2011–2013 Biennial Report
On the horizon

Department of Environmental & Occupational Health Sciences
University of Washington
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Researchers are not alone in wanting to know how our environment influences our health. It’s a topic of interest to all of us.

Departmental researchers study how environmental factors can harm human health and how to identify, prevent, and control their effects. We also seek to understand how environmental factors can support and enhance health and well-being. Our goals—through research, teaching, and service—are injury prevention, health protection, and health promotion in making environmental choices. Through continual discovery, anticipatory exploration, and rigorous analysis, we aim to support wise and informed decisions that better protect the public’s health and safety.

The cover of this report captures photos that reflect our activities and point to how we are preparing for what is “on the horizon.” As educators and researchers, we strive to address the issues of today and concerns for tomorrow. For example, we research known hazards and recommend better safeguards. We investigate new or less-understood chemicals and processes that may pose risks to human health. Our academic programs provide students a strong foundation inside and outside of the classroom and prepare them for what lies ahead.

The 2011–2013 biennial report will introduce you to examples of our department’s activities and programs in Washington state, the Pacific Northwest, and beyond. You will read how we tackle hazards such as those that affect workers’ health and safety in Washington state and about new technologies and innovative partnerships. You will learn how our department has made a difference in the lives of students who graduated during the biennium and in the careers of our alumni who continue to make important contributions to occupational and environmental health.

Please visit us online (http://deohs.washington.edu) or call us (206-543-6991) for more information about our programs.

—David Kalman, Chair
Department of Environmental and Occupational Health Sciences
The Department of Environmental and Occupational Health Sciences is one of five departments in the University of Washington School of Public Health. We study how environmental factors can harm human health and how to identify, prevent, and control their effects. Our goal—through teaching, research, and service—is prevention and protection.

**Education**

http://deohs.washington.edu/academics

Our multidisciplinary faculty teach and train students. We offer undergraduate and graduate degrees and medical residences.

**Research**

http://deohs.washington.edu/research-centers

With an emphasis on human health and environmental factors, the department’s research focuses on maintaining a safe supply of food and drinking water; discovering the mechanisms of environmentally related diseases; treating and disposing of solid and toxic wastes; reducing air, water, food, and noise pollution; and controlling workplace hazards.

**Service**

http://deohs.washington.edu/services

The department’s service activities support occupational health and safety for Washington state workers and employers. We provide:

- Continuing and professional education
- Health and safety training
- On-site monitoring and evaluation
- Laboratory analysis
- Clinical care

**People**

STUDENTS = 134
Graduate students 76
Postdoctoral fellows 13
Undergraduates 45

FACULTY = 125
Core 36
Clinical 17
Emeritus 15
Adjunct 11
Affiliate 46

STAFF = 122
Research 74
Service 19
Operations 19
Communications 4
Computing 3
Student Support 3

WEB plus*

Learn more about us at http://deohs.washington.edu

BY THE NUMBERS...

>200 PUBLICATIONS

>50 AWARDS & HONORS

See a complete list of publications and honors and awards at http://deohs.washington.edu/biennial-report

were authored and co-authored by department researchers and appeared in peer-reviewed journals and books during the 2011–2013 biennium.

were received by our faculty, staff, and students during the biennium.
Several factors shaped department activities in the 2011–2013 biennium and will influence the department’s direction in the coming years. With the implementation of activity based budgeting—which ties student enrollment in courses with tuition revenues—instructional funding to the department from the university was more than $4 million, representing a 25% increase from the 2009–2011 biennium.

The majority of the department’s ongoing and new research projects are funded by federal grants and contracts. Research funding for the biennium was $57.7 million, about a 10% decrease from the previous biennium that was due to federal contract payment schedules, funding cuts to supported projects, and fewer funding opportunities. For example, while more than 100 proposals were submitted, less than one-third received funding. We will continue to develop and submit innovative proposals. However, research awards will remain competitive because more institutions are competing for fewer opportunities and increasingly limited funds.

The department’s appropriation from the Medical Aid and Accident funds remained level compared to previous biennia, as did private gifts and self-sustaining revenue.
Serving WASHINGTON & IMPROVING SAFETY ON THE JOB

We provide workplace monitoring and evaluation, laboratory testing, and clinical services to Washington state businesses and workers. These service activities depend on our department’s strengths in education and research. They provide real-world opportunities for students and researchers who investigate hazards known and unknown and who seek solutions to better protect public health. Complementing our educational mission, we offer professional development courses as well as continuing education and training in occupational health and safety. Our goal is to prevent workplace injury and illness.
Continuing Education

Our continuing education (CE) program designs courses to meet the needs of working professionals in Washington state and across the Pacific Northwest. Directed by Principal Lecturer Janice Camp, the CE program includes courses offered by:

- Pacific Northwest OSHA Education Center (OSHA)
- Northwest Center for Occupational Health & Safety (NW Center) Continuing Education Program
- Programs supported by the National Institute of Environmental Health Sciences (Minority Worker Training Program, Hazardous Waste Worker Training, HAZMAT Disaster Preparedness Training)

<table>
<thead>
<tr>
<th># COURSES</th>
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<tr>
<td>OSHA</td>
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<td>Other CE</td>
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Tunneling: One Course Among Many

Tunnel construction safety was the focus of a course offered at the University of Washington in May 2013 and sponsored by our Northwest Center for Occupational Health & Safety. “The course offered participants—owners, contractors, regulators, and health and safety professionals—information on the scientific basis for health and safety best practices, tunneling regulations, and an opportunity to talk about strategies for building tunnels in the safest way possible,” said Nicholas Reul, the course director. He is an acting instructor in the department and physician in the Occupational and Environmental Medicine Clinic at Harborview Medical Center. More than 125 people participated in the course, which included a tour of the State Route (SR) 99 tunnel boring machine. The machine—which is nearly as tall as a five-story building—will burrow two miles along the Seattle waterfront. The SR 99 tunnel corridor will replace the aging Alaska Way Viaduct.
Medical Clinic
Treating Patients Is an Opportunity to Treat the Workplace, Too

Patients are referred to our Occupational and Environmental Medicine Clinic from across Washington state and from areas that may not have the expertise to diagnose and treat them. These are often complex cases, where the cause of the injury or illness needs to be identified before comprehensive treatment can be planned.

Patients are seen by physicians who are on faculty in our department and in UW’s Division of General Internal Medicine. The faculty also train doctors in our Occupational and Environmental Medicine residency program.

“We don’t just treat the injury or illness and send the patient back,” explained physician Debra Milek, the new medical director of the clinic and adjunct associate professor in our department. Whether the worker has a musculoskeletal injury or chemical exposure, without some intervention, the patient may wind up returning to the clinic with the same injury.

Importantly, what affects one patient may also affect co-workers. Like canaries that were used to warn mine workers of harmful gases before the days of air monitoring, injured workers may point to hazards in a workplace. The clinic’s mission is to prevent injuries from happening. Clinic staff can offer guidance to workplaces that have potentially harmful chemical or physical exposures. “I would like us to be recognized as a resource for workers and employers to make workplaces safer,” Milek explained.

Located in Harborview Medical Center, the Occupational and Environmental Medicine Clinic provides care to patients with illness or injury caused by occupational and environmental exposures. It is the only major referral center for occupational medicine cases in the region. http://deohs.washington.edu/oem/clinical-public-health-services

2011-2013 CLINIC VISITS

Unique Patients 491
Total Visits 1,276

The majority of clinic visits are for musculoskeletal injuries, particularly low back, shoulder, and wrist injuries.
Workplace Consultations and Research

http://depts.washington.edu/frcg

The Field Research and Consultation Group is a small team of dedicated professionals who provide free occupational safety and health services to Washington state businesses and labor groups, explained Senior Lecturer Martin Cohen, the group’s new director. In the 2011–2013 biennium, the group served 116 companies, giving priority to those with fewer financial and health and safety resources. Field investigations involve visits by industrial hygienists to the worksite where they observe activities and processes and measure worker exposures. Samples collected in the field are sent to our Environmental Health Laboratory for analysis. Upon receiving results from the laboratory, the industrial hygienist writes a comprehensive report, detailing the results and providing recommendations on how to control exposures deemed problematic. Follow-up monitoring is often done to assess controls implemented by the business.

Project Highlights

Crab Fishermen

A team of researchers surveyed commercial crab fishermen in Oregon on their work practices and asked them to field-test five personal flotation devices (PFD). This study was conducted to improve safety and better understand the fishermen’s views and experiences regarding PFD use. The team included members of our department, the Oregon Health & Science University, and the National Institute for Occupational Safety and Health Alaska Field Station. The Field Research and Consultation Group developed a health and safety handout summarizing the results and recommendations from the study, which was distributed by the US Coast Guard to those in the crab fishing industry.

Healthcare Workers

Healthcare employees can be exposed to serious infectious diseases, which is why use of respirators can be a necessary precaution. Martin Cohen developed a training video for healthcare professionals on how to properly wear a N95 respirator. Jeanne Vincent is the clinical operations manager for occupational health at Seattle Children’s Hospital where they do over 2500 fit-tests a year. “You can’t just grab any N95,” she said, indicating the importance of a proper fit to protect against viruses and bacteria. “If there is a respiratory hazard—the seal is really critical.” They plan to incorporate the video into their online training program for medical professionals. Watch at http://depts.washington.edu/frcg/N95FitTestVideo.
BY THE NUMBERS...

During the 2011–2013 biennium:

- **STUDENTS** from 35 counties participated in Continuing Education (CE) courses.
- **COMPANIES** from 16 counties were provided on-site monitoring and evaluations by the Field Research and Consultation Group.
- **PATIENTS** who live in 14 counties were seen by physicians in our Occupational and Environmental Medicine Clinic.
- **CLIENTS** from 20 counties submitted samples that were analyzed by the Environmental Health Laboratory.
Our Environmental Health Laboratory

Fire personnel and commercial divers are often seen dropping off breathing air tanks at the Environmental Health Laboratory. They are just a few of the clients that take advantage of our American Industrial Hygiene Association-accredited laboratory that serves employers and labor in Washington state.

The lab, directed by Russell Dills, PhD, tests the air in these cylinders for several gases, including water vapor, one of the most difficult components of breathing air to analyze accurately. These are among the hundreds of submissions that a small, experienced staff of eight processes and analyzes. The samples come from clients across the state and from industrial hygienists in the Field Research and Consultation Group and the Occupational and Environmental Medicine Clinic.

The lab helps identify chemicals in products and processes that may affect people's health in the workplace. Lab scientists test for metals and chemical agents within a wide range of sample media. For example, they look for chloramines and other amines emitted from dewatering sewage sludge. They determine hazardous chemicals that are released into the air from laser-cut acrylic plastic, and they characterize toxic components of fumes released when molten steel is dropped into a mold made of sand.

### ACTIVITY

| Analysis for the Field Research and Consultation Group | 52 | 163 | 804 |
| Direct Client Service | 60 | 395 | 1163 |
| Quality Control | NA | 54 | 223 |

The Environmental Health Laboratory—accredited by the American Industrial Hygiene Association—provides consultation and chemical analytical services to Washington's employers, labor groups, and governmental organizations.

http://depts.washington.edu/ehlab

New Technology Improves Analysis

**Metrohm Ion Chromatograph System**
Primarily used for hexavalent chromium analysis of workplace samples taken from welding, chromeplating, painting, grinding, and foundry.

**Water Vapor Generator**
Used for breathing air analysis because commercial standards are not stable, particularly in winter.

**GC-MS-Thermal Desorption System**
Used to identify and quantify unknown contaminants in air, such as inadvertent pyrolysis products formed by lubricants and cutting fluids heated to smoke point during use.
Chiung-I Hwang

Education

BS, Public Health, National Taiwan University, 1990
MS, Industrial Hygiene and Safety, University of Washington, 1994

Career Path

Employee Health and Safety Coordinator, Northwest Hospital
Environmental Health and Safety Manager, Skanska USA Building, Inc.

It’s a long way from studying public health in Taiwan to enforcing environmental and safety regulations during the construction of a “green,” sustainably designed building in Seattle, but it’s a direction that well suits Chiung-I Hwang.

After completing her MS degree in our department, Hwang joined Northwest Hospital in Seattle where she helped mitigate risks for hospital employees, such as developing protocols that reduce exposure to needles and other sharps, ensuring proper disposal of chemicals, and preparing for emergency response.

Eventually, after 15 years, Hwang was ready for a change. She landed a job as environmental health and safety manager for Skanska USA Building, Inc. While initially Hwang did not have much experience in the construction industry, she found many principles of occupational safety management were directly applicable. She makes the construction site a safer place for workers by preventing injuries.

She has worked on various construction projects for the company at Virginia Mason Hospital, the Hanford Nuclear Reservation, and the UW Medical Center. Now she is involved in the new LEED (Leadership in Energy and Environmental Design) Platinum-certified commercial building being developed by Skanska. It is the site of the future headquarters of Brooks Sports, an athletic shoe and apparel company.

“With this job,” she continued, “I have to understand how construction projects work so I can anticipate hazards.” She also has to ensure that the recycling and ground waste targets for the construction site are met. The project, known as “Stone34,” set a high bar with a goal of recycling 95% of construction debris, higher than Skanska’s national goal for 2013 of 94%. So far, Stone34 has been averaging 98%, exceeding the LEED Platinum certification requirement of at least 90%. The building is due to be completed by July 2014.

“It had never occurred to me that one day I would be in construction,” she said. “But I love it.” She urges current students to keep an open mind and get experience in a variety of industries.
On the horizon

Innovating

TECHNOLOGIES FOR DETECTION AND DIAGNOSIS

Sometimes the tools or methods needed to detect and diagnose environmental and workplace hazards don’t exist, or they aren’t good enough. Our researchers are working to develop the next generation of technologies to better protect the public’s health and safety.
Predicting Reproductive Threats

Over the years, our department’s research has looked at ways that various chemicals can affect the male reproductive system, generally by measuring altered function or infertility in exposed populations.

New research methods in our Institute for Risk Analysis and Risk Communication could improve our ability to predict such chemical harm before it happens.

In 2011, Professor Elaine Faustman received a grant from the US Food and Drug Administration to study the potential effects of numerous chemicals using cell cultures in the laboratory before allowing use of these chemical agents in human populations. This follows a small study she did earlier on alternatives to animal research, using seed money from the Humane Society of the United States and Proctor and Gamble.

The larger study will use the developing field of computational toxicology in vitro (in the lab, not in the body) with cultured testicular cells. Using a three-dimensional testicular cell co-culture system (3D-TCS), her lab is developing a screening tool for testicular toxicants.

This is possible by measuring cell signaling pathways, the complex communication networks that govern how cells respond to their environment. In this case, they are looking at sperm development.

The research uses systems biology to study how cell signaling networks can affect reproductive development. Faustman’s earlier research identified 17 cell signaling pathways that occur across species and in different stages of embryonic development.

“The work proposed is significant,” she said. “Alterations to these processes are serious, so the early detection of preventable causes of impact is important.”
Adapting Video-Gaming Technology to Evaluate Workplace Hazards

The Kinect for Xbox 360 was originally conceived by Microsoft for video gaming. But now, Assistant Professor June Spector is using the technology behind the device to assess ergonomic or musculoskeletal hazards in the workplace. She uses the device’s infrared depth camera and complicated body-mapping algorithms to collect information about workers’ postures and tasks.

Currently, assessing musculoskeletal hazards on a population level requires affixing sensors to people or extensive videotaping and analysis. An accurate, real-time tool is needed to better understand and prevent occupational injuries, especially in the manufacturing industry. In Washington state, this sector in 2011 had the highest number of injuries and illnesses involving days away from work. Between 2002–2010, work-related musculoskeletal disorders accounted for more than 40% of all the workers’ compensation claims filed.

With support from the department’s allocation from the state’s Medical Aid and Accident funds, Spector teamed up with two manufacturing companies and researchers in computer science, mathematics, and the UW Human Motion Analysis Lab to improve and test the feasibility of the technology in the workplace. “Using information collected by the system about the duration of a task, how static someone is in completing the task, and the postures assumed during the task, we can better understand what puts people at risk for musculoskeletal injuries,” said Spector.

Finding Pesticide Danger Faster

Professor Clem Furlong (adjunct faculty in our department) and postdoctoral researcher Judit Marsillach, both in the Department of Medicine (Division of Medical Genetics), are working with Christopher Simpson, associate professor in our department, to radically improve measurement of human exposure to organophosphate pesticides. These chemicals are frequently used in the apple and other tree fruit orchards of the state, where tens of thousands of people are employed.

When the human body breaks down organophosphates, it makes certain products that bind to a protein. Using mass spectrometry, the new method measures the added mass attached to a particular protein. In the past, a person required two separate blood tests—one before any exposure and one after. Now only one test is required, with a small sample known as a blood spot. Levels of exposure far below what the current test can measure alert workers and their families to prevent additional harm.

This testing could widen to include detecting nerve agents that are under scrutiny in Syria and other international battle zones. “The chemistry of these [pesticides] is identical to some nerve agents,” Simpson said. Some refining is going on, but the team hopes that the new testing method will soon become a standard in Washington state.

The project is supported by the Pacific Northwest Agricultural Safety & Health Center, which is funded by the National Institute for Occupational Safety and Health.
Healthcare Diagnostic Tool

According to the Centers for Disease Control and Prevention, every year there are 1.7 million hospital-acquired infections in the United States. These are infections that patients acquire during the course of receiving treatment for other conditions. Clinicians currently use microbiological culture methods to test patient samples for pathogens, looking for bacterial growth to determine the nature of a patient’s infection. A new test being developed will significantly decrease the time needed to diagnose the infection, from four days to four hours.

“We think our test can detect things that culture cannot,” said Professor Gerard Cangelosi, who along with his collaborator, Paul Harris from AttoDx, Inc., received a commercialization grant from the Life Sciences Discovery Fund. The technology behind the method—molecular viability testing—can detect the DNA unique to each type of bacterium and determine whether bacteria present in the sample is still viable and capable of multiplying and causing infection.

Finding Toxins and Their Path in Body

With funding from the National Institutes of Health, Professors David Eaton in our department and Jonathan Himmelfarb in the Department of Medicine are working with the biotech company Nortis to develop 3-D chips that can simulate the human liver and kidney. The goal of these microphysiological systems is to test drugs and chemicals and see how they are metabolized in the body and whether they may be toxic.

These tiny systems—which use human cells from organs, such as the liver and kidney—more accurately mimic human metabolic systems than earlier methods. These systems could improve the safety of drugs approved by the US Food and Drug Administration by giving more accurate results of drug interactions. They could also allow researchers to rule out candidate drugs earlier during research studies and speed the best candidates on to clinical trials. They could give a longer window of observation because current systems allow only about five days before cells degrade, and this system promises 28 days. These same 3-D chips could also help test non-drug chemicals, which are an increasing concern in both the environment and in compounds that people swallow for nutrition purposes. Safety and toxicity studies using this system could identify issues that may go unseen using animal liver models.

More than five labs are involved—including in our department and the Schools of Pharmacy and Medicine, and at Nortis, a company headquartered at the University of Washington.

SPOTLIGHT: In 2011, Professor David Eaton was elected a member of the Institute of Medicine. One of the highest honors in the fields of health and medicine, membership recognizes individuals who have demonstrated outstanding professional achievement and commitment to service.
Ryan Blood, PhD, 2013
Environmental & Occupational Hygiene

Ryan Blood’s path led him to a PhD in Environmental and Occupational Hygiene, yet he has stayed close to his blue-collar roots.

“I have several family members and family friends who have worked in the blue-collar trades their whole careers only to retire in their 50s with mobility issues and chronic pain,” he said. “That has always been a background motivation for my interest in our field.”

For his master’s thesis and doctoral dissertation, Blood looked for ways to prevent the jarring effects of whole body vibration (WBV) on public transit workers and truck drivers, and he helped develop new methods for measuring WBV.

Long-haul truck drivers and Seattle Metro bus drivers have filed a high number of workers’ compensation claims in Washington state for low-back pain or injury, which has been linked to WBV.

Blood tested passive suspension seats, which use compressed air or mechanical springs to reduce vibrations. He found these technologies are slow to react to abrupt road changes and sometimes even amplify the vibrations.

A newer generation of vibration-canceling seats was recently developed by the Bose Corporation. Blood found that the electromagnetically active seat is a promising engineering control that reduces WBV exposures and may prevent injuries.

Detecting Poliovirus

Despite efforts to eradicate polio, the disease remains endemic in a few countries and has reemerged in places previously polio-free. Just one in 100 people who have the virus show symptoms recognizable as polio. As a result, environmental surveillance is necessary.

In collaboration with PATH, a nonprofit global health organization, and with funding from the Bill & Melinda Gates Foundation, Associate Professor Scott Meschke and researchers in his lab developed a new low-cost, easy-to-use sampler for detecting poliovirus in wastewater to help assess the circulation of the virus in the population.

The current grab-sample method is limited to 500 milliliters of wastewater, while the new sampler can capture 10 liters. To use, the bag is dipped into the wastewater, then hung on a tripod. By rolling the bag shut like rolling up a tube of toothpaste, the water passes through the tubing to a filter that collects samples. The larger sample volume and in-the-field method could improve environmental surveillance. The next step is to validate the new method in the field.
Karen Kuter remembers as an undergraduate hearing news reports about a major *E. coli* outbreak. “I was fascinated by the public health implications and how to prevent future outbreaks,” said Kuter. She majored in environmental health because she wanted to learn skills to address real-world problems and make a difference.

Now she works as an environmental health and safety manager at Seattle BioMed, the largest independent, nonprofit organization in the United States focused solely on infectious disease research, including malaria, HIV/AIDS, tuberculosis (TB), and neglected tropical diseases.

She credits having had two internships and lab experience as an undergraduate with helping her to land the job.

Central to her work is keeping laboratories safe for scientific researchers and staff. Kuter implements procedures that mitigate risks from the many “insectaries,” labs that house mosquitoes infected with *Plasmodium falciparum*, the parasite that causes malaria.

She is also working to safely expand the organization’s Biosafety Level 3 (BSL-3) TB facilities and program. The TB bacterium, *Mycobacterium tuberculosis*, can be airborne-transmissible. She helps conduct a “dry run” with a nonpathogenic vaccine strain to make sure that lab safeguards are in place, so that scientific staff who work with live organisms are adequately protected. “Worker safety is public health,” Kuter said.

In addition, she is creating materials to train laboratory and facilities staff on the Global Harmonization System, new national standards for hazard labels, safety data sheets, and risk warning requirements.

“There is always something new in environmental health, which is why I love the field,” said Kuter.
On the horizon

Providing THE SCIENCE TO SHAPE POLICY AND PRACTICE

Researchers in our department help turn research findings into policy and practice that better protect public and worker health. They make research results available, collaborate with practitioners, participate in state and federal scientific advisory boards, and educate leaders on the implications of what scientific results mean to environmental and occupational health and safety.
First Public Health Professional on the US Green Building Council

Howard Frumkin, dean of the School of Public Health and professor in our department, was elected to a three-year term on the board of directors of the US Green Building Council in February 2013, the first designated board position for a health professional. Frumkin brings a public health perspective to the council, which was originally created to promote sustainability in the building and construction industry. Today it is a coalition of tens of thousands of organizations working to make buildings better for health, the environment, and the community. The council offers green building certification under the LEED (Leadership in Energy and Environmental Design) program.

“I am passionate about the potential for sustainable, green built environments to promote human health and well-being, both directly—by providing healthier settings in which to live, work, study, and play—and indirectly, by mitigating climate change, conserving scarce resources, and otherwise helping to maintain a world suitable for human habitation over generations,” Frumkin said.

SPOTLIGHT: Professor Richard Fenske co-chairs the Technical Advisory Group on Human Health and Security for the Washington State Department of Ecology. This group was among four mandated by the Legislature in 2009 to assist in developing a state strategy for how Washington can prepare for and adapt to the impacts of climate change.

BY THE NUMBERS...

We spend 90% of our time indoors, and buildings account for 75% of our total electrical use. They consume enormous resources to heat, ventilate, and light. Added to the strain on the environment are the fossil fuels burned, the carbon dioxide released, and the tons of waste that end up in landfills, according to Joseph David (Point32), who spoke at our Environmental Health Seminar in February 2013.
Children's Exposure to Pesticides

Increasing evidence shows urban and rural children are regularly exposed to low levels of pesticides that can have serious long-term health effects, according to a report issued by the American Academy of Pediatrics. The technical report and an accompanying policy statement on pesticide exposure in children appeared in the December 2012 issue of *Pediatrics*. Associate Professor Catherine Karr, an environmental health pediatrician in our department, co-authored both papers, which recommended public and professional approaches to the issue of childhood pesticide exposure.

Pediatricians don’t get this information or training in their routine medical education and are likely not aware of the wealth of studies that have been published on the subject, said Karr, who served on the American Academy of Pediatrics Council on Environmental Health from 2005 to 2011. She believes doctors can play a significant role in protecting children’s health by recognizing, treating, and preventing exposure to pesticides. Karr also published tips for parents on reducing their child’s exposure to pesticides in food and from other common sources.


**Prescription Regulations Reduce Accidental Deaths**

Dangers of opioid overuse led Research Professor Gary Franklin, medical director at the Washington State Department of Labor & Industries, to help develop dosing guidelines for primary care providers in treating chronic noncancer pain. The guideline contains an online dosing calculator and recommendations to assist providers, including a “yellow flag” threshold of 120 milligrams per day morphine equivalent dose (MED) at which specialty consultation is recommended. The guidelines influenced a 2010 state law limiting unnecessary prescriptions. In a 2012 publication in the *American Journal of Industrial Medicine*, Franklin and his collaborators in the School of Public Health showed that these regulations have led to a 50% decline in mortality, based on data from the workers’ compensation system.

**PROGRAM SPOTLIGHT:** The Occupational Epidemiology and Health Outcomes Program conducts research related to preventing workplace disability and improving healthcare delivery. [http://depts.washington.edu/occepi](http://depts.washington.edu/occepi)

**BY THE NUMBERS...**

From 2004–2010, Washington state reported 96 opioid poisonings and 312 opioid-related adverse effects. Most providers (72%) expressed concern about opioid overdose, addiction, dependence, and recreational use.
Reducing Firefighters’ Exposure to MRSA

A collaboration between Washington Fire Chiefs and department researchers improved awareness of methicillin-resistant *Staphylococcus aureus* (MRSA) and led to policy changes in fire stations.

“Firefighters and paramedics are at the crossroads between the public and hospital environments,” said Professor Marilyn Roberts, an environmental microbiologist in our department. “Their job includes administering first-response care to patients, many of whom are more likely to be MRSA carriers or have MRSA infections than the general population. This may put fire personnel at increased risk.”

To find out the extent of exposure, Roberts and the department’s Field Research and Consultation Group tested samples from 33 fire stations. They found 19 had at least one positive MRSA sample. Each fire station was provided the results, educational materials on how to maintain a clean zone in the fire station, and a fact sheet on tools for improving an infection control program, including policies, work practices, and cleaning techniques necessary to reduce the risk of MRSA transmission.

In April 2013, our Continuing Education Program sponsored a course for fire professionals that covered infectious disease risks and strategies to prevent transmission of MRSA and other pathogens from surfaces and hands.

Learn more about the project at [http://depts.washington.edu/frcg/MRSA.html](http://depts.washington.edu/frcg/MRSA.html).

Responding to the Needs of Dry Cleaners

Most of the approximately 200 dry cleaners who clean on their premises in King County are family-owned businesses where workers can be exposed to high levels of solvent vapors. A commonly used solvent, perchloroethylene (PERC), may pose serious health hazards, although safer alternatives are available.

Our department partnered with King County’s Local Hazardous Waste Management Program and dry cleaning industry groups to study the safety of current practices and find out why alternatives aren’t more widely used. Graduate student Chantrelle Johanson worked on a survey that found that most of these small businesses are Korean-owned and the most common barrier was financial. Several respondents said that their current machine was in good condition or not yet paid off, and some said the alternatives to PERC did not clean as well. Another grad student, Jessie Taylor, found that some cleaners in King County are using a new solvent that produces wastes that would be classified as “extremely hazardous” under Washington state regulations.

This information is helping to drive policy changes at the state level as more dry cleaners adopt new technologies, said Stephen Whittaker, who has overseen the students’ work. He is affiliate faculty in our department and works for the King County agency.
Robert Duff knows that certain environmental health issues can be contentious, especially with so many different stakeholders involved. Duff has worked extensively in the public sector. He has been a public health voice at the table and in the community for cleanup of Superfund sites, the Duwamish River in Seattle and the Fairchild Air Force Base in Spokane. And he has tackled legislative reform at the state level, including a ban on brominated flame retardants and a reduction of copper in brake pads. His academic training in toxicology, he explained, gave him a good scientific background for these positions.

Duff now manages the Environmental Assessment Program in the Washington State Department of Ecology. He is helping the agency push for an update to the federal Toxic Substances Control Act, the legislation that regulates the introduction of new or already existing chemicals or chemical mixtures. And, he is involved in the state’s reexamination of fish consumption rates. These rates ideally protect people who eat fish and shellfish and help determine how clean waters must be from contaminants such as polychlorinated biphenyls (PCBs) or mercury, which end up in fish tissue and pose risks to human health. Studies show that people in Washington state eat more fish than the consumption rates included in the current guidelines.

“Data is not the problem,” said Duff. “We have enough data to support a new fish consumption rate. The current one is not adequate.” But, he added, an updated rule is only part of the solution. Working towards source reduction, or what Duff calls “getting in front of the pipe,” is key. “We need to strive for reduced exposure to toxics. We know we can’t get to zero [risk]. What we need is to look broadly at the multitude of exposures for those that can effectively be reduced,” he said.

Good communication in science is needed, Duff said, and urged more scientists to use their background to influence policy.

Robert Duff
1993

Education
BS, Zoology, University of Massachusetts–Amherst
MS, Toxicology, University of Washington, 1993

Career Path
Risk Assessment Specialist, New Hampshire Division of Public Health Services
Public Health Advisor, Toxicologist, Manager, Site Assessment Section; and Director, Office of Environmental Health Assessments, Washington State Department of Health
Affiliate Instructor, DEOHS
Manager, Environmental Assessment Program, Washington State Department of Ecology

OuR ALUMNI make a difference

Anne Broache
We want our children to grow up healthy and strong, in environments—at home, school, and outside at play—that foster their maturity and development. Small bodies are more susceptible to toxins than adult ones, so researchers in our department are investigating exposures to certain contaminants that may cause adverse health effects in children, now or in the future.

CENTER SPOTLIGHT:
The Northwest Pediatric Environmental Health Specialty Unit is made up of a team of experts who provide training on environmental exposures and their effect on children’s health. They also provide consultations to health professionals, communities, and families. http://depts.washington.edu/pehsu
Asthma and Rural Children

A four-year study of rural children with asthma in the Yakima Valley turned up evidence that exposures to ammonia and fine particles in the air can negatively affect lung function. Limited research is available on the effects of air pollutants on children in rural communities, let alone factors that aggravate pediatric asthma, said Associate Professor Catherine Karr, who led the study. “This study can help facilitate more attention to the problem and motivate solutions,” she said.

The investigation stems from concerns raised by the community whose members live or work near large-scale crop and animal farms. “Agricultural production is important and growing, especially the dairy industry,” said Karr.

Nearly all of the 58 children involved were Hispanic, with median household income below $30,000. Health data on their lung function was measured daily using a special instrument, and control of asthma symptoms was assessed every two weeks in a phone survey. Researchers collected data on fine particles from a local air monitor, and Professor Michael Yost and his lab group designed an air monitoring device to collect samples that could isolate specific contaminants, including ammonia.

The study was initiated under El Proyecto Bienestar, (the Well-Being Project) and the team included our Pacific Northwest Agricultural Safety & Health Center, Heritage University, Yakima Valley Farm Workers Clinic, and KDNA (91.9 FM). Funding was provided by the National Institute of Environmental Health Sciences.

Dietary Exposure to Phthalates

Mothers who try their best to eat environmentally friendly, organic diets may still be exposed to synthetic endocrine-disrupting chemicals such as phthalates and bisphenol A, better known as BPA. Pediatrician Sheela Sathyanarayana found high levels of phthalates in an unexpected place—a control group that was being served prepared organic meals. She suspects the contamination came from spices in their food. Sathyanarayana is an adjunct assistant professor in our department and directs The Infant Development and Environment Study (TIDES), a multi-center cohort study of phthalate exposures during pregnancy and health outcomes in children.

Over the past few years, industry has been replacing current phthalates and BPA in plastic products with compounds that have been less studied. Food remains a worrisome source for the general population, and even for people who try to eat environmentally friendly diets. “Current information we give families may not be enough to reduce exposures,” Sathyanarayana said. Graduate student Samantha Serrano linked phthalate metabolites to soy products in the diets of pregnant women, using data from the TIDES study.

The research was supported by the National Institute of Environmental Health Sciences and by the department.
**Children and Mercury**

In his 44-year research career, Jim Woods, research professor emeritus, has led ground-breaking studies on mercury toxicity among adults with occupational exposure. Recently, he turned his focus to children, seeking to identify kids whose genetic disposition makes them especially susceptible to the adverse effects of mercury on the nervous system.

With funding from the National Institute of Environmental Health Sciences, his research team evaluated 350 subjects who as children were in a study investigating potential effects of mercury exposure from dental amalgam tooth fillings and other sources. The researchers investigated variants of 14 genes that are involved either in mercury handling by the body or that perform critical functions in the brain that may also be affected by mercury. They identified variants in four genes (CPOX4, MT1M, MT2A, COMT) that significantly increase susceptibility to mercury toxicity on a broad range of functions including attention, learning and memory, visual-spatial acuity, and motor function among up to 40% of children, with boys being more affected than girls.

These findings are the first to demonstrate genetic susceptibility to the adverse neurobehavioral effects of low-level mercury exposure in children, said Woods.

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**Reducing Lead Exposure in a Vietnamese Village**

Lead recycling is a cottage industry for some villages in Vietnam. While the extra income helps communities support themselves, unintended consequences result in widespread lead contamination and children with high levels of lead in their blood. Lead can cause health problems and affect a child’s developing brain.

Faculty William Daniell and Catherine Karr and others in the department have been collaborating with the Vietnamese National Institute of Occupational and Environmental Health to study the affected children and their environment and advise on cleanup of the contamination. Ryan Wallace (MPH, 2012), DEOHS staff member Gerry Croteau, and Deborah Havens (MPH, 2012) have also been involved in the project.

Now the nonprofit Blacksmith Institute has initiated a cleanup and education program in a village near Hanoi based on the UW research. The UW will assist in developing an education and training program and a health assessment evaluation, Croteau said.

The project is funded by the Rohm & Haas Professorship in Public Health Sciences, sponsored by the Rohm & Haas Company of Philadelphia, and by the Fogarty Institute of the National Institutes of Health.

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**SPOTLIGHT:** Administrator Adrienne Hidy helped Seattle’s Asa Mercer Middle School on Beacon Hill address pedestrian and bicycle safety. Working with the school’s Parent-Teacher-Student Association, she wrote and received grants totaling $100,000 from the national SAFE KIDS organization, FedEx, and Seattle Department of Transportation Safe Routes to School program.
Cynnie Curl, PhD Candidate, Environmental & Occupational Hygiene

Until now, researchers haven’t explored the relationship between the local food environment and organic food consumption. Some intriguing clues were uncovered in a new study led by PhD candidate Cynnie Curl. She manages our Multi-Ethnic Study of Atherosclerosis (MESA) and Air Pollution. The research center’s huge health database allowed her to look at who eats organic produce—and what their neighborhood has to do with it.

Curl says, “We’re trying to understand who eats organic food and how that decision changes their exposure to pesticides. Ultimately, we’ll use this information to help us understand whether eating organic food leads to a measurable improvement in people’s health.”

She analyzed statistical associations between eating organic produce and demographic, socioeconomic, and neighborhood characteristics for more than 4000 older Americans enrolled in MESA. She found that women were 21% more likely to consume organic produce than men. Study participants were between 50 and 90 years of age. The likelihood of eating organic produce declined significantly with increasing age among this cohort. In addition to those factors, Curl found that organic eating was closely associated with participants’ assessment of produce availability in their neighborhood.

Curl was named a Magnuson Scholar by UW Health Sciences in 2013. One of only six awardees, Curl was selected for her academic performance and potential contribution to health sciences research. The award is named in memory of Senator Warren G. Magnuson and his healthcare legacy.

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Sarah Weppner's career has come full circle; she started off as a teacher in Korea, then participated in a program at the University of Washington that paired science majors with teachers in the classroom. Now she is working to improve children’s education in Idaho. She has found a perfect combination in environmental health and education.

Weppner credits Professor John Kissel and others in the department with giving her the experience and knowledge to excel.

After graduation, she joined Idaho’s Department of Health and Welfare. She started out as an environmental health educator, and later, she managed the Environmental Health Education and Assessment Program.

Then for eight years, Weppner worked for a private consulting firm, TerraGraphics Environmental Engineering, Inc. On one of the projects, Weppner managed the sampling program at the Bunker Hill Superfund site in northern Idaho, an area contaminated with lead from historical silver and smelting practices. Soil samples from residential yards and indoor house dust were taken and monitored for concentrations of lead to track the cleanup’s progress. She also assisted local and administrative leaders in northern Nigeria to investigate and curb the high rates of lead poisoning among villagers living and working near a lead mining area. The villagers were processing lead-containing ore in their homes to extract gold.

Currently, Weppner is director of continuous improvement for the Treasure Valley Education Partnership, a nonprofit dedicated to improving children’s educational and vocational options. In conjunction with nine school districts around Boise, Idaho, she leads efforts to bring together community leaders from various professional sectors in order to advance students’ education to the collegiate level.

“My role is to assist stakeholders and all groups involved to make decisions based on a wealth of good data,” said Weppner.
Partnersing WITH COMMUNITIES NEAR AND FAR

We depend on partners and collaborators to identify and help us solve environmental and occupational health issues and to share findings, too. One of our core missions is to translate the science of what we learn into improved health in nearby communities like south Seattle and in communities farther away, such as on the Alaskan tundra and across the ocean in Vietnam.
Improving Health in Disadvantaged Communities

Our scientists presented on “Communities at risk: Linking science with communities to address environmental and occupational health concerns” at the 2012 annual meeting of the Society for Advancement of Chicanos and Native Americans in Science (SACNAS). The panelists shared their investigations into community-based problems—work done in collaboration with community residents—and recommended ways to improve the health of the populations studied.

More than 3500 people attended the conference, one of the largest gatherings of minority scientists in the country.

“Presenting my research allowed me to showcase one example of the type of work you can do in public health and the positive impact this work can have on disadvantaged communities,” said Vanessa Galaviz (PhD, 2013), who has attended the conference numerous times. She explained that she has met many students of color from disadvantaged communities who want to give back to their communities.

“I can easily relate to them and help them explore and visualize the powerful ways in which they can do this using public health as a venue,” she said.

Read more about the conference and the role Graduate Program Manager Rory Murphy played at http://deohs.washington.edu/environmental-health-news/sacnas-annual-conference.

Vanessa Galaviz, PhD, 2013
Environmental & Occupational Hygiene

Vanessa Galaviz is interested in protecting the environmental health of minority and low-income communities and has a passion for mentoring undergraduate and high school students.

Her doctoral research on traffic-related air pollutant exposures for pedestrians who cross the US-Mexican border was part of the Healthy Borders research study, a collaboration among researchers at San Diego State University, San Diego Prevention Research Center, and Casa Familiar, a community development agency.

Galaviz’s research is providing information to the San Ysidro Community Planning Group and the San Ysidro Smart Border Coalition. It will also be used to support the recommendations of Casa Familiar, which is advocating for San Ysidro residents to ensure that the reconstruction of the US–Mexico border port-of-entry takes into account community concerns. Galaviz received the Abrazo Award from Casa Familiar for her research efforts that are making a difference in this community.

In 2012, Galaviz also received a Community Volunteer Recognition Award from the UW Medical Center and Health Sciences Administration at the Martin Luther King, Jr. Tribute event. The award honors King’s enduring contributions to human rights, peace, and social justice. In spring 2013, she graduated with a PhD in Environmental and Occupational Hygiene and received the Gilbert S. Omenn Award for Academic Excellence, the highest award given to a student by the School of Public Health.
Health Impacts of the Duwamish River Cleanup

In February 2013, the US Environmental Protection Agency proposed a cleanup plan for Seattle’s Duwamish River. More than a century of industrial and urban waste have contaminated the river. Exposure to these toxic chemicals comes from eating resident fish or shellfish and coming into contact with sediment.

Researchers in our department, in collaboration with community health researchers from Just Health Action and the Duwamish River Cleanup Coalition/Technical Advisory Group, examined potential health impacts of the cleanup.

“Our findings demonstrate that EPA’s cleanup plan will significantly impact certain communities, particularly Tribes and people who use the river or live or work nearby,” said Associate Professor William Daniell. A report submitted to the agency made recommendations about how to minimize negative health impacts, maximize health benefits, and reduce health disparities.

This project and report were supported by a grant from the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts; and also by the Rohm & Haas Professorship in Public Health Sciences, sponsored by the Rohm & Haas Company of Philadelphia.

Read the full report at http://deohs.washington.edu/hia-duwamish.

Air Pollution in South Seattle

The Duwamish Valley is at the center of one of the most heavily trafficked areas of Seattle. Long-term exposures to diesel exhaust, a major contributor to air pollution, have been linked to respiratory and cardiovascular health problems and cancer.

In response to community concerns and with support from the Kresge Foundation, department researchers partnered with a local nonprofit coalition, Puget Sound Sage, to help residents measure levels of diesel exhaust. “We were able to develop a much more refined understanding of exposure—and the impacts of various sources of exposure—for this particular area of the city,” said Senior Fellow Julie Fox.

Results indicate that residents of Georgetown and South Park are likely exposed to higher levels of diesel exhaust than those who live in two other Seattle neighborhoods: Beacon Hill and Queen Anne. Also, within the two Duwamish Valley neighborhoods, pollution levels varied, even across small areas, and people living near busy roads and industrial areas faced higher levels of diesel exhaust pollution.

Learn more about the project at http://www.duwamishdiesel.org.
Storytelling & Educating Agricultural Workers

It gets hot—really hot—in eastern Washington, where farmworkers are in the orchards all day. They may not realize that heat can kill them or that heat-related illness is preventable. A new safety video aims to educate workers about heat illness. It was produced by the Pacific Northwest Agricultural Safety & Health Center (PNASH) and community partner, Radio KDNA.

Research we’ve done reveals how compelling farmworkers find personal injury stories featuring real people and events, said PNASH Director Richard Fenske. Center researchers, in collaboration with community organizations, have pioneered storytelling techniques that can reach a largely mobile and Spanish-speaking population. For example, educational audio programs highlight important health and safety issues faced by farmworkers and their families. Each story holds lessons on how to stay safe.

The center works with radio stations such as KDNA in the Yakima Valley and KOMW in the Okanogan, and disseminates the stories in collaboration with the other regional agricultural centers funded by the National Institute for Occupational Safety and Health.

More than 26,500 people work in agricultural jobs in Yakima and Okanogan counties, where the Pacific Northwest Agricultural Safety & Health Center partners with radio stations KDNA and KOMW to broadcast educational programs on heat-related illnesses and other health topics. The stories are also available online at http://depts.washington.edu/pnash/audio_library.

The Tribal Hazardous Response Emergency Activation Team is a collaborative project with our Continuing Education Program, the Tribal Solid Waste Advisory Network, and 31 Tribes in the Pacific Northwest. The program aims to create trained teams that can quickly and safely respond to potentially dangerous spills and accidents on Tribal lands in order to minimize damage to the health of the people and the environment.

BY THE NUMBERS...

26,500 PEOPLE

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A Tribal Threat

The Northwest’s remote Tribal lands have attracted unwanted attention from clandestine methamphetamine labs. These small-time meth cooks leave behind a hazardous waste site, said Kami Snowden, executive director of the nonprofit Tribal Solid Waste Advisory Network (TSWAN). Her network partnered with our Continuing Education Program and the Washington State Patrol to win a federal grant for an unprecedented type of training that integrates meth lab cleanup into a standard hazardous materials (HAZMAT) course. “This training is all about worker safety,” Snowden said. The goal is to raise awareness of the problem and train Tribal workers to recognize meth labs, so they can alert proper authorities for detective work and disposal.

At the beginning of the course, hardly any of the participants—who come from Tribal police, fire, public works, healthcare, and housing agencies in Washington, Oregon, Idaho, and Alaska—say they’ve seen a meth lab during their normal course of duties, Snowden said. After learning how to recognize signs of a meth lab, almost every hand goes up when asked if they’ve seen one.

Read about TSWAN at http://www.tswan.org.

A Native Environmental Health Story

Our department is working with Tribes in the Northwest to use traditional storytelling to explore environmental health issues in Tribal communities.

The Native TEACH (Tradition, Environment, And Community Health) Project is a collaborative partnership between the Center for Ecogenetics and Environmental Health and Tribal groups in the Pacific Northwest. In 2012, they developed a research-based comic book, The Return: A Native Environmental Health Story. Now, with funding from the National Institute of Environmental Health Sciences, they are collaborating with the Southwest Environmental Health Sciences Center at the University of Arizona to hold community conversations and storytelling workshops with Tribal partners in the Northwest and Southwest.

The goal is to develop place-based health promotion materials that can be used to catalyze healing conversations, said Jon Sharpe, the center’s administrator. “This new supplemental funding will allow the Native TEACH Project to strengthen a long-standing collaboration with our colleagues in Arizona and build on our work related to traditional storytelling as a powerful tool for identifying and addressing environmental health issues in Tribal communities.”

Read about the project at http://nativeteach.org.

CENTER SPOTLIGHT: The Center for Ecogenetics and Environmental Health has a strong commitment to research translation and outreach, engaging with community groups, Tribal nations, legislators, and agency staff on the impacts of environmental and genetic factors on health, wellness, and culture. http://depts.washington.edu/ceeh
Shiny Cars, Healthy Workers

Autobody repair shops pride themselves on erasing signs of a car accident. Our department is working with them to keep their workers safe. Professor Michael Yost—with colleagues at the University of Massachusetts Lowell, University of North Carolina at Chapel Hill, and the Safety & Health Assessment & Research for Prevention (SHARP) Program at the Washington State Department of Labor & Industries—has been studying ways to help autobody painters prevent exposure to a family of chemicals called isocyanates, which are used in paint. These chemicals can irritate the eyes, nose, and throat, and can also cause immune sensitization, leading to asthma. Their collaboration, called PaintHealthy Collision Repair, includes shop owners and painters.

Painters have long used respirators, but the gloves they use to prevent absorption have been problematic. Researchers in Yost’s lab have investigated different glove types and recommended those that are most protective, yet provide the tactile sensations painters need for their craft.

Funding comes from the National Institute for Occupational Safety and Health and Washington state’s Medical Aid and Accident funds.

Learn more about the project at http://www.painthealthycollisionrepair.org.

Using Peers to Survey Janitors

Commercial janitors work hard for low wages and have high injury rates. Professor Noah Seixas and his team conducted the nation’s first study to evaluate the effects on custodians from pressure to increase the speed to do the same work with fewer staff. They collaborated with a labor union, Local 6 of the Service Employees International Union (SEIU), and Casa Latina, a labor advocacy group, to train a small group of janitors to survey their peers in one of three languages—English, Spanish, or Vietnamese. These trainees interviewed union and non-union janitors, and a control group of security officers.

When asked to verify that they do not have enough time to get the job done, more than three-quarters of union janitors agreed or strongly agreed, compared with 39% of nonunion janitors and 25% of security guards. All workers with a higher work intensity had a two-fold increase in injury, disability, and pain. Back, arm, and shoulder injuries were common.
Matthew Keifer’s career has always bridged research and practice. He specializes in human health effects of pesticide exposure and agricultural safety and health issues.

He currently directs the National Farm Medicine Center of the Marshfield Clinic Research Foundation in Wisconsin. In addition, Keifer sees patients—injured workers—in a clinic. He recently co-founded a research center focusing on agricultural safety and health, similar to the Pacific Northwest Agricultural Safety & Health Center, which he co-founded when he was on faculty in our department.

Keifer completed a residency in internal medicine at the UW, where he was chief resident. He went on to finish the MPH residency program in Occupational Medicine. After graduation, he went to work in Nicaragua, then returned to UW as a faculty member in DEOHS and the Department of Medicine. He continued to do occupational health work in Central America, and later led activities in Southeast Asia. For more than 12 years, he volunteered as an attending physician with the Yakima Valley Farm Workers Clinic in eastern Washington.

In Washington state, Keifer developed and worked on many community-based projects, including the El Proyecto Bienestar (The Well-Being Project), to identify and address health issues of concern for Hispanic farmworkers and their families. For example, Keifer worked with promotoras (community health educators) and trained them to be safety advocates on farms.

After nearly 20 years at the UW, Keifer moved to Wisconsin, where in addition to research and practice, he oversees the development of innovative health solutions. One is a computer-based application for physicians that helps them communicate with employers of injured dairy and pork workers and identify work task limitations that can facilitate a safe return-to-work plan. He also leads a project called “Farm MAPPER (Mapping to Assist, Prepare and Protect Emergency Responders),” which uses Quick Response (QR) codes to map out resources and hazards on farms. Farmers inventory water, power, gas, chemicals, and manure ponds on their properties and are assigned a QR code, which is stamped on mailboxes or other locations. First responders can scan the code and access information they need, helping them navigate safely and avoid chemicals and other hazards on farms.
Students in the Bachelor of Science (BS) in Environmental Health program learn how to identify and control environmental factors that can adversely affect human health.

The Environmental Health Master of Science (MS) degree program teaches students to identify sources of chemical and microbial contamination in air, water, soil, and food, and on surfaces, and they study strategies to prevent or control the effects on human health and the environment.

The Environmental and Occupational Health Master of Public Health (MPH) degree program teaches students to recognize, assess, and control environmental and occupational hazards and the impact of these hazards on health and society. The program prepares graduates for a variety of applied or policy-oriented roles in the private and public sectors.

The Environmental and Occupational Hygiene PhD program educates students to recognize, assess and evaluate environmental and occupational exposures to chemical, physical, and microbiological hazards. They learn to manage health risks in community and occupational settings and receive advanced training in exposure assessment and control methods.

The Environmental Toxicology MS and PhD degree programs educate students in the development, interpretation, and utilization of toxicological data for solving environmental health problems. Research areas include neurological, hepatic, renal, and respiratory systems; prenatal and neonatal development; carcinogenic and genetic effects of toxicants; and risk assessment.

The Occupational and Environmental Exposure Science MS degree program trains students to assess human exposures to chemical, physical, and biological contaminants in community and occupational settings and to evaluate and manage health risks. Graduates take responsibility for implementing and complying with environmental and occupational health regulations.

The Occupational and Environmental Medicine MPH degree program is designed for students who anticipate careers in occupational and environmental medicine—in clinical practice, research, teaching, or public health settings. The program teaches students to recognize, assess, and manage environmental and occupational hazards, as well as to manage the health impacts of these hazards. A two-year concurrent accredited residency/fellowship program is also offered, and completion of that program enables physician graduates to apply for board-certification in Occupational Medicine from the American Board of Preventive Medicine.

The MS or MPH and Master of Public Administration are concurrent master’s degree program options with the Daniel J. Evans School of Public Affairs. These programs are structured for students interested in environmental and occupational health and public health policy and management.

Learn more at http://deohs.washington.edu/academics.
Undergraduate Degrees Awarded

**Summer 2011**
Kelly Cabral
Madeleine Greenheck
Paul Ho

**Autumn 2011**
Nicholas Ling
Khaled Zaki

**Winter 2012**
William Bond
Iris Davies
Rohan Marrero
Anh Tran

**Spring 2012**
Vickie Carper
Michael Chen
Abbi McClintic
Nazila Shakibaei

**Summer 2012**
Melody Lok-Yi Chan
Leslie Elston
Xiaoqiong (Christy) Huang
Jena Roe
Jordan Song

**Winter 2013**
Grace Liao
Chenye Liu

**Spring 2013**
Rin Chung
Martin Estira
Anna Fretheim
Ara Jo
Nicholas Larned
Julie Leano
Laura Okocha
Dareen Qalfat

**Salifu Mansaray**
BS, 2013
Environmental Health

While completing his degree, Salifu Mansaray did an internship with the UW’s Environmental Health and Safety (EH&S) Department. One of EH&S’s responsibilities is to assess the operational status of all fume hoods in UW’s research laboratories. Fume hoods are designed to move hazardous chemicals away from the breathing zone of laboratory personnel and others in order to create a safe working environment. Mansaray learned procedures for checking the airflow and resetting the fume hood monitors to the required range. He hopes to gain more experience by finding work in the industrial hygiene field, becoming a certified industrial hygienist, and in the future, applying the acquired skills in Sierra Leone, his home country.

**BY THE NUMBERS...**

**DEGREES AWARDED**

- 28 Bachelor of Science
- 16 Master of Public Health
- 25 Master of Science
- 6 Doctor of Philosophy
Graduate Degrees Awarded

Degrees
Master of Science (MS), Master of Public Health (MPH), Doctor of Philosophy (PhD)

Programs
Environmental Health (EH), Environmental and Occupational Health (EOH), Environmental and Occupational Hygiene (EOHy), Environmental Toxicology (Tox), Occupational and Environmental Exposure Science (ES), and Occupational and Environmental Medicine (OEM)

WEBplus* To learn more about the student research listed below, visit http://deohs.washington.edu/student-research.

Graduate program faculty preceptors are identified in parentheses.

Summer 2011
Elizabeth (Kilcline) Bills, MS (EH) Characterization of dermal absorption following decontamination via washing (John Kissel)
Stephanie Chan, MPH (EOH) Residential exposure to air pollution and blood pressure: A cross-sectional assessment of the NIEHS Sister Study (Joel Kaufman)
Eric Smith, MPH (OEM) Combat exposure and hypertension in the post-deployment period: A cohort study (Victor Van Hee)
Rachael DeSouza, MPH (EOH)/MS (Nursing) Novel approaches to development, delivery, and evaluation of a peer-led occupational safety training for Latino day laborers (Noah Seixas)
Jonathan Ebert, MS (ES) Biomonitoring of wildland firefighters: Analysis of methoxyphenols as viable urinary biomarkers of wood smoke exposure (Christopher Simpson)
Michelle Eisen, MS (ES) Manganese exposure estimation and its association with blood manganese (Noah Seixas)
Christa (Younkins) Gorski, MS (ES) A comparison of surface sampling wipe media for isocyanate sampling in the auto repair industry (Michael Yost)
Zachariah Guerrette, PhD (Tox) Integrating biomarkers of organophosphate pesticides in an agriculturally exposed population (Elaine Faustman)
Elena Kwon, MPH (OEM) Outdoor occupational history and risk of Parkinson disease: A case-control study (Harvey Checkoway)
Paul Kwon, MPH (OEM) Night shift work and lung cancer among female textile workers in Shanghai, China (Harvey Checkoway)
Scott Pease, MS (EH) An analysis of viral metagenomes in acetate-fed anaerobic reactors (Scott Meschke)
Nicholas Reul, MPH (OEM) Occupational risk factors for pancreatic cancer among female Shanghai, China textile workers: An updated nested case-cohort study (Harvey Checkoway)
Aaron Riutta, MS (ES) Occupational determinants of chlorpyrifos adducts to plasma cholinesterase in chlorpyrifos exposed agricultural workers in Washington state (Christopher Simpson)

Autumn 2011
Marissa Baker, MS (ES) Nitrogen dioxide exposure and probability of walking in Seattle, WA (Michael Yost)
Allison Crollard, MS (ES) Development, implementation and evaluation of a training intervention for a dual-lingual health and safety committee (Noah Seixas)
Chunyan Zhou, MS (Tox) The effects of prenatal ethanol exposure on ABC cholesterol transporters and cholesterol levels in the developing rat brain (Lucio Costa)

Winter 2012
Elizabeth Cooper, MS (EH) Toward an understanding of children’s exposure to semi-volatile organic compounds in the indoor environment (John Kissel)

Spring 2012
Jesse Billingham, MS (EH) Public health risk associated with recreational exposure to the algal toxin microcystin in western Washington lakes (Scott Meschke)
Elizabeth Cooper
MS, 2012
Environmental Health

As an architect, Elizabeth Cooper was drawn to Environmental Health because of an awareness of the many potential chemicals that are found in the indoor environment. Among the semi-volatile organic compounds or chemicals commonly found indoors is nicotine.

Cooper studied the extent to which constituents of tobacco smoke, termed third-hand smoke, persists in the indoor environment. She then made use of a computer model that simulates a person’s exposure over time to a chemical in an indoor environment. This model helped her to evaluate and better understand the link among surface contamination, exposure, and measured biological levels.

Cooper’s combined knowledge of architecture and environmental health has enabled her to both design, and advise companies on, healthy building. She educates on methods to avoid toxic chemicals in the built environment, such as by creating material “red lists” (deemed harmful to all living creatures) for new construction, renovations, and ongoing facilities management.

David Scoville, MS (Tox) Differential susceptibility to quantum dot induced lung inflammation: A system genetics approach (Terrance Kavanagh)
Katherine Skoral, MS (ES) Control banding tools: Advanced regulated evaluation and authorization of chemical tool and agreement with professional judgment (Michael Yost)
Marissa Smith, MS (Tox) Using a biokinetic model to quantify and optimize cortisol measurements for acute and chronic environmental stress exposure in maternal and child health (Elaine Faustman)
Jessie Taylor, MS (ES) Characterizing the waste streams from alternative solvent dry cleaners (Michael Yost)
Jeffrey Walls, MS (ES) Characterization of work practices and ventilation effectiveness in shipyard confined space welding (Noah Seixas)
Chad Weldy, PhD (Tox) Inhalation of diesel exhaust (DE) and its effects on inflammation and vascular function; investigating the role of oxidative stress and glutathione in DE-mediated effects (Terrance Kavanagh)

Summer 2012
Shonnessy Gilmore, MPH (EOH) Characterization and isolation of fecal indicator bacteria, Staphylococcus aureus, and methicillin-resistant Staphylococcus aureus from Pacific Northwest marine beach samples (Marilyn Roberts)
Deborah Havens, MPH (OEM) Childhood blood lead levels and associated risk factors in Vietnam (William Daniell)
Craig Meggitt, MPH (OEM) Gene-environment interaction and coronary artery disease: Do OLR1 gene polymorphisms modify the cardiovascular effects of traffic exposure? (Victor Van Hee)
Carley Truyens, MPH (EOH) Menstrual hygiene management in South African communal sanitation facilities: Recommendations to the eThekwini Department of Water and Sanitation (William Daniell)
Ryan Wallace, MPH (OEM) Childhood lead exposure in a Vietnamese battery recycling village (William Daniell)
Maternal consumption of alcohol can cause a wide range of effects, including mild to severe cognitive and neurobehavioral effects on the fetus, and can result in fetal alcohol syndrome.

Pamela Roqué’s dissertation focused on the effects of ethanol on synaptogenesis, the process by which synapses between neurons in the nervous system are formed, particularly in the third trimester. Roqué studied glial cells, cells known to assist neurons with synaptic connections, to learn how ethanol may influence synapse formation. Astrocytes, which are star-shaped glial cells, help with the development of neurons.

Roqué found that astrocytes treated with an important neurotransmitter, acetylcholine, caused an increase in synapse number, and that astrocytes may be involved in mediating disease when they are exposed to toxicants such as ethanol.
Spring 2013

Lyndsey Banks, MS (ES) Characterization of traffic-related air pollutants near a major roadway in Albuquerque using a mobile monitoring approach (Christopher Simpson)

Ryan Blood, PhD (EOHy) Whole-body vibration (WBV) exposures among professional drivers: Evaluation of engineering interventions to reduce low back injuries (Michael Yost)

Ling Cui, PhD (EOHy) A health study of occupational calcium carbonate nanoparticle exposure (Harvey Checkoway)

Lea Duffin, MS (ES) Validation of training concepts for effective ventilation control for welding fumes in confined spaces (Noah Seixas)

Hee Yon Kim, MS (Tox) Effects of chlorpyrifos exposure on proliferation and differentiation in human neural progenitor cells (Elaine Faustman)

Amy Leang, MS (EH) Survey of E. coli and Salmonella prevalence on Seattle farmers markets produce (Scott Meschke)

John Linnett, MPH (OEM) Occupational exposures to vapors and gases, liver attenuation and insulin resistance: The Multi-Ethnic Study of Atherosclerosis (Joel Kaufman)


Toluwalose Okitika, MPH (EOH) The University of Washington Superfund Research Program (UW-SRP) community organization capacity needs assessment (Thomas Burbacher)

Jill Schulte, MPH (EOH) Spatial modeling of diesel exhaust markers in south Seattle (Joel Kaufman)

Samantha Serrano, MS (EH) Dietary phthalate exposure in pregnant women (Sheela Sathyanarayana)

Jessica Youngblood, MS (Tox) Longitudinal approaches for metagenomic characterization of the Puget Sound for (EH) surveillance (Elaine Faustman)

Michael Yost
Outstanding Faculty Mentor

Professor Michael Yost was named the 2013 Outstanding Faculty Mentor, the first “repeat” award winner since the DEOHS Graduate Student Advisory Committee established the award in 2006. The award recognizes a faculty member’s exemplary mentorship of students in terms of availability, collegiality, and support, among other criteria. In nominating Yost for the award, one student wrote that “he has a dedication to his students that goes beyond the role of mentor. This is reflected through his unconditional sincerity, passion, patience, support, generosity, devotion, guidance, and encouragement.” He was previously recognized by students in 2010.
2011–2013 New Faculty

Acting Assistant Professor Michelle Averill lectures and researches in Nutritional Sciences. She received her PhD in the program from the University of Washington. She researches the interaction between diet and environment on obesity-associated disorders and atherosclerosis and cardiovascular disease.

Professor Gerard Cangelosi’s research on infectious disease has generated eight patents, two commercial products, and one start-up company. He received his PhD in Microbiology from the University of California, Davis.

Senior Lecturer Martin Cohen directs the Field Research and Consultation Group and teaches in the Exposure Science program. He received his ScD from Harvard University in Exposure Assessment. He is a certified industrial hygienist and certified safety professional.

Acting Assistant Professor Gretchen Onstad studies human exposure to environmental pollution and examines control measures for preventing exposure. She received her PhD in Environmental Sciences & Engineering from the University of North Carolina at Chapel Hill.

Assistant Professor June Spector received her MD from Yale University and her MPH in Epidemiology/Biostatistics from Johns Hopkins University. She studies occupational healthcare services in order to promote better care and optimize a patient’s recovery process.
Autumn 2013
New Faculty

Associate Professor Peter Rabinowitz has joint appointments in DEOHS and the Department of Global Health. His research explores linkages between human, animal, and environmental health in a “One Health” paradigm. He received his MD from the University of Washington and his MPH from Yale University.

Associate Professor Edmund Seto came from the University of California, Berkeley, where he was on faculty and also received his PhD in Environmental Health Sciences. He uses information technology and models to assess exposures to air pollution, noise, and infectious agents.

David Kalman’s Tenure as Chair

Chair and Professor David Kalman announced his plan to step down as chair of the department, a position he has held for 15 years. A chair search will take place in 2013–2014. Kalman will remain on faculty and active in the department.

During his tenure as chair, there have been three deans of the School of Public Health and five presidents of the university, pointing to his steadfast leadership amidst changes.

While faculty have retired and left for other positions, he has been key in keeping a strong, stable academic program. He recruited more than 20 new faculty since 1998 and created opportunities to retain senior faculty and staff.

He also oversaw the department’s expansion into the building on Roosevelt. The undergraduate program—which he steered for seven years—saw growth in the number of students. He supported the beginning of what has become a nationally recognized summer research experience program.

Kalman has often been sought out for his expertise. At the state level, he served on numerous oversight committees, advised the legislature on important health issues, and spent sabbatical time in Olympia. Internationally, he was a member of the accreditation team that visited institutions in the United Arab Emirates. At the request of the School of Public Health at the University of Namibia, he advised school officials on adding environmental health training to the MPH program.

All the while, Kalman has maintained his own research program, such as ongoing studies of arsenic. Most recently, he participated in a multi-university study on the human health effects of arsenic that is contaminating drinking water in Bangladesh.
The individuals, corporations, foundations, and family foundation donors listed below contributed to the Department of Environmental and Occupational Health Sciences between July 1, 2011 and June 30, 2013.

Financial contributions support the innovative science being done in our department to better protect our communities from environmental and occupational health hazards. They also contribute to student scholarships, such as the Jack Hatlen Scholarship, which supports outstanding undergraduates. We sincerely appreciate these gifts and the generosity of our donors.

If you are interested in supporting our programs and students, visit http://deohs.washington.edu/giving.

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- Jack* and Betty Hatlen
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- Terrance Kavanagh and Angelika Grossmann
- Bruce Kelman
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- Gretchen and Lee Monteith
- David* and Mary Noguchi
- Cecil and Jane Quigley

* Department of Environmental and Occupational Health Sciences alumnus
Jack Hatlen Scholarship

The Jack Hatlen Scholarship was established in honor of Associate Professor Emeritus Jack Hatlen and is given to one undergraduate student each year from the Department of Environmental and Occupational Health Sciences. The 2012 recipient was Vickie Carper (left).

Up to $1000

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We regret any misspellings, inadvertent omissions, or incorrect giving category placements of an individual or organization. Please advise us if you have found any errors by contacting the editor at esharpe@u.washington.edu. We appreciate the opportunity to correct our records.

Peter A. Breysse Memorial Lectureship

Our department celebrated the first Peter A. Breysse Memorial Lecture on March 9, 2012, with a reception and special presentation by his son, Patrick Breysse (at right in photo), who is a professor and director of the Division of Environmental Engineering housed in the Bloomberg School of Public Health at Johns Hopkins University. The March event officially launched the endowed lectureship established in memory of DEOHS faculty member Peter Breysse. The lectureship will fund speakers to share new ideas and inspire faculty, staff, and students to continue his legacy.
2011–2013

Secretary, Washington State Department of Health
Mary Selecky (2011–2012) represented by Nancy Napolilli, Director, Office of Environmental Health, Safety, and Toxicology
John Wiesman (2013) represented by Maryanne Guichard, Assistant Secretary, Division of Environmental Public Health

Director, Washington State Department of Labor & Industries
Judy Schurke (2011–2012)
Joel Sacks (2012–2013)

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Jeff Johnson represented by Rebecca Johnson, Governmental Affairs Director

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W. Hugh Maloney represented by Timothy Gilmore, Medical Director, Occupational Medicine, Group Health Cooperative

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Michael Bragg (2013) represented by Richard Storch, Professor and Chair, Department of Industrial & Systems Engineering

Dean, University of Washington School of Public Health
Howard Frumkin

Chair, University of Washington Department of Environmental and Occupational Health Sciences
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Photos, back cover: Letty Limbach, Elizabeth Sharpe, Sarah Fish

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