, manufacturers, warehouses, and stores – in order to maximize system-wide profits and create customer value. Within the broad and rapidly evolving field of supply chain management, the laboratory focuses on analyzing and modeling the coordination of production, inventory, distribution, reverse logistics, and pricing policies of the supply network.

The Consortium for Distributed Decision Making Lab consists of researchers, faculty, and industry members from around the world who focus on Multi-Agent Distributed Decision Making. The members are from various disciplines and share their information to develop a coherent set of theories, tools, and protocols necessary for operating distributed systems. Some of the current applications include: next generation space shuttle design; self-sustaining smart sensors networks; collaborative, adaptive networks of radar for low-altitude weather predictions; multi-agent models of e-manufacturing and supply chains; effective coordination in emergency response systems; and distributed energy generation and congestion-based pricing for energy market design.

The **Energy, Environment, and Economic Decision Making Lab** applies the tools of operations research and economics to a wide variety of environmental, energy, and policy issues, with a focus on technology and technical change. Current projects include: investigating energy technology R&D policy in the face of climate change; applying agent-based modeling to the analysis of electricity markets; developing a decision framework for small dam removal in the northeast; and analysis of recycling policies and the reverse supply chain.

Financial Assistance

It is the goal of MIE to provide assistantships and/or fellowships to all graduate students whose degree will culminate in the completion of a research project, thesis, or dissertation. The Department will also make every effort to provide funding for those involved with specific projects. Though limited in number, teaching assistant positions may be available for those either interested in teaching as a career, or involved in research projects that do not have funding. Typically, tuition waivers are part of the assistantship contract.

Employment

Graduates of IEOR can expect to work for manufacturing and production companies, transportation and distribution firms, government agencies, healthcare groups, consulting firms, academic institutions, and research organizations. A short list of companies that employ industrial engineers are UPS, The Home Depot, Intel, Hewlett-Packard, Clairol, Bristol-Meyers Squibb, the Boston Globe, Andersen Consulting, Amazon.Com, Microsoft, General Electric, and IBM.

Location

The University of Massachusetts is the state university of the Commonwealth. It was founded in 1863 under the provisions of the Morrill Land Grant Act, which was passed by the United States Congress one year earlier. Situated in one of the most picturesque sections of the state, UMass Amherst joins with its academic neighbors – Amherst, Smith, Mount Holyoke, and Hampshire colleges – in the Five College Consortium, which helps maintain the rich tradition of educational benefits (including cross-registration for coursework) and cultural activity (numerous concerts, Broadway shows, plays, readings, entertainers of every kind, and dance performances) associated with the Connecticut Valley. Amherst is also located within easy access to New York, Boston, and Montreal, and has a reputation throughout New England for its numerous outdoor activities, which can all be easily accessed through the UMass Amherst Outing Club.

Contact

For more information on graduate studies in industrial engineering contact
Kourosh Danai, *Graduate Program Director*, danai@ecs.umass.edu
or consult the Program Website at: <http://www.ecs.umass.edu/mie/grad/graduate.html>