

# Environmental Health Sciences, M.S.

## Jun Wu, Graduate Program Director and Departmental Graduate Advisor

856 Medical Sciences Quad, Irvine, CA 92697

<https://sites.uci.edu/publichealths/>

The Department of Environmental and Occupational Health provides graduate training in environmental health sciences and offers the M.S. in Environmental Health Sciences. The program in Environmental Health Sciences provides students with the knowledge and skills necessary and appropriate to teach and/or conduct basic and applied research programs in inhalation/pulmonary toxicology, neurotoxicology, reproductive and developmental toxicology, chemical pathology, toxicokinetics, radiation toxicology, molecular carcinogenesis, exposure sciences, environmental and occupational epidemiology, risk assessment, environmental justice, and community-based participatory research.

Environmental Toxicology involves the scientific study of the entry, distribution, biotransformation, and mechanism of the action of chemical and physical agents that are harmful to the body. The graduate program interprets environmental toxicology as the study of the effects and mechanisms of action of hazardous chemical and physical agents in food, air, water, and soil in the home, the workplace, and the community. It considers experimentally and theoretically such diverse research problems as:

- new scientific approaches to toxicological evaluation of environmental chemicals (e.g., air and water pollutants, food additives, industrial wastes, and agricultural adjuvants) and physical agents (e.g., radiation) at the molecular, cellular, and organism levels
- mechanisms of action in the toxicity of chemical and physical environmental agents
- the molecular pathology of tissue injury in acute and chronic toxicity

Exposure Sciences involves the study of human exposures to chemical environmental contaminants in different media such as air, water, food, and soil and via multiple routes including inhalation, ingestion, and dermal absorption, as well as exposures to physical environmental agents such as radiation, temperature, noise, and other built environment factors. Environmental Epidemiology examines the effects of exposure to environmental agents and other factors on health outcomes. Research in the Exposure Sciences and Environmental Epidemiology Track includes:

- new approaches to the evaluation of human exposures to environmental chemicals, including exposure measurement, modeling, and biomonitoring
- assessing individual level exposures to chemical and physical environmental agents and examining associations of these exposures with health and disease outcomes
- exposure to chemical, physical, and psychosocial work environment hazards, and health outcomes
- environmental justice and community-based participatory research to improve health equity

Students entering the program have varied backgrounds, including chemistry, biology, physiology, environmental science/engineering/health, epidemiology, and public health. The curriculum is based on a foundation of basic and health sciences with applications of scientific principles to environmental exposures and their potential health effects. Formal course work is enriched by a strong commitment to student-professor interaction throughout the program. An important and integral part of the learning process is an early and intensive involvement of the student in ongoing original research projects in environmental health sciences, especially inhalation/pulmonary toxicology, reproductive and developmental toxicology, biochemical toxicology, chemical pathology, neurotoxicology, exposure sciences, risk assessment, environmental epidemiology, environmental justice, and community-based participatory research.

In addition to meeting the general admission requirements set by the Graduate Division, applicants must be admitted by an Admissions Committee composed of faculty members of the graduate program. Candidates will be selected on the basis of a balanced evaluation of the following criteria, with no one factor having more influence (1) prior scholastic performance, including a consideration of grades, course load, nature of courses taken, and college attended; (2) recommendations by professors and others; (3) experience in undergraduate and/or post-baccalaureate research; (4) an interview by members of the Admissions Committee and other faculty members, when feasible; and (5) scores for the general Graduate Record Examination test (GRE), which is temporarily waived for Fall 2023 enrollments.

Undergraduate preparation of applicants should include one year of biology (one quarter of molecular biology or biochemistry is strongly recommended) one year of mathematics (calculus and/or statistics), and one year of chemistry. Outstanding applicants who lack one or two of these prerequisites may be given an opportunity to take the required course(s) either before admission or during the first year in the graduate program; in such circumstances, none of these required undergraduate courses may be used to satisfy the program elective or core course requirements. Upper-division or graduate science courses may be considered as substitutes for the above prerequisites by the Admissions Committee.

## Master of Science in Environmental Health Sciences

All courses must be passed with an average grade of B or better.

A. Complete the following:	
PUBHLTH 206A	Principles of Epidemiology
PUBHLTH 204	Biostatistics I: Introduction to Statistical Methods
EHS 264	Introduction to Environmental Health Science

B. Select two of the following:	
EHS 202	Principles of Environmental Toxicology
EHS 206A	Target Organ Toxicology I
EHS 206B	Target Organ Toxicology II
C. Complete the following:	
EHS 298	Seminar in Environmental Health Sciences <sup>1</sup>
EHS 299	Research Problems <sup>2</sup>
EHS 290	Independent Study in Environmental Toxicology <sup>3</sup>
D. Complete eight units from the approved elective pool.	
EHS 203	Psychosocial Occupational Epidemiology
EHS 204	Neurotoxicology
EHS 212	Inhalation Toxicology
EHS 220	Industrial Toxicology
EHS 269	Air Pollution, Climate, and Health
EHS 294	Health Psychology
EPIDEM 244	Toxic Chemicals in Environment
ANATOMY 203A	Human Microscopic Anatomy
ANATOMY 203B	Human Microscopic Anatomy
DEV BIO 231B	Cell Biology
MOL BIO 203	Nucleic Acid Structure and Function
MOL BIO 204	Protein Structure and Function
PHYSIO 206A	Introduction to Medical Physiology
PHYSIO 206B	Introduction to Medical Physiology
PUBHLTH 206B	Intermediate Epidemiology
PUBHLTH 206C	Advanced Epidemiologic Methods
PUBHLTH 204C	Biostatistics III: Advanced Statistical Methods
PUBHLTH 209	Methods of Demographic Analysis
PUBHLTH 281	Infectious Disease Epidemiology
PUBHLTH 208	Advances in Social Epidemiology
PUBHLTH 283	Geographic Information Systems for Public Health
PUBHLTH 286	Advanced Geographic Information Systems and Spatial Epidemiology
EPIDEM 232	Chronic Disease Epidemiology & Prevention
STAT 203	Statistical Methods for Data Analysis III
PUBHLTH 222	Health Policy and Management
PUBHLTH 223	Risk Communication
E. Complete one of the following plans:	
Plan I:	
Under the direction of a faculty advisor, prepare a thesis that is acceptable to the thesis committee	
Plan II:	
1. Under the supervision of a faculty member, prepare a scholarly paper based on individual study in an area of toxicology	
2. Pass the written comprehensive examination.	

<sup>1</sup> All graduate students in the program will be required to take EHS 298 every academic quarter they are enrolled in the graduate program.

<sup>2</sup> Applies to Plan I.

<sup>3</sup> Applies to Plan II.

Opportunities for individual training and independent research experience exist in inhalation and pulmonary toxicology, atmospheric chemistry and aerosol science, neurochemistry and neurotoxicology, reproductive and developmental toxicology, toxicology of naturally occurring compounds, exposure modeling, risk assessment, chemical pathology, environmental microbiology, and environmental chemistry. Research grants and contracts are available to support qualified doctoral students as research assistants.

Please refer to our website (<https://sites.uci.edu/publichealthhs/>) for updated information about course offerings, and pre-approved electives for this degree.