



**School of Public Health
Department of Environmental and Occupational Health**

**Doctor of Philosophy in Environmental and Occupational Health Sciences
Overview
2023-2024**

Updated: 8/11/2023

1. Program Objective

The objective of the Environmental Health Sciences PhD training program is to provide a broad theoretical and practical education for individuals who desire positions in academic, industrial or government positions as teachers, researchers, or regulators in the multifaceted discipline of Environmental Health Science. The program emphasizes study of the environmental impacts on human disease risk and disease susceptibility. The Environmental Health Sciences program is designed as an integrated modern curriculum combining training in toxicology, environmental exposure pathways, environmental epidemiology, and risk assessment with the new and continually developing fields of cellular and molecular pathobiology of environmental disease. The program provides an understanding of how relevant environmental exposures, laboratory-based model systems, and gene-environment responses can be interpreted and applied in the study of disease etiology in exposed and potentially exposed human populations.

2. Curriculum Design

The curriculum is designed to provide flexibility for students to pursue training in varied research focus areas, such as environmental exposure science, cell and molecular pathophysiology, and genetic and epigenetic-by-environment interactions, as well as epidemiology and risk assessment. The design allows integration of laboratory, field, and data analysis-based graduate training and research. The curriculum combines core courses in Environmental and Occupational Health Sciences with electives throughout the University to enhance training in the student's specific focus area. All of these resources are dedicated to the thematic teaching, laboratory, and computational research focus centered on training at the doctoral (Ph.D.) level.

3. Training Goals

A student completing the Environmental Health Sciences Ph.D. Training Program should have developed many of the ASPH core competencies in environmental health.

They should be able to:

- Acquire a basic theoretical background in cellular, molecular, and genetic etiology and pathophysiology of environmental disease and disease susceptibility
- Identify and explain effective methodologies to evaluate the direct and indirect human, ecological, and safety effects of major environmental and occupational hazards
- Identify and apply methodologies for assessing environmental exposure pathways
- Integrate critical reading of scientific literature to develop and communicate testable hypotheses and ethical hypothesis-driven experimental research designs
- Integrate and apply basic understanding of exposure pathways and molecular mechanisms of action to investigate hypotheses that address the environmental basis of human disease, as well as interventions that reduce disease burden.

Students completing the core curriculum and progressing to the Ph.D. will be required to conduct original research with a faculty member within the Environmental Health Sciences Training Program. In addition to their dissertation, it is expected that students in the Ph.D. track will produce a minimum of two first authored peer-reviewed manuscripts that are either published or deemed of a quality that merits publication on or before the time of their thesis defense.

Admission Requirements

Students seeking to join the Ph.D. Training Program Environmental Health Sciences must meet the general admission requirements of the University of Pittsburgh Graduate School of Public Health. These include the following.

- A bachelor's degree from an accredited college or university (or the equivalent of a U.S. bachelor's degree) with a grade point average of at least a B (3.0).
- Three college credits in human biology with a grade of B or better.
- Three college credits in algebra or higher-level mathematics with a grade of B or better.
- Six college credits in behavioral sciences, including a course in sociology or social psychology and additional credits in such subjects as sociology, anthropology, psychology, political science, or economics.
- Minimum total TOEFL score (if applicable) of 105.

In addition, the following departmental requirements and guidelines apply.

- Candidates must have a degree or career background in a discipline relevant to public health or health sciences.
- It would be adventitious if the candidate has two courses in each of the following disciplines, calculus, biology, physics, and chemistry.

Applicants who are graduates of a recognized college or university, but who do not qualify for admission to full graduate status because of deficiencies in either their undergraduate course program or their scholastic achievement, may be considered as a Master of Science candidate or provisional graduate status if strong supporting evidence of their ability to successfully complete the program is provided. Courses taken to remove deficiencies do not count toward completion of graduate degree requirements.

Applicants who have a graduate degree (e.g. M.S., M.D., M.P.H.) may be exempt from taking individual core courses based on their past transcripts and clear demonstration that they are competent in the topics covered in the core course exempted. Credit can be given for these courses (all if courses were taken at the University of Pittsburgh or a maximum of 24 credits from other institutions).

Environmental and Occupational Health Sciences PhD Course Requirements

A **minimum of 72 credits** is required for the PhD. This total is made up of the SPH core courses, a core of required courses in the Department of Environmental and Occupational Health, and a broad list of electives that utilize coursework from various relevant disciplines in the School and University.

Required Core Courses	Credits	Completed
BIOST 2041 Intro to Statistical Methods 1	3	
BIOST 2049 or Applied Regression Analysis	3	
PUBHLT 2011 Essentials of Public Health	3	
PUBHLT 2022 Public Health Grand Rounds (Semester one)	0	
PUBHLT 2022 Public Health Grand Rounds (Semester two)	0	
EPIDEM 2110 Principles of Epidemiology	3	
EOH 2175 Principles of Toxicology	3	
EOH 2310 Molecular Fundamentals	3	
EOH 2504 Principles of Environmental Exposure	3	
EOH 2122 Transport & Fate Environmental Agents	3	
EOH 2180 Introduction to Risk Sciences	1	
EOH 2181 Risk Assessment Practicum	2	
EOH 3210 Pathophysiology of Environmental Disease	3	
EOH 2805 Epigenetics and epigenomics of environmental health	3	
EOH 2109 Journal Club (Semester one)	1	
EOH 2109 Journal Club (semester two)	1	
EOH 2109 Journal Club (semester three)	1	
EOH 2109 Journal Club (Semester four)	1	
EOH 2110 Rotation Practicum (Semester one)*	1	
EOH 2110 Rotation Practicum (semester two)*	1	
EOH 3011 Development of Dissertation Research (available Spring 2024)	3	
FTDR 3999 Full Time Dissertation Study	0	
Total Required CORE Credits	42	
Electives: Eligible electives are any graduate level courses at the University.	6-15	
Recommended electives:		
EOH 2609 Chemical Toxicology in the Age of Green Chemistry.	3	
EPIDEM 2223 Introduction to Environmental Epidemiology	3	
EOH 2004 Occupational Hygiene	3	
Research:		
EOH 3010 Dissertation Research	3-18	
Transfer Credits from previous graduate degree not at the University of Pittsburgh	Up to 24	
Transfer of graduate credits from the University of Pittsburgh	100%	
Total Required Credits for PhD	72	

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*Optional if Dissertation Mentor is identified.

EOH PhD – Suggested Timeline for Completion of Coursework

FALL TERM – YEAR 1	
*Note that some courses are given in alternate years	
Course	10-14 Credits
EOH 2175 Principles of Toxicology or EOH 2310 Molecular Fundamentals	3
BIOS 2041 Intro to Biostatistics	3
EPIDEM 2110 Principles of Epidemiology	3
EOH 2110 Rotation Practicum (Semester 1)	1
EOH 2109 Journal Club	1
PUBHLT 2022 Public Health Grand Rounds (Semester one)	0
SPRING TERM – YEAR 1	
EOH 2122 Transport & Fate Environmental Agents	3
EOH 2180 Introduction to Risk Assessment/EOH 2181 Risk Assessment Practicum or EOH 3210 Pathophysiology of Environmental Disease	3
PUBHLT 2011 Essentials of Public Health	3
BIOST 2049 or Applied Regression Analysis	3
EOH 2110 Rotation Practicum (Semester 2)	1
EOH 2109 Journal Club	1
PUBHLT 2022 Public Health Grand Rounds (Semester two)	0
SUMMER TERM – YEAR 1	
EOH 3010 Research and Dissertation	3
FALL TERM – YEAR 2	
EOH 2175 Principles of Toxicology or EOH 2310 Molecular Fundamentals	3
EOH 2504 Principles of Environmental Exposure	3
Elective	2-3
EOH 2109 Journal Club	1
EOH 3010 Research & Dissertation	1-9
SPRING TERM – YEAR 2	
EOH 2180 Introduction to Risk Assessment/EOH 2181 Risk Assessment Practicum or EOH 3210 Pathophysiology of Environmental Disease	3
Elective	2-3
EOH 2805 Epigenetics and epigenomic of environmental health	3
EOH 2109 Journal Club	1
EOH 3010 Research & Dissertation	1-9
SUMMER TERM – YEAR 2	
EOH 3010 Research & Dissertation	3
SPRING/FALL - YEAR 3	
EOH 3010 Research & Dissertation	1-6 // 1-9
FTDR 3999 Full Time Dissertation Study	0

Partial listing of elective EOH courses	Credit
EOH 2013 Environmental Health and Disease	3
EOH 2609 Chemical Toxicology in the Age of Green Chemistry.	3
EOH 3305 Genome Instability and Human Disease	3

*In addition to electives offered in EOH, students can select from any graduate level course across the University.

Ph.D. advising and oversight of student progress:

Program Director: Oversees all functions of the Environmental Health Sciences Training Program and is responsible for final decisions following consultation with the Department Chair and the EHS Graduate Program Committee.

EHS Graduate Program Committee: Composed of three to four faculty members with faculty serving three-year terms (1 new member each year). The chair of the committee is the longest-standing faculty member at any one time. Roles for this committee are to:

- Oversee progress of individual students in their coursework and make appropriate recommendations.
- Mentor students prior to their selection of a permanent advisor.
- Oversee Preliminary Qualifying Examination for Ph.D. students.

Department Student Liaison: manages student affairs, records student progress, and ensures that students meet appropriate deadlines for their progression along the Ph.D. track.

Research Advisor/Mentor: The Research Advisor must be a member of the Graduate Faculty and is selected by student upon entry into the Ph.D. program or after completion of a minimum of two and maximum of three eight to ten week research rotations (of which only 2 count for credit) and prior to taking Preliminary Qualifying Examination. The research advisor and student propose a Research Advisory Committee that must be approved by the EHS Graduate Program Committee and GSPH. Note that the research advisor cannot chair the Research Advisory Committee.

Research Advisory and Dissertation Defense Committee (Ph.D. students): Responsible for assisting the primary research advisor and the student in the focus and direction of the student's research. A research advisory committee should be formed by the beginning of the students second Spring term as the student is developing their dissertation research. The student with invite faculty to join their Research Committee with recommendations from their research mentor. Note that the committee can be dynamic if the student's research direction changes.

The Research Advisory Committee conducts the student's Comprehensive Examination and Dissertation Defense and must sign the appropriate forms following its successful completion. This committee is composed of:

- at least four University of Pittsburgh faculty members including the research advisor.
- at least two EOH faculty members.
- at least one University of Pittsburgh faculty member from outside the Department.
- Additional members of the committee can be faculty outside of the University of Pittsburgh.
- A majority of the committee must be Graduate faculty at the University of Pittsburgh.
- The Chair of the Research Advisory Committee must be an EOH and Graduate Faculty member and cannot be the Research Advisor.

This committee should meet twice annually and must sign the annual update of the Independent Development Plan (IDP) beginning at the end of the second academic year.

Independent Development Plan (ICP): The independent development plan is a guiding document that will be completed by the student and advisors upon matriculation into the program. The program develops the student's expectations and goals for advancement through the program and towards the next stage of career development. Before the student identifies a faculty mentor to guide their research and development, the Graduate Program Committee will serve as the advisors for completing the initial IDP. The plan will be reviewed and updated at the end of each academic year. The research mentor and student should complete the IDP after the first academic year and then the Research Committee, mentor, and student will update the IDP in subsequent years. The IDP and documented updates will be kept in the student's file.

Student Performance: The criteria for evaluation of student performance and the procedures for dismissal will be the same for students in this program as for all other GSPH students. Students must maintain a B or better average in courses to be eligible to take the Ph.D. qualifying exam. Student performance will be evaluated at each of the major milestones of the student's tenure in the department (e.g. completion of laboratory rotations, qualifying examination, comprehensive examination, and dissertation defense). Performance will be reviewed by the EHS Graduate Program Committee.

Examinations

Ph.D. Preliminary Qualifying Exam and Admission to Candidacy

- Students must have completed two full semesters of their required core coursework and achieved a GPA of 3.0 or better prior to taking the Preliminary Examination.
- Students can take their examination no sooner than the end of their second semester and no later than the end their fifth semester.
- The exam is comprised of writing a grant proposal based on the student's dissertation research topic and defending it orally. Both the written and oral portions of the grant are graded on a pass-fail basis.
- **Examining Committee:** The examining committee has three members that include one member of the EOH Graduate Program Committee, a member of the EOH Graduate Faculty, and a Graduate Faculty member from another SPH or University of Pittsburgh department. The examining committee roster must be approved by the Dean's Office of Student Affairs. The Graduate Program Committee member will chair the committee and will select the other members based upon content of the approved specific aims. The student's research advisor will participate in the examination as a silent observer of the proceedings.

- **Written Component:** The student will write the equivalent of an F31/R21 type grant application (i.e. two years' worth of research) on the topic of their proposed thesis research. The student must use the standard NIH format guidelines (PHS 398, <https://grants.nih.gov/grants/funding/phs398/phs398.pdf>) to create a well-written and defensible grant application that contains: a title page, abstract, public health statement, single page specific aims, six page research plan, vertebrate animal/Human subject use, and references. The PHS 398 guidelines for title length and page limits will be strictly enforced. When the student is ready to take the exam, they should contact the Graduate Program Committee and start the schedule. Within a week of starting, the student will present a draft of the specific aims to the Chair of the examination committee. Once the aims are approved, the student will have one month to write the grant application, after which time he/she must submit a complete pdf application to the examining committee. The student may seek advice from other faculty members in general aspects of the grant content and the student's research advisor can provide advice in general grantsmanship and composition. However, the proposal must be the student's original ideas and work. The written document will be evaluated by the committee for quality and to decide whether the student can advance to an oral defense of the grant application.
- **Oral Defense of the Written Examination:** The oral examination should be scheduled no sooner than 2 weeks after submitting the written document to the Examining Committee. The examination will start with the student summarizing key elements of the proposal (not to exceed 30 minutes). The examining committee will question the candidate with the goal of revealing strengths and weaknesses of the written proposal in addition to determining whether the student demonstrates a reasonable command of the required curriculum. Oral defense of the written proposal will proceed in an open-ended fashion until each member of the Examining Committee can make an appropriate assessment of the candidate's performance. After a reasonable period of consultation in the absence of the candidate, the Examining Committee will make a pass/fail vote, the result of which will be determined by a majority decision. The entire examination process cannot take longer than two hours.

Students failing the oral portion of Preliminary Examination will not qualify for the Ph.D. They will be allowed to re-take the examination any time up to the end of their third fall semester or 3 months following their first attempt, whichever is sooner. Alternatively, they will be offered the opportunity to complete the requirements for a MS degree. In the event of a second failure, the student will be offered the opportunity to complete the requirements for a MS degree.

- After passing the qualifying exam the student should provide and updated Individual Development Plan (IDP) and should register for Full-Time Dissertation Study-FTDR 3999.

Failure in written or oral portion of exam requires exit from the PhD program and can result in a terminal Masters degree with normal Masters thesis requirements.

Ph.D. Overview/Comprehensive.

- The Comprehensive examination is the first meeting of the students Research Dissertation Committee after the Qualifying exam and should be no later than six months after the qualifying exam. It cannot take place in the same term as the Qualifying exam nor the Dissertation Defense.
- A written update of the Qualifying exam proposal, aims and research plan, should be sent to committee members for prior approval at least 2 weeks before exam.

- The oral exam is a presentation of the aims and progress to the Research Committee. Further revisions to the research proposal may be requested prior to approval and submitting to the student's record.
- Advising and progress meetings should be held every 6 months after Overview as needed until Dissertation Defense
- The IDP should be updated annually and submitted to the student liaison.

Ph.D. Dissertation defense

- The Research Dissertation Committee serves as the dissertation defense examination committee.
- The Dissertation should consist of 2 peer reviewed papers (may be in submission and review) and a written thesis that contains the publications along with a comprehensive review of the field and discussion of the implications of the work.
- The Dissertation must be defended within 5 years of matriculation into the program or special permission can be given by the Department and Graduate Advisory Committee to extend the time required to complete the thesis research.
- The Dissertation Defense cannot occur in the same term as the Comprehensive examination.
- The content of the thesis will be presented in an open seminar followed by questions from the audience.
- The open seminar must be advertised across the University at least three weeks prior to presentation and should be scheduled when the Department Chair can attend. The Departmental Student Liaison will make arrangements and the announcement.
- Following the open seminar, the student will be required to defend the thesis in a closed session administered by the Dissertation Defense Committee.
- The Dissertation Defense Committee make recommendations at the completion of the defense regarding the suitability of the written document, the ability of the student to defend its content, and whether the student should be awarded a Ph.D. degree.