

# DEPARTMENT OF ENVIRONMENTAL SCIENCES AND ENGINEERING

## Introduction

The Department of Environmental Sciences and Engineering combines the physical sciences, health sciences, engineering, and policy to develop solutions to current and emerging environmental challenges. Our mission is promoting human and ecological health for all by identifying, understanding, and solving pressing environmental challenges. This multidisciplinary approach provides unique academic and research opportunities for students. Our undergraduate degree focuses on the environmental health sciences, with specific concentrations in environmental chemistry, environmental health biology, and environmental physics and opportunities to take specialized courses or conduct research in areas of particular interest.

## Advising

Students benefit from advising by a professional academic coordinator who works closely with the director for undergraduate studies. Undergraduate students are encouraged to schedule a personal advising session each semester to review their course of study. These professionals will work with current and prospective majors (see contact information above). The academic coordinator verifies that coursework requirements for the concentration have been met. Departmental academic advising is particularly important for those majors who are considering going on to an accelerated bachelor's-to-master's program. Further information on courses, undergraduate research opportunities, the honors program, careers, and graduate degrees may be obtained from the department's (<http://sph.unc.edu/envr/environmental-sciences-and-engineering-home/>) website (<https://sph.unc.edu/envr/environmental-sciences-and-engineering-home/>).

Each student is also assigned a faculty mentor from the department of Environmental Sciences and Engineering. Faculty mentors collaborate with students to define academic, career and personal goals and assist students in identifying research and internship opportunities.

## Facilities

The Department of Environmental Sciences and Engineering houses research laboratories located in Rosenau Hall, McGavran-Greenberg Hall, and Michael Hooker Research Center. These laboratories are involved in important research related to natural resources, energy and health, water quality, atmospheric chemistry and air pollution, risk assessment of environmental exposures, effects of environmental chemicals on birth outcome, children's and chronic health, environmental and public health microbiology, and occupational health and safety.

The department also offers facilities for modeling and computational analysis of environmental systems, such as infectious disease transmission, atmospheric circulation and air quality models, ground and surface water flow and transport models, fluid flow and contaminant transport models for indoor air environments, computational toxicology, exposure analysis and health effects, risk assessment, and environmental epidemiology.

More detailed information about the individual laboratories and centers can be found at the department website (<http://www.sph.unc.edu/envr/>).

## Graduate School and Career Opportunities

While undergraduate education prepares students for citizenship in ways that go beyond professional concerns, the program in environmental health sciences also provides skills needed for employment and graduate study. Students ending their studies at the undergraduate level gain skills necessary to work in positions such as risk analysts in consulting firms and regulatory agencies; research assistants in research laboratories; environmental health specialists in local, state, and national environmental and environmental health departments; and scientific advisors to environmental organizations. The degree also prepares students for graduate study in the environmental sciences, environmental health sciences, environmental studies, toxicology, and professional disciplines such as medicine, dentistry, veterinary medicine, environmental law, and public health.

Undergraduate students with appropriate science backgrounds have the opportunity to pursue an accelerated bachelor's-to-master's program. This program allows students to complete a master's degree in the department in an accelerated time frame. With advance planning many students complete the bachelors plus masters within five years or five years and a summer. Interested students should read the program description and requirements (<http://sph.unc.edu/envr/envr-degrees/>) carefully.

Students have opportunities to explore possibilities for employment through the rich network of connections among the department, University, and numerous environmental organizations in the Research Triangle Park area, which is home to the highest concentration of environmental health sciences groups in the nation.

### Major

- Environmental Health Sciences Major, B.S.P.H. (<https://catalog.unc.edu/undergraduate/programs-study/environmental-health-sciences-major-bsph/>)

### Minor

- Engineering for Environmental Change, Climate, and Health Minor (<https://catalog.unc.edu/undergraduate/programs-study/engineering-environmental-change-climate-health-minor/>)

### Courses

- Environmental Sciences and Engineering (ENVR) (<https://catalog.unc.edu/courses/envr/>)

*Following the faculty member's name is a section number that students should use when registering for independent studies, reading, research, and thesis and dissertation courses with that particular professor.*

## Professors

**Joe Brown (137)**, Water and Sanitation, Environmental Health Microbiology; Director, Water Institute (Interim); Director, Engineering Programs

**Gregory W. Characklis (98)**, Water Resources Engineering, Economics and Management; Director, Institute for Risk Management and Insurance Innovation

**Orlando Coronell (10)**, Physical and Chemical Processes for Water Treatment, Membrane Technology, Granular Sorbents; Associate Chair for Academics

**Rebecca C. Fry (7)**, Toxicogenomics, Genetic Toxicology; Director, Institute for Environmental Health Solutions; Director, Institute for Environmental Health Solutions; Interim Department Chair

**Avram Gold (43)**, Environmental Chemistry

**Bill Gray**, Hydrology, Porous Media Flow, Environmental Thermodynamics

**Kun Lu (37)**, Microbiome, Exposome, Omics Profiling (Metabolomics, Proteomics, Lipidomics), DNA Adducts, Biomarker Development, Cancer, Chronic Inflammation, Children's Health

**Richard A. Luetlich Jr. (68)**, Marine Sciences, Coastal Physics, Hurricane Storm Surge Modeling; Director, Institute of Marine Science

**Christopher S. Martens (92)**, Marine Sciences, Biogeochemistry

**Cass T. Miller (59)**, Porous Medium Systems, Environmental Physics, Environmental Modeling

**Glenn Morrison (124)**, Indoor Air, Surface Chemistry, Human Exposure

**Rachel T. Noble (110)**, Marine Microbial Ecology, Water Quality Microbiology, Non-Point Source (e.g., Storm Water), Contamination of Receiving Waters

**Leena A. Nylander-French (95)**, Skin and Inhalation Exposures to Toxicants, Exposure Modeling; Director, Occupational Safety and Health Education and Research Center

**Hans W. Paerl (65)**, Aquatic Microbial Ecology, Marine and Freshwater Nutrient Cycling

**Michael C. Piehler (33)**, Marine Environmental Sciences, Environmental Microbial Ecology

**Mark D. Sobsey**, Environmental Health Microbiology, Virology, Water, Sanitation and Hygiene

**Jason Surratt (30)**, Atmospheric Chemistry, Secondary Organic Aerosols, Heterogeneous Chemistry, Air Pollution

**Barbara J. Turpin (32)**, Atmospheric Chemistry, Air Pollution and Human Exposure; Director, Graduate Studies

**William Vizuite (6)**, Atmospheric Modeling, Air Pollution, Environmental Engineering, Atmospheric Chemistry

**Paul B. Watkins**, Drug Safety Sciences, Pharmacotherapy and Experimental Therapeutics, Genomics Technologies

**J. Jason West (16)**, Air Pollution, Climate Change, Atmospheric Modeling, Global Health, Environmental Policy, Environmental Engineering; Director, Graduate Studies

**Dale Whittington (70)**, Water Resources Economics, International Development

## Associate Professors

**Amanda Northcross (134)**, Exposure Assessment, Air Pollution, Global Health; Director, Undergraduate Studies (B.S.P.H. and Assured Enrollment Programs)

**Julia Rager (130)**, Environmental Sciences, Exposure Assessment, Genetics, Toxicology; Associate Chair for Strategic Initiatives

**Marc L. Serre (100)**, Space/Time Statistics, Exposure Assessment, Environmental Modeling, Hydrology, Geostatistics, GIS, Environmental Epidemiology, Risk Assessment, Medical Geography

**John Staley (135)**, Occupational Health and Safety; NC OSHERC; NIOSH Center for Excellence: the Carolina Center for Healthy Work Design and Worker Well-Beings

**Courtney Woods (51)**, Health Equity, Systems Modeling, Environmental Epidemiology, Risk Assessment, Global Health; Director, E.C.H. M.P.H. Program

**Zhenfa Zhang**, Synthetic Organic Chemistry

## Assistant Professors

**Ryan Cronk (11)**, Global Water, Sanitation and Hygiene (WaSH), Environmental Risk Assessment

**Michael Fisher (136)**, Global Water, Sanitation and Hygiene (WaSH)

**Noah Kittner (131)**, Energy Systems Analysis, Sustainability Science, Energy and Environmental Policy, Energy in Underserved Communities

**Megan Lott**, Environmental microbiology, Microbes of the Built Environment and Wastewater-based Epidemiology

**Musa Manga (5)**, Environmental Engineering, Water, Sanitation, Water Resource Management

**Timothy Weigand (108)**, Fluid Dynamics, AI/Machine Learning, Mechanistic Modelling, Computational Science

## Adjunct Professors

**Sarav Arunachalam**, Air Quality Modeling, Analyses, and Health Risk; Environmental Policy

**Stephen Bennett**, Natural Hazards Risk Modeling, Climate Risks for Reinsurance Underwriting, Extreme Weather and Climate Preparation and Response

**Linda S. Birnbaum (86)**, Xenobiotic Metabolism, Biochemical Toxicology

**Clarissa Brocklehurst**, Water Supply and Sanitation

**Daniel L. Costa (97)**, Pulmonary Toxicology

**Felix Dodds**, Sustainable Development, Finance, Climate, Environmental Security

**Jonathan Freedman**, Toxicology, Chemical Exposure, Risk Assessment

**Shabbir H. Gheewala**, Life Cycle Assessment

**Jackie MacDonald Gibson**, Water Quality, Environmental Justice, Risk Assessment

**M. Ian Gilmour**, Immunotoxicology

**Marc Jeuland**, Sustainability, Climate Resilience, Water and Health, Environmental Health Cost-Benefit Analysis

**Valeria Ochoa-Herrera**, Biological and Physico-Chemical Wastewater Treatment, Bioremediation, Biotechnology, Sustainability

**Stephanie Padilla**, Biomolecular and Computational Toxicology

**David Peden**, Immunotoxicology, Cardiopulmonary Toxicology, Translational and Clinical Research in Environmental Lung Disease

**Joseph Pinto (82)**, Atmospheric Modeling

**Joachim Pleil (106)**, Exposure Assessment

**Havala Pye**, Air Quality Modeling

**Ana Rappold**, Environmental Exposure Assessment, Climate Change, Wildfires and Air Quality

**Jacky Rosati Rowe (29)**, Exposure Assessment

**Aaron Salzberg (133)**, Water Supply Planning and Sanitation; Director, Water Institute

**James M. Samet (67)**, Mechanistic Toxicology, Cardiopulmonary Toxicology, Ambient Air Pollutants

**ManishKumar Shrivastava**, Atmospheric Chemistry, Secondary Organic Aerosols, Earth Systems Modeling, Climate and Health Impact

**Jill R. Stewart (26)**, Water Quality Microbiology, Ecological Assessment and Prediction

**Miroslav Styblo (79)**, Nutritional Biochemistry and Biochemical Toxicology

**Bill Suk**, Hazardous Substances Remediation, Environmental Toxicology, Children's Environmental Health

**Cecilia Tan**, Mechanisms of Environmental Exposure and Disease, Physiologically-based Pharmacokinetic (PBPK) Modeling

**John Tomaro**, Research Collaborator for the Water Institute

## Adjunct Associate Professors

**Bok Haeng (B.H.) Baek**, Atmospheric Chemistry and Emission Models, Emissions Trends, Air Pollution Control Response

**Karsten Baumann**, Aerosol Chemistry

**Jared Bowden**, Air Quality and Climate Modeling

**Jada Brooks**, Health Equity, Community Engaged Research, Environmental Justice

**Kristin Isaacs**, Human Exposure Modeling, Risk Assessment

**Janice Lee**, Human Health Risk Assessment, Susceptibility, Mode of Action, Systematic Review

**Liz Naess**, Ambient Air Quality Data Analysis, Science and Policy, Health Equity

**Roger Sit**, Radiation Physics

**Thomas B. Starr**, Risk Assessment

**John Wambaugh**, Computational Toxicology and Exposure

## Adjunct Assistant Professors

**Celeste Carberry**, Toxicological Mechanisms and Health Effects of Environmental Exposures

**Rich Cravener**, Healthy, Safety and Industrial Hygiene; NC OSHERC; NIOSH

**Radhika Dhingra (132)**, Air Pollution, Epidemiology, Epigenetics, Health Effects

**Crystal Lee Pow Jackson**, Occupational and Environmental Epidemiology

**Jordan Kern**, Environmental modeling, Systems Analysis, Financial Risk Management

**Hannah Liberatore**, Analytical Method Development for Per- and Polyfluoroalkyl Substances (PFAS) Sampling and Combustion Ion Chromatography

**Lucas Rocha Melogno**, Environmental Health Science, Policy Translation

**Javad Roostaei**, Environmental Science, Machine Learning, Data Science, AI

**Antonia Sebastian**, Environmental Hazards, Flood Risk Reduction

**Lauren Eaves Sellers**, Environmental Exposure, Prenatal Health Effects, and Epigenetics

**David Singleton**, Environmental Microbiology

**Frank J. Stillo III**, Risk Assessment, Risk Communication of Environmental Exposures in Drinking Water

**W. Jon Wallace**, Occupational Safety and Health Education

## Professors Emeriti

**Jamie Bartram**

**Russell F. Christman**

**Douglas Crawford-Brown**

**Francis A. DiGiano**

**Michael Flynn**

**Donald L. Fox**

**Donald E. Francisco**

**Harvey E. Jeffries**

**Pete Kolsky**

**Donald T. Lauria**

**David H. Leith**

**David H. Moreau**

**Mark S. Shuman**

**Stephen C. Whalen**

**Donald Willhoit**

Visit Program Website (<http://www.sph.unc.edu/ese/>)

### Department Chair

Rebecca Fry

### ESE Student Services

Advising questions and more  
[esestudentservices@unc.edu](mailto:esestudentservices@unc.edu)

## Contact Information

Department of Environmental Sciences and Engineering