

# College of Engineering

## Dean

Ann F. McKenna

## Associate Dean, Academic Programs

Nicole M. Grosland

## Associate Dean for Research and Faculty

H.S. Udaykumar

## Associate Dean for Graduate Education

Suresh Raghavan

### Undergraduate degree: BSE

**Undergraduate certificates:** applied climate science and energy technologies; artificial intelligence, modeling and simulation in engineering; naval science and technology; technological entrepreneurship

### Graduate degrees: MS; PhD

**Graduate certificates:** artificial intelligence, modeling and simulation in engineering; sustainable water development

**Website:** <https://engineering.uiowa.edu/>

## Facilities and Resources

## College of Engineering Facilities

### Seamans Center for the Engineering Arts and Sciences

The Seamans Center for the Engineering Arts and Sciences is home to the College of Engineering. In addition to classrooms, conference rooms, instructional laboratories, and faculty offices, the Seamans Center houses the Lichtenberger Engineering Library, the Hanson Center for Technical Communication, a machine shop, an electronic shop, student workspaces, computational facilities, and research laboratories. A number of classrooms and open spaces located throughout the building were designed to readily accommodate collaborative work.

## Engineering Student Services

The professional staff of Engineering Student Services administers student services for the College of Engineering, including advising, tutoring, student records, and global engineering. It is also the administrative home of Engineering Career Services and the Hanson Center for Technical Communication.

## Engineering Career Services

Engineering Career Services develops and promotes experiential education and professional opportunities for students in the College of Engineering. Professional staff coordinate the college's co-op and internship program, engage in employer outreach, and provide opportunities for students to network with employers, including engineering career fairs and other programming related to career development.

Engineering Career Services offers individual advising and class presentations on résumé and cover letter preparation, job and internship search strategies, interviewing skills, job offer evaluation, and much more. Engineering Career Services partners with the Pomerantz Career Center to facilitate on-campus interviewing, postgraduation outcome collection, and the university's online recruiting system, Handshake.

## Leadership, Ethics, and Professional Pathways (LEaPP)

The LEaPP Academy aims to provide students with the knowledge, skills, and perspectives that enhance their long-term success, make them valuable leaders to the companies that employ them, and develop them as ethically and globally aware citizens of the world. LEaPP Scholars complete a number of cocurricular activities to earn leadership, ethical thinking, and professional development credentials. Individuals who complete the LEaPP Academy receive collegiate accolades and are honored with graduation cords specific to the LEaPP Program. The LEaPP Academy is designed to be accessible no matter the semester or timeline in which a student joins; each piece is individualized and self-led to offer the best experience to each student based on their needs.

## Hanson Center for Communication

The Hanson Center for Communication is an endowed program that works closely with engineering faculty to train students in verbal and written communication throughout the curriculum. The center helps create, manage, and grade writing and presentation assignments and provides training to students, tutors, and faculty on best practices for communication. In addition, the Hanson Center for Communication is home to an innovative peer training center that conducts hundreds of one-on-one and team tutoring sessions each year. The center helps review lab reports, topical papers, technical essays, and technical presentations each semester. Peer tutors are undergraduate students who have shown exceptional promise as communicators and provide individualized feedback throughout the writing and presentation process. In addressing global concerns (organization, clarity, and context), peer tutors help their fellow students transform rough drafts into persuasive, logical documents and presentations.

## Global Engineering

Many of today's top employers are seeking engineering graduates with global experiences and competencies who can effectively interact with colleagues and customers around the world. Successful engineers are able to communicate across cultures, work on diverse teams, and productively deal with issues and conflicts arising from differences.

University of Iowa engineering students have a variety of opportunities to study, pursue internships, or conduct research abroad. Students can enroll in credit-bearing courses in English to fulfill engineering or general education requirements or earn credits toward a minor in another discipline or world language. In addition to completing coursework abroad, engineering students can pursue experiential opportunities abroad, including global internships, conducting independent research in other countries, and volunteering. For more information, see Study Abroad on the College of Engineering website. The College of Engineering and International Programs supports these endeavors by offering students a variety of scholarships and funding.

## Engineering Computer Services

Engineering Computer Services (ECS) provides spaces and technology administration for curricular, administrative, and research computing at the College of Engineering. The college has three drop-in computer labs with 225 high-end Linux and Windows computer workstations with graphics processing unit (GPU) support, a 24-seat computer classroom, a 45-seat machine learning and virtual reality-capable computer classroom, and a 400-seat virtual computer lab with GPU support that students can access from the internet. Numerous public domain and commercial engineering applications support the full range of engineering classes. Software is regularly upgraded, and hardware is refreshed at least every four years. The college's computer labs are open 24 hours a day, every day of the year.

## Engineering Machine Shop

The Engineering Machine Shop (EMS) is a full-service, light manufacturing facility that supports the curricular, research, and operational needs of the College of Engineering and the university. EMS provides professional design and fabrication services and gives students, staff, and faculty controlled access to a student shop that contains a variety of manufacturing equipment. The shop has a high-resolution 3D scanner, commercial 3D printers, a waterjet, a full wood shop, welding, and multi-axis CNC machines.

## Lichtenberger Engineering Library

The Lichtenberger Engineering Library is a branch of the University of Iowa Main Library and is a center of engineering college activity. Its collection includes books (including required course textbooks), tools, equipment, and electronic resources to assist at any stage of research on projects both big and small. Staff are trained to help locate information and provide training on a wide variety of skills, including patent searching, data management, tool usage, and more.

The Engineering Library, located next to the Student Commons in the Seamans Center, provides access to computer workstations, quiet study in the lower level, and group study space where students may reserve a private room for their work. The Engineering Library also houses the Creative Space, a space for students to imagine, tinker, design, and create with virtual reality, 3D scanners, and more.

## NEXUS

The NEXUS Program is an art and engineering program. NEXUS promotes collaboration efforts between the College of Engineering and the art community by getting people and ideas together. The goal is to involve students in science, technology, engineering, arts, and mathematics (STEAM) projects throughout the university and the surrounding community. The program helps participants to think outside the box.

## College of Engineering Research Centers

### Center for Bioinformatics and Computational Biology

The Center for Bioinformatics and Computational Biology (CBCB) is a multidisciplinary research center dedicated to applying high performance networking and computing to basic life science and applied biomedical research. With faculty and students representing more than 20 traditional disciplines,

the CBCB has contributed to the understanding of inherited human diseases, including blinding eye disease, cancer, deafness, diabetes, autism, schizophrenia, hypertension, obesity, and heart disease. For almost 20 years, the CBCB has been at the cutting edge of high-throughput molecular discovery and interpretation in transcriptomics, genomics, and proteomics. At the confluence of these efforts lies the current waveform of personalized genomic medicine, in which the CBCB plays a central role in partnership with labs, centers, and institutes across the university's Carver College of Medicine and basic science programs across campus. The CBCB has also been a center for industry start-ups and partnerships with numerous commercial enterprises. The center is jointly sponsored by the College of Engineering and the Carver College of Medicine.

## Iowa Institute for Biomedical Imaging

The Iowa Institute for Biomedical Imaging conducts research in the following areas: medical imaging (CT, MR, OCT, PET, SPECT, ultrasound, multimodality imaging), medical image analysis and computer-aided diagnosis; cardiovascular image analysis (angiography-intravascular ultrasound data fusion, MR image analysis of congenital heart disease, coronary CT image analysis, early detection of cardiovascular disease); pulmonary image analysis (CT and MR image analysis of the lung); cell image analysis (cell tracking, shape analysis); virtual surgery planning (augmented reality for surgical planning); cancer-related assessment of tumor progression/regression; staging; general machine learning; and disease/treatment outcome prediction. The institute is sponsored by the College of Engineering and the Carver College of Medicine.

## IIHR—Hydroscience and Engineering

IIHR—Hydroscience and Engineering is a world-renowned center with more than 100 years of education, research, and public service focusing on hydraulic engineering and fluid mechanics. Based in the C. Maxwell Stanley Hydraulics Laboratory, a five-story red brick building on the banks of the Iowa River, IIHR is a unit of the College of Engineering. IIHR students, faculty members, research engineers and scientists, and staff work together to understand and manage one of the world's greatest resources—water. Students from around the world benefit from IIHR's comprehensive multidisciplinary approach, which includes basic fluid mechanics, laboratory experimentation, and computational approaches.

IIHR research activities include fluid dynamics (turbulent flows, vortex dynamics, ship hydrodynamics, biological fluid flow, atmospheric boundary layer, experimental and computational fluid dynamics); environmental hydraulics (river mechanics, hydraulic structures, fish passage, sediment management, heat disposal in water bodies and power productions, bioremediation of groundwater, computational hydraulics, water-quality monitoring); water and air resources (air pollution, hydroclimatology, hydrogeology, hydrology, hydrometeorology, remote sensing, water resources and basin-scale processes); environmental engineering and science (PCBs in the air and water, innovative ways of removing contaminants from the soil and water, ultra-fine particles of pollutants in the atmosphere, bioremediation strategies for persistent groundwater contaminants); and water sustainability (development of sound strategies and technological solutions to meet the challenges facing society's growing need for water resources). In 2009, the Iowa Flood Center was founded at IIHR as the only academic center devoted solely to flood-related research and education.

The University of Iowa's Water Sustainability Initiative (WSI) brought new interdisciplinary expertise to the institute in 2013 when WSI faculty members (based in the colleges of Liberal Arts and Sciences, Engineering, and Public Health) became affiliated with IIHR. The Iowa Geological Survey joined IIHR in 2014, bringing new expertise in Iowa's subsurface resources, groundwater modeling, innovative geophysical skills, and more.

Students gain hands-on experience through close cooperation with faculty and staff on research projects funded by industry, government, and other organizations.

## **Iowa Technology Institute**

The Iowa Technology Institute (ITI) conducts basic and applied research. The mission is to cultivate collaboration across disciplines, invent advanced technologies, and conduct trailblazing research in design, simulation, and experimentation that enables a safer and more productive future. ITI provides a unique environment for research and development for faculty, graduate and undergraduate students, research fellows, and professional scientists. ITI spans more than 20 laboratories and centers, led by the Operator Performance Laboratory, the Virtual Soldier Research program, and the Atmospheric and Environmental Research Lab.

Research at ITI focuses on advanced manufacturing and materials, human modeling and simulation, aerospace technology, biotechnology, environment and energy, and systems and sensors. Scientists conduct experiments in flight testing, human performance, robotics, biomedical and biochemical research, machine learning, smart sensors, remote sensing, renewable energy, and modeling of environmental change.

ITI has a satellite office in Orlando, Florida, and has major contracts with the U.S. military and industry partners.

## **High School Program**

### **FIRST Tech Challenge**

For Inspiration and Recognition of Science and Technology (FIRST) gives students the opportunity for real-world application of science, technology, engineering, and math (STEM) concepts. Students participate in an atmosphere that encourages team building, entrepreneurship, and sportsmanship. FIRST Tech Challenge (FTC) allows teams of students to be responsible for designing, building, and programming robots to compete in an alliance format against other teams. Teams are required to develop strategies and build robots based on sound engineering principles. Students learn about working in a team environment, effective communication skills, the ability to fail and succeed at the same time, and competing fairly while being supportive of their competition.