

BIOLOGICAL AND ENVIRONMENTAL ENGINEERING (GRADUATE FIELD)

Program Website (<https://cals.cornell.edu/biological-environmental-engineering/>)

Field Description

Both M.S. and Ph.D. degree candidates are required to select at least one minor subject from outside the field. The M.S. and Ph.D. research degrees require submission of an acceptable thesis or dissertation.

The professional degree of Master of Engineering (Biological and Environmental) is intended primarily for students who plan to enter engineering practice. This program is intended to develop students' backgrounds in engineering design as well as to improve their fundamental engineering knowledge.

The professional degree of Master of Professional Studies (Agriculture) is ideal for career-focused students interested in the thorough study of issues and advancements in the fields of life, social and environmental sciences and agriculture. In addition, the M.P.S. (Agriculture & Life Sciences) program has a Peace Corp option in which the student undertakes two semesters of academic work at Cornell and a Peace Corp assignment. For information and instructions on how to apply, check the M.P.S. (Agriculture and Life Sciences)/Peace Corps Web site (<https://ip.cals.cornell.edu/graduate/mps-%e2%80%93peace-corp-option/degree-requirements/>), or contact International Programs, B075 Mann Library, Ithaca, NY 14853; phone 607-255-3035; email peacecorps@cornell.edu.

Data and Statistics

- Research Master's Program Statistics (<https://gradschool.cornell.edu/about/program-metrics-assessments-and-outcomes/research-masters-program-statistics/?SelectGradField=21>)
- Doctoral Program Statistics (<https://gradschool.cornell.edu/about/program-metrics-assessments-and-outcomes/doctoral-program-statistics/?SelectGradField=21>)

Field Manual

- Manual (<https://cals.cornell.edu/biological-environmental-engineering/graduate/resources-graduate-students/bee-graduate-student-handbook/>)

Subject and Degrees

Agriculture and Life Sciences (Biological and Environmental Engineering)

- Agriculture and Life Sciences (Biological and Environmental Engineering) (M.P.S.) (Ithaca) (<https://catalog.cornell.edu/programs/agriculture-life-sciences-biological-environmental-engineering-mps/>)

Biological and Environmental Engineering

- Biological and Environmental Engineering (M.Eng.) (Ithaca) (<https://catalog.cornell.edu/programs/biological-environmental-engineering-meng/>)
- Biological and Environmental Engineering (M.S.) (Ithaca) (<https://catalog.cornell.edu/programs/biological-environmental-engineering-ms/>)
- Biological and Environmental Engineering (Ph.D.) (Ithaca) (<https://catalog.cornell.edu/programs/biological-environmental-engineering-phd/>)

Concentrations by Subject

Agriculture and Life Sciences (Biological and Environmental Engineering)

- bioenergy and integrated energy systems
- bioenvironmental engineering
- biological engineering
- bioprocess engineering
- ecohydrology
- environmental engineering
- environmental management
- food engineering
- industrial biotechnology
- nanobiotechnology
- sustainable systems
- synthetic biology

Biological and Environmental Engineering

- bioenergy and integrated energy systems
- bioenvironmental engineering
- biological engineering
- bioprocess engineering
- ecohydrology
- environmental engineering
- food engineering
- industrial biotechnology
- nanobiotechnology
- sustainable systems
- synthetic biology

Faculty

Beth A. Ahner (<http://cals.cornell.edu/beth-ahner/>)

- **Campus:** Ithaca
- **Concentrations:** *Biological and Environmental Engineering:* bioenvironmental engineering; environmental engineering
- **Research Interests:** biological indicators of environmental stresses; toxicity and nutrition of trace metals

C. Lindsay Anderson (<http://cals.cornell.edu/c-lindsay-anderson/>)

- **Campus:** Ithaca
- **Concentrations:** *Biological and Environmental Engineering:* bioenergy and integrated energy systems; environmental engineering

- **Research Interests:** renewable energy; energy markets; systems modeling; simulation

Buz Michael Barstow (<http://cals.cornell.edu/buz-m-barstow/>)

- **Campus:** Ithaca
- **Concentrations:** *Biological and Environmental Engineering*: biological engineering; synthetic biology
- **Research Interests:** sustainable energy with biology; redox transformation with biology; biological engineering, synthetic biology, systems biology, genomics, democratizing scientific tools; frugal science

Natalie L. Cápiro (<http://cals.cornell.edu/natalie-capiro/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: bioenvironmental engineering; environmental engineering; nanobiotechnology; *Biological and Environmental Engineering*: bioenvironmental engineering; environmental engineering; nanobiotechnology
- **Research Interests:** applied environmental microbiology, bioremediation, fate and transport of legacy and emerging contaminants in natural systems, development of groundwater remediation strategies, and nanoparticle-microbial interactions in the environment

Michael Timothy Charles (<http://cals.cornell.edu/michael-charles/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: bioenergy and integrated energy systems; environmental engineering; sustainable systems; *Biological and Environmental Engineering*: bioenergy and integrated energy systems; environmental engineering; sustainable systems
- **Research Interests:** sustainable analysis and engineering, food-energy-water systems, computational modeling and design, ecosystem services, community engagement (particularly with Indigenous peoples)

Chang Chen (<http://cals.cornell.edu/chang-chen-0/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: biological engineering; bioprocess engineering; food engineering; sustainable systems; *Biological and Environmental Engineering*: biological engineering; bioprocess engineering; food engineering; sustainable systems
- **Research Interests:** Postharvest Technologies, Food Process Engineering, Mathematical Modeling of Food Processes, Advanced Food Sensing Techniques

Ashim K Datta (<http://cals.cornell.edu/ashim-k-datta/>)

- **Campus:** Ithaca
- **Concentrations:** *Biological and Environmental Engineering*: biological engineering; food engineering
- **Research Interests:** heat and mass transfer in food and biological systems; microwave applications

Stefano Galelli (<http://galelli.cee.cornell.edu/people/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: bioenergy and integrated energy systems; ecohydrology; environmental engineering; sustainable systems; *Biological and Environmental Engineering*: bioenergy and integrated energy systems; ecohydrology; environmental engineering; sustainable systems
- **Research Interests:** water resources management, large-scale hydrology, renewable energy, water-energy nexus, systems modeling

Jacqueline Gerson (<http://cals.cornell.edu/jacqueline-gerson/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: environmental engineering
- **Research Interests:** biogeochemistry, contaminant fate and transport, water quality

Andrea Giometto (<http://www.cee.cornell.edu/faculty-directory/andrea-giometto/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: synthetic biology; *Biological and Environmental Engineering*: synthetic biology
- **Research Interests:** synthetic biology, systems biology, biological physics, experimental evolution, quantitative microbiology

Jillian L Goldfarb (<http://cals.cornell.edu/jillian-goldfarb/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: bioenergy and integrated energy systems; environmental engineering; sustainable systems; *Biological and Environmental Engineering*: bioenergy and integrated energy systems; environmental engineering; sustainable systems
- **Research Interests:** renewable energy, biomass conversions, pyrolysis, tumefaction, hydrothermal carbonization, integrated biorefinery, sustainable carbonaceous materials, materials for contaminate remediation, energy policy, public understanding of science

April Gu (<http://sites.coecis.cornell.edu/gugroup/about-professor-gu/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: bioenvironmental engineering; biological engineering; environmental engineering; *Biological and Environmental Engineering*: bioenvironmental engineering; biological engineering; environmental engineering
- **Research Interests:** Biological water and wastewater treatment, Biological nutrient (phosphorus) removal and recovery, Microbial processes in phosphorus cycling, Roles of polyphosphate in phosphorus cycling, Microbial ecology in natural and engineered systems for remediation, Environmental molecular toxicology and toxicogenomics

Mahdi Hasani (<http://www.engineering.cornell.edu/faculty-directory/mahdi-hasani/>)

- **Campus:** Ithaca - (Minor Member)
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: bioenvironmental engineering; biological engineering; nanobiotechnology; *Biological and Environmental Engineering*: bioenvironmental engineering; biological engineering; nanobiotechnology
- **Research Interests:** Biomaterials, Drug Delivery, Micro- Nano- scale Technologies; Immunoengineering, T Cells, Vaccine Development, Mechanoimmunology

Peter G. Hess (<http://cals.cornell.edu/peter-george-mueller-hess/>)

- **Campus:** Ithaca
- **Concentrations:** *Biological and Environmental Engineering*: environmental engineering; sustainable systems
- **Research Interests:** atmospheric chemistry and the effect of climate change on atmospheric chemistry; climate change; land use and atmospheric chemistry; interactions between atmospheric chemistry and biogeochemistry

Jean B Hunter (<http://cals.cornell.edu/jean-hunter/>)

- **Campus:** Ithaca - (Graduate School Professor)
- **Concentrations:** *Biological and Environmental Engineering*: biological engineering; bioprocess engineering; food engineering
- **Research Interests:** bioprocess engineering; fermentation and enzyme technology; bioseparations; food engineering

Yu Jiang (<http://cals.cornell.edu/yu-jiang/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: bioenvironmental engineering; biological engineering; sustainable systems; *Biological and Environmental Engineering*: bioenvironmental engineering; biological engineering; sustainable systems
- **Research Interests:** plant phenotyping, agriculture robotics, cyber-physical systems, machine/deep learning in agriculture, computer vision

Shaoyi Jiang (<http://www.bme.cornell.edu/faculty-directory/shaoyi-jiang/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: bioenvironmental engineering; biological engineering; nanobiotechnology; *Biological and Environmental Engineering*: bioenvironmental engineering; biological engineering; nanobiotechnology
- **Research Interests:** Drug delivery and biomaterials for biomedical and engineering applications such as protein and cell preservation, immunomodulating materials, and environmentally benign marine coatings

Sunghwan Jung (<http://cals.cornell.edu/sunghwan-sunny-jung/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: biological engineering; sustainable systems; *Biological and Environmental Engineering*: biological engineering; sustainable systems

- **Research Interests:** bio-fluid mechanics, interfacial dynamics, sustainable engineering design

Manoj Karkee (<http://cals.cornell.edu/manoj-karkee/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: biological engineering; *Biological and Environmental Engineering*: biological engineering
- **Research Interests:** AI and Machine Vision for Agriculture, Agricultural Robotics, Smart Farming, Digital Agriculture, Sustainable Agriculture, Biological Engineering

Dan Luo (<http://cals.cornell.edu/dan-luo/>)

- **Campus:** Ithaca
- **Concentrations:** *Biological and Environmental Engineering*: biological engineering; nanobiotechnology
- **Research Interests:** molecular bioengineering for macro-molecule-based drug delivery; nucleic acid engineering; intracellular delivery; nanobiotechnology

Minglin Ma (<http://cals.cornell.edu/minglin-ma/>)

- **Campus:** Ithaca
- **Concentrations:** *Biological and Environmental Engineering*: biological engineering; nanobiotechnology
- **Research Interests:** biomaterials, cell packaging, micro tissues, cell therapy, immune responses to medical implants

John C. March (<http://cals.cornell.edu/john-march/>)

- **Campus:** Ithaca
- **Concentrations:** *Biological and Environmental Engineering*: biological engineering; bioprocess engineering; synthetic biology
- **Research Interests:** metabolic engineering

Sam Rasmussen Nugen (<http://cals.cornell.edu/sam-r-nugen/>)

- **Campus:** Ithaca
- **Concentrations:** *Biological and Environmental Engineering*: biological engineering; bioprocess engineering; food engineering; nanobiotechnology; synthetic biology
- **Research Interests:** biosensors for pathogen detection; food and water safety; genetic engineering of bacteriophages; field deployable assays; sample preparation

Jason Paul Oliver (<http://cals.cornell.edu/jason-oliver/>)

- **Campus:** Ithaca - (Minor Member)
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: environmental engineering; environmental management; sustainable systems; *Biological and Environmental Engineering*: environmental engineering; sustainable systems
- **Research Interests:** Biosystems engineering, agricultural waste management, bioenergy, air quality, climate change

David P. Orr (<http://cals.cornell.edu/david-orr/>)

- **Campus:** Ithaca - (Minor Member)
- **Concentrations:** *Biological and Environmental Engineering*: sustainable systems

- **Research Interests:** highway engineering and construction, including design, inspection, project management, purchasing, budgeting and supervision

Brian Gramlich Rahm (<http://cals.cornell.edu/brian-rahm/>)

- **Campus:** Ithaca - (Minor Member)
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering):* environmental engineering; sustainable systems; *Biological and Environmental Engineering:* environmental engineering; sustainable systems
- **Research Interests:** Water resource infrastructure, watershed management, water quality monitoring and assessment, climate change and resilience, water literacy

Brian Karl Richards (<http://cals.cornell.edu/brian-richards/>)

- **Campus:** Ithaca - (Minor Member)
- **Concentrations:** *Biological and Environmental Engineering:* environmental engineering
- **Research Interests:** soil and water contaminants

Ruth E Richardson (<http://www.cee.cornell.edu/rer26/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering):* bioenergy and integrated energy systems; bioenvironmental engineering; bioprocess engineering; environmental engineering; sustainable systems; *Biological and Environmental Engineering:* bioenergy and integrated energy systems; bioenvironmental engineering; bioprocess engineering; environmental engineering; sustainable systems
- **Research Interests:** Dr Richardson's research interests include sustainable waste treatment and resource recovery, biological water quality monitoring using eDNA tools, freshwater Harmful Algal Blooms, and improved access to safe drinking water for the Global South.

Chris Roh (<http://cals.cornell.edu/chris-roh/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering):* biological engineering; sustainable systems; *Biological and Environmental Engineering:* biological engineering; sustainable systems
- **Research Interests:** Biofluid Mechanics, entomology, comparative biomechanics, bio-inspired engineering, biological cybernetics, in vivo engineering biological cybernetics, in vivo engineering

Rosa Santomartino (<http://cals.cornell.edu/rosa-santomartino/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering):* bioenvironmental engineering; biological engineering; bioprocess engineering; industrial biotechnology; synthetic biology; *Biological and Environmental Engineering:* bioenvironmental engineering; biological engineering; bioprocess engineering; industrial biotechnology; synthetic biology
- **Research Interests:** My research is focused on biotechnologies for space and terrestrial sustainability.

Vivek Srikrishnan (<http://cals.cornell.edu/vivek-srikrishnan/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering):* environmental engineering; sustainable systems; *Biological and Environmental Engineering:* environmental engineering; sustainable systems
- **Research Interests:** climate change, climate risk management, systems modeling and engineering, decision-making under uncertainty

Tammo S Steenhuis (<http://cals.cornell.edu/tammo-steenhuis/>)

- **Campus:** Ithaca
- **Concentrations:** *Biological and Environmental Engineering:* ecohydrology; environmental engineering; sustainable systems
- **Research Interests:** soil and water engineering; water management; watershed hydrology; groundwater quality engineering

Scott Steinschneider (<http://cals.cornell.edu/scott-steinschneider/>)

- **Campus:** Ithaca
- **Concentrations:** *Biological and Environmental Engineering:* ecohydrology; sustainable systems
- **Research Interests:** Water resources risk management, sustainable design and management of integrated water resource systems

Abraham Duncan Stroock (<http://www.cheme.cornell.edu/faculty-directory/abraham-d-stroock/>)

- **Campus:** Ithaca
- **Concentrations:** *Biological and Environmental Engineering:* biological engineering; ecohydrology; environmental engineering; nanobiotechnology
- **Research Interests:** Microfluidics, Environmental and biological transport phenomena, Tissue engineering, Plant water relations and soil physics

Michael Ben Timmons (<http://cals.cornell.edu/michael-ben-timmons/>)

- **Campus:** Ithaca - (Graduate School Professor)
- **Concentrations:** *Biological and Environmental Engineering:* environmental engineering
- **Research Interests:** aquacultural engineering; engineering entrepreneurship and management

Taika von Konigslow (<http://www.vet.cornell.edu/research/faculty/taika-von-konigslow-bsch-msc-dvm-dvsc/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering):* biological engineering; nanobiotechnology; sustainable systems; *Biological and Environmental Engineering:* biological engineering; nanobiotechnology; sustainable systems
- **Research Interests:** • precision livestock technologies; • simulation; • machine learning; • computer vision; • nanotechnology; • biomarker predictors of disease; • antimicrobial stewardship strategies; • neonatal calf health

Todd Walter (<http://cals.cornell.edu/m-todd-walter/>)

- **Campus:** Ithaca
- **Concentrations:** Biological and Environmental Engineering: bioenvironmental engineering; ecohydrology; sustainable systems
- **Research Interests:** environmental fluid mechanics; contaminant transport; cold-regions hydrology; watershed modeling; environmental biophysics; watershed biogeochemistry; environmental engineering; eco-hydrology

Ke Wang (<http://cals.cornell.edu/ke-wang/>)

- **Campus:** Ithaca - (Minor Member)
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: bioenvironmental engineering; biological engineering; bioprocess engineering; industrial biotechnology; sustainable systems; *Biological and Environmental Engineering*: bioenvironmental engineering; biological engineering; bioprocess engineering; industrial biotechnology; sustainable systems
- **Research Interests:** bioprocess engineering, waste valorization, sustainable biomaterial and food, kinetic modeling, techno-economic analysis

Bo Wang (<http://cals.cornell.edu/bo-wang-0/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: biological engineering; nanobiotechnology; synthetic biology; *Biological and Environmental Engineering*: biological engineering; nanobiotechnology; synthetic biology
- **Research Interests:** biotechnology, protein engineering, synthetic biology, biomaterials, chemical biology

Mingming Wu (<http://cals.cornell.edu/mingming-wu/>)

- **Campus:** Ithaca
- **Concentrations:** Biological and Environmental Engineering: biological engineering; nanobiotechnology
- **Research Interests:** micro- nano- scale technologies; cellular engineering; cancer biology; environmental biotechnology

Shuwen Yue (<http://www.cheme.cornell.edu/faculty-directory/shuwen-yue/>)

- **Campus:** Ithaca
- **Concentrations:** *Agriculture and Life Sciences (Biological and Environmental Engineering)*: bioenergy and integrated energy systems; environmental engineering; sustainable systems; *Biological and Environmental Engineering*: bioenergy and integrated energy systems; environmental engineering; sustainable systems
- **Research Interests:** Electrolyte solutions, machine learning, molecular simulation, catalysis, interfacial phenomena, energy systems