Environmental Engineering

CEEATGT
2019-2020
GRADUATE
STUDIES

MASTER'S DEGREE REQS*	NON-THESIS OPTION	THESIS OPTION
SPECIALIZATION REQUIREMENT**	18 CREDITS	12 CREDITS
APPROVED ELECTIVES	12 CREDITS	12 CREDITS
THESIS	0 CREDITS	6 CREDITS
TOTAL REQUIRED CREDITS	**30 CREDITS**	**30 CREDITS**

***Degree requirements** for the MSCE and MSENVE degrees. Requirements for the MSBIOE, MSCSE, and MSESM degrees differ – please contact gradinfo@ce.gatech.edu for more information. ****Specializations include:** Construction and Infrastructure Systems Engineering; Environmental Engineering; Geosystems Engineering; Structural Engineering, Mechanics and Materials; Transportation Systems Engineering; Water Resources Engineering.

PH.D. DEGREE REQS

The Ph.D. program includes research and approximately 50 credits beyond the Bachelor's degree. Doctoral students, in concert with their advisor and thesis committee, construct an individualized program of study tailored to the student's research interests. Major elements of the program include:

- Comprehensive exam
- Minor
- Research Proposal
- Thesis
- Oral defense

THE Environmental Engineering program provides comprehensive educational and research opportunities in air, land and water science and engineering. The principal focus areas include environmental biotechnology; water quality and treatment; wastewater reclamation and reuse; environmental hazards and risk assessment; ground water modeling and treatment; air quality monitoring; pollution control and modeling; environmental sciences; and industrial ecology and sustainability. Environmental engineering is also a key component in Institute-wide initiatives in bioengineering, bioscience and biotechnology, nanotechnology, materials science and technology, sustainable technology and development, environmental science and technology, and energy-water-food systems. The multi-disciplinary credentials of our faculty, our state-of-the-art research facilities, and extensive collaborations with other engineering and science faculty all combine to attract high-caliber students from a variety of disciplines.

RESEARCH AREAS

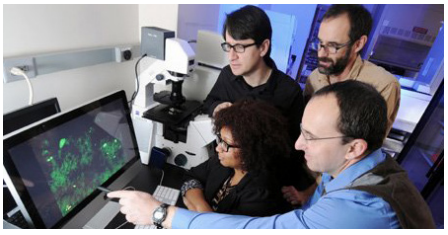
- Air pollution: emissions, formation, transport, and deposition of aerosols
- Chemical and environmental multiphase transport processes
- Environmental and analytical chemistry
- Environmental biotechnology for bioremediation of contaminated soil, sediments and waters
- Hazardous substances in sediments, soils, waters and residues
- Nanotechnology in the environment
- Physical, chemical and biological processes influencing subsurface fate and transport of contaminants
- Physicochemical processes for water and wastewater treatment
- Sustainable technology and development

FACILITIES

The faculty, staff, students and research activities of Environmental Engineering are housed in the Ford Environmental Science and Technology (ES&T), Daniel Laboratory (DEEL) and Sustainable Education (SEB) buildings.

ES&T and DEEL have an excellent range of laboratories with exceptional capabilities and instrumentation for educational and research programs. The Multimedia Environmental Simulations Laboratory in SEB provides advanced capabilities in environmental modeling and exposure assessment.

Interactive collaborations with faculty in earth and atmospheric sciences, biology, chemistry and biochemistry, biomedical engineering, materials science and engineering, chemical and biomolecular engineering, and other disciplines within civil and environmental engineering provide expanded resources and capabilities for students. We also have collaborations in Atlanta with units at Emory University and the U.S. Centers for Disease Control and Prevention.



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Georgia Tech School of Civil and Environmental Engineering
College of Engineering

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FACULTY

JOE BROWN, PH.D., P.E. *Carlton S. Wilder Assistant Professor:* Water infrastructure sustainability; detection methods for pathogens and pathogen indicators in the environment; water treatment technology characterization and innovation; human health effects of exposure to waterborne pathogens, including epidemiological methods and quantitative microbial risk assessment, environmental health microbiology, water and sanitation technologies in the developing world. His work has a global focus with currently funded research projects in Cambodia, Zambia, Tanzania, Malawi, Pakistan, India, the U.K., and Alabama.

YONGSHENG CHEN, PH.D. *Professor* Nanotechnology for water and air purification and pollutant sensing; fate, transport, transformation and toxicity of manufactured nanomaterials; physicochemical processes for algae harvesting and water treatment in biofuel production; urban sustainability.

JOHN CRITTENDEN, PH.D., P.E. *Director, Brook Byers Institute for Sustainable Systems, Hightower Chair & Georgia Research Alliance Eminent Scholar in Environmental Technologies & Professor* Sustainable engineering; physical chemical treatment processes; modeling of wastewater and water treatment processes; reforming of biomass to create commodity chemicals and fuels; preparation of zeolites and catalysts; surface chemistry and thermodynamics; mass transfer; numerical methods.

CHING-HUA HUANG, PH.D. *Professor* Environmental organic and inorganic chemistry; contaminant transformation kinetics and mechanisms; innovative drinking water and wastewater treatment technology; advanced analytical chemistry; water reuse and sustainability; emerging contaminants and disinfection by-products; remediation of heavy metals and resource recovery in energy production wastes.

JENNIFER KAISER, PH.D. *Assistant Professor:* Emissions and chemistry of air pollutants, with a focus on VOCs; interactions of biogenic and anthropogenic emissions; global chemistry-transport modeling; development of air quality monitoring strategies.

JOHN H. KOON, PH.D., P.E. *Professor of the Practice:* Industrial and municipal wastewater treatment, including the treatment of groundwaters; contaminated site remediation; environmental project strategy development; technology evaluations; water quality assessment; permitting; solving environmental problems in chemically complex systems.

KOSTAS T. KONSTANTINIDIS, PH.D. *Professor:* Environmental microbiology and genomics; culture-independent genomic analysis (aka metagenomics) of microbial communities; new technologies to study microbial processes *in situ*; bioremediation of environmental pollutants; novel organisms and enzymes; molecular methods for fecal pollution testing and source tracking; the air microbiome and its role in cloud formation; biotechnological applications of microbial functional diversity; population and single-cell genomics; genome evolution and the species concept; bioinformatic tools for the analysis of microbial genomes and metagenomes.

JAMES A. MULHOLLAND, PH.D. *Associate Chair, Graduate Programs and Research Innovation & Professor* Combustion by-product formation and control; incineration; thermochemistry of polycyclic aromatic hydrocarbons and chlorinated aromatic species; molecular modeling; spatio-temporal analysis of ambient air pollutants.

SPYROS G. PAVLOSTATHIS, PH.D., BCEEM *Professor:* Environmental biotechnology and bioprocess engineering for the bioremediation of contaminated natural systems and the treatment of industrial and municipal wastewater; fate and biotransformation of recalcitrant organic compounds and emerging environmental contaminants; disinfectant-induced antibiotic resistance; bioenergy and biofuels from biomass and waste streams; development of halophilic and thermophilic microbial processes; microbial fuel cell and bioelectrochemical technology; kinetics, modeling and simulation of biotransformation and biotreatment processes.

ARMISTEAD (TED) RUSSELL, PH.D. *Howard T. Tellepsen Chair & Regents Professor & Group Coordinator:* Atmospheric dynamics of air; gas-phase and aerosol pollutants; air quality modeling; atmospheric chemistry; control strategy planning and evaluation; environmental policy analysis; emissions control technology development; emissions inventory modeling and assessment; environmental risk assessment and uncertainty analysis; combustion modeling.

MARC STIEGLITZ, PH.D. *Associate Professor:* Watershed dynamics with emphasis on the interactions between climate, climate variability, hydrology and terrestrial biology; terrestrial carbon and nitrogen cycling; hydroclimatology and land-atmosphere interactions; impacts of climate change.

XING XIE, PH.D. *Carlton S. Wilder Assistant Professor:* Water treatment and reuse; desalination; microbial detection and quantification; energy and resource recovery; electrochemical energy conversion and storage. His research applies materials science and environmental biotechnology at the nexus of water and energy.

SOTIRA YIACOUMI, PH.D. *Professor* Colloidal and interfacial phenomena in environmental systems; sorption phenomena; colloidal interactions; influence of sorption on colloidal behavior; molecular techniques; novel environmental processes.

RESEARCH FACULTY

JIABAO GUAN, PH.D., P.E. *Senior Research Engineer*
YONGTAO HU, PH.D. *Research Scientist II*
M. TALAT ODMAN, PH.D. *Principal Research Engineer*
GUANGXUAN ZHU, PH.D. *Senior Research Scientist*

ADJUNCT & AFFILIATE FACULTY

MAOHANG FAN, PH.D.
COSTAS TSOURIS, PH.D.
AMBARISH VAIDYANATHAN, PH.D.
SHIH-CHI WENG, PH.D.
DAVID BERENDES, PH.D.

EMERITUS FACULTY

MUSTAFA ARAL, PH.D.
F. MICHAEL SAUNDERS, PH.D.
JIM SPAIN, PH.D.