ENGINNEERING  GRADUATE STUDIES
Program Overview for Advanced Degrees

www.engineering.iastate.edu/grad
CYCLONE ENGINEERING: MAKE A DIFFERENCE

What would you do as an engineering graduate student at Iowa State? Lead innovative research. Create knowledge. Become an expert in your field.

You’ll be working in outstanding facilities to solve important worldwide challenges in areas like advanced materials and manufacturing, engineered medicine, engineering education, energy systems, resilient infrastructure, and secure cyberspace and autonomy.

And you’ll get to collaborate with top faculty and fellow students at an internationally recognized and ranked College of Engineering equipped with the technology, ingenuity and passion to make a difference.

Learn more—www.engineering.iastate.edu/grad
Funding Opportunities
Most College of Engineering graduate students receive funding to help cover tuition and living expenses through a stipend each month. The funding can be graduate teaching, research and administrative assistantships or fellowships, and it is available through individual programs and affiliated institutes within the college. To learn more about these opportunities, contact your department or program of interest.

Best college town in the nation
From the Wall Street Journal to Forbes Magazine, the city of Ames continually ranks among America’s best cities to live, work and play. From live music and shopping to outdoor activities and arts and culture, there is something for everyone in Ames.

Iowa State University and the city of Ames welcome students from over 100 countries, all 50 states and U.S. territories to the community every year. A perfect blend of arts, culture and entertainment with a stunning backdrop no matter the season – spring, summer, fall, and winter. Whether you’re exploring campus or the surrounding community, beauty and wonder are around every corner.
The bioinformatics and computational biology major is one of the largest such Ph.D. programs in the nation. Students can explore all major research areas of computational molecular biology, including genomics, molecular structures, functional genomics and computational systems biology.

Iowa State’s cyber security program offers students a rigorous, cutting-edge education in the security of information networks, preparing them to address the technological aspects of information assurance along with questions of policy, law and ethics that are important to the field.

Energy systems are pervasive, affecting nearly every aspect of society. The increasing complexity of these systems, along with increasing environmental constraints, requires practicing professionals in the field that have knowledge, skills and abilities specific to energy system design, evaluation, construction and management.

The master of engineering in engineering management develops skills in engineering, science and management. Students are prepared to meet both the technical and managerial challenges in developing modern, complex engineered systems and can apply a systems approach to solve business problems.

Environmental science provides a technically rigorous, quantitative and integrated approach to study environmental systems. In addition to the ability to work in their chosen area of specialization, students are exposed to the biological, chemical and physical aspects of environmental systems, as well as the specialized training necessary to analyze these systems.
At Iowa State, the leading edge of innovation is found in fields that transcend the boundaries between traditional engineering disciplines.

**Human-Computer Interaction**—[www.vrac.iastate.edu/hci](http://www.vrac.iastate.edu/hci)
Students in human-computer interaction study the dynamic relationship between humans and increasingly powerful and ubiquitous technology. With more than 70 researchers representing all the colleges in the university, Iowa State is a leader in human-computer interaction, user experience, interaction design and virtual reality.

**Immunobiology**—[www.immunobiology.iastate.edu](http://www.immunobiology.iastate.edu)
Immunobiology brings together faculty and graduate students in four colleges and 10 departments, as well as scientists in nearby government laboratories and health sciences institutes. Research topics include cellular and molecular immunology, bacterial pathogenesis, molecular virology, immunogenetics, cellular and molecular pathology, and molecular signaling.

**Neuroscience**—[www.neuroscience.iastate.edu](http://www.neuroscience.iastate.edu)
The neuroscience program provides research opportunities in neuronal membrane functions, signal transduction, neuroanatomy, neurodegenerative diseases, neuroendocrinology, neurotoxicology, neuropathology, developmental neurobiology, neurogenetics, computational neuroscience, neural networks, behavioral neuroscience, tissue engineering, neuroregeneration and brain repair.

**Sustainable Agriculture**—[www.susag.iastate.edu](http://www.susag.iastate.edu)
Students in the sustainable agriculture program study agroecological principles and the social relations underlying sustainable farming and food systems while gaining practical experience with sustainable production methods. The program integrates technical and social sciences through interdisciplinary courses that emphasize critical thinking and collaboration.

**Systems Engineering**—[www.elo.iastate.edu/graduate-degrees](http://www.elo.iastate.edu/graduate-degrees)
The program in systems engineering allows engineers from any discipline to develop analytical skills to design, evaluate and build complex systems that have many components and demanding specifications. Students learn to work across disciplinary boundaries and gain management insight.

**Toxicology**—[www.toxicology.iastate.edu](http://www.toxicology.iastate.edu)
The toxicology program offers interdisciplinary education and training to prepare students for careers in academia, government and industry. Faculty expertise and laboratory facilities are available in a wide range of research areas that include air quality, cancer research, environmental chemistry, forensic toxicology, food safety, groundwater, instrumental analysis, nutritional toxicology, and many more.

**Transportation**—[www.intrans.iastate.edu/transportation-related-graduate-degrees](http://www.intrans.iastate.edu/transportation-related-graduate-degrees)
Solving the complex questions facing transportation systems requires the perspective of many disciplines. This diversity of Iowa State’s transportation program enables students to see the strength of interdisciplinary approaches to planning, operating, managing and maintaining the next generation of transportation systems.
Advance Your Career and Stay on the Job!
Our online engineering programs are constructed to advance your expertise and career while staying on the job.

One Step at a Time or Ready to Leap?
Start with a certificate and continue with a master’s degree or jump into a graduate degree.

Engineering Graduate Certificates
Graduate certificates are ideal for individuals who do not wish to pursue a master’s degree, or for those who already have one or more advanced degrees and wish to add to their credentials in their field. All of the courses in each certificate program earn graduate credits that can be applied toward the parallel master’s degree program.

LEARN MORE www.engineeringonline.iastate.edu

OPPORTUNITIES FOR UNDERREPRESENTED STUDENTS

Diane Brandt Scholarship
Established in 2010 to serve many generations of Iowa State women in science, mathematics, agriculture, engineering, and in other fields in which women have traditionally been underrepresented.

The George A. Jackson Award
George A. Jackson Award aims to promote diversity and inclusion of graduate students from populations historically underrepresented in graduate education. Only newly recruited students with a fall entry term to be appointed as half-time graduate assistantships are eligible. The award may take the form of a specific amount for the first year or a fully funded assistantship. Financial terms are subject to change each year.

Tuition Award for Diversity
This award fully covers 50% of tuition for master’s students nominated for the Jackson Award.

Ronald E. McNair Scholarship
The McNair Scholarship is designed to increase the enrollment of students who participate in a McNair Program, one of the eight federally funded TRIO Programs. Approved applicants receive a one-time scholarship of $3,000 (masters students) or $6,000 (doctoral students) plus additional funding for professional development. Iowa State waives the graduate application fee for all McNair Scholars.

LEARN MORE www.grad-college.iastate.edu/finance/

ENGINEERING ONLINE LEARNING

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Graduate Engineering Programs at Iowa State:

Aerospace Engineering
   Ph.D., M.S. and M.Eng.

Agricultural and Biosystems Engineering
   Ph.D., M.S. and M.Eng.

Chemical and Biological Engineering
   Ph.D., M.S. and M.Eng.

Civil, Construction and Environmental Engineering
   Ph.D., M.S. and M.Eng.

Electrical and Computer Engineering
   Ph.D., M.S. and M.Eng.

Industrial and Manufacturing Systems Engineering
   Ph.D., M.S. and M.Eng.

Materials Science and Engineering
   Ph.D., M.S. and M.Eng.

Mechanical Engineering
   Ph.D., M.S. and M.Eng.

For more information: [www.engineering.iastate.edu/grad](http://www.engineering.iastate.edu/grad)
ISU’s aerospace engineering graduate program offers research opportunities that go beyond traditional aircraft and spacecraft. Autonomous systems, tornado simulation and UAS flight control are only a few of the fields you can explore.

You’ll collaborate with our faculty on challenging problems that are important to economic, societal and defense needs, such as renewable energy, complex system design and nondestructive evaluation.

Working in our exceptional facilities—like our tornado microburst simulator and revolutionary icing wind tunnel—will give you the chance to test and explore new ideas while making research advancements that make a difference.

Most importantly, you’ll be prepared for the next step in your career, whether it’s research and development in the laboratory, teaching at a college or university, or leading a team in industry.

**Research Areas**
Advanced Materials Systems  
Aerodynamics and Aero-Structural Interaction  
Complex Systems and Optimization  
Guidance, Controls and Astrodynamics  
Nondestructive Testing and Evaluation

**Ph.D., M.S. and M.Engr. Degrees Available**

**Graduate Degrees**
Aerospace Engineering  
Engineering Mechanics

**Interdepartmental Programs**
Nondestructive Evaluation  
Human-Computer Interaction  
Systems Engineering (M.Engr. only)

[www.aere.iastate.edu](http://www.aere.iastate.edu)
Iowa State was the first in the nation to offer an agricultural engineering program in the 20th century. We continue to extend the frontiers of knowledge in the 21st century through a strong graduate program that is ranked number one in the nation according to U.S. News and World Report.

Join our internationally renowned faculty in fundamental and applied research in biofuels engineering and technology; industrial and agricultural technology; lean systems and quality management; manufacturing technology; measurements and control systems; process engineering and technology; waste management; and much more.

**Research Areas**

Advanced Machinery Engineering and Manufacturing Systems
Animal Production Systems Engineering
Biological and Process Engineering and Technology
Occupational Safety Engineering
Land and Water Resources Engineering

**Ph.D., M.S. and M.Engr. Degrees Available**

**Interdepartmental Programs**

Biorenewable Resources and Technology
Environmental Science
Human-Computer Interaction
Professional Agriculture
Sustainable Agriculture
Toxicology

**Contact Information**

515 294-1033
abegradinfo@iastate.edu

[www.abe.iastate.edu](http://www.abe.iastate.edu)
A revolution is underway in biotechnology, sustainability, medicine and energy and Iowa State’s Department of Chemical and Biological Engineering is leading the charge. Our graduate students work hand-in-hand with our faculty to achieve breakthroughs in several areas, including biobased products; catalysis and reaction engineering; biomaterials; and polymeric and nanostructured materials.

We are home to the Center for Biorenewable Chemicals, the Nanovaccine Institute and the U.S. Department of Energy’s Ames Laboratory, which focuses on creating materials and energy solutions. Recently renovated laboratories, as well as a major bio-research facility expansion, provide ideal facilities for new students to engage in nationally funded programs.

Chemical and biological engineering alumni flourish in academic, industrial and entrepreneurial settings.

Research Areas
Advanced and Nanostructured Materials
Biorenewables
Catalysis and Reaction Engineering
Computational Fluid Dynamics
Health Care Technology and Biomedical Engineering
Renewable Energy

Interdepartmental Programs
Bioinformatics and Computational Biology
Biorenewable Resources and Technology
Immunobiology
Neuroscience
Toxicology

Ph.D., M.S. and M.Engr. Degrees Available

Contact Information
515 294-1660
chemengr@iastate.edu

www.cbe.iastate.edu
CIVIL, CONSTRUCTION AND ENVIRONMENTAL ENGINEERING

As infrastructure continues to age, there is a strong demand for civil, construction and environmental engineers to build and repair structures of all types. Employers worldwide look to our Department of Civil, Construction and Environmental Engineering as a source of highly skilled engineers, technologies and ideas. Through the engineering knowledge you’ll gain at Iowa State, you’ll have the technical, planning and management skills needed to become part of a dynamic workforce.

Our faculty and staff work closely with you as you learn to design, construct and maintain the infrastructural systems that are critical to modern life. You will have the opportunity to explore some of the most recent, cutting-edge engineering applications and research in all fields of civil engineering. This includes multi-disciplinary research such as multi-hazards engineering, big data analytics and resilience engineering.

Research Areas

- Civil Engineering Materials
- Construction Engineering
- Environmental/Water Resources Engineering
- Geotechnical Engineering
- Intelligent Infrastructure Engineering
- Structural Engineering
- Transportation Engineering

Interdepartmental Programs

- Biorenewable Resources and Technology
- Environmental Science
- Global Positioning System (GPS)
- Transportation (M.S. Only)
- Wind Energy Science, Engineering and Policy (Ph.D. Only)

Ph.D., M.S. and M.Engr. Degrees Available

Contact Information

- 515 294-4975
ccee-grad-inquiry@iastate.edu

www.ccee.iastate.edu
ELECTRICAL AND COMPUTER ENGINEERING

Iowa State’s Department of Electrical and Computer Engineering graduate programs are ranked among the top in the nation and provide an outstanding educational program that offers you the opportunity to pursue cutting-edge research to meet the challenges of the future. In your classes, you will work closely with internationally recognized faculty and in your research, you will gain one-on-one mentoring experiences from your major professor.

In our state-of-the-art research facilities, our expert faculty will guide you to achieve engineering innovation in several areas, including bioengineering; cyber infrastructure; distributed sensing and decision making; energy infrastructure; and materials, devices, and circuits. With a degree from Iowa State, you will be well prepared for a rewarding career in either academia or industry. We invite you to join our growing community of leading electrical and computer engineers who are advancing technologies and building a better future as well as a smarter world.

Research Areas and Programs
- Bioengineering
- Communications and Signals Processing
- Computing and Networking Systems
- Electric Power and Energy Systems
- Electromagnetic, Microwave and Nondestructive Evaluation
- Microelectronics and Photonics
- Secure and Reliable Computing
- Software Systems
- Systems and Controls
- Very Large Scale Integration (VLSI)

Interdepartmental Programs
- Bioinformatics and Computational Biology
- Human-Computer Interaction
- Cyber Security (M.Engr. and M.S.)

Ph.D., M.S. and M.Engr. Degrees Available

Contact Information

515 294-8403
ecpegrad@iastate.edu

www.ece.iastate.edu
We offer an opportunity to develop the skills that will help you become an engineering leader in the 21st century. Learn advanced concepts, theories and formal methods that will help you develop your design and decision-making skills in the context of engineering complex systems.

Your program of study will give you experiences with modern computational methods, processes and tools that you can apply across multiple industries. You will have the opportunity to explore areas such as advanced materials and manufacturing, engineered medicine, energy systems, resilient structures, secure cyberspace and autonomy.

Research Areas
- Advanced Manufacturing
- Data Analytics
- Ergonomics/Human Factors Engineering
- Operations Research
- Systems Engineering

Ph.D., M.S. and M.Engr. Degrees Available

Interdepartmental Programs
- Human-Computer Interaction
- Systems Engineering (M. Engr. only)
- Engineering Management (M. Engr. only)

Contact Information
515 294-0129
imsegradprogram@iastate.edu

www.imse.iastate.edu
Iowa State is a recognized leader in materials research, offering world-class research facilities that include the U.S. Department of Energy’s Ames Laboratory, the Center for Nondestructive Evaluation and the Microelectronics Research Center. Our faculty annually administers about $20 million in research funds to support the work of undergraduate and graduate students; postdocs; and other researchers.

As a student, you will have the opportunity to study and research a range of materials science and engineering applications, including metallic and ceramic materials; glasses; polymers and biomaterials; composites; and materials for energy. With an advanced degree in materials science, you can pursue a number of career directions in industry, government research laboratories, universities and other research centers.

One of Iowa State’s MSE Faculty members, Dan Shechtman, received the 2011 Nobel Prize in Chemistry for his revolutionary discovery of quasi-crystals.

Research Areas
Advanced manufacturing processes
Biomaterials and bio-inspired materials
Functional materials and physical behavior
Materials for energy technologies
Nanomaterials and coatings
Novel phases, structures, and transformations
Rare earth metals and other critical materials

Structural materials, composites, and hybrids

Interdepartmental Programs
Bioinformatics and Computational Biology
Nondestructive Evaluation Certificate Program
Wind Energy Science, Engineering & Policy

Ph.D., M.S. and M.Engr. Degrees Available

Contact Information
515 294-1214
gradMSE@iastate.edu

www.mse.iastate.edu
Iowa State’s mechanical engineering graduate program offers you the opportunity to pursue cutting-edge research directed at addressing global needs that positively impact society and individuals. You will work closely with our accomplished faculty in state-of-the-art facilities to achieve scientific breakthroughs and innovative engineering solutions in core ME disciplines, including design and optimization; dynamic systems and controls; materials processing and mechanics; and thermo-fluid sciences. The professional independence, creativity and leadership you will explore in our program will provide you with a rewarding educational experience highly sought after by industry and academia.

We shape our research portfolio around making the world a more technologically advanced and sustainable place to live. Our work is directed at innovations that preserve the environment and provide substitutes for depleting natural resources and our efforts contribute to better theories, models and technologies that improve the realization of products and manufacturing processes. We have an active graduate student organization that promotes professional development and student success. Our faculty are well recognized for excellence as measured by numerous high-impact publications, reputation in professional organizations, thriving research programs and society fellows.

**Research Areas**
- Energy
- Health
- Fluids
- Multiscale Engineering
- Systems
- Computational Science

**Ph.D., M.S. and M.Engr. Degrees Available**

**Interdepartmental Programs**
- Human-Computer Interaction
- Energy Systems Engineering
- Wind Energy Science, Engineering and Policy

**Contact Information**
515 294-0838
megradinfo@iastate.edu

**www.me.iastate.edu**