The Harvard Education and Research Center for Occupational Safety and Health is a NIOSH-designated training center serving the New England region and the nation.

GRADUATE PROGRAMS
The Center offers graduate training in the following disciplines related to occupational safety and health: occupational medicine, occupational hygiene, occupational epidemiology, occupational and environmental molecular epidemiology, and injury prevention and control. Both master’s and doctoral programs are available.

RESEARCH
Faculty, staff, and students at the Center conduct research related to the cause, prevention and treatment of work-associated safety and health problems. The research includes priorities identified by NIOSH as leading workplace illness and injury.

CONTINUING EDUCATION
The Continuing Education Program, conducted jointly with the Center for Continuing Professional Education, designs and produces professional development programs, conferences, and custom programs for occupational safety and health professionals, paraprofessionals, and technicians. The programs, often co-sponsored with other organizations, are held at the School and at other sites in New England. It is the mission of the Center to develop, present and promote educational opportunities that are timely, relevant, and of the highest quality. To that end, we welcome your comments about how to better serve your needs.

OUTREACH
The visiting scholars program for faculty of other institutions of higher education and other professionals seeks to impact the curricula of other schools and to increase awareness of workplace safety and health issues in government agencies and corporations at the local and state levels.

Many programs of the Center are funded in part by the National Institute for Occupational Safety and Health (NIOSH).
This handbook is produced specifically for ERC students. It is intended to be used as an introduction to the Center, as well as a means of conveying policies to recipients of ERC traineeships. The ERC Student Handbook should be considered a supplement to the Student Handbook of the Harvard T.H. Chan School of Public Health, which includes comprehensive information on many matters pertaining to students. http://www.hsph.harvard.edu/student-handbook/
The Harvard

EDUCATION AND RESEARCH CENTER

SOME HISTORY

OCCUPATIONAL SAFETY AND HEALTH AT HARVARD UNIVERSITY

The history of the Department of Industrial Hygiene at Harvard University corresponds with the principal period of innovation and discovery in the history of industrial health in the United States and includes many unique achievements as well as an extraordinarily large number of outstanding personalities. Indeed, much of the earliest literature on industrial hygiene, industrial toxicology, and occupational medicine in this country originated at Harvard.

Environmental health and, specifically, occupational health have been major concerns at Harvard since 1913, when the Harvard-Massachusetts Institute of Technology School for Health Officers was established by Professor William T. Sedgwick, Dr. Milton J. Rosenau, and Professor George C. Whipple. The curriculum included industrial hygiene and sanitation and covered the adverse effects of factory life on health, including occupational accidents, industrial poisonings, and the effects of ventilation and dusty trades on the widespread incidence of tuberculosis and other diseases.

In 1918 the name of the School was changed to the Harvard-Massachusetts Institute of Technology School of Public Health. Also in 1918, the Harvard Medical School organized a Division of Industrial Hygiene, largely through the efforts of Dr. Frederick C. Shattuck who secured from New England industrialists a fund of $125,000, and began providing training in industrial hygiene in the School of Public Health for factory physicians throughout New England. After the entry of the United States into World War I in the spring of 1917, the number and variety of hazardous occupations had increased sharply in the United States, and the School was prepared to offer instruction in industrial hygiene and facilities to investigate the problems of industry.

Numerous requests regarding pressing problems were received from plant managers and Dr. Cecil K. Drinker organized a research facility. Cecil Drinker became a pioneer in industrial medicine and was among the first to emphasize the importance of the respiratory tract as the route of absorption for toxic dusts and fumes. He proved to be a strong advocate for the establishment of industrial hygiene and applied physiology as disciplines in preventive medicine. The first success of the modest research group in an extended series of investigations on dust and dust hazards was the investigation of an obscure condition of industrial poisoning on behalf of the New Jersey Zinc Company, where manganese was proved responsible.

In 1919 Harvard University's first woman professor, Dr. Alice Hamilton, was named Assistant Professor of Industrial Medicine in the Division of Industrial Hygiene. In spite of prejudices, she achieved major accomplishments in a professional world dominated by men.

In 1921 Harvard received an endowment fund from The Rockefeller Foundation which stipulated that the joint Harvard-Massachusetts Institute of Technology School of Public Health be dissolved. The new School of Public Health at Harvard was opened in 1922, offering studies leading to bachelor, master, and doctor of public health degrees. Dr. Alice Hamilton administered an advanced course in industrial toxicology, and Dr. Philip Drinker, Cecil Drinker's brother, directed a new program in ventilation that applied engineering principles to measurement of air flow, psychometry, the use of the Kata-thermometer, and the design of air conditioning in factories. Opportunities for studies in occupational medicine were offered at the Industrial Hygiene Clinic of the Massachusetts General Hospital, where Dr. Harriet Hardy later practiced occupational medicine.

In 1924 Drs. Cecil Drinker, Katherine Drinker, and William B. Castle were the first scientists to investigate radium poisoning thoroughly. Radium poisoning was suspected among workers painting dials of clocks and watches in Orange, New Jersey. The hazard resulted from painting brushes by placing them between the lips and from the atmosphere in the work-rooms. Through a succession of other radium-poison investigations, the findings of this group became the accepted authority.

The effects of temperature and humidity came under intensive study at Harvard beginning in 1925 when Mr. Constantine P. Yaglou joined the staff of the Department of Industrial Hygiene as Instructor. Mr. Yaglou collaborated with Dr. Kenneth Blackfan, Professor of Pediatrics at the Medical School and Physician-in-Chief at the Children's Hospital, to construct and operate an air-conditioned room for premature infants whose mortality was very high. Mr. Yaglou's studies resulted in the formulation of a temperature scheme applicable to premature babies that stabilized body temperature and greatly reduced mortality.

Beginning in 1926 Philip Drinker worked under the auspices of the Rockefeller Institute to develop better methods of resuscitation. He sought to improve the old-fashioned pulmator for resuscitating victims of electric shock or illuminating gas poisoning, and was aided by Louis Shaw, a Harvard colleague, in the development of a respirator large enough to hold a human. The first patient to use it was from the Children's Hospital. The child was unconscious from respiratory paralysis, but recovered consciousness in less than a minute after the respirator was started. This was one of the most dramatic discoveries in the history of industrial hygiene, and the Drinker Respirator, or "iron lung", rapidly gained worldwide acceptance.

For many years Alice Hamilton taught industrial toxicology at Harvard and made significant contributions in research on the chronic effects of carbon monoxide poisoning in garages, printing establishments, tunnels, and mining in collaboration with Cecil Drinker, and on mercury poisoning in the felt-hat industry with Wade Wright, Philip Drinker, and others. She produced a significant number of papers on industrial lead and aniline poisoning.

Largely through her investigation of worker poisoning in the Illinois lead industry, that state became the first in the country to adopt legislation aimed at safeguarding workers' health. This was the first comprehensive survey of occupational disease conducted in the United States. Hamilton and Professor Philip Drinker struggled to gain management and labor support for
measures aimed at combating lead poisoning as well as silicosis.

Alice Hamilton, pioneer in industrial toxicology and occupational medicine, wrote many papers that are classics in the field of industrial health. Her productivity continued beyond her retirement in 1935, and her influence in this field cannot be overestimated. Her opinion was constantly sought by many large organizations, and her decisions almost always resulted in decisive action by the application of proper protective measures.

Leslie Silverman came to the School in 1937 and was named Instructor in Industrial Hygiene in 1939 while he continued doctoral work. Charles R. Williams also came to the School in 1937 on a part-time basis with the title of Instructor in Industrial Hygiene. He was employed by the Liberty Mutual Insurance Company to conduct dust surveys for their insured risks and became an expert on the identification and analysis of airborne dust.

By 1939 the Department of Industrial Hygiene was staffed with a significant group of scientists and engineers including Philip Drinker, Constantin Yaglou, Leslie Silverman, and Charles Williams. War-oriented work during World War II included the development of oxygen equipment for high-altitude flight and its physiological evaluation; a protective gas mask to meet the needs of chemical warfare; heating, ventilation, and air-conditioning systems; and a national health-education program for shipyard workers.

In 1946 the School of Public Health became independent of the Medical School, and peace-time teaching and research were resumed. Increasing numbers of students sought to extend industrial hygiene knowledge into the newer specialties of radiological health and air-pollution control. Drinker, Silverman, and Williams began serving as consultants to the Atomic Energy Commission, and as a result radiation protection, aerosol physics, and air and gas-cleaning technology gained greater prominence in the teaching programs.

In 1949 Philip Drinker initiated a study to determine permissible concentrations of sulfuric acid vapor for humans and animals. Dr. Mary Amdur joined Drinker and Silverman in these studies and extended the research to other common acids. By the mid-1950's the Department of Industrial Hygiene had enlarged its curriculum and research efforts to include radiological safety and air-pollution control in addition to the more traditional studies of industrial hygiene, industrial medicine, industrial safety, and environmental sanitation.

The Departments of Industrial Hygiene, Physiology, and Sanitary Engineering were grouped under a single Division of Environmental Health and Engineering Sciences. In 1957 the Rockefeller Foundation funded a grant to the School of Public Health for a program in radiological hygiene. Leslie Silverman was responsible for the engineering aspects of this program and became the second Head of the Department of Industrial Hygiene when Philip Drinker retired in 1961.

New research laboratories were dedicated in 1962 and the Department of Industrial Hygiene was situated in new quarters with other departments in the Division of Environmental Health and Engineering Sciences, which had been placed under the direction of Dr. James L. Whittenberger. Later, the Division became a part of the new NEIHS-funded Kresge Center for Environmental Health at the School.

The launching of a new field of studies on solid-waste management in 1962 by Leslie Silverman and Melvin First continued the enlargement of the scope of concern related to environmental health problems in the Department of Industrial Hygiene.

Leslie Silverman became ill in 1966, and upon his death James L. Whittenberger was appointed Acting Head of the Department of Industrial Hygiene. Under the leadership of Drs. Whittenberger, Benjamin G. Ferris Jr., John M. Peters, David H. Wegman, and William A. Burgess, continuation of the historic interest in the relationship between occupational exposures and occupational disease was reflected by a series of more recent research efforts aimed at identifying new job-related hazards and bringing them under control. These included studies of toluene di-isocyanate (TDI) and lead toxicity; evaluations of health hazards involved in firefighting and rubber-tire manufacture; respiratory disease in granite cutting, talc mining, and meat wrappers employed in the retail food industry; and mortality in a number of different types of manufacturing concerns in Massachusetts. Morbidity or mortality studies determined whether excess disease was seen when compared to less-exposed populations. Industrial hygiene evaluations characterized exposure to specific chemical substances and were used in the development of recommendations for controlling identified hazards.

Although interdisciplinary teamwork had long marked occupational health research at the School, it was not until 1971 that another important form of collaboration was achieved. The School played a signal role as a non-partisan participant in environmental research of vital concern to differing societal groups: industry, government, consumers, and workers. A pioneering agreement with the United Rubber Workers and the BF Goodrich Company paved the way for similar three-way agreements with labor and management at the School and elsewhere. After careful negotiation, the Company and the Union agreed to make Company resources available and the University agreed to conduct research on occupational health, industrial hygiene, and occupational epidemiology in the rubber-tire industry. Over a period of ten years, the School's researchers created a detailed picture of health effects in the industry and proposed changes adopted by a joint labor-management team.

There has been continued interest in such collaborative studies, since joint labor-management sponsorship of occupational health studies carries with it great potential both for achieving cooperation from all parties and for having control methods suggested by the research results implemented. The meat wrappers project, which began in 1976 and was concluded in 1983, was another investigation that successfully adopted the rubber industry model. In 1984 members of the faculty and staff began studying the health effects of machining fluids used in the automobile industry. This project arose from the joint initiatives of the General Motors Corporation and the United Automobile Workers' Union. The Corporation provided funding for this study as a result of GMUAW contract negotiations.

In 1983, Dr. Richard Monson, Professor of Epidemiology, took over as director of the ERC and recruited most of the current faculty. Since the late 1980's new research initiatives developed by ERC faculty have involved combining molecular biology with epidemiology in the investigation of exposure-related disorders. Large-scale investigations now underway include genetic susceptibility to lung cancer and non-malignant respiratory disease, biomarkers of exposure and response after exposure to particulates, fuel-oil ash, bio aerosols, hydrocarbons, and heavy metals, such as lead and arsenic. The study of the gene-environment interactions has been the focus of many of the large research projects. In addition, occupational reproductive
studies of textile, petrochemical, and agricultural workers are being performed and incorporate state-of-the-art biologic markers. International occupational health studies have expanded greatly over the past nine years and the ERC faculty conducts collaborative research in Asia, Africa, and Latin America.

Other current research spans a wide variety of occupational health problems with the broad objective to identify and reduce or eliminate job-related health and safety hazards. These activities include developing and evaluating methods of exposure assessment, evaluating control systems, evaluating surveillance systems, developing and evaluating worker training, developing and evaluating programs that combine health promotion approaches with health protection, and examining health and economic outcomes associated with occupational illness and injury.

In 1996 Dr. David Christiani, Professor of Occupational Medicine and Epidemiology, and Elkan Blout Professor of Environmental Genetics, assumed Directorship of the ERC with Dr. Thomas Smith, Professor of Industrial Hygiene as Deputy Director. Under their leadership research has continued to expand in the areas they and their colleagues have developed through the 1990’s: an emphasis on innovative multidisciplinary investigations aimed at defining exposure-related disorders and developing methods to control them. In 2012, upon Dr. Smith’s retirement, Dr. Robert Herrick, Senior Lecturer in Industrial Hygiene, assumed the position of Deputy Director of the ERC.

Current investigations draw upon the expertise of epidemiologists, industrial hygienists, biostatisticians, toxicologists, cancer biologists, physiologists, engineers, chemists, physicists, and other occupational health specialists, as well as economists, sociologists, and behavioral scientists. The School of Public Health's role as a synthesizer of the efforts of scientists in many disciplines continues to be perhaps its greatest strength, for, as in its earliest years, its research and training programs in environmental and occupational health have lent breadth through the cross-disciplinary collaboration of many fields.

In 1977 the National Institute for Occupational Safety and Health (NIOSH) established regional centers of learning for occupational safety and health professionals within universities throughout the United States. The Centers were developed in response to the Occupational Safety and Health Act of 1970, which mandated that the Secretary of the Department of Health and Human Services ensure an adequate supply of trained professionals for this field. The Harvard School of Public Health was selected as the site of a NIOSH-sponsored Occupational Safety and Health Educational Resource Center (ERC) to serve the New England region. This award greatly enhanced the School's training capacity in this field and helped to strengthen the core of professionals conducting research as well. In 1997 the name of the center was changed to the Education and Research Center for Occupational Safety and Health, reflecting the Center's dual mission of professional training and research. The Harvard ERC offers interdisciplinary graduate-degree programs in occupational medicine, occupational epidemiology, occupational (industrial) hygiene, ergonomics/injury prevention, and in other disciplines that come into play to solve occupational health and safety problems. The educational programs target the New England states, but attract candidates for training from all areas of the country as well as from foreign countries. Indeed, Harvard University has always been a global leader in research and training for many disciplines and occupational health is one of them. Many of the leading occupational health scientists in the US and abroad, who direct training programs, research programs, government agencies, labor and corporate health and safety departments, are graduates of the Harvard ERC.

The objective of the Center is to train occupational safety and health professionals to recognize and prevent occupational injuries and disease, with prevention being the primary orientation. This objective is being accomplished by directing the training effort at the development of public-health perspectives, the acquisition of skills and knowledge for prevention, and the creation of sensitivity about the political and social climate in which professionals must act. Harvard ERC graduates are serving in many realms: academia, industry, all levels of government, hospitals, occupational health clinics, and labor unions.

In addition to the full-time degree programs, mid-career training is offered through short-term courses, seminars, and workshops for physicians, nurses, industrial hygienists, safety engineers, and other occupational safety and health professionals, paraprofessionals, and technicians. Lectures are presented by faculty, staff, and students of the Center, supplemented by external experts for coverage of special topics. Some of the courses are structured so that institutions of higher education, public health and safety agencies, professional societies, or other appropriate organizations can utilize the information to provide training at the local level to occupational health and safety personnel serving in the workplace. The Center often collaborates in offering such training with professional associations, educational institutions, and other organizations committed to providing training opportunities.

Another innovative aspect of the Center's activities is its Outreach Program. This program impacts the New England region through efforts to spark the development of occupational safety and health training programs or the incorporation of curriculum content at other institutions. The Visiting Scholars Program serves as the vehicle for achieving this objective. A secondary goal is to create awareness of occupational safety and health in professional and non-professional communities. The regional networking system that has been developed by this program has been fostered through interaction with colleges and universities, agencies, professional societies, public health departments, occupational health clinics, unions, management, community associations, and other entities.

Faculty, staff, and students all play a role in outreach and public service activities ranging from serving on committees and providing private consultation to presenting papers or seminars, offering curriculum assistance, screening groups of workers for health effects due to workplace exposures, and recruitment of potential students.
## WHO’s WHO?

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ELPIDOFOROS SOTERIADES, ScD | Visiting Scientist in Occupational and Environmental Medicine

KATHRYN TAYLOR, SD | Visiting Scientist in Environmental Health

VASILEIA VARVARIGOU, MD | Visiting Scientist in Environmental Health

ANTONIO VELA-BUENO, MD | Visiting Scientist in Environmental Health

PAL WEIHE, MD | Visiting Scientist in Environmental Health

ROBERTA F. WHITE, PhD | Visiting Scientist in Environmental Health

THOMAS WINTERS, MD | Visiting Scientist in Occupational Medicine; Preceptor in Occupational Medicine

ROBERT WRIGHT, MD, MPH Visiting Scientist in Environmental Health | Professor and Ethel H Wise Chair, Department of Preventive Medicine, Mt Sinai School of Medicine

MING-TSANG WU, MD, ScD, MOH | Visiting Scientist in Occupational and Environmental Health

BLAIR WYLIE, MD, MPH | Visiting Scientist in Occupational and Environmental Health

MPH AND OTHER MASTERS DEGREE STUDENTS

MARSHALL HAYES MPH | Advisor: Dr. Kales

WINTON LASLIE MPH | Advisor: Dr. Kales

MARK LAYER MPH | Advisor: Dr. Kales

MICHAEL MANNEN SM | Advisor: Weisskopf

ELIZABETH NOLAN MPH | Advisor: Dr. Kales

OCCUPATIONAL HYGIENE STUDENTS

YU-SHAN CHUNG SM | Advisor: Dr. Herrick

MATTHEW SCHAEFER SM | Advisor: Dr. Herrick

ANNA YOUNG SM | Advisor: Dr. Herrick

INJURY PREVENTION/ ERGONOMICS DOCTORAL STUDENTS

SARAH COPPOLA | Advisor: Dr. Dennerlein

OCCUPATIONAL ENVIRONMENTAL EPIDEMIOLOGY DOCTORAL STUDENTS

SHANGZHI GAO | Advisor: Dr. Christiani

YICHEN GUO | Advisor: Dr. Christiani

ANNA IOKHELES | Advisor: Dr. Korrick

FAN-YUN LAN | Advisor: Dr. Kales

CHENG-KUAN LIN | Advisor: Dr. Christiani

PI-I (DEBBY) LIN | Advisor: Dr. Christiani

ELIZABETH LOEHRER | Advisor: Dr. Christiani

ROSIE MARTINEZ | Advisor: Dr. Baccarelli

VY NGUYEN | Advisor: Dr. Weisskopf

ALEXANDER WU | Advisor: Dr. Weisskopf

QIANYU YUAN | Advisor: Dr. Weisskopf

YINNAN ZHENG | Advisor: Dr. James-Todd

BLAIR WYLIE, MD, MPH | Visiting Scientist in Occupational and Environmental Health
FACULTY ADVISORS
Faculty advisors play a key role in planning curriculum, referring students to resources available within the School and the University, and shaping career goals. Students should meet with their advisors to devise a suitable program prior to filing study forms and course cards with the Registrar. Deviations from the specified curricula must be approved as an exception by the ERC faculty. Advisors will present requests to the faculty for discussion and approval at regularly scheduled administrative meetings.

It is the responsibility of the student to maintain open lines of communication with his or her advisor. However, students are not restricted to their appointed advisor in seeking guidance in career, academic, or personal matters. Every member of the Center faculty is prepared to provide this kind of assistance.

A change in advisor assignment may be made at the request of the student. Requests of this nature should be brought to the director of the Center. When approved, the administrator will notify the Registrar of the changes.
Office locations and telephone numbers of faculty advisors and staff members in the Environmental and Occupational Medicine and Epidemiology Program are listed below. All of the faculty and staff look forward to working with you and helping make your participation in the Center's programs stimulating, educational, and enjoyable.

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changes are reversible and responsive to environmental DNA sequence. Unlike genetic mutations, which represent rare structure and gene expression without changing the underlying pollutants, which are known to be relevant to disease causation. pesticides, dioxin-like compounds, and persistent organic including particulate air pollution, airborne benzene, metals, on DNA methylation of a variety of environmental pollutants, influences. Using a highly quantitative Pyrosequencing-based approach for DNA methylation analysis, he has been examining the effects on DNA methylation of a variety of environmental pollutants, including particulate air pollution, airborne benzene, metals, pesticides, dioxin-like compounds, and persistent organic pollutants, which are known to be relevant to disease causation.

ANN BACKUS
Ann Backus, MS, is Director of Outreach for the Harvard ERC, and the Harvard NIEHS Center Grant. Her responsibilities include the Visiting Scholars Program, the Minority Mentorship Program (ERC), and the development of other programs that improve the access of the public, policy-makers, academicians, and practicing health professionals to concepts and current research findings in occupational and environmental health. Ms Backus is PI on the Northeast Drum Winch Safety Study funded by NIOSH through the Northeast Center for Agricultural Safety and Health.

She is interested in management issues related to occupational safety and health and the resolution of workplace concerns through competent management of human resources. Her current work includes membership in the Maine Commercial Fishing Safety Advisory Council, and work with the Marine Safety Office of the US Coast Guard to reduce injury and death of fishermen. Her column FISH SAFE appears bi-monthly in Commercial Fisheries News; she also writes under the byline, The Voice of Safety, for Fishermen’s Voice and authors occasional articles in Landings, the monthly publication of the Maine Lobstermen’s Association.

In the field of environmental health, Ms. Backus promotes environmental education for academic and public health nurses. She conducts community-based projects related to the improvement of air quality and of respiratory health. Ms. Backus is the coordinator for the Harvard Occupational and Environmental Medicine Residency Program.

DAVID C. BELLINGER
Dr. Bellinger's research focuses on neurodevelopmental impacts of children's exposures to environmental chemicals. His studies have focused on lead, elemental mercury, methyl mercury, cadmium, arsenic, fluoride, PFOAs, and pesticides. He is particularly interested in identifying the bases of inter-individual variation in vulnerability (including factors such as mixed exposures, genotype, stress, enrichment opportunities, etc.). He is also interested in methods for expressing the global burden of exposures to chemicals.

DAVID C. CHRISTIANI
Dr. Christiani became Director of the EOME Program in July 1996. His major research interest is in occupational epidemiology, particularly in developing new methods and applications of physiological and biologic markers in population studies. He has been involved in epidemiologic studies of working populations in the US and abroad. For example, with colleagues in Shanghai, China, he has been conducting a longitudinal study of respiratory disease in cotton textile workers for the past 35 years. Study objectives have included determining the rate of loss in lung function among cotton dust- and endotoxin-exposed workers, using silk workers as controls. Objectives have also included evaluating symptoms in chronic lung function loss as well as the relationship between acute changes in lung function and chronic lung function loss and exposure-response relationship to gram-negative bacterial endotoxin and cotton dust exposure.

Other major projects have included the development of a multi-disciplinary approach for the molecular and genetic analysis of lung and esophageal cancer in collaboration with other researchers in the ERC and the Massachusetts General Hospital. He is also leading studies using biologic markers of airway inflammations, lung injury and carcinogenesis. Other areas of occupational epidemiology work have included investigating cardiac effects of occupational particulate exposure; investigation of respiratory, skin, renal, and neuropsychological abnormalities among solvent-exposed printing pressmen; respiratory disease in workers exposed to machining fluids, with particular attention to occupational airways disease; occupational asthma among health-care
workers; molecular epidemiology of acute lung injury; cardiopulmonary responses to metal fume exposure, and development of biological markers for use in assessing occupational and environmental diseases.

He has conducted occupational health research on four continents and has developed a wide network of collaborators. He has a particular interest in collaborative occupational health research in developing countries and has adapted state-of-the-art research techniques for use in settings of industrializing countries in East Asia, Africa, and Central America. Current international projects include, in addition to the study of respiratory disease in cotton textile workers in China, reproductive effects of exposure to pesticides and agricultural chemicals in China; respiratory effects of herbicide and pesticide exposure in Southern Africa; a study of arsenic exposure and bladder and cancer in Taiwan, and Bangladesh; a study of brain neoplasms and leukemia in children in Taiwan; and cardiac and respiratory effects of particulate exposure in both occupational and community populations.

In addition to his research and teaching at Harvard, Dr. Christiani practices Pulmonary and Occupational Medicine at the Massachusetts General Hospital. In addition, Dr. Christiani directs the ERC Occupational Epidemiology academic core.

Dr. Christiani has published over 600 articles in the medical literature and serves on several federal advisory committees and journal editorial boards.

THEODORE K. COURTNEY
Mr. Courtney is an Instructor in Injury, Safety and Ergonomics at the Department of Environmental Health. His research includes analytic studies of slips, trips and falls at work, at home and in the community; research on perception of slipperiness; comparative research on fall-related injuries in the US and Europe; US workforce injury surveillance studies; research on working time and fatigue; and studies of injury in the People’s Republic of China. He is a recipient of the 2003 William Floyd Medal, the 2006 NORA Partnering Award, and the 2008 Best Paper Award in Ergonomics for his accomplishments in slips and falls research and a recipient of the 2014 Excellence in Science Award from the American Public Health Association Injury Control Section. He currently serves on the Board of Scientific Counselors of the National Institute for Occupational Safety and Health, U.S. Centers for Disease Control and Prevention.

Mr. Courtney is board certified in occupational safety and ergonomics. He is an Associate Editor of Accident Analysis and Prevention, serves on the Editorial Boards of the Journal of Occupational and Environmental Hygiene and Injury Epidemiology, and has previously served on the Editorial Board of Professional Safety. Mr. Courtney teaches in EH243 and serves on the Advisory Board of the Occupational Injury Prevention Program.

JACK T. DENNERLEIN
Dr. Dennerlein has 20 years of research in injury prevention and biomechanics with a focus on occupational ergonomics. He joined the Harvard School of Public Health faculty in 1999. He is the co-director of the Occupational Injury Prevention Research Training Program and Co-Principal Investigator the School’s Center for Work, Health, and Well Being. Since September 2012, Dr. Dennerlein has been a Professor in the Department of Physical Therapy within the Bouve College of Health Sciences at Northeastern University, and remains an Adjunct Professor at the Harvard Chan School.

His projects include comparative effectiveness research in ergonomics and injury prevention, evaluating and developing ergonomic interventions in terms of reducing biomechanical load and musculoskeletal health outcomes. In the laboratory, his research evaluates the biomechanical differences in proposed office equipment and mobile computing technology including multi-touch devices such as the iPhone and iPad. With colleagues from the University of Washington his group is measuring the changes in whole body vibration exposure of an electromagnetic active whole body vibration cancelation seat suspension system and its effects on physiological responses in the low back muscles of truck drivers. In addition, Dr. Dennerlein’s group is using randomized controlled trials to evaluate employee based incentive program to improve the safety of construction workers (reducing injury) and the health effects of an electromechanical active whole body vibration cancellation seat suspension system developed by Bose for Long Haul Truck drivers.

His research projects also include the development of exposure assessment instruments and methods for biomechanically relevant factors in the epidemiology of work-related musculoskeletal disorders. These biomechanically relevant factors include force, limb movement & posture, and muscle efforts (electromyography EMG). Currently we are using these instruments in a large field study to determine associations between force and various psychosocial work environments. We have developed a method that estimates spinal loading during lifting tasks based on capturing four video frames during a lift.

His research projects in occupational biomechanics are determining relationships between task constraints and motor control of movement. We have observed that single finger – single keying typing relies on a large extent on the elbow joint; however, when the movement requires more complexity such as tapping on two keys, the shoulder becomes involved. This also includes the development of a musculoskeletal model for the finger, hand, and forearm for dynamic hand activities. We have applied this model to typing to explore the effects of wrist angle during keyboard use. We found that the reduction of the wrist extensor muscle’s moment arm about the wrist during flexion increases the required force to counteract gravity, suggesting that flexed wrist postures should be avoided as much as extended wrist postures.

DOUGLAS W. DOCKERY
Professor Doug Dockery, MS, ScD, is Professor of Environmental Epidemiology. Professor Dockery is internationally known for his innovative work in environmental epidemiology, particularly in understanding the relationship between air pollution and respiratory and cardiovascular mortality and morbidity. He was one of the principal investigators of the landmark Six Cities Study of Air Pollution and Health, which showed that people living in communities with higher fine particulate air pollution had shorter life expectancies.

Professor Dockery has studied the health effects of air pollution in studies of people who have been followed for a few months up to 25 years. His research has shown that combustion particles in the air are linked to increased morbidity and mortality even at the relatively low concentrations observed in developed countries today. Specifically, his work has shown that episodes of particulate air pollution are associated with increased numbers of deaths, increased hospital admissions and emergency room visits, respiratory conditions including asthma attacks, increased respiratory symptoms and lower lung function and cardiovascular conditions including heart attacks and cardiac arrhythmias. Long-term follow-up studies have shown
particulate air pollution is associated with shortened life expectancy in adults and increased chronic respiratory illness and lower lung function in children. This research has led to the current standards for particulate air pollution both nationally and internationally. He was first author of the most cited air pollution paper in the peer-reviewed literature.

Dr. Dockery is currently evaluating the benefits of improved air quality on people’s health. He has been mentor to some of the outstanding investigators in environmental epidemiology including Bert Brunekreef, Annette Peters, Arden Pope, and Joel Schwartz. The International Society for Environmental Epidemiology honored him with its first award for Outstanding Contributions to Environmental Epidemiology in 1999 and the first Best Paper in Environmental Epidemiology Award in 2010.

JOHN S. EVANS
Dr. Evans’ research focuses on risk assessment. Areas of interest include risk assessment by analogy, characterization of uncertainty in exposure and risk assessment, and estimation of the value of information.

Currently he is working with a team of scientists from HSPH and Mexico’s National Institute of Public Health to estimate the health benefits generated by substantial improvements in Mexico City’s air quality since 1990. Dr. Evans is also working with Harvard’s China Project to assess the impacts of energy policies on air pollution and health throughout China.

Past work has included (1) a study of the health effects of the Kuwait Oil Fires; (2) an analysis of the health and economic benefits that could be achieved in the US by a 10% reduction in intake of methyl mercury; (3) a study of the current levels, and sources of, ambient particulate matter in Kuwait; (4) an analysis of the fish consumption, fish mercury levels, hair mercury levels and health risks to the Kuwaiti population from the consumption of mercury laden fish; and (5) an expert judgment study of the uncertainty in estimates of the mortality impacts of small changes in levels of ambient particulate matter in the US and Europe.

From 2009 through 2014, Dr. Evans directed the HSPH-affiliated Cyprus International Institute for Environment and Public Health. Previously he co-directed the Program in Environmental Science and Risk Management, served as the director of the IPH Program in Environmental Health and Public Policy, and was a leader in the Harvard Center for Risk Analysis. He is a founding member of the Society for Risk Analysis and was the first recipient of its Outstanding Educator Award. Dr. Evans has served on the EPA Science Advisory Board, both as a member of the Drinking Water Subcommittee and as a consultant to several committees, and served as a member of the NAS Committee to Estimate the Health Benefits of Further Improvements in Air Quality.

ROSE H. GOLDMAN
Dr. Goldman is the course director for Introduction to Environmental Health (EH201). She is the former Chief of the Division of Occupational & Environmental Medicine at Cambridge Health Alliance (CHA) and is currently Director of Faculty Affairs for CHA’s Dept. of Medicine. She is board certified in both internal medicine and preventive medicine (occupational medicine). Her academic appointments are as Associate Professor of Medicine at Harvard Medical School, and Associate Professor of Environmental Sciences at Harvard T.H. Chan School of Public Health. Dr. Goldman’s research has centered on clinical epidemiological questions, particularly involving neurotoxicity, repetitive strain injuries, metals, and pediatric environmental health as well as innovative education methods. She also serves as Associate-director of the New England Pediatric Environmental Health Specialty Unit, a collaboration between Cambridge Hospital and Children’s Hospital. Dr. Goldman is an occupational/environmental medicine consultant to the Massachusetts/Rhode Island Poison Control Center, and to the Massachusetts Adult Lead Registry. She is an ardent educator, and has also been involved in projects and research involving teaching occupational and environmental health both in the US and abroad. She is also CHA’s site director for the new Harvard Medical School Course, “practice of medicine.”

PHILIPPE GRANDJEAN
Dr. Grandjean is an Adjunct Professor, who brings international experience with emphasis on life-course epidemiology. His studies of birth cohorts in the Faroe Islands focus on mercury, PCB, and endocrine disruptors and their effects on development, neurobehavioral, cardiovascular, and immune function. The results have led to decreased exposure limits for mercury in many countries. Dr. Grandjean’s most recent book is ‘Only One Chance’, on the impact of chemical pollutants on brain development. He has also authored handbooks on ‘Skin Penetration’ and ‘Clinical Effects of Environmental Chemicals’. Among current activities, he is examining the implications of the precautionary principle for research and prevention.

Dr. Grandjean is also Professor and Chair of the Department of Environmental Medicine at the University of Southern Denmark, Odense, Denmark. He serves on editorial boards of several scientific journals and is founding editor of the web-based journal Environmental Health. As part of his international work, he has served on or chaired several committees under the auspices of the EC, IARC, IPCS, UNEP, WHO, and other organizations.

RUSS B. HAUSER
Dr. Hauser’s research interest is in the field of reproductive and developmental epidemiology. He is currently conducting several studies on the relationship of environmental and occupational chemicals with fertility and pregnancy outcomes. The studies are being conducted in collaboration with researchers at Massachusetts General Hospital and Brigham and Women’s Hospital. His specific interests are to determine if organochlorines, pesticides, bisphenol A, and phthalates adversely affect fertility and pregnancy through altered endocrine signaling.

He is also conducting a longitudinal study on the relationship between dioxins and sexual maturation and physical growth among adolescent males in Chapaevsk, Russia. Individuals in Chapaevsk are exposed to high levels of dioxins as a result of environmental contamination from a large complex of chemical plants in the city. The study is being conducted in collaboration with Russian investigators from the Chapaevsk Medical Association and scientists from the Russian Academy of Sciences, Moscow.

Dr. Hauser is director of the ERC Pilot Projects Research Training Program. He is also director of the Organic Pollutants research core in the Harvard Chan School’s NIEHS Center for Environmental Health.

ROBERT F. HERRICK
Dr. Herrick is the ERC Deputy Director. His research interests are centered on the assessment of exposure as a cause of
occupational and environmental disease. Within this area, he has investigated the development of methods for measuring the biologically active characteristics of epoxy paint aerosols. He has also conducted studies of work processes in the construction and foundry industries to develop task-based models to identify and control the primary sources of worker exposures. In his work on exposure assessment in epidemiologic studies, Dr. Herrick has investigated the reconstruction of historical exposures to formaldehyde, ethylene oxide, benzene, and acrylonitrile.

Dr. Herrick is also active in international health, specifically in the development and practice of occupational hygiene. He is past-president of the International Occupational Hygiene Association, and he is incoming chair of the American Conference of Governmental Industrial Hygienists.

TAMARRA JAMES-TODD
Dr. James-Todd’s research focuses on reproductive and diabetes epidemiology in the context of environmental chemical exposures. Specifically, she evaluates the role of environmental chemicals and adverse pregnancy outcomes related to glucose dysregulation in mothers and their offspring. These studies are being conducted in a number of Harvard-based pregnancy cohorts. Of interest, Dr. James-Todd assesses the relationship between endocrine disrupting chemicals, such as phthalates and bisphenol A, and glucose dysregulation during and after pregnancy. She also focuses on racial/ethnic and socioeconomic disparities as it relates to environmental chemical exposures and diabetes risk in mothers and their offspring.

In addition, Dr. James-Todd is conducting several educational intervention studies for women with a recent history of gestational diabetes, as well as women with preexisting diabetes in pregnancy. These interventions are designed to improve lifestyle factors during the postpartum period to reduce the risk of type 2 diabetes and diabetes-related complications. The studies are being done in collaboration with investigators at Brigham and Women’s Hospital and the Joslin Diabetes Center.

STEFANOS N. KALES
Dr. Kales became the Director of the Occupational & Environmental Medicine Residency in July 2006. He is a Professor of Medicine at Harvard Medical School; Professor at the Harvard T.H. Chan School of Public Health; Division Chief of OEM and the Medical Director of Employee Health & Industrial Medicine at the Cambridge Health Alliance. He is trained in Internal Medicine and OEM and Board-Certified in Preventive Medicine: Occupational Medicine, and has been elected to Fellowship by both the American College of Physicians and by the American College of Occupational & Environmental Medicine.

Dr. Kales has participated in a wide range of research, advisory and teaching activities on five continents, resulting in over 135 publications. His primary research has focused on cardiometabolic risk; including studies of heart disease in firefighters and police and sleep apnea in trucking. Further studies have sought to identify risk factors for adverse health and employment outcomes, and heart disease in particular. His group’s work is influencing medical standards for firefighters’ fitness for duty, the need for improved wellness programs and methods for determining the causal relationship of heart disease among firefighters and police to their job activities and other factors.

Dr. Kales’ research on firefighters has received Massachusetts, Federal and Canadian funding. Other collaborations focus on occupational sleep medicine as well as cardiovascular and metabolic risk factors and their evolution over time. Additional research areas have included carbon monoxide exposure, chemical terrorism and chemical emergencies and heavy metals. One particular area, related to lead exposure from traditional Indian medications has had wide impact, triggering changes in the regulation of these medications by the Indian and Canadian governments and spurring various American health departments to scrutinize the sale of these folk remedies.

Dr. Kales is on the editorial boards of Occupational Medicine (London), the Archives of Environmental and Occupational Health and a Greek occupational health journal. He is also an occupational medicine consultant to the Massachusetts/Rhode Island Poison Control Center.

JEFFREY N. KATZ
Dr. Katz is a Director of Health Services Research at the Robert Brigham Multipurpose Arthritis and Musculoskeletal Diseases Center at Brigham and Women’s Hospital. His primary appointment is as Associate Professor of Medicine, HMS. His work has focused on optimizing clinical and occupational outcomes of work associated upper extremity problems. He has studied cohorts of workers with carpal tunnel syndrome in diverse occupational groups throughout Maine, and large population based cohorts of patients undergoing total hip replacement in the Medicare population. He has employed a range of methodological approaches in his work including qualitative research, basic development of outcome assessment scales, epidemiology, psychometrics, administrative data analysis and cost effectiveness analysis.

SUSAN KORRICK
Dr. Korrick’s research focus is on children’s environmental health. Specifically, she studies the developmental, cognitive, behavioral, and immune toxicities of common environmental contaminants including metals (lead, mercury, manganese, arsenic), organochlorines (pesticides, polychlorinated biphenyls (PCBs), and dioxin-like compounds), and prototypical endocrine disruptors (phthalates and phenols including bisphenol A or BPA). Much of her research emanates from ongoing longitudinal studies in the New Bedford Birth Cohort (NBC) which she has directed as PI since 1993. This work is focused on the relation of early life exposures to metals and organochlorines with subsequent childhood growth, cognition, and behavior. Results of NBC studies have contributed new insights into potential environmental risk factors for common behavioral disorders of childhood including symptoms of Attention Deficit Hyperactivity Disorder (ADHD). In collaborations with colleagues at the University of Illinois and Dartmouth College, she is studying the relation of phthalates and BPA with sexually dimorphic behaviors in the NBC adolescents and neurodevelopmental toxicities of early life arsenic exposure in the New Hampshire Birth Cohort (NHBC). In related work, Dr. Korrick’s research includes studies of environmental contaminants and women’s reproductive health as well as studies of cognitive function and mental health among aging women, the latter done in collaboration with the Nurses’ Health Study. In addition to her research program, Dr. Korrick has a clinical practice in Occupational and Environmental Medicine as part of the Department of Medicine, Brigham and Women’s Hospital (BWH).
PETROS KOUTRAKIS
Dr. Koutrakis designs and develops personal samplers that measure human exposures to acidic aerosols and gases. His samplers and methodology have been utilized in national and international epidemiologic studies. He has also pioneered a new passive sampler which assesses human exposures to ozone.

Dr. Koutrakis recently became the technical editor-in-chief for the Journal of the Air & Waste Management Association, the oldest and largest international publication in this field. He continues to investigate the physical and chemical processes affecting the formation, transport, and fate of indoor air contaminants. His two largest current projects, both funded by the US EPA, involve the investigation of acid aerosol exposures in metropolitan settings and the development of sampling methods for exposure assessment of inorganic air pollutants. He is particularly interested in assessing the relative contributions of indoor and outdoor sources as well as investigating chemical reactions occurring on indoor surfaces. Dr. Koutrakis applies multivariate analysis techniques such as factor, cluster, and correspondence analysis to identify and apportion sources of air pollutants, developing methods that are very important for emission control strategies.

CAROLYN S. LANGER
Dr. Carolyn Langer is the Chief Medical Officer for MassHealth, the Massachusetts state Medicaid program. In this role, she directs the Office of Clinical Affairs and provides clinical leadership to the Medicaid program. She has an extensive career as a physician executive, including positions as Medical Director at Harvard Pilgrim Health Care, Fallon Community Health Plan, Blue Cross Blue Shield of MA, and Tufts Health Care Institute, and as VP and Chief Medical Officer at ManagedComp (a managed care workers' compensation company).

Dr. Langer is an Instructor at the Harvard School of Public Health (HSPH), where she teaches a graduate course on Occupational Health Law, Policy and Administration and sits on the HSPH Occupational Medicine Residency Advisory Committee. She also holds an appointment as Associate Professor at the University of Massachusetts Medical School and sits on the Advisory Board for the Health Policy and Management Department at the Boston University School of Public Health. Dr. Langer has lectured extensively on the Americans with Disabilities Act, ethics in occupational health, legal aspects of workplace reproductive hazards and more.

Dr. Langer received her medical degree from Jefferson Medical College and completed her residency at the Harvard School of Public Health. She is board certified in occupational medicine. Dr. Langer holds a law degree and a Masters in Public Health from Harvard University. She is also a retired Colonel and former flight surgeon in the Army National Guard.

DAVID A. LOMBARDI
Dr. Lombardi is Instructor in the Department of Environmental Health and adjunct assistant professor at the University of Massachusetts Amherst. He joined the Harvard ERC faculty in 2003. Dr. Lombardi has been integrally involved in developing and instructing our core course in Injury Epidemiology and Prevention (EH 282). Key areas of training include lectures on case-crossover methods, narrative analysis methods, and analytic epidemiological study designs to meet the training needs of our program. He also advises trainees, specifically working closely with doctoral students on methodology and studies of traumatic injury. He has co-authored many publications with program faculty and students concerning occupational injury epidemiology topics and continues to contribute to the literature on novel methodological approaches for studying acute injuries. In 2006, he received the NIOSH NORA Partnering Award from the U.S. Centers for Disease Control and Prevention (CDC) for his work with colleagues as co-investigator of a major analytic and intervention project on slips, trips, and falls in healthcare workers. Dr. Lombardi leads the injury epidemiology aspects of the training program. Dr. Lombardi is on the Editorial Advisory Board for the International scientific journals, Scandinavian Journal of Work, Environment & Health, Accident Analysis and Prevention, Injury Epidemiology, and Conference Papers in Medicine.

MAITREYI MAZUMDAR
Dr. Maitreyi Mazumdar is a pediatric neurologist at Boston Children’s Hospital. Her major research interest lies in the effects of environmental exposure and the development of childhood neurological diseases. She is currently leading Project 1 of the Harvard Chan School Superfund Program; she is establishing a new birth cohort in Bangladesh that studies the long-term effects of developmental exposure to arsenic, lead and manganese. Dr. Mazumdar also is leading studies in Bangladesh that investigate the associations between arsenic exposure and neural tube defects. As an attending neurologist at Boston Children’s Hospital, Dr. Mazumdar cares for patients with complex neurological problems including refractory epilepsy, cerebral palsy, mental retardation and chronic pain.

JAMES McDEVITT
Much of Dr. McDevitt’s research activity to date has centered on developing novel methods for the assessment of microbial aerosols using molecular and microbiology techniques. Recognizing a need for improved estimates of bioaerosol inhalation exposure within a conventional industrial hygiene context, he utilized quantitative PCR measurement of microbial nucleic acid and cell culture methods to measure viruses in conjunction with traditional air sampling methods to devise a means of reliably determining airborne concentrations of infectious bioaerosols. He has used these aerosol-measuring techniques to study inactivation of aerosolized viruses through the use of heat, ultraviolet germicidal irradiation, and chemical methods under varying environmental conditions.

Dr. McDevitt’s current research is focused on using exhaled breath particles as biomarkers of infectious and inflammatory pulmonary disease. Currently he is studying airborne transmission of respiratory viruses. Source characterization of exhaled breath particle number and size will be critical for understanding the spread of airborne infection as well as for determining appropriate interventions. The collection of exhaled breath particles can also be used for noninvasive collection of epithelial lining fluids (ELF) and enables the analysis of a wide variety of biomarkers of pulmonary disease. Dr. McDevitt’s research is focusing on optimizing breathing maneuvers, air samplers, and molecular analysis techniques to increase sensitivity and allow meaningful study of exhaled breath proteins as biomarkers of exposure.

PATRICIA McGAFFIGAN
Patricia McGaffigan is the Associate Director for Administration and Finance in the Environmental and Occupational Medicine and Epidemiology Program and the Administrator of the Harvard ERC. Her office is responsible for the administration and management of program resources, including finances, grants, personnel, IT, operations, faculty affairs, and planning. She
oversees grants management and compliance for the program’s research portfolio of close to $15 million in federal and nonfederal funding. She has over 25 years of research, project, and administrative management experience.

**EILEEN McNEELY**

Dr. McNeely became interested in the health effects of work and the environment while treating patients in Appalachia, noting the central role or work in the individual’s life. Her area of study includes the broader political, economic and social arrangements that affect work, productivity, health, and the quality of life.

She is interested in health care policy, workers’ compensation, organizational behavior and psychology, in addition to, the traditional focus of physical exposures in the environment.

She is principal investigator for the largest cohort study of flight attendants. In addition, she is founder and Co-Director of SHINE at the Harvard Center for Health and the Global Environment. SHINE aims to advance wellbeing as part of the corporate strategy for sustainability and social responsibility. SHINE research includes the development and testing of the SHINE Wellbeing Index.

Dr. McNeely teaches the core course in Work, Health and Productivity (EH523).

**MURRAY MITTLEMAN**

Dr. Mittleman is Professor of Epidemiology. He is Faculty Director and Chair of the MPH program and leads the concentration in Quantitative Methods. Dr. Mittleman is a cardiovascular epidemiologist and methodologist. He has an interest in the health effects of environmental and occupational exposures on cardiovascular outcomes.

**BRIGID O’CONNOR**

Brigid O’Connor is Director of Continuing Education for the ERC. She is responsible for ERC continuing education programs.

**GLORIAN SORENSEN**

Glorian Sorensen, PhD, MPH, is Professor of Social and Behavioral Sciences in the Harvard T.H. Chan School of Public Health, the Principal Investigator for the Harvard T.H. Chan School of Public Health Center for Work, Health and Wellbeing. This Center, funded by the National Institute of Occupational Safety and Health, represents a strong collaboration between the Departments of Environmental Health and Society, Human Development and Health. She is also the Faculty Vice President for Faculty Development at the Dana-Farber Cancer Institute, where she directs the Center for Community-Based Research.

The core of Dr. Sorensen’s cancer prevention research is randomized worksite- and community-based studies that test the effectiveness of theory-driven interventions targeting individual and organizational change. A theme of this work is to test the efficacy of behavioral and organizational interventions that are embedded in the social context or environment in which people live and work. Her research has focused on a range of settings, particularly worksites and labor unions. She conducted the first randomized controlled worksite intervention trials to integrate occupational health and health behaviors, and has designed and tested cancer prevention interventions in across a range of industries, including manufacturing, construction, health care, social service, and transportation, and with small and large worksites. These interventions aim in particular to address disparities in worker health outcomes and to be effective for low-income, multi-ethnic populations.

Dr. Sorensen’s research also examines disparities in tobacco control and consumption in India; she has developed strong collaborations with investigators at the Healis-Sekhsaria Institute of Public Health in Mumbai. Her research in India currently includes two studies funded by the National Cancer Institute to design and test tobacco use cessation interventions with teachers in the state of Bihar and with manufacturing worksites in Mumbai. Dr. Sorensen’s research has included a PO1 program project, several U01’s, and multiple RO1’s funded by NCI, NIEHS, CDC, and NIOSH, as well as through foundations, including the Robert Wood Johnson Foundation.

She also leads the Center for Community-based Research at Dana-Farber Cancer Institute and the Training Program in the Lung Cancer Disparities Center, which train pre- and post-doctoral fellows in cancer prevention.

**JOHN D. SPENGLER**

Dr. Spengler has conducted research in the areas of personal monitoring for particles, acid aerosols, metals, nitrogen dioxide, carbon monoxide, and volatile organic compounds among other pollutants. His experience includes air pollution meteorology, indoor air pollution, and their health effects. Current interests are the global health implications related to energy, housing, small industries, and the application of comparative risk analysis and pollution prevention.

**VISHAL S. VAIDYA**

Vishal’s principal effort is in basic and translational research, with the remaining time devoted to teaching and administration. Vishal Heads the Systems Toxicology program within the Harvard Program in Therapeutic Sciences at Harvard Medical School and Directs the Laboratory of Kidney Toxicology and Regeneration at Brigham and Women’s Hospital. Vishal has been successful in receiving consistent funding from NIH, foundations and industry; have delivered more than 70 seminars as invited/keynote speaker and written over 70 peer-reviewed publications (>5600 citations; h-index 37). Supported by an NIH/NIEHS Pathway to Independence grant, he led the team at Brigham and Women’s Hospital in collaboration with the Predictive Safety Testing Consortium to produce results pivotal to earning regulatory qualification for Kidney Injury Molecule-1 (KIM-1) as a new safety biomarker. Vishal was awarded the Leading Edge in Basic Science Award in 2014 by the Society of Toxicology for this work, as it was a major milestone in toxicology that provides regulatory assurances that drug candidates in development can be safely tested in human clinical trials. Named the NIH/NIEHS Outstanding New Environmental Scientist (ONES) in 2011, Vishal led an excellent laboratory team that shed light on the role of fibrinogen as a translational biomarker and therapeutic target in acute and chronic kidney injury. In 2013, Vishal was selected as one of six North American scientists to win the Innovation in Regulatory Science Award from the Burroughs Wellcome Fund to break new ground by classifying the toxic response of a kidney cell using a composite index of subtle molecular changes in genes and protein signaling. Vishal’s laboratory uses cellular systems, mouse models as well as human biospecimens, and applies methodologies at the interface of cell/molecular biology, systems pharmacology and translational science to understand kidney disease.

Vishal is also very committed to teaching. He directs the course “Understanding Biomarker Science: From Molecules to Images,” offered through the Harvard Catalyst. The 6th iteration of this course (attended by over 100 participants from academia,
industry, the FDA, and NIH) was offered over 4 days in April 2016. Vishal also direct a 5-credit course on Principles of Toxicology-Molecular and Translational Toxicology at HSPH in the Fall (EH504).

Vishal plans on continuing the efforts in innovative research and education of the next generation of scientists, with the goal of preventing and predicting kidney disease, as well as identifying novel mitigation strategies.

GREGORY R. WAGNER
Dr. Wagner is an Adjunct Professor, Harvard T.H. Chan School of Public Health. He recently served as U.S. Deputy Assistant Secretary of Labor for Mine Safety and Health. Previously he served as Director of the NIOSH Division of Respiratory Disease Studies. Dr. Wagner works closely with the World Health Organization (WHO) and International Labour Organization (ILO) in international efforts to combat occupational lung disease. He has represented the U.S. on a variety of expert committees of the WHO and ILO, including those responsible for updating the ILO listing of occupational diseases, recommending approaches to medical screening and surveillance of workers, and revising the system for classifying radiographs for pneumoconiosis. Dr. Wagner has chaired the Ethics Committee for the American Thoracic Society (ATS) and served on the Ethics Committee of the American College of Occupational and Environmental Medicine that rewrote their code of ethics. He has served on ATS committees developing policy statements on silicosis, on the adverse health effects of air pollution, and on the diagnosis of non-malignant disease from asbestos exposure; and on federal advisory committees for the Departments of Energy and Justice on issues related to beryllium disease prevention and compensation for uranium miners. A graduate of Harvard College and Albert Einstein College of Medicine, Dr. Wagner has both taught and practiced internal and occupational medicine, and is board certified in both fields. His current professional work focuses on optimizing the role of government in the prevention of disease and understanding the consequences of changes in employment relationships on worker health, safety, and well-being.

DAVID H. WEGMAN
Dr. Wegman served on the faculty of the Harvard T.H. Chan School of Public Health from 1972-83 and was director of the Occupational Health Program from 1980-83. He then served as Chair of Occupational and Environmental Health at UCLA’s School of Public Health until 1987, when he became the founding chair of the Department of Work Environment at the University of Massachusetts in Lowell, now one of the leading academic centers of research and training in New England. From 2003-2008 Dr. Wegman served as dean of a new School of Health and Environment. In 2010 Dr. Wegman became Professor Emeritus at University of Massachusetts.

Dr. Wegman has focused his research on epidemiologic studies of occupational respiratory disease, musculo-skeletal disorders, and cancer. He carried out some of the early work showing low-level effects of isocyanates on non-asthmatics, and has collaborated with Dr. Christiani in the study of cotton textile workers in China. In related work he is exploring issues of variability in peak expiratory flow measurements in normal populations. Another major interest has been the developing methods to study subjective outcomes such as respiratory or irritant symptoms reports. He also directed a major research activity exploring health and safety risks among construction workers involved in the building of the Third Harbor Tunnel and the underground Central Artery in Boston.

His professional activities include having served in leadership roles in the American Public Health Association (APHA), the International Commission on Occupational Health (ICOH) and the International Epidemiological Association (IEA) and as an editorial board member for American Journal of Public Health, American Journal of Industrial Medicine and the International Journal of Occupational and Environmental Health Dr. Wegman has served on or chaired a number of ad hoc Academy committees, most recently chaired the committees on the Role of Human Factors in Home Health Care, and the External Evaluation of the National Institute of Disability and Rehabilitation Research and previously chairing the NRC-IOM committees on Review of NIOSH Research Programs, the Health and Safety Needs of Older Workers, and the Health and Safety Consequences of Child Labor. He currently serves on the NRC committees on Mine Safety: Essential Components of Self-Escape and on Worker Safety on Offshore Wind Farms.

Dr. Wegman chaired the 1995-6 MSHA Advisory Committee on the Elimination of Pneumoconiosis Among Coal Mine Workers and previously served on the Department of Labor’s Standards Advisory Committee on Metal Working Fluids; the Boards of Scientific Counselors for NIOSH and for the National Toxicology Program as well as on the EPA Science Advisory Board. In 1998 he was awarded a Fulbright Senior Fellowship for study of Health and Safety of Older workers in Sweden and then, in 2006 he was appointed chair of the International Evaluation Group for an analysis of Occupational Health Research in Sweden. He also serves as Chair of the Epidemiology Review Board for DuPont Corporation and is newly appointed to the Board of Directors of the Alpha Foundation for Improvement of Mine Safety and Health.

Dr. Wegman has published over 100 articles in the medical literature. In addition to articles addressing the research interests noted, he has also published on public health and policy issues concerning such issues as hazard and health surveillance, methods of exposure assessment for epidemiologic studies, the development of alternatives to regulation and the use of participatory methods to study occupational health risks. He is co-editor with Dr. Barry Levy of one of the standard textbooks in the field of occupational health, Occupational Health: Recognition and Prevention of Work-Related Disease, the 6th edition of which was published in 2011.

MARC WEISSKOPF
Dr. Weisskopf’s primary research interests, stemming from his background in neurobiology, include neurodegenerative disorders and how environmental factors affect the nervous system. Currently, he is working on projects to study environmental risk factors for amyotrophic lateral sclerosis (ALS), environmental risk factors for Autism, neurological effects of traumatic brain injury, and environmental risk factors for cognitive function, psychological distress, and psychiatric disorders. Dr. Weisskopf works with many different populations, including large cohorts like the Normative Aging Study, Nurses Health Study, and the registry system that covers the entire population of Denmark, as well as smaller groups such as local boilmakers.

An important additional direction of Dr. Weisskopf’s research involves exploring new ways of examining environmental and occupational impacts on the nervous system, such as simple brain reflexes that can be monitored physiologically. The goal of this work is to develop new biomarkers of effects on the nervous system in humans that may be earlier indicators- and potentially more sensitive ones- of adverse effects, as well as to improve our understanding of the mechanisms underlying toxicant effects on the nervous system.
# The Harvard T.H. Chan Academic Calendar

## FALL SEMESTER 2017

### AUGUST
- **07** Deadline to submit on-line applications for TAP/Affiliates and Non-Harvard Cross-Registration for fall semester and Fall 1 term courses
- **10** Fall Pre-registration begins
- **21** Check-in new students (8:00-11:00am)
- **28** Fall Semester and Fall 1 term courses begin

### SEPTEMBER
- **04** Labor Day holiday
- **07** Add/Drop/Change Deadline: Fall Semester and Fall 1 Term courses for all degree and non-degree students.
- **12** Advisor Registration Approval Deadlines (5:00pm)
- **22** Withdrawal Deadline: Fall 1 Term Courses (5:00pm)*

### OCTOBER
- **09** Columbus Day holiday
- **10** Deadline to submit Online Application & materials: for TAP/Affiliates and Non-Harvard Cross-Registrants for Fall2 Term courses
- **20** Fall 1 Term courses end
- **23** Fall 2 Term courses begin
- **26** GRADES DUE: Fall 1 Term courses
- **31** Advisor Registration Approval Deadline: Fall 2 Term Courses

### NOVEMBER
- **10** Veteran's Day
- **17** Withdrawal Deadline: Fall 1 Semester and Fall 2 Term courses (5:00 pm)*
- **22-24** Thanksgiving Recess

### DECEMBER
- **07** Spring Pre-Registration Begins
- **14** Deadline to submit Online Application & materials: for TAP/Affiliates and Non-Harvard Cross-Registrants for Winter Session Term courses (4:00pm)
- **15** Fall Semester and Fall 2 Term courses end
- **18-29** Winter Recess

*The notation WD will be permanently noted in the student's academic record

## SPRING SEMESTER 2018

### JANUARY
- **01** New Year’s Day holiday
- **02** Winter Session courses begin
- **09** Deadline to submit Online Application & materials: for TAP/Affiliates and Non-Harvard Cross-Registrants for Spring semester and Spring 1 Term courses
- **15** Martin Luther King, Jr. holiday
- **19** Winter Session courses end
- **26** GRADES DUE: Winter Session courses

### FEBRUARY
- **01** Add/Drop/Change Deadline: Spring, & Spring1 Courses for degree and non-degree students & for Spring & Spring1 Cross-registration
- **06** Advisor Registration Approval Deadline: Spring Semester and Spring1 Term (5:00pm)
- **16** Withdrawal Deadline: Spring1 term courses (5:00pm)*
- **19** Presidents’ Day holiday

### MARCH
- **06** Deadline to submit Online Application & materials: for TAP/Affiliates and Non-Harvard Cross-Registrants for Spring2 Term courses
- **09** Spring Term 1 courses end
- **12-16** Spring Recess
- **16** GRADES DUE: Spring 1 Term courses (5:00pm)
- **19** Spring 2 Term courses begin
- **22** Add/Drop/Change Deadline: Spring 2 Courses for degree and non-degree students & for Spring 2 Cross-registration
- **27** Advisor Registration Approval Deadline: Spring 2 Term Courses

### APRIL
- **06** Deadline: Withdrawal Spring Semester & Spring 2 Courses (5:00pm)*
- **20** DISSERTATION SUBMISSIONS DUE: May degree candidates

### MAY
- **11** Spring Semester and Spring 2 Term courses end
- **15** GRADES DUE: Spring Semester and Spring 2 Term courses
- **24** Commencement
- **28** Memorial Day holiday

## SUMMER SEMESTER 2017
To be announced.
The Harvard
EDUCATION AND RESEARCH CENTER

CURRICULA

ACCREDITATION
The Occupational and Environmental Medicine Residency is reviewed on a periodic basis by the Residency Review Committee for Preventive Medicine of the Accreditation Council for Graduate Medicine (ACGME). The Program was last reaccredited in January 2015 by the ACGME to offer graduate medical education of two years duration in occupational and environmental medicine.

The professional master’s degrees in Occupational Health are accredited by the Council for Education in Public Health (CEPH).

COURSE DESCRIPTIONS
Course information from all of Harvard’s faculties is available online on the internet, tools that facilitate browsing and searching information on the Internet. Course descriptions, faculty information, and other material are included, and the system allows for searching information across Harvard schools as well as within a single school.

To access the course catalogs for to all Harvard Schools use: https://courses.my.harvard.edu

For Harvard T.H. Chan School of Public Health courses: https://www.hsph.harvard.edu/registrar/courses-and-schedules/

GRADED CREDITS
Students admitted to a one-year program must spend a minimum of one academic year in residence at the University and successfully complete a program of 42.5 credits for SM 1 year and 45 credits for MPH. Students admitted to a two-year program must spend two academic years in residence and successfully complete a program of at least eighty credit units.

FOR SD STUDENTS: EOME POLICY FOR WAIVER OF WRITTEN DOCTORAL QUALIFYING EXAMINATIONS
After the completion of the SD student’s second academic year and approval by CAD of the prospective program, students may request a waiver of the written examination. A student should hold a minimum 3.5 GPA in required courses in order to be eligible to request a waiver for the written examination. The SD student will submit a written request to the EOME program director, Dr. David Christiani and Patricia McGaffigan, requesting a waiver of written exam and granting EOME access to their academic folder.

In addition, the student will schedule a research presentation for the EOME faculty at an EOME faculty meeting. The presentation should describe briefly the student’s proposed thesis research topic and design. The presentation should last no more than 10 minutes and, should be no more than 10 slides. The presentation will allow faculty to become more familiar with the research projects of all students in the program, and also allows for faculty to offer suggestions and to ask the student questions.

This presentation is for informational purposes only, and will be scheduled after the faculty has reviewed the student’s record and determined that a waiver of the written examination is warranted. The presentation to the EOME faculty should be scheduled prior to the student’s oral exam.

WINTER SESSION
Considered part of the Spring Semester, Winter Session is a special term at the Harvard T.H. Chan School of Public Health, which runs from January 2 through January 19, 2017. For students and faculty, Winter Session provides a break from the academic routine of the fall and spring semesters, and offers opportunities for creativity and innovation in learning and teaching.

All MPH students must follow MPH Winter Session guidelines. Departmental guidelines cannot be substituted. Consult http://www.hsph.harvard.edu/registrar/winter-session/.

This site presents all the information needed to guide you through the processes of Winter Session.

All full-time MPH students are expected to participate in Winter Session. Each student is required to submit an electronic form describing the nature of the student’s Winter Session activities. Students will receive a link to the form via email from Qualtrics, the form is due at the end of November 2017.

Please see the MPH Program Guidelines and/or the web for details regarding suggested/allowable Winter Session activities. If you have additional questions, please contact the Registrar’s Office directly at 617-432-1032 or registrar@hsph.harvard.edu.

The department is also offering a special winter session course EH 330: Field Experience in International Occupational Health and Safety. This intensive two to three week course, in collaboration with Kaohsiung Medical University’s (KMU) Graduate Institute of Occupational Safety and Health, will focus on several major heavy industries in Kaohsiung, Taiwan. This course will be also attended by master and doctoral students from Graduate Institute of Occupational Safety and Health, KMU. Lectures will cover these industrial processes and their known health and safety risks. Students will be taken on several supervised site visits to each industry, and will be encouraged to process their observations through interactive discussions. This course will also provide exposure to cultural issues around work, work organization, labor-management relations, and governmental and academic roles relevant to occupational safety and health in these settings. The faculty includes several Harvard Chan School alumni and experts in southern Taiwan, including Ming-Tsang Wu, MD, ScD, MOH; Chiung-Yu Peng, PhD; Yung-Chang Lai, PhD; Chih-Wei Lu PhD; Jin-Lian Tsai PhD; Chi-Kung Ho, MD, MPH.

Course Activities: Site visits; seminar presentations (case-study participatory approach). Site visits will be supervised by the above faculties, along with exposure assessment experts from the industries. Written reports of site visits will be prepared by students, with oral presentations and discussion.

Course Credit: 2.5 credits. Grading: Pass-Fail.

Applications: Please send an inquiry and CV to Prof. David Christiani (dchris@hsph.harvard.edu) by October 13, 2017.
OCCUPATIONAL (INDUSTRIAL) HYGIENE/ERGONOMICS INTERNSHIP

The internship program is recommended for students who do not have practical occupational hygiene/ergonomics/safety experience. Students are employed for a three-month period under the direction of company mentors who are qualified and experienced professionals and students are paid a salary agreed upon by Harvard and the company. During the first half of the period the student usually gains practical experience in the use of field instruments for measuring air contaminants and physical stresses such as noise, for measuring effectiveness of control systems and interventions, and utilizing existing occupational health and safety data bases for data collection and analysis. The second half is devoted to an applied research project of interest to the company, which encourages the student to develop a talent for applied research. For students not participating in the formal internship program, opportunities for work experience during the summer break are often available.

OCCUPATIONAL AND ENVIRONMENTAL MEDICINE RESIDENCY

PLEASE NOTE: MPH degree candidates in the Occupational Environmental Medicine Residency Program (OEMR) Effective: September 2005

1) All students who are in the residency must take the following courses/credits for an ordinal grade at Harvard Chan School:
   - the first 5 credits of epidemiology
   - the first 5 credits of biostatistics
   - Occupational and Environmental Medicine (EH 232)
   - The Practice of Occupational Health (ID 263)
   - Epidemiology of Environmental and Occupational Health Regulations (EH 236)

2) For all students who are in the residency: ANY requests for Pass/Fail status in any courses must have the signed approval of an EOME faculty member. In the event that the deadline is close and no faculty person is available to sign the form in person, verbal or email permission to have Anne Occhipinti sign the form may be given to Anne by an EOME faculty member or by Ann Backus.

CURRICULA

Curricula for the training programs and course schedules for the Fall and Spring semesters follow this text. Students receiving financial aid through the Education and Research Center must engage in an appropriate occupational safety and health program as presented here. Degrees are offered at the masters and doctoral levels.

REQUIRED HUMAN SUBJECTS TRAINING

All students engaged in human subjects research must fulfill human subjects training requirements every three years. Harvard’s online human subjects training is the CITI program. For more information regarding training requirements, please go to the Harvard Chan School Office of Human Subjects Administration website. http://www.hsph.harvard.edu/research/human-research-administration.

All students and postdoctoral fellows are required to take HPM 548 “Responsible Conduct of Research”. This course is offered during Fall 1 and Spring 1 semesters. The course can be taken for credit or not for credit/as an auditor.
ONE YEAR MPH DEGREE PROGRAM CONCENTRATIONS (45 CREDITS)

The Occupational and Environmental Health concentration has two tracks:
Environmental Health (EH)
Occupational Health (OH)

Key
R: Required courses
Re: Recommended

Courses listed as "F1 and F2" meet in the fall, "S1 and S2" courses meet in the spring.
Please note: All full-time MPH students are expected to participate in Winter Session
To see approved alternative course options please check the MPH-45 Student handbook
Additional elective course selections for MPH students should be determined in close collaboration with the faculty advisor

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Title</th>
<th>Course Credits</th>
<th>Environmental Health</th>
<th>Occupational Health</th>
<th>Occupational and Environmental Medicine Residency (OEMR)</th>
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<tbody>
<tr>
<td>ID 216 F1:F2</td>
<td>Critical Thinking and Action for Public Health Professionals (pilot course) ♦</td>
<td>5.0</td>
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<tr>
<td>ID 201 F1:F2</td>
<td>Core Principles of Biostatistics and Epidemiology for Public Health Practice (Alternative courses available)</td>
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<td>SBS 201 F1</td>
<td>Society and Health (Alternative course: SBS 281 F2)</td>
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<tr>
<td>ID 250 F1 or S1</td>
<td>Ethical Basis of the Practice of Public Health</td>
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<tr>
<td>HPM 548 F1 or S1</td>
<td>Responsible Conduct of Research (can be taken for credit or audited)</td>
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<tr>
<td>EH 201 F2</td>
<td>Introduction to Environmental Health (Choose either: EH 201 F2 or EH 202 S1)</td>
<td>2.5</td>
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<td></td>
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<tr>
<td>EH 202 S1</td>
<td>Principles of Environmental Health (Choose either: EH 201 F2 or EH 202 S1)</td>
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<td>R*</td>
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<tr>
<td>EH 262 F1:F2</td>
<td>Introduction to the Work Environment</td>
<td>2.5</td>
<td>R</td>
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<tr>
<td>EH 243 F1:F2</td>
<td>Ergonomics/Human Factors</td>
<td>2.5</td>
<td>R**</td>
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<tr>
<td>EH 241 S1:S2</td>
<td>Occupational Safety and Injury Prevention</td>
<td>2.5</td>
<td>R**</td>
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<tr>
<td>EH 504 F1:F2</td>
<td>Principles of Toxicology</td>
<td>5.0***</td>
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<td>EH 231 S1:S2</td>
<td>Occupational Health Policy and Administration</td>
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<td>EH 232 S1:S2</td>
<td>Introduction to Occupational and Environmental Medicine</td>
<td>2.5</td>
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<tr>
<td>ID 215 S1:S2</td>
<td>Environmental and Occupational Epidemiology</td>
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<td>EH 523 Winter</td>
<td>Work, Health, Productivity: Sustainability and Human Capital (alternate years)</td>
<td>2.5</td>
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<td>Re</td>
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<tr>
<td>EH 300 S1:S2</td>
<td>Independent Practice Option for EH</td>
<td>2.5</td>
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<tr>
<td>ID 263 S1:S2</td>
<td>Practice of Occupational Health</td>
<td>5.0♦</td>
<td>R</td>
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<tr>
<td>EH 236 S1:S2</td>
<td>Epidemiology of Environmental and Occupational Health Regulations</td>
<td>5.0</td>
<td></td>
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</tbody>
</table>

♦ ID 216, Critical Thinking and Action for Public Health Professionals: Some students will take this new integrated course (see p. 15, of the MPH Student handbook, for more information). Other students will take the individual public health core courses separately (see pages 9-13, of the MPH Student handbook). OEMR students should complete the individual public health core courses.

☐ HPM 548 Responsible Conduct of Research is required for students on NIOSH Training Grants

* EH Track students may select either EH 201 or EH 202, to fulfill the Environmental Health Sciences core requirement.

** EH & OH students must take either EH 243 F1:F2 and/or EH 241 S1:S2, both courses are required for OEM Residents.

*** OEM Residents and other physicians can opt for the 2.5 credit option for EH 504 Principles of Toxicology

✈ For OH track, the "Practice Course" and its field work yield a total of 5 credits. We are assigning 2.5 credits to OEH core requirements and 2.5 to Practice and Experience. Course may be audited taken 2nd year

♦ EH 236 required for OEM Residents, the course may be audited during their second year.
MPH DEGREE PROGRAM CONCENTRATIONS (65 CREDITS)

The Environmental Health concentration has three tracks:

- Environmental Health Sciences
  - Environmental Health Sciences Required Curriculum
- Occupational and Environmental Health and Safety
  - Occupational and Environmental Health and Safety Required Curriculum
- Sustainability, Health, and the Global Environment
  - Sustainability, Health, and the Global Environment Required Curriculum

★ HPM 548 Responsible Conduct of Research is required for student on NIOSH Training Grants

MASTER’S DEGREE (TWO YEAR) PROGRAM CONCENTRATIONS (80 CREDITS)

- Environmental Occupational Health (See table)
- Occupational Hygiene/ Ergonomics & Safety – EER Curriculum

Key:
R: Required courses

Courses listed as "F1 and F2" meet in the fall, and "S1 and S2" courses meet in the spring

Additional elective course selections for master’s students should be determined in close collaboration with the faculty advisor.

Individualized programs, based on each student’s experience and needs, should be developed to ensure the coursework provides the requisite background for dissertation research and fulfills the student’s major and minor field areas.

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Title</th>
<th>Course Credits</th>
<th>Environmental Occupational Health</th>
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</thead>
<tbody>
<tr>
<td>BST 201 F1F2</td>
<td>Introduction to Statistical Methods</td>
<td>5.0</td>
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<td>EH 243 F1F2</td>
<td>Ergonomics/Human Factors</td>
<td>2.5</td>
<td>R*</td>
</tr>
<tr>
<td>EH 205 F1F2</td>
<td>Human Physiology</td>
<td>5.0</td>
<td>R</td>
</tr>
<tr>
<td>EPI 201 F1</td>
<td>Introduction to Epidemiology: Methods I</td>
<td>2.5</td>
<td>R</td>
</tr>
<tr>
<td>EPI 202 F2</td>
<td>Epidemiologic Methods 2: Elements of Epidemiologic Research</td>
<td>2.5</td>
<td>R</td>
</tr>
<tr>
<td>EH 241 S1S2</td>
<td>Occupational Safety and Injury Prevention</td>
<td>2.5</td>
<td>R*</td>
</tr>
<tr>
<td>EH 231 S1S2</td>
<td>Occupational Health Policy and Administration</td>
<td>2.5</td>
<td>R</td>
</tr>
<tr>
<td>ID 215 S1S2</td>
<td>Environmental and Occupational Epidemiology</td>
<td>2.5</td>
<td>R</td>
</tr>
<tr>
<td>EH 262 F1F2</td>
<td>Introduction to the Work Environment</td>
<td>2.5</td>
<td>R</td>
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<tr>
<td>EH 504 F1F2</td>
<td>Principles of Toxicology</td>
<td>5.0</td>
<td>R</td>
</tr>
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<td>EH 236 S1S2</td>
<td>Epidemiology of Environmental and Occupational Health Regulations</td>
<td>5.0</td>
<td>R</td>
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<tr>
<td>ID 263 S1S2</td>
<td>Practice of Occupational Health</td>
<td>5.0</td>
<td>R</td>
</tr>
<tr>
<td>HPM 548 F1 or S1</td>
<td>Responsible Conduct of Research (can be taken for credit or audited)</td>
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<td>R</td>
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<td>EH 202 S1</td>
<td>Principles of Environmental Health</td>
<td>2.5</td>
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<tr>
<td>EH 269 S1S2</td>
<td>Exposure Assessment for Environmental &amp; Occupational Epidemiology</td>
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<td>R</td>
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<tr>
<td>EH 300 S1S2</td>
<td>Independent Study (Practicum requirement)</td>
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<td>BST 210 S1S2</td>
<td>Applied Regression Analysis</td>
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<td>EH 510 F1F2</td>
<td>Fundamentals of Human Environmental Exposure Assessment</td>
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<td>EH 260 S1S2</td>
<td>Workplace Environmental controls for Established and Emerging Technologies</td>
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<tr>
<td>EH 261 S1S2</td>
<td>Occupational Health and Safety Management Practices for New and Emerging Technologies</td>
<td>2.5</td>
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<tr>
<td>RDS 500 S2</td>
<td>Risk Assessment</td>
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<tr>
<td>EH 279 F1F2</td>
<td>Radiation Environment: Its Identification, Evaluation and Control</td>
<td>2.5</td>
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<tr>
<td>EH 508 S1S2</td>
<td>Master's Thesis and Collaborative Research Practicum</td>
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<tr>
<td>EH 263 F1F2</td>
<td>Analytical Methods and Exposure Assessment</td>
<td>5.0</td>
<td>R</td>
</tr>
<tr>
<td>EH 292 S1S2</td>
<td>Properties and Behavior of Airborne Particles**</td>
<td>2.5</td>
<td>R</td>
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<tr>
<td>ID 240 S1</td>
<td>Principles of Injury Control</td>
<td>2.5</td>
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</table>

Either EH 243 fall or EH 241 spring recommended
DOCTORAL PROGRAMS IN OCCUPATIONAL HEALTH

Doctoral education at The Education and Research Center (ERC) is provided in several concentrations relevant to Occupational Safety and Health. The Doctor of Science degree in Environmental Health with concentrations or areas of interest in Occupational Health, Occupational Epidemiology, Occupational Hygiene, Injury Epidemiology, Occupational and Environmental Molecular Epidemiology are offered. The doctoral programs are structured to give students exposure to key components of research: study design, field experience, relevant laboratory experience, and statistical analysis.

The Candidates may be admitted to a doctoral program in more than one discipline if the program meets the requirements of both departments. Usually, three to four years following the master’s program are necessary to complete requirements for the award of doctoral degree.

Following are the curricula for the pre-doctoral and post-MD doctoral programs. Students admitted will either be recent college graduates in biology, natural science or mathematics, or will be students with a Master’s degree in one of these disciplines. Persons accepted must have an outstanding record in science courses and a high quantitative GRE score. Preference will be given to students with a prior Master’s degree who have had experience in fields relevant to epidemiology and occupational health. Usually, these students will enroll directly in the doctoral program.

Students without a prior Master’s degree will spend most of their first two years in formal courses in epidemiology, biostatistics, occupational health, occupational hygiene and exposure assessment, physiology and toxicology. In their third or fourth semester at the Harvard Chan School, pre-doctoral students identify a thesis topic and work on that until completion of the doctoral degree. The total time in training at the School is four to five years.

The following is a list of didactic courses that will be required for pre-doctoral students. Exceptions to these requirements will be made only if suitable prior training (e.g., MD degree, Master’s degree) or alternate courses exist. A description of each course is provided in the school course catalogue. Ordinarily, a 2.5 -credit course has 32 class-hours per semester and a 5.0-credit has 64 class-hours per semester.

### PhD in Population Health Sciences Program-Wide Required Courses and Credits

In addition to the doctoral curriculum listed on the next page, all PhD students are expected to complete the following requirements:

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Title</th>
<th>Course Credits (GSAS)</th>
</tr>
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<tbody>
<tr>
<td>PHS 2000 A F,F$_2$</td>
<td>Quantitative Research Methods in Population Health Sciences</td>
<td>4.0</td>
</tr>
<tr>
<td>PHS 2000 B S,S$_2$</td>
<td>Quantitative Research Methods in Population Health Sciences</td>
<td>4.0</td>
</tr>
<tr>
<td>SBS 506 F$_1$</td>
<td>An Intro to History, Politics, &amp; Public Health: Theories of Disease Distribution &amp; Health Inequities</td>
<td>2.0</td>
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</table>

### Pre-Program Requirement

All students should have prior coursework in biostatistics equivalent to at least BST 201 (Introduction to Biostatistics) at the entry into the program. Admitted students will be required to take an online biostatistics pre-test to assess competency with the BIO201 material. Students who score below a certain threshold will be required to either (i) take an online biostatistics module during the summer preceding program entry or (ii) register for an in-person summer biostatistics course at the school. Students who do particularly poorly on the pretest will be strongly encouraged to pursue the in-class option.

Regardless of the pre-test outcome, the PHS Program will encourage students to attend a biostatistics “bootcamp” in late August during program orientation to ensure all students are adequately prepared for the required quantitative research methods sequence.

### PHS Wednesday Evening Seminar

1st Year- Wednesdays, 5:30pm-7:30pm

This ‘standing’ evening seminar is required for all PHS students and takes place one night per week throughout the first year, covering various rotating topics/components.

**Topic Rotations (Four per month, rotate by week):**

- Week One: PHS ‘Pulse’ Check Dinner with Faculty Director S.V. ‘Subu’ Subramanian (begins in Fall One)
- Week Two: Scientific Communication & Grant-Writing (begins in Fall Two, continues through Year Two)
- Week Three: PHS Speaker Series (begins in Fall One; optional in Year Two)
- Week Four: Pedagogy & Teaching (begins in Spring One, continues through Year Two)

Please note: In order to alleviate the various potential ‘stressors’ associated with the timing and coordination of a weekly evening class, the PHS team will order-in dinner and beverages each week for all students and participants.
DOCTORAL DEGREE PROGRAM CONCENTRATIONS:
- Environmental and Occupational Epidemiology
- Occupational Epidemiology
- Environmental Molecular Epidemiology
- Environmental/Occupational Molecular Epidemiology
- Occupational and Environmental Medicine
- Environmental Epidemiology
- Injury Epidemiology
- Ergonomics & Safety
- Occupational Hygiene

Key
R: Required courses,
E: Elective courses students choose 10 or 15 credits
R10: ordinarily students take 10 credits from these recommended courses.
Courses listed as "F1 and F2" meet in the fall, and "S1 and S2" courses meet in the spring, W is winter session.

Please Note: Training Grant funding may require additional courses, please check with your Training Grant Director.

Doctoral trainees with Environmental Epidemiology concentration funded by the NIEHS training grant should follow curriculum: Training Program in Environmental Epidemiology.

Doctoral trainees with Occupational Hygiene concentration should follow: Occupational Hygiene Curriculum

Additional courses other than those listed may be chosen in close collaboration with the faculty advisor.

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Title</th>
<th>Course Credits</th>
<th>Environmental Epidemiology</th>
<th>Occupational Epidemiology</th>
<th>Environmental Molecular Epidemiology</th>
<th>Environmental/Occupational Molecular Epidemiology</th>
<th>Occupational and Environmental Medicine</th>
<th>Environmental Epidemiology</th>
<th>Injury Epidemiology</th>
<th>Ergonomics &amp; Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>BST 201 F1F2</td>
<td>Introduction to Statistical Methods</td>
<td>5.0</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>E</td>
<td>E10</td>
<td>E</td>
<td>R</td>
</tr>
<tr>
<td>BST 210 S1S2</td>
<td>Applied Regression Analysis</td>
<td>5.0</td>
<td>R*</td>
<td>R*</td>
<td>R*</td>
<td>E</td>
<td>E15</td>
<td>E15</td>
<td>E</td>
<td>R</td>
</tr>
<tr>
<td>BST 213 F1F2</td>
<td>Applied Regression for Clinical Research</td>
<td>5.0</td>
<td>R*</td>
<td>R*</td>
<td>R*</td>
<td>E</td>
<td>E15</td>
<td>E15</td>
<td>E</td>
<td>R</td>
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<tr>
<td>EH 205 F1F2</td>
<td>Human Physiology</td>
<td>5.0</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R10</td>
<td>E10</td>
<td>E</td>
<td>R</td>
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<tr>
<td>EH 231 S1S2</td>
<td>Occupational Health Policy and Administration</td>
<td>2.5</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R10</td>
<td>E10</td>
<td>E</td>
<td>R</td>
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<tr>
<td>EH 236 S1S2</td>
<td>Epidemiology of Environmental &amp; Occupational Health Regulation</td>
<td>5.0</td>
<td>R</td>
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<td>Introduction to the Work Environment</td>
<td>2.5</td>
<td>R</td>
<td>R</td>
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<td>E15</td>
<td>R10</td>
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<tr>
<td>EPI 201 F1</td>
<td>Introduction to Epidemiology: Methods I</td>
<td>2.5</td>
<td>R</td>
<td>R</td>
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<td>R10</td>
<td>E10</td>
<td>E</td>
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<td>EPI 202 F2</td>
<td>Epidemiologic Methods 2: Elements of Epidemiologic Research</td>
<td>2.5</td>
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<tr>
<td>EPI 204 S2</td>
<td>Analysis of Case-Control and Cohort Studies</td>
<td>2.5</td>
<td>R</td>
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<td>EH 504 F1F2</td>
<td>Principles of Toxicology</td>
<td>5.0</td>
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<tr>
<td>ID 215 S1S2</td>
<td>Environ and Occupational Epidemiology</td>
<td>2.5</td>
<td>R</td>
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<tr>
<td>ID 263 S1S2</td>
<td>Practice of Occupational Health</td>
<td>5.0</td>
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<td>E10</td>
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<tr>
<td>HPM 548 F1 or S1</td>
<td>Responsible Conduct of Research (course can be taken for credit or audited)</td>
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<td>R</td>
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<td>BST 222 F1F2</td>
<td>Basics of Statistical Inference</td>
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<td>Applied Longitudinal Analysis</td>
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<td>Occupational Safety and Injury Prevention</td>
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<td>E10</td>
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<td>Course Number</td>
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<td>Course Credits</td>
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<td>EH 282 S,S2</td>
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<td>RDS 500 S</td>
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<td>E10</td>
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<td>EH 523 W</td>
<td>Work, Productivity and Health</td>
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<td>BST212 S,S2</td>
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<td>BST232 S,S2</td>
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<td>BST 233 S,S2</td>
<td>Methods II</td>
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<tr>
<td>EH 208 S,S2</td>
<td>Pathophysiology of Human Disease**</td>
<td>5.0</td>
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<td>EH 232 S,S2</td>
<td>Introduction to Occupational and Environmental Medicine</td>
<td>2.5</td>
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<tr>
<td>EH 278 S</td>
<td>Human Health and Global Environmental Change</td>
<td>2.5</td>
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<tr>
<td>EPI 213 S</td>
<td>Epidemiology of Cancer</td>
<td>2.5</td>
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<tr>
<td>EH 521 F2</td>
<td>Environmental Cardiology</td>
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<tr>
<td>EPI 247 F2</td>
<td>Epidemiologic Methods Development</td>
<td>2.5</td>
<td>R10</td>
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<tr>
<td>EPI 269 F2</td>
<td>Epidemiologic Research in Obstetrics and Gynecology</td>
<td>2.5</td>
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<tr>
<td>EPI 293 W</td>
<td>Analysis of Genetic Association Studies</td>
<td>2.5</td>
<td>R10</td>
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<tr>
<td>EPI 507 F2</td>
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<td>EH 298 S,S2</td>
<td>Environmental Epigenetics</td>
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<tr>
<td>EPI 289 S,S2</td>
<td>Models for Causal Inference</td>
<td>2.5</td>
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<tr>
<td>EPI 205 F,F2</td>
<td>Practice of Epidemiology</td>
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<td>EH 516 W</td>
<td>Environmental Genetics**</td>
<td>2.5</td>
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<tr>
<td>BST 223 S,S2</td>
<td>Applied Survival Analysis</td>
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<tr>
<td>EH 279 F,F2</td>
<td>Radiation Environment: Its Identification, Evaluation &amp; Control</td>
<td>2.5</td>
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<tr>
<td>ID 214 S,S2</td>
<td>Nutritional Epidemiology</td>
<td>2.5</td>
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<tr>
<td>EPI 254 S2</td>
<td>The Epidemiology of Aging</td>
<td>1.25</td>
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<tr>
<td>EPI 284 S</td>
<td>Epidemiology of Neurologic Diseases</td>
<td>2.5</td>
<td></td>
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<td>EPI 207 F1</td>
<td>Advanced Epidemiologic Methods</td>
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<td>EPI 223 F2</td>
<td>Cardiovascular Epidemiology I</td>
<td>2.5</td>
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<td>ID 240 S</td>
<td>Principles of Injury Control</td>
<td>2.5</td>
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<td>EH 260 S,S2</td>
<td>Workplace Environmental Controls for Established and Emerging</td>
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<tr>
<td>EH 261 S,S2</td>
<td>Occupational Health and Safety Management Practices for New and</td>
<td>2.5</td>
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</table>

¬ Required for EH students
* Required for EPI students
<table>
<thead>
<tr>
<th>Course Number</th>
<th>Title</th>
<th>Course Credits</th>
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<tbody>
<tr>
<td>EH 296 S:S₂</td>
<td>Occupational Biomechanics**</td>
<td>5.0</td>
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<tr>
<td>BE 110</td>
<td>Biomedical Engineering: Physiological Systems Analysis <em>(Course at Harvard FAS)</em></td>
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<tr>
<td>MIT 16.463J</td>
<td>Human Systems Engineering</td>
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</tr>
<tr>
<td>MIT 2.184</td>
<td>Biomechanics and Neural Control of Movement</td>
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</tr>
<tr>
<td>EH 252 S:S₂</td>
<td>The Impact of Buildings on Health, Productivity and Sustainability</td>
<td>5.0</td>
</tr>
<tr>
<td>EH 257 S:S₂</td>
<td>Water Pollution</td>
<td>5.0</td>
</tr>
<tr>
<td>EH 297 S:S₂</td>
<td>Atmospheric Environmental Seminars</td>
<td>5.0</td>
</tr>
<tr>
<td>EH 522 F:F₂</td>
<td>Indoor Environmental Quality and Health</td>
<td>5.0</td>
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</table>

** Offered alternate years, check catalog

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**The SD Student Timetable**

<table>
<thead>
<tr>
<th>PROGRESS</th>
<th>PROGRESS DUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submission of Prospective Program Form</td>
<td>End of 2nd Semester, but no later than the end of the 3rd semester with permission*</td>
</tr>
<tr>
<td>Submission of Final Program Form</td>
<td>End of 5th Semester*</td>
</tr>
<tr>
<td>Submission of Nomination of Oral Qualifying Examination Committee Form</td>
<td>End of 6th Semester*</td>
</tr>
<tr>
<td>Submission of Oral Qualifying Examination Scheduling Form</td>
<td>One month after successful completion of Oral Examination</td>
</tr>
<tr>
<td>Submission of Nominations for Research Committee Form</td>
<td>Six months after passing Oral Examination. Must be submitted at least twice a year thereafter until dissertation defense.</td>
</tr>
<tr>
<td>Submission of Progress Report Form</td>
<td>Before degree granting period in which dissertation is defended</td>
</tr>
<tr>
<td>Submission of Application for Degree Form</td>
<td>End of 5th year for full-time students End of 7th year for part-time students</td>
</tr>
</tbody>
</table>

* Double the time for part-time students.

Full-time students have five academic years from date of entry into the program to complete required course work, and to defend and to submit the dissertation. Any deviation from the five-year limit must be approved by the CAD prior to the second semester in the fifth year. Part-time students have seven academic years from date of entry to complete degree requirements, and any deviation from this limit must be approved by the CAD prior to the second semester in the seventh year.
The following chart outlines the four-year Milestones and timing expectations for all PhD students in Population Health Sciences. Students intending to complete their course studies, research, and dissertation process on an accelerated schedule (less than four academic years) should work closely with their advisor, Field of Study administration, and the PHS Program Office in order to determine the appropriate timing and scheduling for Milestones and Qualifying Examinations.

<table>
<thead>
<tr>
<th>#</th>
<th>MILESTONE</th>
<th>TIMING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Submission of Prospective Program Form</td>
<td>End of 2nd Semester</td>
</tr>
<tr>
<td>2</td>
<td>Field of Study Written/Oral Qualifying Exam/s</td>
<td>See chart below</td>
</tr>
<tr>
<td>3</td>
<td>Submission of Final Program Form</td>
<td>End of 4th Semester (Following successful FoS Written Qualifying Exam/s completion)</td>
</tr>
<tr>
<td>4</td>
<td>Submission of PQE Scheduling Form</td>
<td>Submission of PQE Scheduling Form</td>
</tr>
<tr>
<td>5</td>
<td>Completion of PQE - Preliminary Qualifying Exam (formerly the SPH Oral Qualifying Exam)</td>
<td>Taken and passed prior to the end of 5th Semester</td>
</tr>
<tr>
<td>6</td>
<td>Submission of Nominations for DAC Form</td>
<td>By January 15th</td>
</tr>
<tr>
<td>7/8</td>
<td>Submission of Progress Report Form AND In-Person Meetings with DAC – Dissertation Advisory Committee</td>
<td>Every three months from date of PQE (Submitted and scheduled in conjunction until Dissertation Defense is scheduled)</td>
</tr>
<tr>
<td>9</td>
<td>Submission of Application for Degree Form</td>
<td>See GSAS deadlines and procedures</td>
</tr>
<tr>
<td>10</td>
<td>Dissertation Defense</td>
<td>Prior to the end of the 8th semester, in accordance with GSAS deadlines and procedures for submission of electronic dissertation</td>
</tr>
</tbody>
</table>

Field of Study Written and/or Oral Qualifying Examination(s)

Each Field of Study determines whether to hold Written or Oral Qualifying Examinations (or potentially, both) and the timing at the programmatic level and offers them on a yearly basis to students as follows (referenced by Milestone #2 above):

Environmental Health: Written examination after 4th semester (or 2nd semester for those with prior master degree from Harvard T.H. Chan).
SEMINAR SERIES IN OCCUPATIONAL SAFETY AND HEALTH
One (sometimes two) Mondays per month during academic sessions beginning in September held from 1:00 - 2:00 pm, FXB G12, is organized by Dr. Christiani and Ann Backus. The seminar schedule can be found here: http://www.hsph.harvard.edu/erc/announcements

A variety of topics in occupational safety and health are presented in the seminar series, which primarily features guests from outside the Center and the School. The diversity of speakers has ranged from a lawyer interested in ethical issues of medical screening to a toxicologist working with a major union, and from medical historians to health care professionals working with community groups. A multi-disciplinary approach, including economic and policy issues, is emphasized.

Faculty and students of the Center are expected to attend; staff, visiting scholars, and others with an interest in the broad field of occupational and environmental health are also welcome. Monthly schedules are distributed by email, posted on bulletin boards throughout Harvard Chan, and published on the Environmental Health department event calendar.

OCCUPATIONAL/ ENVIRONMENTAL MEDICINE GRAND ROUNDS
Alternate Fridays during academic sessions beginning in September held from 1:00 - 2:00 pm, fall: Kresge 502, organized by Dr. Kales and the Chief Resident, Dr. John Clarke. http://www.hsph.harvard.edu/erc/announcements

The purpose of these rounds is to provide residents in occupational and environmental medicine with the opportunity to discuss clinical features of occupational and environmental diseases and their prevention and management. One to three cases are presented during each session by experienced occupational physicians and second-year occupational and environmental medicine residents.

Attendance by first and second-year occupational and environmental medicine residents is required. The sessions have been organized so that first-year residents will have the opportunity to meet rotation proctors for the practicum year. All other MPH, MS students, OH, and faculty are encouraged to attend as well. Schedules are posted on bulletin boards at the Center, near the elevators and emailed.

OCCUPATIONAL HEALTH PROGRAM RESEARCH SEMINAR SERIES
Alternate Fridays during the academic session beginning in September held from 1:00 - 2:00 pm, Kresge, Room 502, is organized by Ann Backus and Tiffany Sarkissian. http://www.hsph.harvard.edu/erc/announcements

The research seminars in occupational safety and health and environmental biostatistics offer a forum for work-in-progress presentations on research by faculty, staff, postdoctoral fellows, doctoral students, second-year residents, and second-year nursing and occupational hygiene master's students of the Center. The focus of the seminar series is issues in epidemiologic research as they relate to occupational and environmental health.

All Center personnel are welcome to attend. First and second year residents in the Occupational and Environmental Medicine Residency Program as well as degree candidates in the MPH (OEH) program are required to attend. Schedules are posted on bulletin boards at the Center, near the School elevators and emailed.

DISSERTATION WRITING SEMINAR
Every Wednesday (with a few exceptions), beginning August 30, 2017, 3:30-5:20 pm, Donald Halstead, Instructor (dhalstea@hsph.harvard.edu).

This is the only Harvard Chan School course that addresses the specific needs of dissertation writers. Our chief activity each week is the discussion of a draft study that has been submitted in advance by a group member. We also examine a wide range of topics and strategies that enable members to improve their scientific writing skills and to manage the complex dissertation process effectively. The seminar's highly creative, supportive, and constructive environment also helps counteract the isolation most dissertation writers experience. The course is open to any SPH doctoral student who is writing or preparing to write a dissertation. Those interested in joining should contact the Instructor in advance, or for more information as well as to arrange a visit or to sit in on a session.

CONTINUING MEDICAL EDUCATION CREDITS
The Executive and Continuing Professional Education is authorized by the Accreditation Council for Continuing Medical Education to designate that relevant sessions of the Monday Seminars, Grand Rounds, and Research Seminars meet the criteria for credit toward Category 1 of the Physicians Recognition Award of the American Medical Association. All participants must sign attendance roster and complete evaluation of the session.

EXECUTIVE CONTINUING PROFESSIONAL EDUCATION PROGRAM
The Continuing Education Program of the Education and Research Center (ERC) provides professional training through occupational safety and health programs for physicians, nurses, industrial hygienists, safety engineers, and other occupational safety and health professionals, paraprofessional and technicians. The ERC Continuing Education Program is managed by the School's Executive and Continuing Professional Education (ECPE). Programs and conferences are offered throughout New England and include annual meetings of professional occupational health and safety associations. Continuing Education Credit is available for all programs, and the specific programs also offer AMA PRA Category 1 Credits™.

The schedule for 2017-2018 programs is available in the Kresge G-3 classroom, or on the Center's website:
THE MASSACHUSETTS COALITION FOR OCCUPATIONAL SAFETY AND HEALTH
The Massachusetts Coalition for Occupational Safety and Health (MassCOSH) brings together unions, professionals, and workplace and community activists in a common quest to make Massachusetts job sites healthy and safe places to work. MassCOSH is the only organization serving eastern and central Massachusetts dedicated solely to empowering unions and workers through building a movement to improve safety conditions on the job. Activities include worker health and safety education, advocacy for workers/unions, publication of a newsletter, and a technical assistance hotline. MassCOSH has an extensive occupational safety and health library, with many materials available in multiple languages. To become a member or inquire about volunteer activities, write or call MassCOSH, 12 Southern Avenue, Dorchester, MA 02124, 617-825-7233 x15 or visit their website at www.masscosh.org.

THE NEW ENGLAND COLLEGE OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE
The New England College of Occupational and Environmental Medicine (NECOEM) is a constituent organization of the American College of Occupational and Environmental Medicine (ACOEM). NECOEM sponsors educational activities throughout the academic year in the form of dinner meetings, mini-conferences, workplace site visits, and an annual two-day conference. Special rates are available for residents in occupational medicine and students. You do not have to be a member to participate, nor must you be a physician. Nurses and occupational hygienists are welcome to attend educational sessions of interest. Notices are posted on bulletin boards at the Center. Contact dianne@necoem.org, or visit their website at www.necoem.org for further information regarding NECOEM activities.

Any doctor of medicine or doctor of osteopathic medicine who has an interest in the health of workers is eligible for membership in ACOEM, thereby becoming a member of NECOEM. To obtain further information and membership application forms, contact Ann Backus at 617-432-3327 or contact ACOEM at 25 Northwest Point Blvd., Suite 700, Elk Grove Village, Illinois, 60007-1030, Telephone: (847) 818-1800, www.acoem.org. The membership fee for ACOEM is paid by the OEMR Program for residents.

THE AMERICAN INDUSTRIAL HYGIENE ASSOCIATION, NEW ENGLAND SECTION
The New England Industrial Hygiene Association (NEIHA) holds regular half-day and evening meetings in the locality, and welcomes student members. With industrial hygienists from government, industry, and other universities, the group provides excellent contacts for students and operates a local placement service. For further information contact Dr. Herrick at herrick@hsph.harvard.edu.

THE PUBLIC HEALTH MUSEUM IN MASSACHUSETTS
In recognition of the significant history of achievements and milestones in public health that occurred in Massachusetts and New England, a museum was introduced to the community in 1994 to protect, preserve, and display historical materials and artifacts that document this rich tradition. It is a place for learning and study, located in the historic old clock tower administration building at Tewksbury Hospital. In addition to serving as a repository for artifacts of public health history, the Museum also seeks to educate citizens about new developments, programs, and needs in public health today.

The Museum is supported by foundation grants and corporate contributions, as well as membership fees and private donations. The museum is open Wednesday 10:00am – 2:00pm and other times by appointment. For information or to make an appointment call: 978-851-7321 ext. 2606. There is a $5 admission fee to the museum and group rates are available. Information can also be obtained from their website at www.publichealthmuseum.org.
ERC TRAINEESHIP AWARDS
Traineeship awards consisting of partial financial assistance in the form of tuition, stipend, health fee, and health insurance are available on a competitive basis to qualified individuals undertaking approved training programs in occupational medicine, occupational hygiene, occupational epidemiology, and occupational injury prevention. Awards are offered through the Education and Research Center for Occupational Safety and Health (ERC) at Harvard.

To maintain eligibility for the award, trainees must meet the academic standards of the School as stated in the current Official Register and must engage in an appropriately planned occupational safety and health program (see the curricula section of this handbook). Compliance with requirements of the Registrar, the Student Financial Aid Office, and the Harvard ERC is also expected.

An appointment under a U.S. Public Health Service (PHS) training grant may not be held concurrently with any other Federal educational award that provides a stipend or otherwise duplicates financial provisions, with the exception of Veterans Administration Benefits (GI Bill). Loans from Federal funds are not considered Federal awards.

Tuition and health insurance awards appear as credits in student accounts. Tuition awards are usually completed during the summer so that students may enroll without hindrance in the fall.

Tuition awards are made for a specific number of course credits. The cost of course credits beyond the specified or required curriculum is the responsibility of the student. For example a full-tuition scholarship for the MPH degree pays for 42.5 credits. Students taking additional credits beyond required will be responsible for these costs.

If a tuition deposit has been made by a student prior to registration and a full tuition award has been granted, the deposit is refundable to the student. To obtain a refund, complete the, Credit Balance Refund Form, https://harvard.az1.qualtrics.com/jfe/form/SV_0DqodwfsaLsdH1P. The refund check will be sent by mail; to have the refund by direct deposit the student must set it up in the Termbill system prior to completing the refund form.

All students are automatically enrolled in the Student Health Insurance Plan, but may submit a waiver during matriculation if they have comparable medical insurance. The deadline to waive is July 31, 2017 for the fall term (or full academic year), and February 28, 2018 for the spring term.

The Student Health Fee is mandatory for all students registered for more than 10 credits each semester. Part-time students taking 10 or fewer credits may waive this fee and this coverage if on-line waiver form is completed prior to July 31st for fall, and January 31st for spring.

Doctoral candidates and preventive medicine residents finishing their first year are granted a three-week paid vacation during the summer. Residents in occupational and environmental medicine must schedule their vacation time with Dr. Kales and Ann Backus. The dates of the vacation should be reported in writing to Ann Backus and the student's advisor. This vacation time is in addition to holiday periods observed during the academic year.

Any publications related to projects undertaken while holding an ERC traineeship should bear the acknowledgment below. Seven copies should be given to the administrator.

Supported by the Education and Research Center for Occupational Safety and Health CDC/NIOSH grant award T42/0H008416 at the Harvard T.H. Chan School of Public Health.

Questions concerning ERC traineeship awards should be addressed to Patricia McGaffigan (pmcgaffi@hsph.harvard.edu).

STIPENDS
Awarded students receive the monthly stipends on the first of the month starting in September for newcomers and in July for OEM first-year residents.

Second year OEM residents receive the monthly stipend at the end of the month, beginning in July of the second year.

Awarded students and fellows should sign up in PeopleSoft for direct deposit and local address updates. Peoplesoft can be accessed by first obtaining a HarvardKey, (https://key.harvard.edu) and then logging onto HarvIE (https://hr.harvard.edu) and clicking on the link at the top right labeled “PeopleSoft Access’. Once in PeopleSoft, the path is Home>Self-Service>Payroll and Compensation>Direct Deposit.
The Harvard
EDUCATION AND RESEARCH CENTER

ADDITIONAL INFO

SEMINARS
All research fellows and degree candidates at the Harvard ERC are expected to attend the Monday seminars in occupational safety and health seminar series on a regular basis. Research fellows, doctoral candidates, residents in occupational and environmental medicine, and second-year master's students are expected to attend the occupational safety and health research seminar series that alternates with Grand Rounds on Fridays.

All first year residents in Occupational and Environmental Medicine are expected to attend Monday ERC Seminars. All residents regardless of year are expected to attend Grand Rounds and Research Seminars on Fridays.

ALUMNI/AE ASSOCIATIONS
Every graduate of the Harvard T.H. Chan School of Public Health is a member of the Harvard Public Health Alumni/ae Association. The Association is governed by an elected body, and news is published twice each year in the Harvard Chan School Review. The Association, together with the Alumni/ae Relations Office at the School, works to promote a spirit of fellowship and encourage communication among all graduates. For further information, call the Alumni Relations Office at 617-351-0160.

Graduates of the industrial hygiene program become members of the Harvard Guild of Industrial Hygienists. Members of this organization contribute to internships and graduate employment. Industrial hygiene alumni meet annually at the American Industrial Hygiene Conference to renew acquaintances and learn about the latest developments at the School.

DISABILITY SERVICES
Services are provided for all students with clinically documented learning and/or physical disabilities, regardless of whether they are full or part-time, participants in a forum, special program, etc. Assistance in academic support, extracurricular activities, residential life, personal assistance, and transportation is available. Amy Wooldridge, Associate Director of Student Affairs, provides confidential consultations with students regarding needs. Her office is located in Kresge Suite G-4 and she can be reached at 617-432-1542 or e-mail awooldri@hsph.harvard.edu. Please review the official Harvard School policy for more information at: http://www.hsph.harvard.edu/student-handbook/

COMPUTING AND EMAIL SERVICE
Computers are generally available to research fellows, doctoral students, residents in occupational and environmental medicine, and master's students conducting research.

The School operates its own Instructional Computing Facility (ICF) dedicated to serving the needs of students and faculty and offering free academic computing and data processing resources. ICF provides free academic computing and data processing resources in a distributed computing environment and is used by students for course work, word processing, spreadsheets, file transfer, basic statistical analysis, and e-mail service. This facility, open daily throughout the entire year, is staffed by user assistants from 9:00am to 5:00pm during the academic year. Swipe access using your Harvard ID card is required weekdays after 6pm and for access during the weekend. It is located on the lower level of the Kresge Building in rooms LL-6, LL-15 and LL-19. The Administrative Office may be reached by calling 617-432-4357. The User Assistance line may be reached by dialing 617-432-3165.

DEPARTMENT OF ENVIRONMENTAL HEALTH
The Department of Environmental Health focuses on complex problems that require the insights of many specialties. The department's faculty, research staff, and students reflect the multidisciplinary nature of the field and include chemists, engineers, epidemiologists, applied mathematicians, physicians, industrial hygienists, occupational health nurses, physiologists, and physicists. Teaching and research activities of the department are conducted through three primary programs: Exposure Epidemiology & Risk (EER); Environmental and Occupational Medicine and Epidemiology (EOME); and Molecular and Integrative Physiological Sciences (MIPS). ERC programs bridge departmental programs in occupational health and environmental science and engineering.

COURSE MATERIALS
Unless otherwise announced, course handouts are available only in the classroom, not in the Center's offices. The cost of course materials is the student’s responsibility.

SUPPLIES AND SERVICES PURCHASED
Supplies and services purchased are not reimbursed by the Center for students. However, research fellows, doctoral students, residents, and master's students conducting research may be able to use ERC funds or other sponsored research funds to procure what is needed. Please consult with your advisor.

TEACHING ASSISTANTS
Doctoral students are asked to serve as paid teaching assistants in one academic course. Usually the following courses require assistants: EH 231(Spring), EH 232(Spring), EH 236(Spring), and ID 215(Spring). The primary purpose of this requirement is to develop teaching skills and to work with faculty members in teaching as well as in conducting research. Doctoral students may serve as teaching assistants in more than one course, conditional on satisfactory progress in the doctoral program, needs of the faculty, approval of advisor, and availability of funds.

LIBRARIES/ON-LINE LIBRARY ACCESS
The Countway Library of Medicine – the library needs of the School are served primarily by the Francis A. Countway Library of Medicine, the largest academic medical library in this country. The Countway offers faculty, students, clinicians, researchers, and scholars a collection of some 630,000 volumes of books and journals, some 2,000 electronic journals, a myriad of databases

The Harvard Chan School offers computing and data processing resources. ICF provides free academic computing and data processing resources in a distributed computing environment and is used by students for course work, word processing, spreadsheets, file transfer, basic statistical analysis, and e-mail service. This facility, open daily throughout the entire year, is staffed by user assistants from 9:00am to 5:00pm during the academic year. Swipe access using your Harvard ID card is required weekdays after 6pm and for access during the weekend. It is located on the lower level of the Kresge Building in rooms LL-6, LL-15 and LL-19. The Administrative Office may be reached by calling 617-432-4357. The User Assistance line may be reached by dialing 617-432-3165.

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and other electronic resources, complimented by a superb rare books collection.

The Rare Books and Special Collections Department holds the archives of the Harvard Schools of Medicine, Dental Medicine, and Public Health, an extensive manuscript collection as well as prints, photographs, and the Warren Anatomical Museum.

Online resources are available through the Countway Library’s Digital Library (http://www.countway.harvard.edu) or through the Harvard Libraries Portal (http://lib.harvard.edu). Because electronic resources such as journals, books, and databases, are licensed by the Harvard University Libraries for use by current faculty, students, and staff only, individuals must hold a valid Harvard University ID in order to access the online resources. Online system users must also obtain a Harvard University PIN (http://www.pin.harvard.edu) or an eCommons username and password (http://ecommons.med.harvard.edu).

Harvard’s book, journal, and other resource holdings are listed in the HOLLIS catalog (http://holliscatalog.harvard.edu). Students may borrow from the Harvard College Library, including Widener and others in Cambridge and also from the libraries of other Harvard schools. It is important to consult each library for hours and access restrictions. Items such as books or journal articles not held at the Countway Library may be requested through interlibrary loan (CountwayDoc), available through the Countway Website.

**Hours:** 8:00am–11:00pm Monday through Thursday; 8:00am–8:00pm Friday; 12pm–7:00pm Saturday; and 12pm–11:00 pm Sunday.

**Circulation:** Books four weeks with renewal five times. Reserve books are used in-house for two-hour periods with renewals. Journals do not circulate.

For current information regarding the Library, please visit the Countway’s Website at http://www.countway.harvard.edu/ or call 617-432-2136 (access) or 617-432-4888 (hours).

**MAIL**

In addition to the student mailboxes on the ground floor of the Kresge Building, EOME students have mailboxes within the Program outside Room 1402 of Building 1. Please check both regularly. We cannot forward mail from the 14th floor. EOME Residents share a mailbox on the 14th floor marked OEMR. For all ERC students who applied via other programs within the Department of Environmental Health, your mailboxes should be provided through your respective programs.

**OFFICES**

The Center's administrative office is located in Room 1402 of Building I. Most occupational health faculty offices are located on the 14th floor. The offices for industrial hygiene faculty are in the Landmark Building. The offices for first and second year residents are located at the Landmark Building, 3rd Floor East. The office for the Director of the Occupational Medicine Residency is Main Campus, 14th Floor, Room 1-1407, and for the Director of the Outreach Program- Room I-1415. Limited office space is available for research fellows, doctoral students, residents, and master's students conducting research projects.

**EOME POLICY ON MOONLIGHTING**

(OEM RESIDENTS)

The Harvard Chan School Occupational and Environmental Residency (OEMR) has physicians with a variety of clinical skills and board certifications. Some of the OEMR residents/fellows will want to moonlight in their clinical specialty area. OEMR residency does not prohibit residents/fellows from moonlighting that they have arranged for independently, under their personal full Massachusetts Medical License and medical malpractice insurance. This “moonlighting” experience would be considered completely independent from the OEMR program at the School. The only guidance the faculty would offer to residents/fellows who commit to moonlighting is to give careful consideration to timing and workload, so as not to interfere with schoolwork and responsibilities. According to ACGME rules, moonlighting counts toward your “duty hours” and therefore total clinic work cannot exceed 80 hours per week.

If you are an OEMR resident/fellow, you will be doing clinical practicum OEMR rotations under a CRICO malpractice policy that has been purchased by Harvard T.H. Chan School of Public Health. This policy covers your clinical work ONLY at the Harvard Chan School practicum sites to which you have been assigned, and would not cover you doing clinical work at any other location. Although in some hospital-based fellowships/residencies it may be possible for residents/fellows to apply for expanded coverage schedule in order to moonlight, this is not an option that OEMR can offer to its residents/fellows.

In rare situations, for fellows who have already attained considerable clinical skills in occupational and environmental medicine, and those who hold a full license in Massachusetts, there may be an opportunity to do a small amount of “moonlighting” in Occupational and Environmental Medicine at a the School practicum site in which the resident has already successfully completed a rotation. A proposal for this moonlighting must be reviewed and approved by the Residency Director. Note: Moonlighting is not permitted with a limited license.

**TRAVEL**

Prior to traveling on University business, individuals unfamiliar with University travel policies should request information from John Yong 617-432-2219.

Registering International Travel: Students who are traveling internationally with Harvard sponsorship are required to register with the Harvard Travel Registry: https://www.globalsupport.harvard.edu/travel-tools/harvard-travel-registry

Providing your itinerary and contact information enables the Global Support Services team to communicate with you and provide medical and security assistance in the event of an emergency (i.e. natural disaster, civil unrest, etc.).

**SAFETY**

For your safety in the Longwood Medical Area and the city of Boston, walk with friends via main thoroughfares and in well-lit areas. Watch what’s happening around you, stand tall, and walk confidently. Don’t wear expensive jewelry. Be cognizant of and alert to your surroundings. When walking after dark, travel in groups of two or more; do not travel alone. Carry your purse close to your body. Don’t pat your clothing to make sure your valuables are still where you placed them. Don’t ride in the last car of the subway (farthest from the conductor), especially at night. Abide by common sense; if something looks suspicious, avoid and report it.

**Police (617-432-1212)**

The Longwood Area police are stationed at 90 Smith Street. Officers are available to give assistance 24 hours a day.
AFTER HOURS TAXI SERVICE
From 9:00pm to 3:00am, Harvard T.H. Chan School of Public Health faculty, staff and students with a valid Harvard Longwood Campus photo ID can obtain taxi vouchers for trips to T-stops or residences within a one-mile radius from campus. Should your destination go beyond the one-mile radius of the campus, the taxi meter will be turned on and you will be responsible for the additional fare. Each taxi will only go to one destination with up to four people. Taxi service is available at anytime during these hours on a first come first serve basis. Please be aware that traffic and weather conditions may affect the timeliness of the taxi service. Interested parties must go to the security desk at the front lobby of the FXB Security Desk, at 651 Huntington Avenue.

SHUTTLE BUS
The Landmark/Longwood shuttle provides service between Landmark Center and Harvard T.H. Chan School of Public Health Monday through Friday from 8 am to 6 pm. No weekend or Holiday service. The shuttle departs from the front of the Regal Movie Theater at Landmark Center at 8:00 a.m. making a stop at Vanderbilt Hall and then proceeding on to 651 Huntington Ave. (FXB Building), to St. Alphonsus (Smith St.) then along to Overland St. Each loop takes about 20 minutes. For more route information visit: https://www.hsph.harvard.edu/landmark/shuttle/

The M2 shuttle bus service is available from the Longwood Medical Area to Harvard Yard in Cambridge. The shuttle departs from Vanderbilt Hall. The shuttle from Harvard Square to Vanderbilt Hall will stop at the Fenway T Station. Shuttle stops may be requested at other MBTA stops on route as well. MASCO will print revised schedules and post signs in shuttles. This service is free for students carrying their University photo ID. Buses leave the Medical Campus and Cambridge every 10-15 minutes during peak periods, and at least once an hour during the rest of the day, from approximately 7:00am-11:30pm Monday through Friday. The Saturday M2 runs during the academic year only from 8:30am to 10:30 pm on the half hour. There is no service on holidays and Sundays. For more information call the MASCO Customer Service Line at 617-632-2310 or visit the web site: http://www.masco.org/transit/ptsM2.htm.

COMMUNICATIONS
As part of the Harvard University Emergency Management Plan, the Harvard community can now expect to receive text message alerts in addition to traditional methods of notification. MessageMe, Harvard University’s Emergency Notification System, helps you to stay informed in the event of an emergency by sending alerts to your personal electronic device (cell phone, pda, smartphone, etc.) through text messaging, voice, and/or email. Harvard community members are encouraged to sign-up for this service in order to facilitate rapid and effective communication throughout the community. Please make sure to register for the MessageMe service: https://messageme.harvard.edu/.

WALKING ESCORT SERVICE
The Harvard Longwood Campus has a walking escort service available 24 hours a day. On request, the security officer will escort faculty, staff, or students to any of the Longwood Campus Area parking lots, buildings, or local "T" stops. To use this service, call 617-432-1379. Please call ahead as it may take as long as fifteen minutes for your escort to arrive. Please wait for your escort once you have called.