ENG

CORNELL ENGINEERING

Facts 2009

Introduction

When Cornell University opened its doors in 1868, engineering was one of the founding disciplines. Since then the college has been a model for the development of other engineering institutions worldwide and remains one of the leading engineering colleges.

Drawing upon the rich research community and resources of Cornell, the college has focused on leadership in research and excellence in education to create a better future for all. Faculty and students work and learn in a challenging, enlightened, and collaborative academic environment that demands excellence, encourages innovative education, and supports ground-breaking discovery.

In Cornell's College of Engineering, research takes learning beyond the limits of conventional thought as students and faculty push the boundaries of human understanding. Discovery stretches across disciplines to find answers to complex and challenging problems in such fields as nanotechnology, biomedical engineering, molecular and cellular biology, advanced materials, and information science.

We invite you to discover for yourself the commitment to learning and the spirit of innovation that defines Cornell Engineering and to learn more about the opportunities Cornell's College of Engineering has to offer. Visit us in person to experience the beauty of our region and campus, or virtually at **www.engineering.cornell.edu.**

At a Glance

	Cornell University	College of Engineering
Undergraduate Students	13,846	3,051
Graduate Students	4,565	1,423
Faculty	1,637	236
Academic Nonfaculty	1,193	264
Nonacademic Staff	7,540	215
Total Annual Externally Funded Research Expenditures	$544.8M*	$116.4 M

*includes Weill Cornell Medical College in New York City ($163.4M)

www.engineering.cornell.edu

Academic Schools and Departments

School of Applied and Engineering Physics
Frank Wise, Director
www.aep.cornell.edu, 607-255-5198

Department of Biological and Environmental Engineering
Daniel Aneshansley, Chair
www.bee.cornell.edu, 607-255-2465

Department of Biomedical Engineering
Michael Shuler, Chair
www.bme.cornell.edu, 607-255-1003

School of Chemical and Biomolecular Engineering
Paulette Clancy, Director
www.cheme.cornell.edu, 607-255-8656

School of Civil and Environmental Engineering
Leonard Lion, Interim Director
www.cee.cornell.edu, 607-255-3438

Department of Computer Science
Éva Tardos, Chair
www.cs.cornell.edu, 607-255-7316

Department of Earth and Atmospheric Sciences
Larry Brown, Chair
www.eas.cornell.edu, 607-255-5267

School of Electrical and Computer Engineering
Tsuhan Chen, Director
www.ece.cornell.edu, 607-255-4109

Department of Materials Science and Engineering
Emmanuel Giannelis, Director
www.mse.cornell.edu, 607-255-9617

School of Mechanical and Aerospace Engineering
Lance Collins, Director
www.mae.cornell.edu, 607-255-3623

School of Operations Research and Information Engineering
James Renegar, Director
www.orie.cornell.edu, 607-255-4856

Department of Theoretical and Applied Mechanics*
www.tam.cornell.edu, 607-255-3623

Christopher K. Ober, interim dean of the College of Engineering and the Francis Bard Professor of Materials Science and Engineering

* A merger with the School of Mechanical and Aerospace Engineering is in process.

Academic Programs

Degrees Offered

Bachelor of Science (BS)

Master of Engineering (MEng)

Master of Science (MS)

Master of Professional Studies (MPS, Applied Statistics only)

Doctorate (PhD)

Undergraduate Majors

Biological Engineering

Chemical Engineering

Civil Engineering

Computer Science

Electrical and Computer Engineering

Engineering Physics

Environmental Engineering

Independent Major

Information Science, Systems, and Technology

Materials Science and Engineering

Mechanical Engineering

Operations Research and Engineering

Science of Earth Systems

Graduate Subjects

Aerospace Engineering

Applied Mathematics (MS/PhD only)

Applied Physics (MS/PhD only)

Applied Statistics (MPS only)

Biological and Environmental Engineering

Biomedical Engineering

Biophysics (MS/PhD only)

Chemical Engineering

Civil and Environmental Engineering

Computer Science

Electrical Engineering

Engineering Management (MEng only)

Engineering Mechanics (MEng only)

Engineering Physics (MEng only)

Geological Sciences

Information Science (MS/PhD only)

Materials Science and Engineering

Mechanical Engineering

Operations Research (MS/PhD only)

Operations Research and Information Engineering (MEng only)

Statistics (MS/PhD only)

Systems Engineering (MEng only)

Systems Engineering Distance Learning (MEng only)

Theoretical and Applied Mechanics (MS/PhD only)

National Academy of Engineering Members **21**

A. M. Turing Award **2**

Strategic Areas of Research

The College of Engineering has identified six strategic areas of significant research focus for the next decade.

Systems Biology and Biomedical Engineering

Cornell has a unique opportunity for international leadership in biomedical engineering. Life sciences research has advanced to a point where engineering methods can be used to obtain a greater understanding of biological systems and will ultimately allow scientists to design and control them with a focus on solving human health problems and improving the quality of life.

Nanomaterials, Nanoscience, and Nanodevices

Engineering at very small length scales has the potential to produce important technologies that use materials with new and fundamentally different properties. It is possible to create devices the size of biological cells with the ability to operate autonomously. Such developments are expected to revolutionize many areas of society, economic development, and our personal lives.

Energy, Environment, and Sustainable Development

Over the next 50 years the Earth's population is expected to increase to 10 billion people and energy demand to grow from 15 to 50 terawatts. Engineering will make fundamental contributions to the discovery, development, and implementation of alternative energy sources and to the sustainability of the environment.

Information, Computation, and Communication

As the digital revolution continues to accelerate, discoveries in materials, electronics, and optics will provide dramatic enhancements in speed, computation, storage, and power consumption. Discoveries in computation, communication, and algorithms will have wide-ranging impacts in areas such as data warehousing and analysis, marketing, speech recognition, machine learning, and genomics.

Advanced Materials

New materials are being developed with properties and structures custom tailored at the atomic level for specific applications. These advances will enable future progress in digital and analog technologies, the life sciences, and the development of innovative products such as smart cards, flexible clothing displays, and cost-competitive solar cells.

Complex Systems and Networks

Society relies on complex, automated systems to deliver critical services including information, financial systems, water, power, transportation, and emergency response. The study and analysis of both natural and artificial systems will improve our ability to design and control complex communication, manufacturing, services, and security systems.

Faculty

Full Professors **138**
Associate Professors **53**
Assistant Professors **45**
Total Faculty, Fall 2008 236
Underrepresented Minority Faculty 5.5%*
Women Faculty 11.9%

*does not include Asians

Research Expenditures

Total Externally Funded Research Expenditures by Funding Source

Federal/National	**$84.9M**
State	**$5.9M**
Private/Nonprofit	**$5.1M**
Individual	**$10.4M**
Industry	**$9.6M**
Other	**$0.5M**
Total Research Expenditures, Academic Year 2007–2008	**$116.4M**

Enrollment

BS 3,051
MEng 558
MS/PhD 868
Total Enrollment, Fall 2008 4,477

Total Undergraduate Enrollment, Fall 2008 3,051
- Underrepresented Minority Undergraduate Students 6.4%*
- Women Undergraduate Students 30.2%
- International Undergraduate Students 12.6%

Total Graduate Enrollment, Fall 2008 1,426
- Underrepresented Minority Graduate Students 4.6%*
- Women Graduate Students 25.4%
- International Graduate Students 45.2%

*does not include Asians

Degrees Granted

BS 726
MEng 470
MS 125
PhD 109
Total Degrees Granted August 2007–May 2008 1,430

Affiliated Centers, Facilities, Laboratories, Institutes, and Programs

Center for Applied Mathematics (CAM)

Center for Biochemical Optoelectronic Microsystems (CBOM)

Center for Life Science Enterprise

Center for Nanoscale Systems (CNS)

Center for Pulsed-Power-Driven High Energy Density Plasma Studies

Center for Radiophysics and Space Research (CRSR)

Cornell Center for Advanced Computing (CAC)

Cornell Center for Materials Research (CCMR)

Cornell Center for a Sustainable Future

Cornell Electron Storage Ring (CESR)

Cornell Fuel Cell Institute (CFCI)

*Cornell High Energy Synchrotron Source (CHESS)

Cornell Institute for Digital Collections

Cornell Integrated Microscopy Center

*Cornell NanoScale Science and Technology Facility (CNF)

Cornell Waste Management Institute (CWMI)

CU-Advance

Developmental Resource for Biophysical Imaging Optoelectronics (DRBIO)

Institute for Biotechnology and Life Science Technologies

Institute for Comparative and Environmental Toxicology (ICET)

Institute for Disease and Disaster Preparedness

Institute for Resource Information Systems (IRIS)

Institute for the Study of the Continents (INSTOC)

Intelligent Information Systems Institute (IISI)

KAUST-Cornell Center for Energy and Sustainability

Kavli Institute at Cornell for Nanoscale Science

*Laboratory for Elementary-Particle Physics (LEPP)

Laboratory of Atomic and Solid State Physics (LASSP)

Laboratory of Plasma Studies

MCEER (Multidisciplinary Center for Earthquake Engineering Research)

Nanobiotechnology Center (NBTC)

*National Astronomy and Ionosphere Center (NAIC)

*National Science Digital Library

New York State Water Resources Institute (WRI)

Northeast Regional Climate Center

Northeast Sun Grant Institute of Excellence

Polymer Outreach Program (POP)

Power Systems Engineering Research Center

Program for Biogeochemistry and Environmental Biocomplexity

Program of Computer Graphics

Transportation Infrastructure Research Consortium

*National Centers

Career Services and Cooperative Education

Academic Year 2007–2008

	Full-time	Summer
Employment Interviews on Campus	3,906	1,101
Students Registered with Career Services to Interview	1,330	1,125
Employers Interviewing	178	95
Employer Visits	223	95

Cooperative Education Program, Academic Year 2007–2008

Interviews on Campus	710
Students Who Participated in Co-op	104
Employers Who Hired Co-op Students	50

Postgraduate Pursuits (BS recipients), Academic Year 2007–2008

- Employment **49%**
- Graduate School **45%**
- Seeking Employment **3%**
- Other **3%**

www.engineering.cornell.edu/careerservices

Undergraduate Experiential Learning

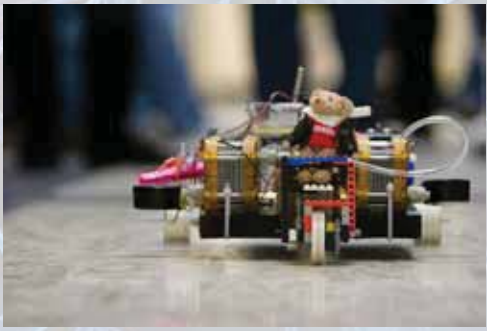
The College of Engineering emphasizes hands-on experience, encouraging students to expand their learning beyond the classroom by taking advantage of student project teams, undergraduate research, study abroad, Co-op job placements, and internships. The following are a few examples of the many engineering projects that help students translate imagination into reality.

AguaClara

AguaClara is a nonprofit, student-run organization whose mission is to improve water treatment technologies and provide training so that communities in developing countries can own, operate, and maintain safe drinking water supply systems. The group, established in 2004 as a project of the Cornell Chapter of Engineers for a Sustainable World, has designed two gravity-powered water treatment plants for communities in Honduras. The first began producing clean water in July 2005 and the second was inaugurated in January 2007. Both undergraduate and graduate students can participate in AguaClara and receive course credit. https://confluence.cornell.edu/display/AGUACLARA/Home

ChemE Car Team

With their shoebox-size car powered by a hydrogen fuel cell, the 18-member undergraduate ChemE Car Team placed first at the American Institute of Chemical Engineers student-car competition in Philadelphia in 2008, beating out more than 30 other teams. The win propels them to the international competition in Montreal in August. The car also made history by being the first ever to stop exactly at the target distance as outlined by competition rules. The competition required students to build a $2,000 car, powered by a chemical reaction of their choice, that could travel 60 feet carrying a water payload of 250 milliliters. (Teams are told just before the competition starts what the load and distance will be, and they have one hour to calculate adjustments to the chemicals.) Within two minutes, the car had to go the required distance and come to a complete stop. The stopping mechanism also had to be triggered by a chemical reaction—no brakes. www.rso.cornell.edu/chemecar



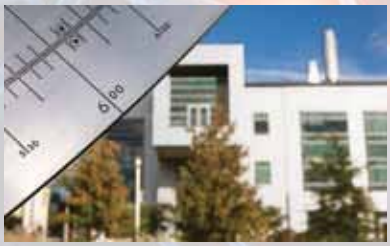
Aaron Chen '09

Cornell MineSweeper

To make clearing minefields safer, Cornell Engineering students are designing and building a low-cost, autonomous robot that can pinpoint the exact location of landmines. They plan to compete in the Intelligent Ground Vehicle Competition, but their main goal is to save lives and limbs. Team members are getting hands-on experience with machine vision, artificial intelligence, and mechanical design. More important, they are fulfilling the first principle of engineering: protection of the public welfare above all other considerations. Nobel Peace Prize co-laureate Rae McGrath, co-founder of the International Campaign to Ban Landmines, was on campus for an invited lecture last spring and visited the MineSweeper team beforehand in the Experimental Learning Lab. "I really want to congratulate Cornell for allowing this young team the freedom to develop the idea," he said. "The next step for them is to go to somewhere with the problem of landmines, and I've promised them that I will put them in touch with people who can help them to take this next step." http://minesweeper.engineering.cornell.edu

Undergraduate Research

Cornell students are eager to discover and innovate. Almost half of Cornell Engineering undergraduates participate in some form of research here in the college and through programs with other institutions across the country and internationally. Guided by faculty mentors, they apply classroom learning to improve existing processes or develop entirely new approaches. From nanotechnology to outer space and from pharmaceuticals to bridges, Cornell undergraduates are making valuable contributions to research. Tara Holter '09 is helping Biological and Environmental Engineering Professor Antje Baeumner develop a quick, simple, and inexpensive immune-system test for people in the developing world. Results from the test could help extend the lives of HIV/AIDS sufferers in the poorest countries, possibly by as much as 15 years. www.engineering.cornell.edu/ugresearch



Alumni

Cornell Engineering's 42,000 alumni live across the United States and around the world. They interact with the college as employers, admissions recruiters, guest speakers, student mentors, key corporate relations contacts, advisory board members, and leaders of many important university groups, including reunion classes, regional clubs, the University Council, and the Board of Trustees. They generously support the college financially and play an ongoing role in helping the college fulfill its mission.

For more than 100 years, the Cornell Engineering Alumni Association (CEAA), formerly the Cornell Society of Engineers, has served to keep College of Engineering alumni informed and connected with the college. The CEAA sponsors awards for students and faculty members, regional alumni events, and an annual Engineering Conference. Alumni visit campus each year to contribute in the classroom as guest speakers in the first-year Engineering Advising Seminars and the Master of Engineering Enterprise Seminar, as well as in other classes and forums. Through these activities and with its recent elimination of membership dues, the CEAA is working to engage more alumni than ever to have them become active participants in the life and growth of the college. For more information, visit www.ceaa.cornell.edu.

Notable Graduates

Armando J. Olivera '72 is the president and chief executive officer of Florida Power & Light Company, a leader in energy efficiency. He also serves on the Florida Governor's Action Team on Energy and Climate Change, is the immediate past chairman of the Florida Reliability Council, and is a member of the Cornell University Council.

Sophie Vandebroek PhD '90 is Xerox's chief technology officer and president of the Xerox Innovation Group. She is a fellow of the Institute of Electrical and Electronics Engineers (IEEE), a Fulbright fellow, and a fellow of the Belgian-American Educational Foundation. She holds 12 U.S. patents and has received awards from Xerox, IBM, HP, Monsanto, the Belgian National Science Foundation, Semiconductor Research Corporation, IEEE, and Cornell University. Vandebroek is a member of the Board of Analogic Corporation, a technical advisor to Cummins Corporation, and a trustee of WPI.

Padmasree Warrior MS '84 is Cisco System's chief technology officer. She came to Cisco from Motorola where she was executive vice president and chief technology officer. She held numerous high-level positions at Motorola in her 23-year career with the company

Greg Galvin MS '82, PhD '84, MBA '93 is president and CEO of Kionix, Inc., a company he co-founded in 1993 to commercialize a novel microelectromechanical systems (MEMS) technology pioneered by researchers at Cornell. Leading innovations in MEMS technology developed by Kionix include inertial sensors, microfluidic systems, microrelays, and micromirror arrays that are now used in the biomedical, automotive, security, wireless, gaming, and personal computing industries. Galvin has published more than 20 technical papers and holds 15 patents.

Sherri K. Stuewer '73, MS '75 is vice president environmental policy and planning for ExxonMobil Corporation. Over the span of her 34-year career at ExxonMobil, she has held a variety of technical and managerial positions and, prior to her current position, was the ExxonMobil vice president for safety, health, and environment. She is a member of the Board of Trustees at Cornell University.

Mei Wei Cheng '72 is chairman and CEO of Ford Motor China. He is also vice chairman of Jiangling Motor Company, vice chairman of Changan Ford Mazda Automobile Corporation Ltd., and a member of the Board of Directors for Ford Lio Ho Motor Company Limited.

David Fischell '75, MS '78, PhD '80, inventor and biomedical engineer, has co-founded five biomedical device companies: NeuroPace, IsoStent, Cathco, Angel Medical Systems, and a company that develops implantable heart-attached monitoring systems. He currently has more than 75 issued U.S. patents, and he has published numerous papers in the fields of telecommunications, interventional cardiology, radiobiology, and radiation dosimetry.

Nora Stanton 1905 was the granddaughter of Elizabeth Cady Stanton, one of the first advocates of women's rights. Nora Stanton was the first woman to earn a degree in Civil Engineering at Cornell University.

Irwin Jacobs '54, BEE '56 founded QUALCOMM, the company that pioneered Code Division Multiple Access (CDMA) technology. CDMA is now used in wireless networks and handsets all over the world. Jacobs was awarded the Presidential Medal of Technology.

Meredith C. Gourdine '52, BEP '53 was the inventor of electrogasdynamics. He won the silver medal for the long jump in the 1952 Olympics in Helsinki. Gourdine was a member of the National Academy of Engineers, the Black Inventors Hall of Fame, and the Science and Engineering Hall of Fame.

David Welch PhD '85 is founder and chief strategy officer of Infinera, a digital optical networking and photonic integrated circuits company. He has published more than 250 articles and is the author of more than 50 patents in the area of optics.

Contact Information

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www.engineering.cornell.edu

Dean
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Associate Dean for Diversity
607-255-0735

Associate Dean for Research and Graduate Studies
607-255-0880

Associate Dean for Undergraduate Programs
607-255-8240

Associate Dean for Administration
607-255-4914

Assistant Dean for Alumni Affairs and Development
607-255-8299

Assistant Dean for Strategic Planning, Assessment, and New Initiatives
607-255-2225

Assistant Dean for Student Services
607-255-8240

Admissions
607-255-5008

Advising
607-255-7414

Communications and Media Relations
607-255-6095

Computing Facilities
607-255-2236

Cooperative Education and Career Services
607-255-5006

Corporate and Foundation Relations
607-255-6135

Diversity Programs in Engineering
607-255-6403

Engineering Library
607-255-5933

Learning Initiatives
607-255-9622

Registrar
607-255-7140

Research and Graduate Studies
607-255-7413

Student Services and Undergraduate Programs
607-255-8240