THE COLLEGE OF ENGINEERING

The College of Engineering is one of the largest and oldest colleges on the MSU campus. What began as a single field of study—Mechanic Arts—in 1885 has grown to a six-department college with 165 faculty and more than 3,000 undergraduate students. Ten undergraduate degree programs are offered, plus the opportunity to further pursue special interests with a variety of concentrations and cognates, ranging from biomedical engineering to environmental engineering to supply chain management. Nine graduate degree programs are available.

What sets Spartan Engineers apart is the way their skills are acquired. We believe that being an engineer in the twenty-first century means more than just developing, designing, and building. All engineers do that, and Spartan Engineers are no exception. But at MSU, a process we call Spartaneering prepares our graduates to open the doors to excellence and innovation from day one on the job.

DEPARTMENTS

- Biosystems and Agricultural Engineering
- Chemical Engineering and Materials Science
- Civil and Environmental Engineering
- Computer Science and Engineering
- Electrical and Computer Engineering
- Mechanical Engineering

RESIDENTIAL EXPERIENCE

The Engineering Residential Experience is a living–learning community that couples intensive classroom study with hands-on learning. Students are immersed in the engineering experience from day one. Special seminars, tutoring, reserved class sections, networking opportunities, and corporate-sponsored themed floors are just a few of the advantages of the residential program.

CORNERSTONE ENGINEERING

The Cornerstone Engineering program is an integrated set of first-year engineering courses providing students with a broad introduction to the engineering design process. Beginning with their first week on campus, students are exposed to hands-on design projects, where they quickly develop problem-solving skills while learning to work in teams. Students in the EGR 100 (Introduction to Engineering) course have an opportunity to work on real-world, service-learning projects through MSU’s Resource Center for Persons with Disabilities.

UNDERGRADUATE PROGRAM

More than 3,000 undergraduate students are enrolled and more than 500 bachelor’s degrees are awarded annually in applied engineering sciences, biosystems engineering, chemical engineering, civil engineering, computer engineering, computer science, electrical engineering, environmental engineering, materials science and engineering, and mechanical engineering.

GRADUATE PROGRAM

Each year, approximately 800 students are enrolled in our advanced degree programs and nearly 200 MS and PhD degrees are awarded. Graduate programs are offered in biosystems engineering, chemical engineering, civil engineering, computer science, electrical engineering, environmental engineering, materials science, mechanical engineering, and engineering mechanics.

COLLEGE HIGHLIGHTS

- With a $25 million grant, MSU has established BEACON, an NSF Science and Technology Center for the Study of Evolution in Action. MSU is among five universities selected by NSF to lead one of these highly coveted centers.
- The U.S. Department of Energy tapped MSU to lead an Energy Frontier Research Center (EFRC), one of 46 established nationwide. MSU’s EFRC, funded at $12.5 over five years, focuses on thermoelectrics.
- A research team received $2.5 million from the U.S. Department of Energy Advanced Research Projects Agency-
Energy (ARPA-E) to build and develop the wave disk engine, which uses turbo combustion “shock wave” technology to convert liquid fuel or compressed natural gas or hydrogen into electrical power. With this technology, fuel efficiency for hybrid vehicles could increase five times compared to internal combustion engine vehicles on the road today and costs could be reduced by 30 percent.

MSU is part of a research group that received $1.7 million in U.S. Department of Energy Advanced Research Projects Agency-Energy (ARPA-E) funding to build a reactor system for Ralstonia eutropha, a bacterium that scientists aim to engineer to metabolize hydrogen and carbon dioxide to produce isobutanol, a fuel that can be used as a replacement for gasoline.

In the past two years, nine of our faculty members have received NSF CAREER Awards.

The computer science doctoral program was placed in the top 17% in the United States according to the National Research Council (NRC) ranking.

The Center for Engineering Education Research (CEER) @ MSU provides a focus for expanding engineering education research in the college, engaging more faculty in engineering education research, and working collaboratively with colleagues in other colleges across campus.

CAESRT, the Center for Alternative Energy Storage Research and Technology, conducts innovative, high-impact fundamental and applied research in materials and technologies for energy storage devices and systems. Research at CAESRT is coupled with efficient and effective technology transfer to industry and government.

The Composite Vehicle Research Center is a U.S. Department of Defense–supported center of excellence for the design and testing of composite structures for lightweight, environmentally friendly, durable, and safe vehicles, with both military and civilian applications.

The Structural Fire Testing Facility, the first of its kind in a U.S. university setting, draws faculty from other institutions and government agencies to work collectively with MSU faculty in developing new materials, sensors, and design methodologies that will ensure that our infrastructure withstands natural and man-made fires.

In the past ten years, the College of Engineering has produced nine Goldwater Scholars, two Churchill Scholars, and a Gates Cambridge Scholar.
RESEARCH AND CORPORATE PARTNERSHIPS

• Consumers Energy and GE Transportation became the first two corporate sponsors in the Engineering Theme Partnership program within the college's Engineering Residential Experience. Students are encouraged to participate in “theme” communities brought together around important issues—issues that the National Academy of Engineering has outlined as “the Grand Challenges of the 21st century.” Themed areas of the residence hall, sponsored by industry, engage students around a different problem or theme, in areas like transportation, sustainability, or energy. Student involvement could include developing ideas to address specific issues, leading environmental initiatives, attending topical seminars, and field trips to the sponsors’ facilities. These partnerships enable us to connect with our students’ passions and at the same time involve them in working on the problems of the future—areas that will need our attention over the next 40 years.

• Our graduates are recruited aggressively in Michigan and around the world. They work in every industry from aerospace to transportation, in every size company from Fortune 100 to small- and medium-sized Michigan based-companies, and in every state and country. Spartan Engineers are everywhere!

• MSU engineering students can go beyond classroom work and add an Undergraduate Research Experience to their educational program. This gives them the opportunity to work with leading researchers on cutting-edge solutions to modern technical dilemmas. Each year, more than 200 undergraduate research assistants enhance their education by working side by side with graduate students and faculty in engineering research labs.

• The Center for Spartan Engineering assists students in obtaining their career goals through research experience, cooperative education, internships, service-learning, and post-graduation employment. The Center offers K-12 outreach activities as well as seamless career exploration and connections for students, alumni, employers, and faculty.

• More than 90% of our undergraduate students voluntarily participate in an “experiential education” program prior to graduation. This includes traditional co-op and internship programs and summer work, as well as university research and study/work abroad.

FACULTY AND STAFF

The College of Engineering comprises 165 faculty and 121 academic specialists and support staff.

• 8 new faculty have joined the college since January 2011.
• Nearly every faculty member participates in undergraduate teaching.
• Most of our faculty hold leadership positions in professional societies and have been widely recognized for their accomplishments.

NUMBERS AT A GLANCE

Faculty ........................................... 165
Undergraduates ................................... 3,045
MS students .................................. 271
PhD students .................................. 527
Degrees awarded
  BS ........................................... 556
  MS ........................................... 73
  PhD ........................................... 67
Active grants .................................. 619
Research expenditures (FY 2009-10) ........ $45,454,000

FOR MORE INFORMATION

Satish Udpa, Dean
College of Engineering • Michigan State University
3410 Engineering Building • East Lansing, MI 48824
Phone: (517) 355-5113 • Fax: (517) 355-2288
Website: http://www.egr.msu.edu/