Chapter 2

Engineering Departments, Graduate Fields, and M.Eng. Degrees
The distinction between departments, schools, graduate fields and Master of Engineering (M.Eng.) majors can get a little confusing at Cornell; a preliminary explanation is in order. M.S./Ph.D. students at Cornell are officially in the Graduate School, while Master of Engineering students are actually in the M.Eng. degree program that is run by the Office of Research, Graduate Studies, and Professional Education of the College of Engineering.

There are eleven schools/departments in the College of Engineering: Biological and Environmental Engineering (BEE), Applied and Engineering Physics, Chemical Engineering, Civil and Environmental Engineering, Computer Science, Electrical and Computer Engineering, Geological Sciences, Materials Science and Engineering, Mechanical and Aerospace Engineering, Operations Research and Industrial Engineering, and Theoretical and Applied Mechanics.

M.Eng. degree majors are, strictly speaking, different from the schools and departments. For M.Eng. students, there are 13 possible majors; Mechanical Engineering and Aerospace Engineering, for example, are distinct M.Eng. majors. There is also an M.Eng. degree in Nuclear Science and Engineering, although this is not a department/school in the College of Engineering. The M. Eng. Program also allows students to supplement their field curriculum with a “program option.” Students who chose a program option enroll in courses that satisfy elective requirements. The program options offered are Bioengineering, Financial Engineering, Manufacturing, Engineering Management, and Systems Engineering. Each M.Eng. degree has a program director that typically comes from the associated department/school.

There are a large number of graduate fields for M.S./Ph.D. students in the Graduate School at Cornell. There are actually 93 major fields and 12 minor-only fields. Of these about 15 may be said to be engineering-related. These graduate fields, like M.Eng. degrees, need not be the same as the schools/departments in the College of Engineering. For instance, one graduate field is Applied Mathematics, which is associated with the Center for Applied Mathematics (CAM). Nuclear Science & Engineering and Biomedical Engineering are also graduate fields that are not schools/departments in the College of Engineering. The graduate fields of Mechanical Engineering and Aerospace Engineering are distinct, though they are both affiliated with the School of Mechanical and Aerospace Engineering.

The sections in this chapter provide a brief description of each of the departments/schools/fields at Cornell University that are related to engineering. Graduate students from the specific department or field have supplied much of this information. If you find that this description is lacking in any way, please submit your suggestions and corrections to egsa@cornell.edu for inclusion in the next version of the handbook.

For general information about the College of Engineering, see <http://www.engineering.cornell.edu>.
For general information about the Graduate School go to <http://www.gradschool.cornell.edu>.

2.1 Applied and Engineering Physics (AEP)

Home Page: <http://www.aep.cornell.edu>

Director of the School of Applied & Engineering Physics: Joel D. Brock

Director of Graduate Studies: Alex L. Gaeta

Director of M. Eng. Program: Bruce Kusse

Graduate Field Assistant: Kelli Hulslander

Phone No.: (607)255-0638

Location: 212 Clark Hall (D4)
2.2. APPLIED MATHEMATICS

Degrees Offered: Master of Engineering (Engineering Physics), Doctor of Philosophy (Applied Physics)

Statistics:
- No. of active faculty: 16
- Currently 88 students in graduate program,

The School of Applied and Engineering Physics (A&EP) is one of the departments in the College of Engineering. The undergraduate and M.Eng. major is called Engineering Physics or “EP”; the graduate field is called Applied Physics.

The M.Eng. degree may lead directly to employment in engineering design and development or may be a basis for further graduate work. Students have the opportunity to broaden and deepen their preparation in the general field of applied physics, or they may choose the more specific option of preparing for professional engineering work in a particular area such as laser and optical technology, nanostructure science and technology, device physics, materials characterization, or software engineering. A wide latitude is allowed in the choice of the required design project.

The course of study leading to a Ph.D. in applied physics is flexible, individualized, and limited only by a student’s interests. The interdisciplinary nature of applied physics enables students to enroll in courses offered by departments throughout the university, including physics, chemistry, biological sciences, astronomy, electrical engineering, computer science, mathematics, and materials science. Students who wish to do so may also take courses in a variety of nonscientific topics such as music, business, and foreign languages.

2.2 Applied Mathematics (CAM)

Home Page: <http://www.cam.cornell.edu>

Director of the Center of Applied Mathematics: Terrence L. Fine

Director of Graduate Studies: Terrence L. Fine

Administrative Manager: Dolores Pendell

Phone No.: (607)255-4756

Locations:
- Center of Applied Mathematics: 657 Rhodes Hall (D6)
- Graduate Office: 614 Rhodes Hall (D6)

Degrees Offered: Doctor of Philosophy

Statistics:
- Affiliated faculty 82 members
- Ph.D. students 40
- Population Distribution: female 38%, international 23%

Applied Mathematics is one of the most diverse graduate fields, comprising faculty members from a wide range of disciplines such as biometry, chemical engineering, chemistry, civil engineering, computer science, economics, electrical engineering, management, mathematics, mechanical and aerospace engineering, operations research, physics, and theoretical and applied mechanics. Graduate students in CAM can work with any affiliated faculty member. Students graduating from CAM go on to academic post docs, assistant professorships, industry, and government labs.

CAM faculty members work in the following principal areas of research:
Analysis
Applied logic and theory of computing
Computational mathematics
Discrete and combinatorial mathematics
Information and control theory
Mathematical biology
Mathematical finance and economics
Mechanics and dynamics

The Center for Applied Mathematics has a network of Sun workstations consisting of about twenty high-end Sparcs including several Ultrasparcs. Other machines in the network include PCs. The center also has access to the Cornell Theory Center supercomputing facilities. CAM workstations offer a wide range of mathematical software, including Maple, MATLAB, and Mathematica. The facility is used by graduate students, faculty and other researchers for many aspects of their work.

All students in CAM are required to complete a graduate minor in mathematics and another in an application area of their choice. CAM offers an applied mathematics minor for graduate students in other fields; information on the minor is available at <http://www.cam.cornell.edu/phd/phdprogram.html>

2.3 Biological and Environmental Engineering (BEE)

Home Page: <http://www.bee.cornell.edu>

Director of Department of Biological and Environmental Engineering: Michael F. Walter

Director of Graduate Studies: Daniel J. Aneshansley

M.Eng. Coordinator: James A. Bartsch

Student Services Coordinator: Katrina Overton

Phone No.: (607)255-2173

Locations:
Department: 106 Riley Robb Hall (G5)
Graduate and M.Eng. Office: 207 Riley Robb Hall (G5)

Degrees Offered: Master of Engineering (Agricultural and Biological), Master of Professional Studies, Master of Science, Doctor of Philosophy

Statistics:
No. of active faculty: 21
Currently 71 graduate students
41% in M.S, 31% in doctoral study, 5% in professional degree programs, 23% in M.Eng. programs
Population Distribution: female 39%, international 37%

Agricultural and Biological Engineering (ABEN) is currently undergoing a name change. The new name, Biological and Environmental Engineering (BEE), more accurately reflects the department’s teaching and research. The program content, accreditation, and degree requirements will remain unchanged. During this transition period, both ABEN and BEE may be used in reference to the department and degree program.

The field of Biological and Environmental Engineering (BEE) is consistently rated the best of its kind in the country. Graduate students come from a variety of undergraduate programs, including other fields of engineering, physics, applied mathematics, biological sciences, and the physical sciences. Roughly one-half of the students have an undergraduate degree in a subject other than agricultural and biological
There are three main program areas: Biological Engineering, Environmental Engineering, and Food and Fiber Engineering. Within these, there are ten specialization areas:

- Biological Engineering
- Energy
- Environmental Engineering
- Environmental Management (MPS only)
- Food and Fiber Processing Engineering
- International Agriculture
- Local Roads Engineering
- Machine Systems
- Soil and Water Engineering
- Structures and Environment

Facilities of the department include a microcomputer center within Riley-Robb, a machine shop, and an up-to-date copy center. In addition to those in Riley-Robb Hall, laboratory facilities are located at the Animal Science Teaching and Research Center at Harford, New York, and the nearby Agricultural Waste Management Laboratory and Pilot Plant. Students also have shared access to greenhouses. The University has mainframe computers accessible to remote users.

### 2.4 Biomedical Engineering

**Home Page:** <http://www.cheme.cornell.edu/BioMedEng>

**Director of Bioengineering Program:** Michael L. Shuler

**Director of Graduate Studies:** William Olbricht

**Graduate Field Assistant:** Bonnie Sisco

**Phone No.:** (607)255-1003

**Location:** Graduate Office: 270 Olin Hall (C6)

**Degrees Offered:** Master of Science, Doctor of Philosophy

**Statistics:**

29 faculty members

A program leading to the M.S. and Ph.D. degrees in any traditional field of engineering may involve coursework and research in some area of bioengineering. In addition, Cornell has established a M.S./Ph.D. program in biomedical engineering. This new graduate field includes faculty from the Cornell University Medical College in New York City. There are four areas of emphasis: biomedical instrumentation and Diagnostics; biomaterials; drug delivery, design, production and metabolism; and biomedical mechanics.

Industrial R&D in this field is growing at a rapid pace, especially in small firms with flexible employees who have the ability to quickly transform new discoveries into completed products. In such environments, Ph.D.-level engineers work on teams whose duties range all the way from initial investigations to practical marketing. The new Cornell program will prepare its graduates for this expanding research environment at the interface between engineering and the life sciences. Throughout their program, students work closely with biological and clinical scientists, integrate knowledge from a broad range of fields to synthesize solutions, and use their technical problem-solving skills to translate ideas into needed products.
2.5 Chemical and Biomolecular Engineering (ChemE)

Home Page: <http://www.cheme.cornell.edu>

Director of the School of Chemical Engineering: Paulette Q. Clancy

Director of Graduate Studies: Lynden A. Archer

Director of M.Eng. Program: Claude Cohen

Graduate Studies Coordinator: Shelby Clark

Phone No.: (607)255-4550

Locations:
  Department: Olin Hall (C6)
  Graduate and M.Eng. Office: 358 Olin Hall (C6)

Degrees Offered: Master of Engineering, Master of Science, Doctor of Philosophy

Statistics:
  18 faculty members
  63 M.S./Ph.D. students
  19 M.Eng. students

The field of chemical engineering offers advanced degree programs to prepare its students for research and technical careers in industry, academia, and government. The program strikes a balance between the science of chemical engineering and its implementation through synthesis — a blend that provides a strong base in the discipline’s fundamentals while developing in its students the skills to apply these fundamentals to significant engineering problems.

  The research in the department is divided into six main areas:
    Advanced Materials Processing
    Biochemical/Biomedical Engineering
    Environmental/Biochemical
    Fluid Dynamics, Stability, and Rheology
    Polymer Science and Engineering
    Reaction Engineering: Surface Science, Kinetics, and Reactor Design

2.6 Civil and Environmental Engineering (CEE)

Home Page: <http://www.cee.cornell.edu>

Director of School of Civil and Environmental Engineering: John F. Abel

Director of Graduate Studies: Wilfried H. Brutsaert

Chair of M.Eng. Program: Fred H. Kulhawy

Graduate Field Coordinator: Patty Apgar
Phone No.:
School: (607)255-3438
Graduate/M.Eng. Office: (607)255-7560

Locations:
School: 220 Hollister Hall (C6)
Graduate and M.Eng. Office: 219 Hollister Hall (C6)

Degrees Offered: Master of Engineering, Master of Science, Doctor of Philosophy

Statistics:
- Faculty members 35
- M.S/Ph.D. students 82
- M.Eng. students 61
- Population Distribution: female 26%, international 57%

The School’s research facilities, housed in Hollister Hall (C6) and Thurston Hall (C6), include separate laboratories for research in environmental engineering, hydraulic engineering, environmental fluid mechanics and hydrology, geotechnical engineering, remote sensing, materials of construction, structural modeling, and static and dynamic loading of large structural components and systems. Distributed computational facilities are available to graduate students.

The School offers two distinct graduate degree programs. The first is a research-oriented program leading to the degrees of Master of Science and Doctor of Philosophy. It is intended primarily for students seeking research or academic careers, although a number of degree recipients do enter professional practice. The second program is a two-semester professional course of study leading to the degree of Master of Engineering. It is intended primarily for those who plan to enter professional engineering practice or management, but it can also be used as preparation for the Ph.D. program. Both the M.S. and Ph.D. degrees require a thesis, while the M.Eng. entails a 6-credit group project.

The School is organized into three primary Mission Areas, with subdisciplines within each area. Note that the subdisciplines coincide with the 9 graduate concentrations within the graduate field of CEE.

Civil Infrastructure
- Structural Engineering
- Geotechnical Engineering

Environment
- Environmental Engineering
- Environmental Systems Engineering
- Water Resource Systems Engineering
- Environmental Fluid Mechanics and Hydrology

Systems Engineering & Information Technology
- Transportation Systems Engineering
- Remote Sensing
- Engineering Management (M.Eng. only)

Each of the Mission Areas and several of the subdisciplines sponsor seminar series.

2.7 Computer Science (CS)

Home Page: <http://www.cs.cornell.edu>

Director of the Department of Computer Science: Charles Van Loan

Director of Graduate Studies: Eva Tardos
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Director of M.Eng. Program: Graeme Bailey

Assistant Director of Graduate Studies: Becky Stewart

M.Eng. Program Coordinator: Stephanie Meik

Phone No.: (607)255-8593 or (607)255-8720

Location: Graduate/M.Eng. Office: 4126 Upson Hall (C6)

Degrees Offered: Master of Engineering, Master of Science, Doctor of Philosophy

Statistics:
Faculty members 30
M.S./Ph.D. resident students 85
M.Eng students 50
PhD students: female 14.4%, international 64.4%

The department is consistently ranked in the top 5 Computer Science programs for both its graduate and undergraduate programs. Created in 1965, it is one of the oldest CS departments in the country and home to two Turing Award winners. Undergraduates at Cornell can major in Computer Science from both the College of Arts and Sciences and from the College of Engineering.

Some of the areas of research in the CS department include applied logic, artificial intelligence, computer vision, databases, digital libraries, natural language processing, networking distributed systems, programming languages, scientific and engineering computing, systems, and theory. The department has close ties to industry and many students spend a summer or two working at an industrial research lab. The Computer Science department is located on floors 3 through 5 of Upson Hall (C6) and has some space in Rhodes Hall (CD6). Facilities include over 500 computers, and there is a technical support staff of roughly eight full-time people.

The department of Computer Science also has close ties to the newly formed Office of Computing and Information Science. This new office was formed to draw together the role of computing in a range of disciplines across the entire university.

2.8 Earth and Atmospheric Sciences (EAS)

Home Page: <http://www.eas.cornell.edu>

Chairman of Department of Earth and Atmospheric Sciences: Bryan L. Isacks

Director of Graduate Studies: Larry Brown

Director of M.Eng. Program: Larry Cathles

Graduate Field Assistant: Christine Day

Phone No.: (607)255-3474

Location: 3122 Snee Hall (C6)

Degrees Offered: Master of Engineering, Master of Science, Doctor of Philosophy
EAS has two locations, Snee Hall (C6) and the 11th floor of Bradfield Hall (E5). The department administers two graduate fields, Geological Sciences and Atmospheric Sciences, both of which offer M.S. and Ph.D. degrees. The department also plays a major role in the graduate program in Biogeochemistry.

The department’s research facilities, housed in Snee Hall (C6) and Bard Hall (C6), include the Cornell Center for Materials Research, the X-ray Diffraction Facility, and the Electron & Optical Microscopy Laboratory.

The following research projects are currently being funded:
- High Pressure Mineral Physics Laboratory
- W. M. Keck Foundation Isotope Laboratory
- Cornell Andes Project (CAP)
- Earth Observing System (EOS)
- Geological and Geophysical Information for the Middle East, North Africa, and Eurasia
- Consortium for Continental Reflection Profiling (COCORP)
- URSEIS - Urals Deep Seismic
- Global Basins Research Network (GBRN)
- INDEPTH
- Complexity, chaos, and fractals in Earth systems

The department is unusual in that it is both a part of the College of Engineering and the College of Arts and Sciences. Faculty members of the department are drawn from many different majors at Cornell, including Civil and Environmental Engineering, Theoretical and Applied Mechanics, Astronomy, and Materials Science. This enables EAS majors to easily study many different subjects and broaden their education far beyond the standard graduate program. Their research interests cover over 10 aspects, such as economic geology, engineering geology, environmental geophysics, geobiology, geochemistry and isotope geology, geohydrology, geomorphology, geotectonics, mineralogy, paleontology, petroleum geology, petrology, planetary geology, Precambrian geology, Quaternary geology, rock mechanics, sedimentology, seismology, stratigraphy, structural geology.

2.9 Electrical and Computer Engineering (ECE)

Home Page: http://www.ece.cornell.edu>

Chair of School of Electrical and Computer Engineering: Clifford R. Pollock

Director of Graduate Studies: Mike Spencer

Director of M.Eng. Program: John Belina

Graduate Field Coordinator (M.S./Ph.D.): Scott Coldren

Graduate Field Coordinator (M.Eng.): Linda Struzinsky
Locations:
Department Office: 224 Phillips Hall (C6)
Graduate Office: 229 Phillips Hall (C6)
M.Eng. Office: 222 Phillips Hall (C6)

Degrees Offered: Master of Engineering (Electrical and Computer Engineering), Master of Science (Electrical Engineering), Doctor of Philosophy (Electrical Engineering).

Statistics:
- Faculty members: 40
- M.S. students: 2
- Ph.D. students: 175
- M.Eng. students: 106
- Population distribution: female 17%, international 61%

The scope of Electrical Engineering is wide, and the traditional image of circuits and soldering irons is little related to most of the activity here. The biggest groups of graduate students and faculty are working on semiconductors and on signals and systems, but computer engineering is rapidly expanding, and there is active research in optics, plasmas and space physics, microwaves and antennas, and power systems and control. Signals and systems is primarily concerned with telecommunications issues such as signal processing, wireless communications, and information theory. Semiconductor research here is shaped by the Nanofabrication Facility, so while there is work on VLSI design, the primary focus is on novel fabrication processes, thin films, and micromachines. In the next few years, the proposed Duffield Hall will dramatically expand Cornell’s nanofabrication capabilities, and a corresponding increase of interest in semiconductors is expected.

The classrooms, offices, undergraduate laboratories, and many of the graduate research laboratories are housed in Phillips Hall and in Rhodes Hall. Among the graduate research laboratories are those devoted to communications, computer engineering, control systems, digital signal processing, high-energy particle beams, integrated circuits, ionospheric physics and radio-wave propagation, lasers and optoelectronics, microwave and semiconductor devices, and semiconductor material preparation and characterization. Faculty members and graduate students use the facilities of the following centers, laboratories, and programs: the Center for Applied Mathematics, the Electronic Packaging Program, the Laboratory of Plasma Studies, the Materials Science Center, and the Cornell Theory Center. In addition, the facilities of the Cornell Nanofabrication Facility, the National Astronomy and Ionosphere Center (Arecibo, Puerto Rico), and the Jicamarca Radio Observatory (Peru) are available. All research areas are served by a variety of computing resources. These include networked multi-MIP workstations, PCs, and the Cornell Supercomputing Facility.

2.10 Materials Science and Engineering (MSE)

Home Page: <http://www.mse.cornell.edu>

Director of the Department of Materials Science and Engineering: Christopher Ober

Director of Graduate Studies: Ulrich Wiesner

Graduate Field Assistant: Joseph C. Sweet

Phone No.: (607)255-9159

Location: 214 Bard Hall (C6)
Degrees Offered: Master of Engineering, Master of Science, Doctor of Philosophy

Statistics:
- Faculty members: 15
- Students admitted to M.S./Ph.D. program each year: 13
- Ph.D. students: 57
- M.Eng. students: 4
- Population distribution: female 38%, international 53%

The department of Materials Science and Engineering offers both undergraduate and graduate degrees. The M.S./Ph.D. program is research-oriented and requires a thesis. There are no specific credit requirements, although 9 to 12 courses are usual. M.Eng. students work with a faculty advisor on a design project (12 credits) and take courses for at least 18 credits. Enrollment in the M.Eng. program has typically been small.

The faculty members in the department do research in areas of metals, ceramics, polymers, surface and interface science, electronic materials, solid state-chemistry and mesoscopic and nanostructure materials. Advances in the understanding and development of materials have been crucial in many developments of modern technology, such as computers and other electronic products.

The department of Materials Science and Engineering is located in Bard, Thurston, and Kimball Halls (all C6), on the engineering quadrangle. Facilities in individual laboratories include equipment for electron spectroscopy, deep-level transient spectroscopy, differential scanning microscopy, infrared and Raman spectroscopy, low-energy electron diffraction, mass spectroscopy, mechanical testing at high temperatures and pressures, optical and interference microscopy, reactive ion-beam etching, scanning tunneling, and atomic force microscopy. The department operates a joint facility for materials preparation and mechanical testing.

Much of the research is conducted in connection with the interdisciplinary Materials Science Center, one of the largest such university centers supported by NSF, which encompasses research from nine schools and departments. The Center’s extensive facilities, three of which are located the Bard and Thurston, include laboratories for electron microscopy, Rutherford backscattering spectroscopy, crystal growth, x-ray diffraction, and computing.

Various other interdisciplinary centers and programs at the university provide valuable facilities and opportunities for interaction with researchers in other fields. They include the Cornell Nanofabrication Facility, the SRC Program in Microscience and Technology, the Cornell High Energy Synchrotron Source, and the Advanced Electronic Packaging Facility.

2.11 Mechanical and Aerospace Engineering (MAE)

Home Page: <http://www.mae.cornell.edu>

Director of the Sibley School of Mechanical and Aerospace Engineering: Sidney Leibovich

Directors of Graduate Studies: Elizabeth Fisher (Aerospace), Nicholas Zabaras (Mechanical)

Director of M.Eng. Program: Michel Y. Louge

Graduate Field Assistant: Karen Biesecker

Phone No.: (607)255-5250

Location: Graduate/M.Eng. Office: 107 Upson Hall (C6)
Degrees Offered: Master of Engineering (Aerospace), Master of Engineering (Mechanical), Master of Science (Aerospace), Master of Science (Mechanical), Doctor of Philosophy (Aerospace), Doctor of Philosophy (Mechanical)

Statistics:
- Faculty members: 35
- M.Eng. students: 23
- M.S./Ph.D. students: 13 (Aerospace), 49 (Mechanical)
- About 18% women students
- About 37% international students

The Sibley School of Mechanical and Aerospace Engineering offers M.S. and Ph.D. programs, which provide advanced levels of training suitable for students pursuing careers in research and development, education, or advanced engineering analysis and design. The department focuses on research at a fundamental level rather than applications.

The major areas of research in Mechanical Engineering are:
- Biomechanical engineering
- Combustion
- Energy and power systems
- Fluid mechanics
- Heat transfer
- Materials and manufacturing engineering
- Mechanical systems and design
- Multiphase flows

The major areas of research in Aerospace Engineering are:
- Aerodynamics and Aeroacoustics
- Computational Fluid Dynamics
- Dynamics and Control
- Fluid Dynamics
- Microgravity Granular Flows
- Reacting Flows
- Turbulence
- Combustion

2.12 Field of Nuclear Science and Engineering

Home Page: <http://www.osp.cornell.edu/VPR/ward/wcns.html>

Director of Ward Center for Nuclear Sciences: Kenan Ünlü

Director of Graduate Studies: K. Bingham Cady

Graduate Field Assistant: Linda M. Clasby

Phone No.: Graduate Office: (607)255-3480

Location: Graduate Office: 102 Ward Center (C6)

Degrees Offered: Master of Engineering (Nuclear Engineering), Master of Science (Nuclear Science and Engineering), Doctor of Philosophy (Nuclear Science and Engineering)
Statistics:
  6 faculty members

Nuclear science and engineering is concerned with the understanding, development, and application of nuclear reactions and radiations. It includes reactor physics, nuclear power, plasma physics, thermonuclear fusion, electron- and ion-beam physics, neutron activation analysis, prompt and delayed gamma ray spectrometry, atomic physics, and radiation effects in materials. The programs at Cornell allow specialization in science, in engineering, or in a combination of the two.

The M.S. and Ph.D. programs permit a variety of analytical applications, atomic processes, nuclear engineering, controlled fusion and plasma physics, and radiation effects. The two-term curriculum leading to the degree of Master of Engineering provides a professional degree for persons entering the nuclear industry, but it may also serve as preparation for doctoral study in nuclear science and engineering.

Nuclear analytical methods such as neutron activation analysis, prompt gamma activation analysis, neutron depth profiling, and neutron radiography are being used to determine composition, depth, and condition of materials relevant to science and technology. The nuclear analytical methods are available to M.S., M.Eng., and Ph.D. degree candidates majoring and minoring in nuclear science and engineering. Improvement of some of these nuclear analytical methods and applications of these methods to science and technology are in progress.

Students with majors in non-nuclear fields (e.g., materials science and engineering, archeology, geology, civil and environmental engineering, etc.) who expect to use nuclear analytical methods may minor in nuclear science and engineering.

Students can use the facilities of two laboratories. Experimental facilities of the Ward Center for Nuclear Sciences (C6) include the TRIGA reactor, the Gamma Cell, a conventional solenoid electron-beam ion source (EBIS) and a cryogenic, superconducting solenoid EBIS. Facilities at the Laboratory of Plasma Studies and the High Voltage Laboratory include a variety of magnetic confinement systems and intense particle beam generators.

2.13 Operations Research and Industrial Engineering (ORIE)

Home Page: <http://www.orie.cornell.edu>

Director of the School of Operations Research and Industrial Engineering: Sidney Resnick

Director of Graduate Studies: David Shmoys

Director of M.Eng. Program: Mark J. Eisner

Graduate Field Assistant: Kathy King

Phone No.: (607)255-9128

Locations:
  Department Office: 204 Rhodes Hall (C6)
  Graduate/M.Eng. Office: 201 Rhodes Hall (C6)

Degrees Offered: Master of Engineering, Doctor of Philosophy
Statistics:
Faculty members 20
Ph.D. students 40
M.Eng. students 89

The faculty members in the school of Operations Research and Industrial Engineering are evenly divided among three subdisciplines: mathematical programming, applied probability and statistics, and manufacturing systems engineering. Several are also consultants to industrial organizations, and research is often conducted directly with a cooperating company, (e.g. in automotive or semiconductor manufacturing).

The Master of Engineering program is a one-year professional degree that stresses applications of operations research and industrial engineering and requires completion of a project. Students can select special options in manufacturing or financial engineering. Most graduates work for companies that specialize in manufacturing or logistics, consulting, financial services, information technologies, or transportation.

Ph.D. students are encouraged to select at least one minor subject outside of operations research; typical choices are computer science, econometrics, environmental systems engineering, managerial economics, mathematics, and hotel or business administration. Graduating students have gone to both academic and industrial positions.

2.14 Theoretical and Applied Mechanics (TAM)

Home Pages: <http://www.tam.cornell.edu>

Chair of Department of Theoretical and Applied Mechanics: Timothy J. Healey

Director of Graduate Studies: Wolfgang H. Sachse

Director of M.Eng. Program: James T. Jenkins

Graduate Field Assistant: Sreemati Mukherjee

Phone No.: (607)255-5062

Location: 212 Kimball Hall (C6)

Degrees Offered: Master of Engineering, Master of Science, Doctor of Philosophy

Statistics:
About 30 doctoral students
About 6% are women and 70% international students
22 faculty members in the field

The research in this department can be divided in three broad fields: solid mechanics and mechanics of materials, dynamics and space mechanics, and fluid mechanics. This department places great emphasis on interdisciplinary research. The faculty and graduate students often interact closely with researchers from various other fields like Materials Science, Mechanical Engineering, Computer Science (for computational issues in mechanics), Structural Engineering, and Physics. There are some crosscutting research areas in TAM, such as biomechanics, mathematical biology, computational mechanics, microelectromechanical system (MEMS), applied mathematics and manufacturing.

The department has laboratories well equipped for work in stress analysis, vibration, nonlinear dynamics and chaos, ultrasonics, dynamic and fatigue fracture, composite materials, metal cutting, and inelastic deformation of materials. State-of-the-art facilities for materials processing and characterization are available through the Cornell Center for Materials Research. These include electron microscopy, atomic force
microscopy, X-ray diffraction, sample preparation and mechanical testing. In addition, the facilities of the Cornell Nanofabrication Facility are available for design, fabrication and testing of MEMS.

The department maintains a comprehensive, networked computer facility comprised of PCs, Macintosh, SUN and DEC Alpha workstations. Software for numerical computation includes Macsyma, Mathematica, MATLAB, ABAQUS, and IMSL, as well as most programming languages. The computer facility is networked to all other university computing facilities including the Cornell Theory Center.

Though the department does not offer its own baccalaureate program, it is responsible for teaching engineering math (freshman & sophomore level) to all engineering students. The department also offers courses in mechanics & dynamics for the sophomore students. The graduate students in the department are TAs for these classes. Thus, TAing in TAM is a different experience, as one has to teach students from other areas. Also, all engineering students have to take math classes and thus pass through TAM TAs. Hence, TAM graduate students affect each class of Cornell Engineering undergraduates.

The students graduating from the department have found jobs in a variety of engineering industries from aerospace to electronic packaging. A number of students have also successfully chosen academic careers and secured tenure track positions at prestigious universities across the nation.