

Environmental Engineering

CEEatGT
2021-2022
GRADUATE
STUDIES

MASTER'S DEGREE REQS*

SPECIALIZATION REQUIREMENT

APPROVED ELECTIVES

THESIS

TOTAL REQUIRED CREDITS

NON-THESIS OPTION

18 CREDITS

12 CREDITS

0 CREDITS

30 CREDITS

THESIS OPTION

12 CREDITS

12 CREDITS

6 CREDITS

30 CREDITS

*Degree requirements for the MSCE and MSENVE degrees. Requirements for the MSBIOE, MSCSE, and MSESME degrees differ – please contact gradinfo@ce.gatech.edu for more information

GT-Shenzen: The EnvE program also offers the potential to earn an MS EnvE at the Georgia Tech-Shenzen Campus, opening up the potential to conduct all or part of your studies overseas. Admission is done separately for the Atlanta- and Shenzhen-based programs

PH.D. DEGREE REQS

The Ph.D. program includes both course work and research. 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: modeling, emissions, formation, transport, and deposition of aerosols and health impacts
- 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
- Resource recovery and waste management
- Sustainable technology and development
- Machine learning of environmental applications



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), Economic Development Building 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, including a rooftop air quality observation platform and penthouse lab. Students and researchers have ready access to the supercomputing facilities as part of the Partnership for Advanced Computational Environments (PACE).

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 College of Engineering

**School of Civil and
Environmental Engineering**

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FACULTY

JOE BOZEMAN, PH.D., CEM

Assistant Professor: Equitable climate change adaptation/mitigation measures with an emphasis on urbanization, food-energy-water, policy development, and circularity using life cycle assessment, scenario analysis, survey administration, and cross-disciplinary approaches.

YONGSHENG CHEN, PH.D.

Professor and Director of the N.E.W. Center for AgTech: Nanotechnology implications and applications; membrane technology for blue energy production algae harvesting and biofuel production, nutrients recovery and water reuse; food-energy-water nexus; machine learning for environmental applications including membrane synthesis sustainability and resilience.

JOHN CRITTENDEN, PH.D., P.E., NAE

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.

EMILY GRUBERT, PH.D.

Assistant Professor: Multi-criteria decision making; socioenvironmental assessment; life cycle assessment; energy-water nexus; societal prioritization

CHING-HUA HUANG, PH.D.

Turnipseed Family Chair & Professor: Environmental organic and inorganic chemical environmental chemistry; water quality engineering; waste remediation; contaminants of emerging concerns; disinfection byproducts; advanced physicochemical treatment processes for water supply and reuse; advanced oxidation technologies; resource recovery and green chemistry; environmental analytical chemistry monitoring.

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

JOHN H. KOON, PH.D., P.E., NAE

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.

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.

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.

ADJUNCT & AFFILIATE FACULTY

MAOHANG FAN, PH.D.

COSTAS TSOURIS, PH.D.

AMBARISH VAIDYANATHAN, PH.D.

SHIH-CHI WENG, PH.D.

DAVID BERENDES, PH.D.

NGA SALLY NG, PH.D.

EMERITUS FACULTY

MUSTAFA ARAL, PH.D.

JIM MULHOLLAND, PH.D.

SPYROS PAVLOSTATHIS, PH.D.

F. MICHAEL SAUNDERS, PH.D.

JIM SPAIN, PH.D.

GUANGXUAN ZHU, PH.D.

RESEARCH FACULTY

JIABAO GUAN, PH.D., P.E.

Senior Research Engineer

PETRO VASILAKOS, PH.D.

Research Engineer I

YONGTAO HU, PH.D.

Senior Research Scientist II

M. TALAT ODMAN, PH.D.

Principal Research Engineer



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