



biennial  
2009–2011  
report

DEPARTMENT OF ENVIRONMENTAL  
SCHOOL OF PUBLIC HEALTH  
& OCCUPATIONAL  
UNIVERSITY OF WASHINGTON  
HEALTH SCIENCES



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Cover photo: Sarah Fish

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# AN INTRODUCTION

## striking a balance

Mary Levin/UW Photography



The cover of this report features a stone sculpture that overlooks Seattle's Beacon Hill neighborhood and Puget Sound from Jefferson Park. The balanced rocks reflect the Department of Environmental and Occupational Health Sciences' perspective as we look back on the 2009–2011 biennium and forward to future biennia; in a myriad of ways, our goal was and is to strike a balance.

The balance begins with how we carry out our mission to foster knowledge in and understanding of environmental and occupational health sciences through research, teaching, and service activities.

We research ways to better protect workers and the public. The balance between what we know and what we need to understand keeps us investigating potential problems and solutions. What we discover in the lab or in the field can help prevent or manage the environmental and occupational factors that contribute to injury, illness, and disability. We apply this knowledge to address local, national, and global issues. We share what we learn through teaching, service, and community-engagement activities. We partner with agencies, organizations, and industries to extend our reach and connect to families, patients, and workers at home and around the globe. Our faculty, students, and staff also disseminate findings at conferences, in publications, on the web, in the classroom, at community events, and in the workplace.

Our students are highly successful while they are enrolled and after they graduate. In this report, we feature students who graduated during the biennium and five alumni who have made important contributions to the field of environmental and occupational health.

In this ongoing period of budget cuts, balance is critical in managing financial resources. A large part of our teaching programs depends on faculty-led research projects, which are mainly funded by federal, state, nonprofit, and private-sector grants and contracts. Unfortunately, the pool of funds is shrinking while the number of applications is increasing. As a result, we partner across disciplines and with outside groups to share resources. Our goal is to maintain a robust research program that benefits students and service activities.

Leveraging academic productivity to yield value to Washington state businesses and workers is a tradition in our department, extending back more than 50 years. A unique relationship between the Washington State Department of Labor & Industries, the Washington State Department of Health, and the University of Washington was formalized in 1963 under a unanimously approved legislative mandate. Our department accepted responsibilities to do testing, research, teaching, and service in occupational health, and received support from the state's Medical Aid and Accident Fund to sustain these activities.

In this report, short articles illustrate the diversity and importance of our programs. I hope you will find it interesting and energizing. Please visit us online (<http://depts.washington.edu/envhlth>) or call us (206-543-6991) for more information.

—David Kalman, Chair

# TABLE of contents

At a glance: Who we are	4
Research & practice: Finding solutions to better protect workers	6
Farm-tested solutions	8
A better seat	8
Orchard safety	9
Extending our reach: Partnering to make a difference	10
Day laborers	11
Healthy housing	11
Tribal networks	11
National Children's Study	12
Chemicals in consumer products and food	13
Environmental Health Laboratory	13
Arsenic and drinking water	14
A better bag for beans	15
Lung cancer and textile workers	15
Preparing for the future: Predicting & managing exposures	16
Preventing disability & reducing costs	18
Risk factors for back injury	19
Alumnus profile: Joel McCullough	20
Safer by design	21
Alumnus profile: Rafael Ponce	23
Climate change in the Pacific Northwest	24
Health impacts study	24
Safe (& green) jobs	25
Climate change around the globe	25
Alumnus profile: Breyan (Brie) Paske	26
Transportation & public health	27
New center studies health effects of traffic	27
Urban runoff and salmon survival	28
New guidelines for doctors	28
Policy implications	29
Community engagement	30
Alumnus profile: Yolanda Sanchez	31





Research & practice



Extending our reach



Preparing for the future

The biennium in review: Core values, changing times	32
Richard Gleason: Lifetime Safety and Health Leadership Award	33
Alumnus profile: Sylvie Adam	36
Degrees awarded	37
Undergraduate academic program & degree	37
Kendra Broadwater, BS, Environmental Health	37
Graduate academic programs & degrees	38
Anna Schmidt, MS, Exposure Sciences	38
Heather Klintworth, PhD, Toxicology	40
Measuring our accomplishments	42
Jeffrey Shirai: 2010 Distinguished Staff Award	42
Vanessa Galaviz: Abrazo Award	42
Our donors	43
Friends of Sean Quigley Toxicology Endowed Fund	44
Endowed Lectureship in Honor of Peter Breyse	44
Department advisory committee	inside back cover

# AT A GLANCE who we are

## Academic Programs

Environmental Health

Environmental and Occupational Health

Occupational and Environmental Exposure Sciences

Occupational and Environmental Medicine

Toxicology

## Student Services

Graduate Program Office

Undergraduate Program Office

## Service Programs

Continuing Education

- Pacific Northwest Occupational Safety and Health Administration Education Center
- Northwest Center for Occupational Health and Safety, Continuing Education
- Worker Education and Training Program

Environmental Health Laboratory

Field Research and Consultation Group

Occupational and Environmental Medicine Clinic

top to bottom:

undergraduates at the 2011 University of Washington graduation,  
staff and students at the department's 2010 annual holiday party,  
department administrative staff members

*left: adapted from me40/photos.com; insets, top to bottom: Marissa Matsuyama,  
Jonathan Sharpe, Elizabeth Sharpe; opposite page, Mary Levin/UW Photography*



## Centers, Institutes & Research Programs

Center for Chemically Related Illness

Center for Clean Air Research

Center for Ecogenetics and Environmental Health

Collaborative Center for Healthy Work and Environment

Disease Investigation through Specialized Clinically  
Oriented Ventures in Environmental Research

Institute for Risk Analysis and Risk Communication

- Center for Child Environmental Health Risks Research
- Pacific Northwest Center for Human Health and Ocean Sciences
- Pacific Northwest Center for the National Children's Study

Multi-Ethnic Study of Atherosclerosis and Air Pollution

Nanotoxicology Center

Northwest Center for Occupational Health and Safety

Northwest Pediatric Environmental Health Specialty Unit

Occupational Epidemiology and Health Outcomes Program

Pacific Northwest Agricultural Safety and Health Center

Superfund Research Program

## WEB *plus*\*

For a complete list of our faculty, please visit:  
<http://depts.washington.edu/envhlth/facultyList.php?reg>

For more details about each of our centers, institutes, and research programs, please visit:  
[http://depts.washington.edu/envhlth/research\\_center/center.php](http://depts.washington.edu/envhlth/research_center/center.php)

### Faculty pictured below:

top row, l to r: Evan Gallagher,  
Thomas Burbacher, David Eaton,  
Charles Treser, Scott Meschke,  
John Kissel, Michael Morgan,  
Peter Johnson, Janice Camp,  
William Daniell, and Noah Seixas;  
bottom row, l to r: Zhengui Xia,  
Lianne Sheppard, Marilyn Roberts,  
Elaine Faustman, David Kalman,  
Richard Fenske, Michael Yost,  
Christopher Simpson,  
and Richard Gleason



# research & practice

“We are focused  
on harnessing  
science to identify,  
characterize, and  
fix workplace  
hazards.”

— David Kalman  
*Chair and Professor*





# FINDING SOLUTIONS to better protect workers

Our department combines research with service activities to better serve Washington state workers. Department researchers work closely with industry and labor groups and across disciplines to investigate occupational health issues and assess potential solutions.

Attention to a problem may come from a variety of sources. A physician may refer a worker to the **Occupational & Environmental Medicine Clinic** for an illness or injury, such as hand-arm vibration syndrome, a disorder resulting from prolonged exposure to vibration. The clinic is the only major regional referral center for occupational medicine cases. A business may approach the **Field Research and Consultation Group**. This service group identifies and characterizes chemical and physical health hazards in workplaces and investigates remedial factors. For example, to help evaluate a local exhaust ventilation system being proposed for nail salons, exposures were measured and translated into a bar graph. The graph was superimposed on a video of the worker, showing exposures changing as the worker performed his or her job. Agencies may request the **Environmental Health Laboratory's** services, which range from routine analyses to lab and field investigations. For example, fire departments turned to the laboratory staff to determine why air samples they were taking from their self-contained breathing apparatus often "failed" to meet Occupational Safety and Health Administration standards for water vapor content.

Projects focus on the translation and transfer of research findings, technologies, and information into highly effective practices and products. Faculty, in turn, bring their research and understanding of occupational health problems to the classroom, teaching students to identify and reduce hazards and preparing them for successful careers.

## STRIKING A BALANCE...SERVICE TO THE STATE, 2009–2011

### 104 COMPANIES

The Field Research and Consultation Group provided occupational health and safety consultation services to 104 companies. <http://depts.washington.edu/frcg>

### 10,134 SAMPLES

The Environmental Health Laboratory conducted analyses on 2,088 samples in response to 686 requests from 140 agencies and businesses. In support of department research, the laboratory analyzed 8,046 samples for 45 projects. <http://depts.washington.edu/ehlab>

### 1,425 PATIENT VISITS

Patients made 1,425 visits to the Occupational and Environmental Medicine Clinic. <http://uwmedicine.washington.edu/patient-care/our-services/find-a-clinic/pages/clinic.aspx?clinicid=607>



## Farm-Tested Solutions

*Practical Solutions for Pesticide Safety*, an English/Spanish guide for agricultural pesticide handlers, was released in 2011. It developed out of our commitment to reduce workers' exposure to organophosphate pesticides and a collaborative relationship between Pacific Northwest Agricultural Safety and Health Center (PNASH) researchers and Washington state safety educators, growers, pesticide handlers, and clinics.

"Our team of physicians, industrial hygienists, and health educators brings professional expertise to the table, but it is farm managers, workplace supervisors, and pesticide handlers who have the experience and skill to identify the most practical and cost-effective methods of reducing pesticide exposure," said Professor Richard Fenske, director of PNASH. "Their input is essential to finding health and safety solutions."

The PNASH study team visited 25 orchards and ranches in central Washington to compile innovative solutions for pesticide safety. Researchers interviewed 95 managers and pesticide handlers about the use, practicality, and cost of pesticide safety solutions. The end product is a guide that includes the top 29 safety solutions, instructions on how to set up and use them, and testimonials from farmers.

This project was supported by the National Institute for Occupational Safety and Health.

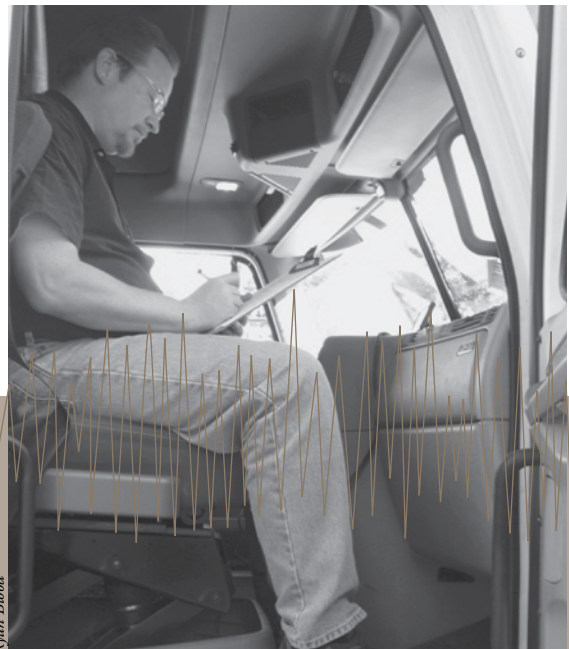
## A Better Seat

Associate Professor Peter Johnson (pictured in photo below) and researchers in his lab have been studying occupational exposures to vibration and evaluating solutions that can impact the health of millions of workers who drive buses and trucks and who operate heavy equipment.

Long-haul drivers in Washington state have filed a substantial number of workers' compensation claims associated with musculoskeletal disorders, especially low-back pain or injury. Research studies have linked low-back pain with exposure to whole body vibration (WBV), vibration transmitted to the human body from supporting surfaces, such as the floor of the vehicle and the driver's seat.

In the short-term, WBV can cause adverse health effects, such as fatigue and headaches; over the long-term, it can contribute to back and muscular problems and is thought to be a contributing factor to some circulatory and respiratory issues.

Bus drivers share similar occupational exposures from long hours on the road. The high number of workers' compensation claims from King County Metro's bus drivers prompted Tim Drangsholt (BS, Environmental Health, 1980), manager of safety and claims for King County, to approach the Field Research and Consultation Group (Field Group) in 2003. The Field Group in turn worked with Johnson to investigate the source of the problem. In 2005, Johnson received funding through the department from the Medical Aid and Accident Fund (MA/AF) to measure WBV exposures in Metro drivers. With the addition of federal funding, Johnson and Ryan



Ryan Blood



Blood (MS, Exposure Sciences, 2007) evaluated the ability of different seats to attenuate vibration exposures.

Current engineering approaches to reduce a driver's exposure to WBV rely on passive suspension systems, explained Johnson. These passive seat suspensions typically use compressed air or mechanical springs to reduce the WBV drivers experience. However, these technologies are slow to react to abrupt road changes and sometimes amplify rather than reduce vibration exposures, said Johnson.

Recently, the Bose Corporation developed vibration-canceling seats that employ a computer-controlled linear electromagnetic motor in the seat suspension to actively counteract and reduce vibration.

In 2010, with funding from the National Institute for Occupational Safety and Health and from the department's appropriation from the MA/AF, a research group led by Johnson teamed up with scientists at Harvard University to evaluate WBV exposures of drivers using the Bose seat. The University of Washington (UW) group included Blood, who is now a doctoral student (Environmental and Occupational Hygiene), Postdoctoral Researcher Charlotte Lewis, and Visiting Research Scientist Patrik Rynell. The study compared differences in WBV exposures among 16 drivers who drove one semi-truck outfitted with a new passive air-suspension seat and an identical semi-truck outfitted with the active vibration-cancelling seat along the same 60-kilometer route. Johnson said the seats developed by Bose reduced WBV exposures by up to 50 percent compared to conventional air-suspension seats that are standard equipment in most large trucks.

The UW/Harvard team hopes to conduct a large randomized controlled trial to determine whether the active vibration-cancelling seat is a viable intervention for reducing WBV exposures and improving the low-back health of long-haul truck drivers. The UW research team will continue to evaluate the ability of seat suspension designs to reduce WBV exposures and ultimately low-back injuries among King County Metro bus drivers.

**The Pacific Northwest Agricultural Safety and Health Center** conducts research and promotes best health and safety practices for Northwest workers and producers in farming, fishing, and forestry.

<http://depts.washington.edu/pnash/>

Maria Tchong-French



## ON THE HORIZON...

### Orchard Safety

Professor Richard Fenske, Associate Professor Peter Johnson, and Research Industrial Hygienists Kit Galvin and Maria Tchong-French are working closely with tree fruit growers to ensure the ergonomic safety of workers as the industry adopts new technologies.

Tree fruit production is the economic backbone of many Washington state communities. To make the industry more sustainable, orchards are transitioning from work done on ladders to work on mobile, raised platforms. By semi-automating labor-intensive aspects of fruit orchard work, including harvesting, pruning, and fruit thinning, orchards can increase efficiency and productivity and also reduce falls associated with ladders, the number one cause of injuries. Orchard-related injuries and illnesses take a huge toll on families and cost the industry and our state \$8 million each year.

Researchers will evaluate a new mobile platform (see photo above) because the equipment requires workers to lean and reach in new ways. "We'd like to get the right design now rather than years down the road," said Jim Doornink, an orchard owner and member of the Washington Tree Fruit Research Commission.

This research is supported by the National Institute for Occupational Safety and Health and through the department from the Medical Aid and Accident Fund.



# extending

Researchers in our department connect with key people and organizations in our region and around the world to improve occupational and environmental health. Balancing their focus on projects in different locations, department researchers leverage expertise by creating multi-disciplinary teams, made up of epidemiologists, statisticians, physicians, toxicologists, and exposure scientists, among others, to address complex issues. Students, too, learn to work with people in other fields, such as urban planning or transportation, to uncover health issues or better promote mental and physical well-being.



# our reach...

## PARTNERING to make a difference

### Day Laborers

As many as 4,000 day laborers live and work in the greater Seattle area. Research by Professor Noah Seixas and colleagues has shown that injury rates for this occupational group is five times higher than for other workers in the construction industry. Day laborers often work in short-term, physically challenging jobs, such as yard work, roofing or other construction tasks, and moving heavy furniture or equipment. To teach these workers to recognize hazards they may face and how to stay safe, the department's Continuing Education Programs partnered with Casa Latina, a nonprofit that works with day laborers, to offer health and safety training in Spanish. The course covers workers' rights, personal protective equipment, and safe work practices on ladders, at heights, and with electricity. Funding was provided by a Susan Harwood Training Grant from the Occupational Safety and Health Administration.

### Healthy Housing

In the United States, nearly six million families live in substandard housing conditions that can lead to illness, injury, and even death. Senior Lecturer Charles Treser raises awareness about potential hazards and how to make homes safer. He teaches healthy housing continuing education courses through the university's Northwest Center for Public Health Practice. The center is a partner in the National Healthy Homes Training Center and Network, which brings together public health and housing practitioners to promote practical and cost-effective methods for making homes healthier. In 2010, Treser adapted a healthy housing course for university undergraduates. Because many students will work as sanitarians or environmental health specialists with local health agencies, they will need to know how to diagnose housing problems and make recommendations, he said.

### Tribal Networks

The Continuing Education Programs (CE) team up with organizations to reach Native workers in rural communities and to identify environmental health and safety needs. For example, CE has ongoing programs with the Tribal Solid Waste Advisory Network, a nonprofit alliance of 31 tribes in the Pacific Northwest, and the Yukon River Intertribal Watershed Council, made up of 70 First Nations and Tribes dedicated to the protection and preservation of the Yukon River Watershed in Alaska and Canada. CE trains workers in safe and effective waste management and disposal. Courses include hazardous waste operations and emergency response, hazardous materials transport, oil spill response, first-aid and CPR, and clandestine-methamphetamine-lab recognition. Support for the training comes from the US Department of Agriculture and the National Institute for Environmental Health Sciences.

## National Children's Study

Families in Grant County, Washington, are involved in the largest study of children's health ever conducted in our nation. Funded by the National Institutes of Health, the National Children's Study will eventually follow more than 100,000 children, from before birth to age 21, to better understand the link between the environments in which children live and their physical and mental health.

The Pacific Northwest Center for the National Children's Study, based at the University of Washington (UW) and directed by Professor Elaine Faustman, is part of this country-wide effort. Nearly 150 current and prospective parents in Grant County have been recruited into the study. Their participation will help improve the health of children for generations to come.

UW scientists from the fields of medicine, toxicology, epidemiology, and child development are examining how environmental factors specific to the Pacific Northwest may affect the growth and well-being of children. Researchers will examine a number of variables, such as family history and where the children live, learn, and play to understand their health effects. Also, air, water, diet, noise, family dynamics, and community and cultural influences will be tracked.

Future recruitment is planned in King, Pierce, and Thurston counties.



Comstock/Photos.com

**150** CURRENT AND  
PROSPECTIVE PARENTS

The Pacific Northwest Center for the National Children's Study has recruited more than 150 current and prospective parents in the study to help improve the health of children for generations to come. <http://www.nationalchildrensstudy.gov>

The Center for Child Environmental Health Risks Research focuses on understanding the mechanisms that define children's susceptibility to pesticides. <http://depts.washington.edu/chc/>

## Chemicals in Consumer Products and Food

Sources of environmental chemicals and their impact on infant health are being investigated by pediatrician Sheela Sathyanarayana, an adjunct assistant professor and member of the Northwest Pediatric Environmental Health Specialty Unit in our department. She leads the Seattle arm of a multi-site cohort study, The Infant Development and the Environment Study (TIDES), funded by the National Institutes of Health. Sathyanarayana and her colleagues are collaborating with researchers at institutions in Rochester, New York; Minneapolis, Minnesota; and San Francisco, California; to recruit up to 800 pregnant women and their infants after they are born for the TIDES cohort.

Bisphenol A (BPA) and phthalates have raised concerns because they may have toxic effects on fetal and infant endocrine, reproductive, and neurobehavioral systems. Animal studies have shown that early-life exposure to phthalates—in the womb or shortly after birth through a mother's milk—increased the risk of genital disorders and reproductive function in rodents. BPA has also been closely linked to abnormalities in offspring after exposure to the chemical *in utero*.

BPA is used to make plastic and is found in the lining of canned food. Phthalates are similarly ubiquitous in consumer products. They are used to soften plastics and are found in children's toys and many personal care products, such as lotions, powders, and shampoos.

Children are especially vulnerable because they often put plastic toys and other objects into their mouths, and their metabolic systems are still developing. Environmental chemicals can more profoundly affect smaller bodies than adult ones because of a child's compact surface area and faster metabolism.

Findings from the TIDES study can help us understand how environmental chemicals like these affect a child's health.

## Environmental Health Laboratory

*Supporting research at the UW and workplaces around the state*

Accredited by the American Industrial Hygiene Association, the Environmental Health Laboratory provides support for research at the University of Washington and serves Washington state workplaces.

A small staff of six researchers analyze environmental and occupational health-related samples for studies in the department, including those led by Professor Elaine Faustman as part of the Pacific Northwest Center for the National Children's Study and those led by Adjunct Assistant Professor Sheela Sathyanarayana (see stories at left and on opposite page).

The laboratory also responds to industrial hygiene service requests from a variety of organizations and agencies, including those from our department's Field Research and Consultation Group, and provides consultation on the chemicals produced during industrial processes.

Lab Director Russell Dills is adept at methods development, setting up an analytical lab procedure that replicates the occupational process to identify the contaminant of concern.

### 4 STATES

The Northwest Pediatric Environmental Health Specialty Unit serves clinicians and public health professionals in Alaska, Idaho, Oregon, and Washington, helping them identify, prevent, diagnose, manage, and treat environmentally related health effects in children.

<http://depts.washington.edu/pehsu/>



## Arsenic and Drinking Water

Professor and Chair David Kalman is collaborating with other researchers in a University of California, Berkeley-led epidemiological study in Bangladesh, where high levels of arsenic contaminate the drinking water.

Bangladesh and neighboring parts of India are the location of a major environmental disaster: the largest mass poisoning in known human history. In the early 1960s, tube wells were drilled as an alternative water source because surface water was contaminated with pathogens that were causing high rates of diarrheal disease and infant mortality. Tragically, one problem was exchanged for another. The water filters through arsenic-rich rocks and is pumped up from deep aquifers laced with the mineral. The World Health Organization's recommended maximum limit for arsenic in drinking water is 10 parts per billion. Yet, the levels in Bangladesh can be 10 to 100 times that amount or even more, explained Kalman. Today, nearly half of the 8.6 million wells have been tested for arsenic, and 30 percent of the wells have water that has been declared unsafe to drink.

Exposure to high levels of arsenic in drinking water often shows up as skin lesions, skin pigmentation changes, and keratosis of the hands and feet. Long-term exposure also increases the risk of different cancers and a wide range of other illnesses affecting the cardiovascular, respiratory,



David Kalman

Brick workers in Matlab, a district that lies in a river delta south of Dhaka, Bangladesh.

and nervous systems. Developmental effects from prenatal or early life exposures are less well understood, but early evidence suggests that impacts on a child's development can have serious consequences.

With funding from the National Heart, Lung, and Blood Institute, the US researchers are working with the International Centre for Diarrhoeal Disease Research in Bangladesh, which operates medical clinics that serve communities in Matlab, a district south of Dhaka. The study is focused on the respiratory health of teenagers who have been exposed to arsenic prenatally or from an early age. Kalman said findings from the study will be used to better understand risk factors for disease and the health consequences of arsenic exposures, and to help Bangladeshis understand their health status and how to prioritize needed interventions.



The Collaborative Center for Healthy Work and Environment offers training to health practitioners in Asia and Latin America.  
<http://depts.washington.edu/cchwe>

## A Better Bag for Beans

Coffee starts the day for people around the world and is crucial to the economies of many developing countries like Nicaragua, where the beans are grown and harvested. Clinical Instructor Kate Stewart collaborated with other researchers to design a new bag that will help Nicaraguan coffee harvesters do their jobs more safely.

Currently, harvesters carry large, shallow baskets at their waists that not only put pressure on their backs, but also force them to reach out farther to get the beans—an ergonomic nightmare. The bag change will have a significant impact in Nicaragua, where coffee provides agricultural jobs and supports more than 45,000 families who own coffee farms.

Stewart worked with researchers from Nicaragua and from the Safety and Health Assessment and Research for Prevention (SHARP) Program, a division of Washington's Department of Labor & Industries, to evaluate the bag prototype. Results of a pilot study show the proposed bag puts less strain on workers' lower backs. The researchers hope to develop a bag that can be replicated by coffee harvesters in other countries.

The project is supported by the International Ergonomics Association, the Japan Ergonomics Society, the 4C Association, and Pueblos en Acción Comunitaria/People in Community Action.



A coffee bean harvester using a prototype bag, developed for its ergonomic benefits.

Steve Russell

## Lung Cancer and Textile Workers

Textile and clothing manufacturing is one of the world's largest industries, and women make up nearly 40 percent of the workforce. Professor Harvey Checkoway and others in the department have been studying occupational exposures of textile workers in Shanghai, China, that may increase the risk of lung and other cancers. Together with researchers at Zhong Shan Hospital Cancer Center in Shanghai and occupational hygienists from the same city, the University of Washington scientists investigated occupational exposures as potential carcinogens in a cohort of more than 260,000 women textile workers from 502 factories.

Findings show that endotoxin, a bacterial product contaminant in cotton dust, reduces risk for lung cancer, as has been seen in other industrial studies. On the other hand, exposures to silica and formaldehyde may elevate risks of lung cancer and warrant consideration as potential hazards in these and other textile factories.

Other ongoing occupational health research in Shanghai is investigating the risk of cancer from exposures to dust and chemicals, and from work conditions, such as shift work. Researchers are also studying endotoxin as a risk factor for parkinsonism.

This research is supported by the US National Cancer Institute and the National Institute of Environmental Health Sciences.



A textile worker in China, one of 260,000 women in a study on occupational exposures.

Janice Camp



# preparing for the future


Public health is a dynamic field; department scientists balance research on known hazards with investigations of potential risks. Prevention is our priority; a healthy public and a safe workforce are foundational to our mission.







## PREDICTING & MANAGING exposures



Our faculty, staff, students, and alumni share a common concern for environmental and occupational health and a vision for a better, safer future. Our researchers are involved in fields as diverse as nanotechnology and transportation. Their findings provide policy-makers and planners with the information they need to make important decisions.

Year after year, our department prepares students for careers by giving them the skills to identify and reduce hazards in industry and in the environment. Our Continuing Education Programs design courses to meet the needs of working professionals across the Pacific Northwest.



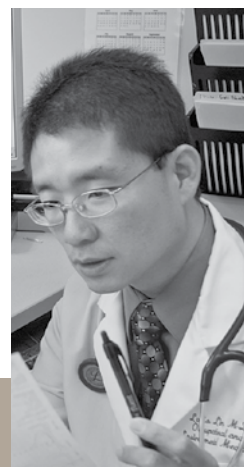
Nanotechnology



Climate change



Transportation



Occupational health

# PREVENTING DISABILITY & reducing costs

For nearly a decade, department researchers have been developing a system to improve the quality of care for injured workers in Washington state. Evidence shows that early intervention can shorten the length of disability and time away from work, saving money for employers and taxpayers.

In 2011, evidence from these studies culminated in a new Washington state law, directing the Department of Labor & Industries (L&I) to create a statewide network for providers who treat injured workers. The legislation also calls for expanding access to the state's Centers of Occupational Health Education (COHE). By 2015, all of the state's injured workers will have access to the COHE system, which started in 2002 in Renton and Spokane. The legislation is expected to save the state \$218 million over the next four years by returning more workers to good health and helping them get back on the job sooner after an injury.

## By 2015, all of Washington state workers will have access to Centers of Occupational Health Education.

COHEs teach occupational health best practices to healthcare providers who treat injured workers. The providers are encouraged to intervene soon after an injury and work with the patient and employer to develop a return-to-work plan. The four current COHEs in Washington state, in Renton, Spokane, Everett, and

Seattle, treat about one-third of the state's workers' compensation claims. More than 1,000 providers are participating in the COHE system.

In a study of more than 100,000 injured workers, researchers found that patients whose healthcare providers adopted the COHE's best practices had, on average, 57 percent fewer disability days, and their medical costs were about \$500 lower than those who saw independent physicians. The savings were greater for cases involving back sprain, which can lead to permanent disability.

The study, which was funded by L&I, is published in the December 2011 issue of the *Medical Care*. Professor Thomas Wickizer, formerly a professor in the University of Washington School of Public Health and now at The Ohio State University, was the lead investigator. Also involved in the study from our department were Research Professor Gary Franklin, who is also the medical director of L&I; Research Scientists Deborah Fulton-Kehoe and Jeremy Gluck; Occupational Health Nurse Terri Smith-Weller; and Research Coordinator Kathleen Egan.

COHEs save money partly by reducing paperwork and employing health services coordinators to help facilitate cases. Often in workers' compensation, Franklin said, long delays result from communication problems among the healthcare provider, the employer, the injured worker, and the insurer. The longer a worker is off work and on disability, the lower his or her chance of returning to work.

"Work-related disability is a major public health problem that's largely overlooked in the US," Franklin said. "This study shows that using occupational health best practices when treating injured workers can have an important effect on their recovery."

The **Occupational Epidemiology and Health Outcomes Program** conducts research related to preventable disability among injured workers and improving healthcare delivery.

<http://depts.washington.edu/occepi>

The **Centers of Occupational Health and Education** aim to prevent disability among injured workers by promoting occupational health best practices that emphasize timely and efficient coordination of healthcare services.

<http://www.lni.wa.gov/ClaimsIns/Providers/ProjResearchComm/OHS/>



*above: Clare McLean/UW Medicine, right: Sarah Fish*



Access to Centers  
of Occupational  
Health Education  
is expected to save the  
state \$218 million over  
the next four years.

## Risk Factors for Back Injury

Louis Lim (right in photo above), an Occupational & Environmental Medicine resident (MPH, 2011) who studied with Research Professor Gary Franklin, investigated the risk factors that can turn a back injury into a long-term disability. From 1999 through 2003, such injuries cost the state of Washington workers' compensation system \$1.7 billion. Lim found that among workers with less severe injuries, the best predictor of a poor outcome was patients' perception of whether they would ever return to work. In more severe injuries, risk factors included race and ethnicity, age, having pain in more than four sites, a previous back injury, and injury severity. Lim's findings will help identify workers with high-risk characteristics so that healthcare providers can intervene early.



# Joel McCullough

MPH, Occupational Medicine, 1995

Public Health Director and Health Officer,  
Spokane Regional Health District

On Joel McCullough's first day of work in May 2009 at the Spokane Regional Health District in eastern Washington, the first case of a child with H1N1 influenza was diagnosed in Spokane. The H1N1 pandemic had only just started, McCullough remembered.

As public health director and health officer, McCullough is responsible for educating the public and stakeholders on public health concerns such as H1N1. His job also includes providing vision and strategic direction for the agency, supervising executive staff, directing resources to improve the public's health, and building collaborative relationships with partners. He finds being able to work on a range of topics "exciting and rewarding." He explained, "There are more than 30 different program areas in our agency—from food safety to immunization to maternal child health to physical activity and nutrition—there is always something new happening."

While in medical school, McCullough became fascinated with the idea of working in occupational epidemiology. After earning his MD, he practiced in the National Health Service Corps, which is part of the US Department of Health and Human Services and offers healthcare services in underserved communities. In 1995, he came to the department to complete an MPH in Occupational Medicine, the program now called Occupational and Environmental Medicine. While at the University of Washington (UW), he also completed a residency in internal medicine.

He credits the department with providing him with the essential tools of public health, epidemiology, and research methods in occupational health, all of which help him with his current job. "I deal with topics of exposure to xenobiotics and physical agents regularly," he said. "Many health officers don't have that experience and are less comfortable with these topics."



Naci Seyhanli; Illustrations: iLex/photos.com

After completing a residency, McCullough practiced occupational medicine and internal medicine at Quad Graphics in Milwaukee, Wisconsin, and worked for a brief time for Exxon. He next took a job with the Centers for Disease Control and Prevention in the National Center for Environmental Health, following an interest developed at the UW in population health and prevention. He served as medical director for environmental health at the Chicago Department of Public Health for eight years prior to moving back to the Northwest.

Despite the reduced staff and shrinking budgets of many public health agencies today, McCullough projects there will be opportunities for new public health leaders as many staff are nearing retirement age. "There is a need for younger public health professionals to come in and fill these shoes," he said.

# SAFER BY design

Nanomaterials can be found in many commercial products, including sporting goods, stain-resistant clothing, and electronics. As of March 10, 2011, more than 1,300 products made with nanotechnology were being sold around the world, according to the Project on Emerging Nanotechnologies. “Nano” refers to the tiny scale of particles measured in nanometers, either natural or engineered. A nanometer is so small, in fact, that the diameter of a human hair measures 100,000 times larger.

Coupled with advances offered by nanomaterials in making products more effective are cautions raised about the unknown health consequences that may come from exposure to nanomaterials in off-the-shelf products, on the job, or in the environment.

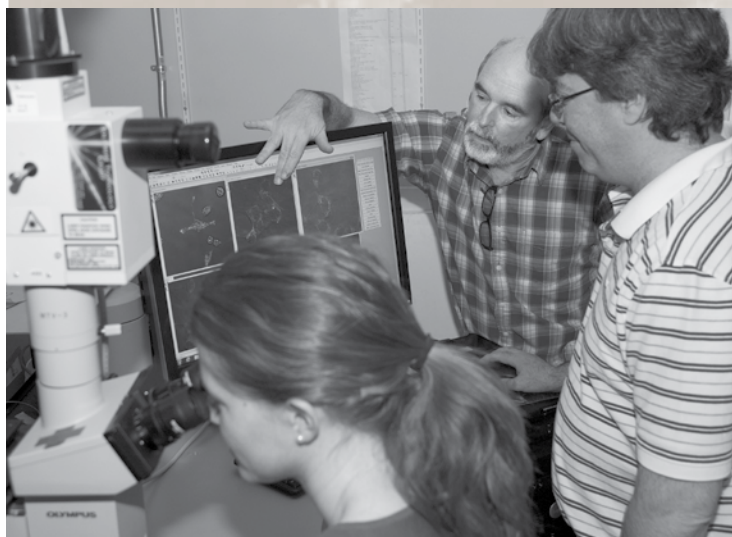
The University of Washington Nanotoxicology Center is one of eight centers in a national consortium of institutions funded by the National Institute of Environmental Health Sciences (NIEHS) to identify physical and chemical properties of engineered nanomaterials and their potential impacts on human health.

“The novel size and size-dependent physical and chemical properties that make nanomaterials useful also make their interactions with biological systems difficult to anticipate and critically important to explore,” reported NIEHS, whose recent funding initiative is part of a large-scale cross-agency effort to support nanotechnology-related environmental, health, and safety research. Because the nanotechnology field is relatively new, with different applications still in development, governmental agencies want to preemptively identify health and safety concerns.

Toward that end, the Nanotoxicology Center is developing standardized techniques, analytical tools, and mathematical models to assess and predict the toxicity and environmental impact of nanomaterials.

“We can use this information and the power of molecular engineering and biotechnology to build environmental health and safety into the nanoproducts of tomorrow,” explained Professor Terrance Kavanagh, center director. “They will have improved safety because they’ll be safe by design.”

Kavanagh and center researchers will assess the toxicity of semiconductor quantum dots (Qdots), fluorescent



Sarah Fish background: Collin White

above top, l to r: Undergraduate student Laura Denman (Public Health), Professor Terrance Kavanagh, and Research Scientist Collin White from the Nanotoxicology Center.

above: Professor Kavanagh describes how flow cytometry—a technique for counting and examining cells—helps researchers analyze Qdot uptake.

background: UW researchers use custom-designed quantum dots to measure inflammatory response in mouse cells.

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nanoparticles that show great promise for medical imaging and optoelectronics (for example, LEDs and solar panels). However, Qdots have raised concerns because they commonly contain heavy metals, such as cadmium or mercury. If Qdots were to break down, they might release those metals. This could increase their toxicity to humans. Also, the kind of surface coating on Qdots can influence their interactions with cells. “For instance, we know that nanoparticles with positive charges tend to be more toxic and more inflammatory than those with neutral charges,” explained Kavanagh.

Center researchers will use custom-designed Qdots, modified with respect to their core composition, surface charge, size, and method of manufacture. They will examine the relationships between the different physical and chemical properties and other quantitative measures of toxicity. Qdots will be tested *in vitro* on cultured human and mouse cells to examine their ability to evoke an inflammatory

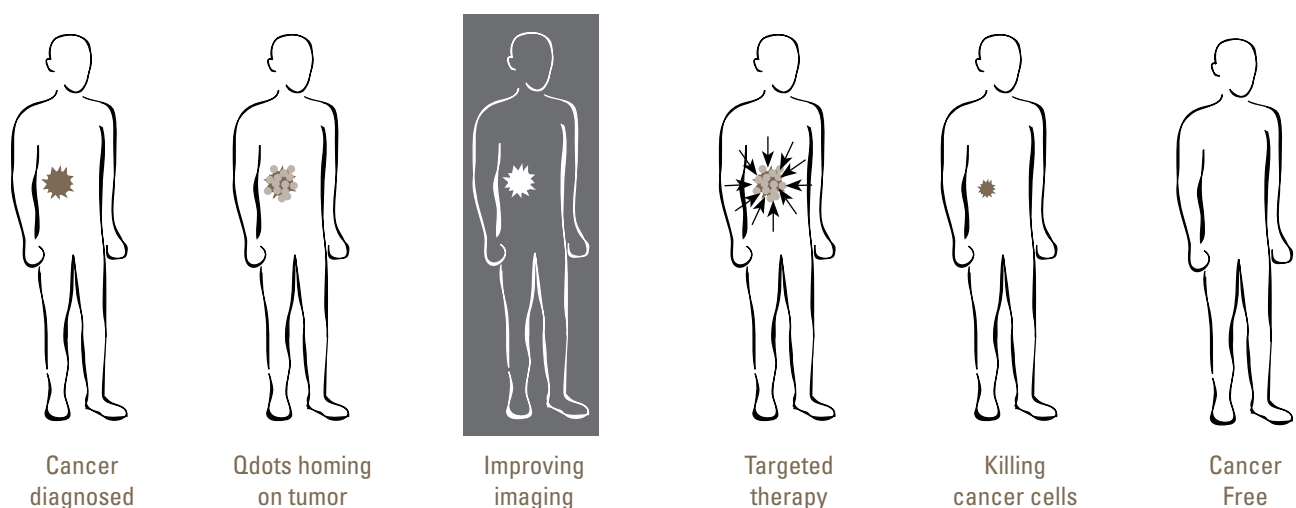
response. They will also be tested using genetically defined mouse strains to better understand how Qdots are absorbed, distributed, and eliminated, and how they cause toxicity in the body. Using systems genetics technology, researchers will look for gene expression changes to further define which genes are responsible for susceptibility or resistance to Qdots. These data will be used to develop a risk framework that can be made accessible to researchers, product developers, and agencies.

“Once we determine which aspects are most highly associated with toxicity and the pathways involved, we’ll be able to recommend modifications that will make them safer,” explained Kavanagh.

Other lead researchers in the center include Professors David Eaton, Elaine Faustman, and Michael Yost from our department; Assistant Professor Xiaohu Gao from Bioengineering; Professor Francois Baneyx from Chemical Engineering; and Professor William Parks from Medicine.

The Nanotoxicology Center is developing standardized techniques, analytical tools, and mathematical models to assess and predict the toxicity and environmental impact of nanomaterials. <http://depts.washington.edu/nanotox/>

The Center for Ecogenetics and Environmental Health strives to understand and communicate how genetic factors influence human susceptibility to environmental health risks. <http://depts.washington.edu/ceeh/>



Quantum dots, used with medical imaging, might show tumor sites more clearly and may improve treatment by targeting cancer cells.

*Illustration adapted from Kristian Molhave, Cathy Schwartz*



# Rafael Ponce

PhD, Toxicology, 1995

Scientific Director, Amgen, Seattle

Affiliate Associate Professor,

UW Environmental and Occupational Health Sciences

When Rafael Ponce first came to the University of Washington (UW), he wanted to “save the whales,” he said, only half joking. Ponce completed an MS degree in Fisheries, with a focus in aquatic toxicology, an interest that had developed while working in northern Finland. Then, in 1990, after receiving his master’s degree, Ponce became one of the first five students in the department’s new doctoral program in Toxicology. He wrote his PhD dissertation on methylmercury—a derivative of mercury that transforms in aquatic systems and bioaccumulates in fish. Ponce investigated mechanisms of methylmercury toxicity that negatively affect the developing nervous systems of newborns that have been exposed *in utero*.

After graduation, Ponce headed north as state toxicologist for Alaska’s Department of Health and Social Services. He analyzed health risks to subsistence populations. He evaluated samples from ice caves and burial grounds where mummies of Alaska Natives are located. He studied their potential exposure to mercury through their diet of seals and whales.

Ponce continues to pursue linkages between chemical exposures and their impacts on health in his current role as scientific director at Amgen, a leading biotechnology firm that develops drug therapeutics. He ensures safe clinical trials of drugs designed to treat various types of late-stage cancer, such as ovarian, lung, and breast cancer. His particular interest is immunomodulation in cancer—understanding changes in the body’s immune system that are caused by agents that activate or suppress its function. “Drugs used to suppress autoimmune conditions such as lupus or other diseases where the intention is to suppress inflammation can open up potential risks to patients,” he explained. “These connections need to be better understood.”

Beside the positions mentioned above, Ponce has had a varied career that includes being a toxicologist for a

Sarah Fish; Illustration: Elena Gade/photos.com



Japanese-owned research laboratory, working at ZymoGenetics to help build its preclinical development capacity, and contributing to a US Department of Energy study of nuclear sites—all jobs he learned about through UW faculty connections.

Currently, Ponce is active in the department as an affiliate associate professor and in other roles, including participation in our annual Career Day.

Ponce is enthusiastic about the opportunities for new graduates, particularly in biotechnology, and recommends that students develop an expertise in a particular field. In addition, he noted: “Being able to write clearly and succinctly as well as being able to explain complex issues clearly and simply” are valuable skills. “Networking is important, but it’s also the people you meet along the way—they can help you identify opportunities that you may not have even known about,” he said. “Connections can get you in the door, but what’s going to keep you there?” He notes that “perseverance and production, doing things well, thinking creatively, and being willing to take risks”—all of these matter.

alumnus profile

# CLIMATE CHANGE IN THE **pacific northwest**

## Health Impacts Study

Climate change is one of this century's most important dilemmas because of its inevitable consequences, such as eroding natural resources and adverse effects on human health. Researchers predict that the impacts of climate change will vary from community to community across the country and the globe.

Our department is working with leaders and policy-makers to better understand potential future conditions in the Pacific Northwest and to determine practices we can set in place now to avoid worst-case scenarios.

Professors Michael Yost and Richard Fenske, Associate Professor Catherine Karr, and Research Scientist Cole Fitzpatrick were among the scientists from our department who collaborated with the University of Washington (UW) Climate Impacts Group to assess public health impacts associated with climate change, and the rates of mortality linked to increased temperatures and worsening air quality.

Relatively short but intense heat waves over the last 30 years have been responsible for hundreds of deaths in the

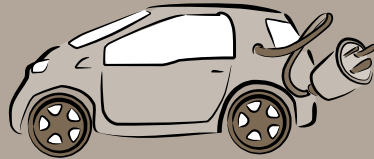
In 2009, the Centers for Disease Control and Prevention (CDC) awarded a team of UW researchers from our department, Health Services, and Atmospheric Sciences nearly \$1 million over three years to work with local communities to study health risks that will likely occur in the next 35 years and to develop strategies for how communities might reduce those risks.

"The information people hear about health impacts of climate change tends to be broad and without solid evidence," said Fenske. "The public is told that these health impacts are occurring or are likely to occur in the near future. And the claims leave the public apprehensive, but with no clear direction on how to prepare."

The UW researchers have computed the probable number of heat events that will occur in our region and have identified populations at risk. The elderly, people with respiratory conditions like asthma, those who have high blood pressure or cardiovascular disease, and others with health issues may be adversely affected by heat stress.



Recycle



Use less fossil fuel



Save energy



Conserve water

United States and Canada and thousands of deaths in Europe. In the greater Seattle area, during heat events over the past 25 years, mortality rates have increased. The UW team's climate change projections suggest these events will become more frequent, more intense, and longer lasting in the 21st century. The highest impact may be in cities that currently have milder summers, less air conditioning, and higher population density, all of which are characteristic of cities in the Pacific Northwest.

The evidence-based forecast of health impacts will "empower public health officials to develop specific plans of action to prevent health risks associated with climate change," said Fenske, who leads the CDC-funded project with Susan Allan, director of the university's Northwest Center for Public Health Practice and associate professor in the Department of Health Services.

Local public health agencies and emergency responders, among others, need to develop and implement policies to

better prepare for heat events and reduce the number of hospitalizations and deaths. Examples include formulating action plans for and increasing resources allocated to warning and transportation systems and emergency medical services.

## (Safe &) Green Jobs

Department faculty and staff are identifying and addressing critical health and safety issues in emerging occupational fields so that workers can recognize and better protect themselves from potential hazards.

“Green-collar” or “green” jobs are occupations that are environmentally friendly and involve manufacturing and construction materials that minimize or avoid waste, pollution, or greenhouse gas emissions. Examples of green jobs include building, installing, and maintaining energy-efficient technologies, such as wind turbines and solar panels.

Agencies, such as the National Institute for Occupational Safety and Health, caution that as traditional job fields become “greener,” careful and purposeful safeguards must be put in place. Workers involved in green jobs, such as building wind turbines, should be as well protected from hazards as those constructing a multi-story building.

Our Continuing Education Programs (CE) helped develop curriculum with consortium partners, the University of California (UC), Los Angeles and UC Berkeley to teach workers about green building systems, health and safety hazards, prevention strategies, and green chemistry. The latter—green chemistry—consists of using and producing chemicals and chemical processes that reduce waste products, have nontoxic components, and improve efficiency, and thereby reduce or eliminate negative environmental impacts.

CE also partnered with Sellen Construction, a leader in sustainable practices that worked on criteria with the US Green Building Council for the Leadership in Energy and Environmental Design (LEED) green projects certification. Together, they offered health and safety courses to students at the Seattle Vocational Institute Pre-Apprenticeship Construction Training program who are preparing for jobs that involve green building and energy retrofits.



## CLIMATE CHANGE around the globe

A collaborative program among schools and colleges at the University of Washington brings together experts from different disciplines to anticipate and measure the impacts of climate change on food and water security around the globe. This group of climate fellows come from disparate fields: law, anthropology, engineering, nursing, medicine, and public health, among others.

Associate Professor Scott Meschke from our department is one of these climate fellows. He is an environmental microbiologist who has developed new technologies and quantitative methods that have been applied to routing out pathogens that can contaminate food and water supplies and pose health risks to humans.

The climate fellows are investigating how to effectively measure co-benefits of small- and large-scale efforts to adapt and mitigate the effects of climate change. A co-benefit is an ancillary health benefit achieved through changes in a program, policy, or action. For example, if one crop is substituted for another because of changing temperatures, the population may receive added nutritional benefits.



# Breyan (Brie) Paske

BS, Environmental Health, 2008

Safety Administrator,  
The Boeing Company, Everett

Worker safety resonates for Breyan (Brie) Paske, in part because members of her family are employed in the manufacturing industry. Paske is a safety administrator with The Boeing Company in Everett, where the commercial airplanes are assembled. Her parents work at the Renton location on the Boeing 737 line—her mother in the “Wings Area” and her father in “Final Assembly.” “So I feel like I’m working for my family,” said Paske.

She works in the Environment, Health, and Safety Department at the company. Paske supports employee safety for a shop area known as “Final Body Join.” “That’s where the parts of the fuselage—the main body section of the plane—are joined together,” explained Paske. Her job involves a range of tasks, including incident investigations, compliance audits, and hazard assessments. Paske identifies existing or potential hazards, ensuring that equipment is set up correctly and that safety measures are properly followed. “This could include making sure that lanyards are attached at the right point and that body harnesses are worn,” she said.

At times, Paske consults with senior experts in her department about compliance regulations or a specific worksite issue. She works alongside environmental engineers, senior industrial hygienists, disability specialists, senior safety specialists, and ergonomists. Internal compliance audits are done regularly to ensure company employees are following Washington State Department of Labor & Industries standards and other important compliance measures concerning safety, such as for confined spaces or for fall protection.

While Paske was an undergraduate at the University of Washington, her academic advisor suggested that she take an introductory course in Environmental Health. She did, and was instantly hooked. Paske interned one summer with Tacoma-Pierce County’s pool compliance program, where she gained first-hand experience in environmental public

health safety. She helped inspect public swimming pools at schools, hotels, and gymnasiums to ensure properly functioning filtration systems, chemical balance in the water, removal of objects to prevent accidental falls, and adequate fencing around pool properties.

After graduating from the department with a BS in Environmental Health in 2008, she interned again, this time at Boeing, and the connection led to her current position.

When asked what type of plane she would be taking on an upcoming vacation trip overseas, she replied without any hesitation: “It’ll be a Boeing plane. I always look for them,” noting that the 777 and 737 are two of her preferred models.



Boeing Creative Services, Illustrations: Jupiterimages/photos.com, Gordon Tipton/photos.com



alumnus profile

# TRANSPORTATION & public health

In the 1950s and 1960s, cars and trucks emitted soot tainted with toxic agents such as lead. Our Environmental Health Laboratory helped provide the research underpinnings for Seattle's first air pollution regulatory efforts. Since then, our reputation for air quality research has grown. We now have three major air pollution research centers: the University of Washington (UW) Center for Clean Air Research, Disease Investigation through Specialized Clinically Oriented Ventures in Environmental Research (DISCOVER), and Multi-Ethnic Study of Atherosclerosis and Air Pollution (MESA Air).

## New Center Studies Health Effects of Traffic

Heavy traffic. It can make us late. It can make us mad. And it is increasingly evident that it can make us sick.

Professor Sverre Vedal and researchers at three other institutions are investigating how and why urban traffic causes cardiovascular disease, which contributes to some 28,000 deaths in the United States and Canada each year. Vedal is a board-certified pulmonary physician and epidemiologist who studies the health effects of air pollution.

Urban outdoor air pollution stands out as the highest risk factor for mortality, compared with other environmental risks, such as indoor smoke, water, and lead, Vedal reported during the December 2011 UW School of Public Health's Distinguished Faculty Lecture.

In December 2010, the US Environmental Protection Agency (EPA) awarded an \$8 million, five-year grant to establish the UW Center for Clean Air Research (CCAR), directed by Vedal. Its investigators are studying the health effects of exposure to pollution near roadways, focusing on the impact of air pollution on the heart and blood vessels.

This new line of research represents a shift in the EPA's management of air pollution, he said, from a single-pollutant focus to a complex mix of gasoline, diesel, and road surface pollutants, which undergo chemical changes as they age and travel through the atmosphere.

Previous studies have shown that exposure to these pollutants is greatest within about 300 meters of a roadway. Condos and apartments are often that close to major roads, as are some single-family homes. People who live farther away travel on those congested roads.

The CCAR team also includes researchers from Washington State University, Lovelace Respiratory Research Institute in Albuquerque, and the University of New Mexico.







## Urban Runoff and Salmon Survival

Heavy metals and asbestos can enter streams through urban runoff. In 2010, the Washington Legislature passed a new law that restricts the use of these toxicants and requires a phase-out of copper in automotive brake pads and shoes. Research that studies the effects of these toxicants on human and animal health is essential to informing transportation policies.

Professor Evan Gallagher is studying how pesticides and neurotoxic metals, including copper, can interfere with the migration of Coho salmon. Detrimental effects on salmon can occur at extremely low exposure levels, he said, and can impact behaviors critical to survival, such as homing, feeding, and predator-prey avoidance.

Pacific salmon are anadromous; they hatch in freshwater streams or lakes, migrate to the ocean, then return home to breed and lay eggs. Returning salmon use chemical cues to find their way up hundreds or even thousands of miles of waterways to their place of birth.

Gallagher's lab is generating molecular biomarkers of olfactory injury in salmon, caused by toxic effects of metals such as copper. The ultimate goal is to better understand chemical-mediated environmental neurotoxicity that occurs in wild salmon. His research findings could be used to identify cleanup priorities for Superfund sites and to assess the effectiveness of the cleanup.

Gallagher's project is funded by the National Institute of Environmental Health Sciences' Superfund Research Program.

## New Guidelines for Doctors

Professor Joel Kaufman and 14 other leading experts in cardiovascular disease contributed to the American Heart Association's latest guidelines for physicians, released in 2010. These guidelines are based on evidence that particulate air pollution can trigger fatal and nonfatal cardiovascular events such as heart attacks, arrhythmia, and strokes.

Their major concern was  $PM_{2.5}$ , fine particulate matter with a diameter of 2.5 micrometers or less, which mostly come from burning fossil fuels for energy and transportation. These tiny particles—too small to be seen—can be breathed deeply into the lungs and can reduce life expectancy by months or years.

Even a few hours of exposure can be hazardous, and living in areas with higher pollution levels carries more risk of cardiovascular disease. Studies show that reductions in pollution can reverse the risk.

The panel drafted several cautionary recommendations for doctors who treat cardiac patients and other at-risk groups, including the elderly, those with coronary artery disease, and those with diabetes. Among the new recommendations:

- Teach your patients where to find the daily EPA Air Quality Index, either in newspapers, on *The Weather Channel*, or online.
- Once patients learn to read this index, they can plan strenuous activity either inside where particle levels are lower or when particle levels are lower outside.



## Policy Implications

This biennium, two of the nation's leading experts in public health and the built environment joined our faculty. Together they help increase awareness of how public health issues should impact transportation policy in order to make communities healthier.

School of Public Health Dean and Professor Howard Frumkin and Affiliate Professor Andrew Dannenberg came to the University of Washington from the Centers for Disease Control and Prevention, where they both advocated for healthy community design. Frumkin directed the National Center for Environmental Health and the Agency for Toxic Substances and Disease Registry. Dannenberg retired as associate director for science in the Division of Emergency and Environmental Health Services at the National Center for Environmental Health. They co-edited a 2011 book, *Making Healthy Places: Designing and Building for Health, Well-being, and Sustainability*.

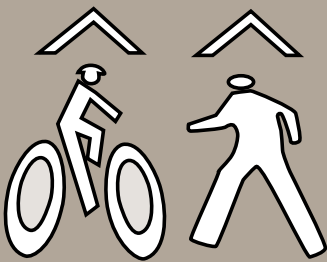
Frumkin said that the term “built environment” conjures images of places—buildings, neighborhoods, and parks—while transportation infrastructure forms the connective tissue that links these places together. Such linkages aren't without problems, he noted. Communities of color and those with lower socio-economic status disproportionately live near busy roads and rail lines and suffer health consequences.

Dannenberg encourages policymakers to consider health benefits such as increased physical activity and reduced obesity as part of their cost-benefit calculations for new transit systems. He is helping promote the use of health impact assessments (HIA) in the United States. HIAs are objective evaluations of the potential health effects of a project or policy before it is built or implemented. HIAs are modeled in part on environmental impact statements, focusing on issues such as physical activity, respiratory disease, injury, mental health, social capital, and environmental justice.

Washington state has been a leader in using HIAs. When the legislature approved funding to replace the State Route 520 bridge over Lake Washington, it mandated that an HIA be done. Dannenberg worked with Public Health – Seattle & King County to help guide the assessment in 2008.

A new series of interdisciplinary courses co-taught by Dannenberg focuses on research and tools that demonstrate the associations between community design and human health. The courses draw students across campus and offer them an opportunity to influence policy decisions. In a Spring 2011 course, they assessed the health impacts of the King Street Transit Hub redevelopment project and submitted their report to the Seattle Department of Transportation.

## HOW CAN THE BUILT ENVIRONMENT AFFECT HEALTH?



Provide safe bicycling and walking routes and physical activity increases



Develop community gardens and farmers' markets and nutrition improves



Build parks, trails, and green space to promote interaction with others and boost mental health

In order to raise greater awareness about environmental health, members of the Student Environmental Health Association collaborated with Program Coordinator Letty Limbach to design and paint a bus shelter mural for King County Metro on University Avenue in Seattle.

Undergraduates, l to r: Tiana Nizamic, Kendra Broadwater, Markus Grove (Biochemistry), Vickie Carper, Lani Gabriel, and Anna Fretheim.



*Sarah Fish*

## Community Engagement

Nearly 5,000 people in the Georgetown and South Park neighborhoods—more than one-quarter of them foreign born—share their home with Interstate 5 and State Route 99, Boeing Field, the Port of Seattle, and the Lower Duwamish Waterway Superfund Site.

Ongoing and emerging projects are bringing the scientific knowledge, skills, and expertise of our researchers to work for members of these communities. University of Washington (UW) researchers are collaborating with organizations attuned to the community's concerns to help design studies based on citizen input. Findings can support efforts to help achieve sound environmental policies.

Led by Professor Thomas Burbacher, an outreach arm of the Superfund Research Program (SRP) has been working with the Duwamish River Cleanup Coalition/Technical Advisory Group (DRCC/TAG) for nearly a decade, bringing researchers, policymakers, and concerned citizens together. With support from the National Institute of Environmental Health Sciences, SRP researchers are investigating human and wildlife exposure to toxicants common at Superfund sites and examining potential biological markers that can determine susceptibility to disease and physiological damage. The DRCC/TAG is an alliance of community,

environmental, and small business groups affected by ongoing pollution and cleanup plans for the Duwamish River.

Researchers from the UW are teaching community residents to use exposure assessment tools to monitor traffic-related air pollution. Funded by a two-year grant from the Kresge Foundation, the project is led by Professor Joel Kaufman; Julie (Richman) Fox, a postdoctoral scientist; and Sheryl Magzamen, a former postdoctoral scientist. They are collaborating with Puget Sound Sage, a nonprofit coalition of labor, faith, and community organizations that is part of the Church Council of Greater Seattle.

To help the Environmental Protection Agency select a cleanup plan for the Lower Duwamish Waterway Superfund site, Associate Professor William Daniell will lead a health impact assessment (HIA) with DRCC/TAG and Just Health Action, a nonprofit organization working to reduce health inequities. The HIA will focus on health changes that may result from the proposed cleanup and make recommendations about how to minimize health impacts, maximize health benefits, and reduce health disparities in the affected communities. The HIA is supported by the Health Impact Project, a collaboration between the Robert Wood Johnson Foundation and The Pew Charitable Trusts.



# Yolanda Sanchez

MS/MPA, Environmental Health/  
Public Affairs, 2007

Environmental Health Scientist,  
US Environmental Protection Agency, Washington, DC

As an undergraduate student in Arizona, Yolanda Sanchez saw residents of a South Phoenix neighborhood rallying. They were demanding decontamination of their properties and appropriate medical assessments from a toxic industrial fire six years earlier. Witnessing residents in a low-income, minority community demand their right to a clean, healthy environment spurred Sanchez's interest in environmental justice. She became inspired to work for a more equitable distribution of environmental burdens and benefits, and determined that to be effective in this field she would need graduate training in both public administration and environmental health. She came to the University of Washington for graduate school and completed a joint master's degree with our department and the Daniel J. Evans School of Public Administration.

Today Sanchez is an environmental health scientist with the Environmental Protection Agency (EPA) in Washington, DC, working with Superfund's Community Involvement and Program Initiatives Branch. She landed her job after completing a two-year fellowship at the EPA.

Superfund is a nationwide program that partners with state and tribal governments and involves local communities in efforts to clean up hazardous waste sites. The agency is placing renewed emphasis on environmental justice through outreach to and protection for communities historically under-represented in EPA decision-making. Sanchez manages the Community Involvement University, a program that teaches EPA staff how to work more effectively with community members involved in remediating Superfund sites.

Sanchez values the field perspective she received from her student experience as a research assistant with El Proyecto Bienestar (The Well-Being Project), a community-based approach to addressing environmental and occupational

health concerns of Hispanic farm workers and their families in Yakima Valley, Washington.

Of the EPA staff, Sanchez said, "They are passionate and energetic about involving their communities in meaningful ways throughout the Superfund cleanup process. Their genuine approach toward community involvement is admirable."

Sanchez said her education from our department has helped in her current position. She has drawn on courses in risk communication, toxicology, biostatistics, hazardous waste management, and others, all of which help her to "ask the right questions" while working with experts in these fields. She developed a "101" course on risk assessment for a non-technical audience, which has been offered to regional staff and at the 2011 EPA Community Involvement Conference.

She recently took on a new temporary assignment with the EPA Office of Research and Development's National Center for Environmental Assessment (NCEA). NCEA staff prepare technical reports and toxicity assessments using the most up-to-date research to inform EPA policies. Sanchez's role is to coordinate between NCEA researchers and staff in other EPA program offices where regulatory, enforcement, and remedial action decisions are made. "This job is a perfect mesh of my MS and MPA," Sanchez said.

Courtesy of Yolanda Sanchez; Illustration: Thinkstock Images/photos.com





## THE BIENNIUM IN REVIEW

# core values, changing times

Fundamental to our department is a dedication to high-quality education and improving the health and safety of workers and the public through research and service. Our researchers investigate how environmental factors can harm human health and how to prevent or control their effects, taking human genetic variations into account.

In the 2009–2011 biennium, we took advantage of opportunities to evaluate strengths in our instructional, research, and service programs. We also solicited input from faculty, students, staff, alumni, university leadership, and external partners to help us assess current needs in the fields of environmental and occupational health and set future directions for the department. We are now poised to implement some new areas of growth while we maintain the quality of our programs.

Balancing our education, research, and service mission objectives, we are able to offer a diverse portfolio of activities to benefit students, workers, and the citizens of Washington state.

## Education

In the last 50 years, environmental health responsibilities have significantly expanded. Skilled professionals are needed to adequately respond to complex conditions that affect millions of people.

Within the five states that comprise the Pacific Northwest (Alaska, Idaho, Montana, Oregon, and Washington), our department has the most comprehensive environmental and occupational health sciences graduate program and one of only two accredited environmental health undergraduate programs. To help maintain the high quality of our curricula and instruction, the department completed reviews of both the graduate and undergraduate programs during the 2009–2011 biennium. The review of the undergraduate and graduate programs required an assessment by internal and external committees, a site visit, a report, and interview sessions with faculty, staff, students, and alumni. In addition, the undergraduate program underwent a review in 2010 by the National Environmental Health Science and Protection Accreditation Council.

To help better prepare students for careers and graduate school, we developed the Environmental Health Research Experience Program—a nine-week summer internship that offers select undergraduates first-hand experience in

the laboratories of leading environmental and occupational health researchers. This program targets outstanding students from disadvantaged or underrepresented groups and offers them a stipend to complete a substantial research project. This program is supported by a five-year grant from the National Institute of Environmental Health Sciences. With a supplemental grant from the American Recovery and Reinvestment Act (ARRA), the 2010 summer program was able to fund additional trainees and a faculty member from Heritage College in Yakima.

While student enrollment and graduation rates have remained steady, the downturn in the national economy has increased pressure on funding sources that have historically supported students. Our Northwest Center for Occupational Health and Safety Education and Research Center supports graduate student training and continuing education for professionals. The center has been funded by the National Institute for Occupational Safety and Health since 1977. However, after the 2012–2013 school year, continued funding remains uncertain, due to a proposed elimination of the program in the federal budget. Our faculty and staff are helping students secure funding support through training grants from other departments, competitive scholarships, and fellowships.

## Research & Service

Faculty and staff continued to focus on research and service—two strong and essential components of our mission.

National funding opportunities continue to decline, and more institutions are competing for a shrinking pool of resources. Yet our faculty and staff remain dedicated to a strong research enterprise. Grant and contract proposals were submitted at levels equal to previous biennia, totaling approximately 100 proposals each year.

The Pacific Northwest Agricultural Safety and Health Center, the Center for Ecogenetics and Environmental Health, and the Center for Child Environmental Health Risks Research all received renewed funding. Two new centers were funded: the Center for Clean Air Research, which builds on the department's expertise in the health effects of air pollutants, and the Nanotoxicology Center, where researchers study the impacts of nanotechnology on human health.

Department faculty and staff explored new funding sponsors and research directions. Several faculty were

awarded ARRA funds from the National Institutes of Health to purchase large equipment and hire additional staff. In 2010, a proposal for a collaborative project with Michigan State University on food safety was submitted to the US Department of Agriculture and reached the final stages of consideration. Unfortunately, the project was not selected for funding.

State and federal awards supported collaborative projects between faculty and groups outside the university. Through the Washington State Department of Labor & Industries (L&I) Safety and Health Investment Projects grant program, department researchers worked on projects to address the health and safety issues faced by day laborers, welders, restaurant workers, and winery employees. Project partners included labor unions, business management, and worker advocacy organizations.

Generous gifts from Hewlett Packard, Logitech, and Microsoft supported ergonomic research, and private donors contributed to departmental funds for student scholarships, pilot projects, and a lecture series.

53 INTERNS

15 graduate students and 38 undergraduates participated in an internship.

69%

69 percent of our graduates work in Washington state (2009 alumni survey).

472 CE COURSES

7,381 students took 472 Continuing Education (CE) courses.

<https://osha.washington.edu>

## LIFETIME SAFETY AND HEALTH LEADERSHIP AWARD

Lecturer Richard Gleason (MSPH, Industrial Hygiene & Safety, 1980) was awarded the Lifetime Safety and Health Leadership Award from the Puget Sound Safety Summit, an alliance of government, management, and labor groups that develops methods and solutions to improve workplace safety. The Summit's focus is on increasing educational opportunities and safety awareness and improving safety practices throughout the state. Gleason has taught occupational health and safety classes for the past 15 years to graduate students and to working professionals through the Pacific Northwest Occupational Safety and Health Administration Education Center.



Marie Svoboda

The department received an allocation of approximately \$13 million from the Washington State Medical Aid and Accident Fund, an appropriation from the Washington State Legislature. These funds are used to support faculty and students, health and safety projects, and service programs.

Our service programs include the Field Research and Consultation Group (Field Group), the Environmental Health Laboratory, the Occupational and Environmental Medicine Clinic, and the Continuing Education Programs (CE). The Field Group conducts worksite-based research projects to identify and characterize chemical and physical health hazards and to investigate associations between hazards, health outcomes, and remedial factors. The Environmental Health Laboratory's services range from routine analyses for known workplace hazards to lab and field investigations to identify hazards.

The Occupational and Environmental Medicine Clinic is located at Harborview Medical Center in Seattle. It is the only major regional referral center for occupational medicine cases, the sole site of an inhalation challenge chamber for diagnosis of occupational asthma, and a core component of the L&I Multidisciplinary Consultation Service for Complex Spine Conditions.

The continuing education component of the Northwest Center for Occupational Health & Safety and the Pacific Northwest Occupational Safety and Health Administration Education Center offered 472 professional training courses to 7,381 students during the biennium. To better reach professionals, CE used innovative teaching technologies that included online modules and live-streamed seminars.

## Faculty, Students & Staff

The department experienced limited transitions in our faculty and staff. As with previous biennia, we celebrated the promotions of faculty, including Scott Meschke and Christopher Simpson to associate professor. We welcomed the new hires of Howard Frumkin as both a professor in our department and dean of the School of Public Health and Victor Van Hee as a joint assistant professor with the Department of Internal Medicine. Scott Barnhart changed from a joint professor with the Department of Medicine to an adjunct professor in our department. We also welcomed a number of new auxiliary faculty, including Sheela Sathyanarayana as an adjunct assistant professor and Andrew Dannenberg and John Garland as affiliate professors.

Our department saw Professor Jane Koenig and Research Professor James Woods retire; both have emeritus status. Steven Hecker stepped down from his role as director of the continuing education and outreach program. We said farewell to several faculty members. Professor Matthew Keifer was appointed director of the National Farm Medicine Center in Wisconsin. He is now an affiliate professor in the department. Assistant Professor Sarah Adar accepted a position at the University of Michigan. She is now an affiliate assistant professor in the department. Jordan Firestone, head of the Occupational and Environmental Medicine Clinic and an adjunct assistant professor, departed for Stanford University. We were saddened by the passing of Associate Professor Emeritus Peter Breyse, Affiliate Professor Foppe de Walle, Lecturer Emeritus Goldy Kleinman, Affiliate Professor L.-J. Sally Liu, former Associate Professor John Milner, and Affiliate Associate Professor Stanley Pier.

During the biennium, we accepted a total of 54 students into our graduate programs, and 64 undergraduates enrolled in the major. We granted 40 BS, 30 MS, 10 PhD, and 14 MPH degrees.

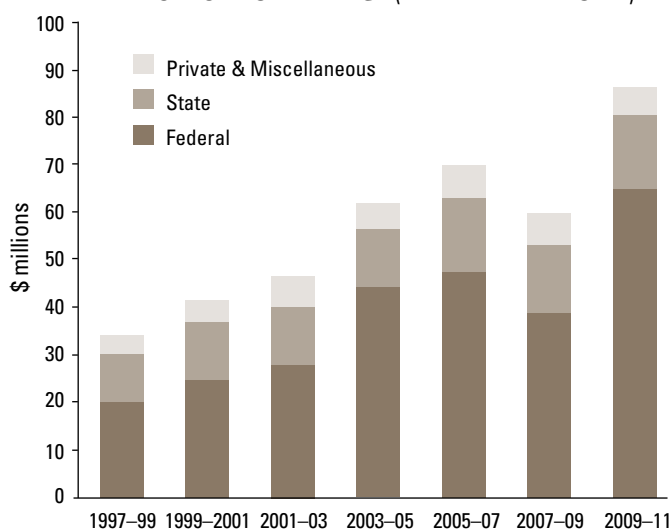
We were fortunate to retain the same staffing levels at about 125 employees, primarily due to the ongoing success of research and contract submissions and stable Washington State Medical Aid and Accident Fund support. Many of the staff departures were due to career opportunities, including senior staff who accepted faculty positions. Marina Guizzetti accepted a position as assistant professor at the University of Illinois at Chicago, and Richard Nietzel accepted an appointment as assistant professor at the University of Michigan.

## Our Future

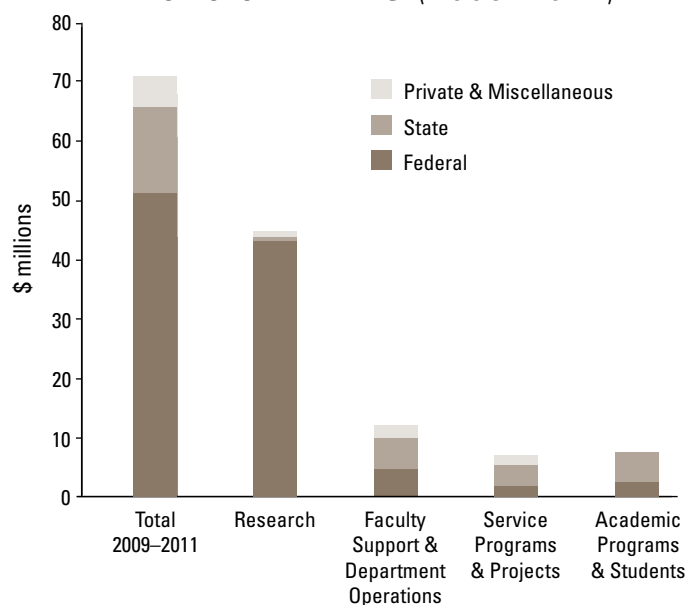
Change is inevitable, and our department has made it an ongoing priority to remain true to our core values as we adapt to changing circumstances. We anticipate that the 2011–2013 biennium will bring about challenges that could affect our funding, faculty hiring, department direction, and educational programs. The university is gearing up to fully implement the activity based budgeting system, which will impact the funds directed to the School of Public Health and our department from the state, tuition, and research cost recovery returns. We also foresee that research funding from traditional sources, including the Centers for Disease Control and Prevention, National Institute for Occupational



DEOHS FUNDING (BY BIENNIUM)



DEOHS SPENDING (2009-2011)



## 32 CORE FACULTY

Our department has 32 core faculty members and 80 adjunct, affiliate, clinical, and emeritus faculty.

## ~100 STUDENTS

Year after year, our department attracts high-caliber undergraduate and graduate students; during the 2009-2011 biennium, we had, on average, 100 students enrolled in our eight academic degree programs.

Safety and Health, and National Institute of Environmental Health Sciences, will continue to decline and securing these funds will become more competitive. It will be important for our faculty, students, and staff to explore new areas of research and support and expand their reach to nontraditional public and private sponsors.

Our department is preparing for upcoming faculty retirements. Currently, our faculty consists primarily of senior-level professors, many of whom will likely retire in the next five to ten years. Anticipating this turnover, we launched a nationwide search in 2010 for assistant-level professors to address vacancies, and we expect these searches to continue. In January 2012, we hired June Spector as an assistant professor.

In light of these changes and in response to recommendations made during the department's academic program

review, a strategic planning process was initiated in 2010. Efforts to gather information and feedback were overseen by a departmental planning committee and external consultants. A retreat that focused on future faculty hires was held in November 2011. We anticipate that our strategic plan will be completed in 2012. The School of Public Health's strategic planning process was finalized in December 2011, and it will inform the department's future directions.

Finding a balance between a commitment to core values and changing needs may be challenging. However, with a strong and commonly held vision; the expertise of faculty, staff, and students; and the shared passion for and belief in the importance of environmental and occupational health, we are confident we can retain our strengths while discovering new territory.

# Sylvie Adam

MS, Industrial Hygiene and Safety, 1995

Director of Environmental Health and Safety,  
Central Park Conservatory, New York City

From her office overlooking Central Park in New York City, Sylvie Adam is responsible for the health and safety of nearly 200 employees of the Central Park Conservatory, a nonprofit whose mission is to restore, manage, and enhance the park. Adam graduated in 1995 with an MS in Industrial Hygiene and Safety, which is now Exposure Sciences.

Adam joined the Conservatory as director of environmental health and safety in October 2011. Soon after she began her job, a severe, early snowstorm in the fall of 2011 damaged more than 2,500 trees, and workers with chain saws and chippers had only one week to ready the park for the New York City marathon. Adam was also making sure snow removal operators stayed safe.

Adam works to ensure that safety precautions are taken, such as use of eye, ear, and face protection when using equipment to maintain Central Park's grounds. Horticulturalists, gardeners, and tree care specialists comprise the workforce.

"The great thing about this job is that I use my skills and experience, but I also get to know the 180 employees who do such excellent conservation and restoration work in the park," said Adam. "At the same time, I'm able to discover the history of Central Park. Each day I learn amazing new things about the park."

Adam started out in New York City as an occupational health and safety specialist with the Department of Health and Mental Hygiene. In the post-9/11 environment, she joined its Bureau of Environmental Emergency Preparedness and Response. As part of the "All Hazard Team," her job entailed collaborating across various bureaus and city agencies to build a common plan to prepare for a variety of catastrophes, such as natural disasters and terrorism. She liked the job, but found she missed the direct interaction with workers that previous jobs had offered.



Beth Moorefeld; Illustration: Borut Tadinaj/photos.com

Before she moved to New York City, Adam worked in Seattle as an industrial hygienist at the Fred Hutchinson Cancer Research Center and as a consultant with Clayton Group Services, where clients included Boeing and other Puget Sound employers. Through the consultancy work, she gained experience in air and noise monitoring, indoor air investigations, and mold remediation work.

During graduate school, Adam had a summer internship with Texaco, which she described as "invaluable." It helped her better understand safety issues in a "high-hazard environment," and she gained respect for the workers operating an oil refinery. She said she learned the importance of communicating with workers, and "developing the social and psychological skills to be able to do so effectively. It is something you mainly learn on the job." Convincing someone to wear a pump can be a challenge, she said. "It's not always welcome, but environmental health and safety is as much about educating the workers about hazards and their controls as it is about evaluating, assessing, and measuring their exposures."

# DEGREES awarded

## Undergraduate Academic Program & Degree

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.

**WEB** *plus* \*

Visit <http://depts.washington.edu/envhlth> for more details about our undergraduate program.

### Autumn 2009

Mehak Ahluwalia  
Aminta Dang  
Danielle Hansen  
Judy Louie  
Luke Swart

### Winter 2010

Emily Cane  
Mark Crippen

### Spring 2010

Ashley Barlund  
Rachel Denney  
Kevin Do  
Sarah Helgeson  
Helen Iwasaki  
Andy Leung

### Thanh-Hien Ngo

Lorena Ray  
Kelsi Thorsness  
Nhu-Minh Nguyen Truong  
Alyssa Vivas  
Joanna Vong  
Aster Zemenfeskidus

### Summer 2010

Alain Flores  
Regina Ma  
Frew Meshesha  
Mary Tseng

### Autumn 2010

Lani Gabriel  
Wint Wai

### Winter 2011

Matt Wilson  
Chantel Yanagawa

### Spring 2011

Sundeep Bajwa  
Kendra Broadwater  
Zachary Christopher  
Jamie Chu  
Jennifer Gee  
Taylor Heiss  
Amy Leang  
Marissa Matsuyama  
Ahmed Mohamed  
Tiana Nizamic  
Christina Tolley  
Vivian Yu



Sarah Fish

### Kendra Broadwater, BS, 2011 Environmental Health

At the 2010 University of Washington Annual Undergraduate Research Symposium, Kendra Broadwater presented on her summer internship experience at the Center for Research on Occupational Environmental Toxicology at Oregon Health & Science University in Portland. There she worked with researchers assessing neurobehavioral changes in children exposed to pesticides using the Behavioral Assessment and Research System (BARS), which is a computer software program designed to test neurobehavioral abilities. She assessed the reliability of BARSpC, a newer version of the software, which also measures neurobehavioral performance. She said she enjoyed learning about computer software used to test health outcomes and spending time with local people in Hood River who were involved in the study.



## Graduate Academic Programs & Degrees

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), Occupational and Environmental Exposure Sciences (ES), Occupational and Environmental Medicine (OEM), and Toxicology (Tox).

**WEB** *plus*\*

Visit <http://depts.washington.edu/envhlth> for more details about our graduate programs.

**Environmental Health** students learn to identify sources of contamination in air, water, soil, and food, and on surfaces, and they study strategies to prevent or control the effects on human health or environmental quality.

**Occupational and Environmental Exposure Sciences** students learn to identify, evaluate, and manage health risks found in a wide variety of community and occupational settings.

*Graduate program faculty preceptors are identified in parentheses.*

### Summer 2009

Sarah Armel, MS (Tox) Urinary porphyrin excretion in normal and autistic children (*Woods*)

Hamilton Bennett, MS (ES) Characterization of a novel electropositive filter for the concentration of viruses from deionized and simulated marine water (*Shin*)

Diana Ceballos, PhD (EOHy) Evaluation of protective gloves used in the collision repair industry (*Yost*)

Ingeborg Cox, MPH (OEM) Testing validity of audio computer assisted self interview (ACASI) among low literate pesticide handlers (*Keifer*)

Tingting Li, PhD (Tox) Coproporphyrinogen oxidase (CPOX) polymorphism in human mercury neurotoxicity (*Woods*)

Phayong Thepaksorn, MS (ES) Measurements of atmospheric trace gases using an ultraviolet differential optical absorption spectroscopy (UV-DOAS) (*Yost*)



Sarah Fish

### Anna Schmidt, MS, 2011

#### Exposure Sciences

Fish is an important part of a healthy diet; however, eating large amounts of fish from contaminated bodies of water may negatively affect health. Anna Schmidt worked with Associate Professor William Daniell to characterize fish consumption and environmental concerns in low-income and food-insecure populations that often fish in local waterways to supplement their diet. She found that fish consumption behaviors were comparable to other high fish-consuming populations, such as Native Americans and Asian-Pacific Islanders. Environmental regulators use fish consumption rates to set water quality standards. This study suggests that low-income populations should be considered in policy decisions surrounding water quality.

## Autumn 2009

William Callis, MPH (OEM) The relationship between self-reported morale and post-deployment mental illness: A retrospective cohort time to event analysis (*Daniell*)

Ling Cui, MS (ES) Performance and physical exposure differences between children and adults when using standard and small computer input devices (*Johnson*)

Laurel Jennings, MS (EH) An investigation of perfluorinated compounds (PFCs) in Puget Sound shellfish (*Kissel*)

Kenneth Kuhn, MPH (OEM) Evaluation of exposure to jet-propellant-8 (JP-8) and health care utilization in United States Army soldiers returning from deployment to Operation Iraqi Freedom (*Firestone*)

Jason Faulkenberry, MS (EH) Inactivation of human adenovirus by sequential disinfection with UV irradiation and monochloramine (*Shin*)

Rachel Fischer, MPH (OEM) Shift work and its association with endometrial and ovarian cancer among women textile workers in Shanghai, China (*Checkoway*)

Margaret Hughes, MS (ES) Effects of key displacement distance and key switch mechanism on applied forces during typing (*Johnson*)

Christine Kim, MS (ES) Nasal inhalation exposure method of quantum dots to mice using a nebulizer (*Yost*)

Heather Klintworth, PhD (Tox) Molecular mechanisms of dopaminergic neuron death (*Xia*)

The Occupational and Environmental Medicine program gives physicians a better understanding of the clinical and scientific principles in environmental and occupational health.

The Toxicology program focuses on identifying, understanding, and analyzing toxic agents in the environment and their effects on human health.

Richard Neitzel, PhD (EOHy) Improving estimates of occupational noise exposure (*Seixas*)

Christina Rohlik, MS (EH) Characterization of bioaerosols and bacterial surface contamination at a large Washington dairy operation (*Meschke*)

## Spring 2010

Carolyn Bergstrom, MS (EH) Particle size distributions, size concentration relationships, and adherence to hands of selected geologic media derived from mining, smelting, and quarrying activities (*Kissel*)

Ryan Bible, MS (ES) Efficiency assessment of an omnidirectional, wind and water tolerant, high-volume bioaerosol inlet (*Yost*)

Matthew Chambers, MPH (OEM) Tobacco use among soldiers is higher following combat trauma and post-traumatic stress disorder (*Firestone*)

Alexander Domesle, MS (EH) Investigation of chemical uptake at low loads on skin (*Kissel*)

Jessica Kocian, MPH (EOH) Quantitative microbial risk assessment of methicillin-resistant *Staphylococcus aureus* present in swine confined animal feeding operations (*Meschke*)

Jennifer Krenz, MPH (EOH) Minimizing pesticide handler pesticide exposure: Practical solutions fresh from the orchard (*Fenske*)

Jonathan Lesesne, MPH (EOH) Multi-scale spatial determinants of fine particulate matter (PM) chemical composition in US cities (*Vedal*)

Yuh-Chi Niou, MS (ES) Investigation of children's respiratory symptoms due to poor indoor air quality in Sichuan, China (*Yost*)

Miyoko Sasakura, MS (ES) Iodinated trihalomethane exposure potential from point-of-use water treatment (*Simpson*)

Sukriti Singhal, MPH (OEM) Effect of air pollution on exercise-induced bronchospasm in children (*Vedal*)

Julie Wagner, MS (ES) Bioavailability of inhaled chromium VI in occupational settings (*Morgan*)

Jill Walters, MS (ES) Evaluation of quantitative respirator fit testing of workers exposed to Cr VI aerosols from various industrial work processes (*Morgan*)

Lynn Wilder, PhD (IH)\* Variation in urinary creatinine and dissolved solids from childhood to adulthood: Impact on the interpretation of urinary biomarkers of chemical exposure (*Fenske*)

Stephanie Wong, MS (ES) A spatial model to assess the impact of major roadways on a low income Seattle neighborhood using an intensive NOx sampling campaign (*Kaufman*)

### Summer 2010

Kellie Fay, PhD (Tox) Comparative analysis of short-term vs. long-term culture of primary mouse hepatocytes for modeling *in vivo* responses to toxicants (*Kavanagh*)

Kelly Jones, MS (EH) Development of a strand-specific method to detect infectious human enterovirus-b (HEV-B) species in environmental samples (*Meschke*)

Tao Lin, PhD (Tox) Glutathione modulates amphiphilic polymer-coated CdSe/ZnS quantum dot-induced pro-inflammatory cytokine/chemokine expression (*Kavanagh*)

Christine Loftus, MPH (EOH) Development and attempted validation of an asthma vulnerability index for use in targeting schools of Region 10 EPA (*Karr*)

Erin Peck, PhD (Tox) The role of CYP1A enzymes in aristolohic acid toxicity and mutagenicity: Clues to mechanism and disease (*Eaton*)

Emma-Jane Poulton, PhD (Tox) The characterization of sulforaphane as a novel antagonist to the human pregnane and xenobiotic receptor (PXR) (*Eaton*)

Eileen Wong, MS (EH) Removal of *Mycobacterium avium* complex from drinking water by physicochemical processes (coagulation/flocculation/sedimentation) (*Shin*)

### Autumn 2010

Jing Chen, PhD (Tox) The up-regulation of cholesterol transporters and cholesterol acceptor-mediated cholesterol efflux in brain cells as a novel mechanism of developmental neurotoxicity: Ethanol and retinoic acid (*Costa*)

\* The Industrial Hygiene and Safety program officially changed its name to Occupational and Environmental Exposure Sciences in Fall 2007. However, students admitted prior to that date graduated with a degree in Industrial Hygiene.

The Environmental and Occupational Health Master of Public Health degree program teaches students to recognize, assess, and control environmental and occupational hazards and the impact of these hazards on health and society. Students learn approaches to regulations, enforcement, and policy development.



Courtesy of Heather Klintworth

## Heather Klintworth, PhD, 2010

### Toxicology

Heather Klintworth completed her MS and PhD in Professor Zhengui Xia's laboratory. For her dissertation, she studied how two pesticides, rotenone and paraquat, and MPTP—a toxic byproduct of a narcotic drug—affected neurons typically damaged in Parkinson's disease. Some epidemiological studies have shown that people who work with pesticides or people who live in farming communities have a higher risk of developing Parkinson's disease. In the US, paraquat use has long been restricted to certified applicators, and currently the only allowable use of rotenone is as a piscicide for invasive fish species. However, use of these two agents are widespread and less regulated in developing countries. Klintworth found the two pesticides activated the JNK protein that causes neurons to go into programmed cell death, a process called apoptosis. She also found that basic fibroblast growth factor prevented cell death, which she said may be important in developing a therapy for Parkinson's disease.



The Master of Science or Master of Public Health and Master of Public Administration (MS/MPA or MPH/MPA) are concurrent master's degree program options with the Daniel J. Evans School of Public Affairs (Evans). These programs are structured for students interested in environmental and occupational health and its use in public health policies and management.

Rad Cunningham, MPH/MPA (EOH, Evans) Occupational risk factors for serum cholinesterase inhibition among pesticide applicators exposed to organophosphate and N-methyl-carbamate pesticides in Washington state, 2006–2010 (*Keifer*)

Stephen Hyland, MPH (OEM) Clinical validation of mental health screening instruments following combat deployment (*Firestone*)

#### Winter 2011

Chantrelle Johanson, MS (ES) Characterizing the health and safety needs of the dry cleaning industry in King County (*Yost*)

#### Spring 2011

Kristen Cosselman, MS (Tox) Traffic-related air pollution: science and policy: Blood pressure response to controlled diesel exhaust exposure in human subjects and factors influencing air quality policy implementation and success (*Kaufman*)

Emily Edens, MS (EH) Distribution and characterization of methicillin-resistant *Staphylococcus aureus* (MRSA) in three Seattle area beaches (*Roberts*)

Edward Evanson, MS (ES) Formation and removal of iodoform from iodinated personal drinking water (*Simpson*)

Hiroshi Fujita, MS (ES) Ambient heat-related morbidity in Washington state: Hospitalizations and associated costs in summer 2004 (*Fenske*)

Amelia Greenhall, MS (EH) Assessment of children's non-dietary indoor exposure to a phthalate found in floor tile (*Kissel*)

Samantha Kantrowitz, MS (Tox) Inhalation of diesel exhaust in human subjects and gene expression in peripheral blood leukocytes (*Kaufman*)

Louis Lim, MPH (OEM) Clinical outcomes after a back injury—Looking beyond injury severity (*Franklin*)

Stefani Penn, MS (ES) Integration of a cholinesterase test kit into diagnosis and clinical practice for monitoring farm worker exposure to pesticides (*Simpson*)

Anna Schmidt, MS (ES) An evaluation of fish consumption and environmental concern in low income and food insecure populations in Seattle (*Daniell*)

Leah Tait, MS (Tox) Modulation of paraoxonase 2 (PON2) in the CNS (*Costa*)

Domonick Zanarini, MS (ES) Glove efficacy in collision repair shops using isocyanate and solvent based spray paints: A field study (*Yost*)

Hilary Zetlen, MPH (EOH) Pesticide exposure assessment and control in orchards: Spectrofluorometric analysis of fluorescent tracers in air, deposition and wipe samples (*Fenske*)

below, l to r: 2010 Exposure Sciences graduates Yuh-Chi Niou, Ryan Bible, Margaret Hughes, Miyoko Sasakura, Julie Wagner, Stephanie Wong, and Jill Walters.



# MEASURING our accomplishments



Elizabeth Sharpe

## 2010 DISTINGUISHED STAFF AWARD

Jeffrey Shirai (MS, Environmental Health, 1995), a research scientist and laboratory supervisor in Professor John Kissel's lab, received the department's 2010 Distinguished Staff Award. The favorite part of his job, Shirai says, is working with students, and witnessing their transformation from when they first enter the program: progressing through classes and research experiences, gaining confidence in the lab, and then taking ownership of their research project. "It's gratifying to be part of that process and assist in the development of individuals who will serve as the next generation of environmental health practitioners," Shirai explains.

## STRIKING A BALANCE... RESEARCH, TEACHING, AND SERVICE

### WEB *plus*\*

For full details about our awards, honors, and peer-reviewed publications during the 2009–2011 biennium, visit: [http://depts.washington.edu/envhlth/biennial\\_report/biennial\\_report\\_09\\_11/](http://depts.washington.edu/envhlth/biennial_report/biennial_report_09_11/)

### >50 AWARDS & HONORS

Our faculty, staff, students, and alumni are recognized for their achievements with more than 50 local and national awards and honors.

### >200 PUBLICATIONS

Our department researchers published more than 200 peer-reviewed journal articles, books, and book chapters.

## ABRAZO AWARD

Vanessa Galaviz is studying personal exposure and uptake of diesel particulate matter among pedestrians who cross the US–Mexico border at San Ysidro, a community in California. She is a doctoral student in the Environmental and Occupational Hygiene program and studies with Professor Michael Yost. Her work is part of a study being led by researchers from San Diego State University and the San Diego Prevention Research Center. The biological and environmental samples that Galaviz has collected and analyzed will be used to support the recommendations of Casa Familiar, a community group advocating to ensure that the reconstruction of the US–Mexico border port-of-entry takes into account resident concerns. In 2011, Galaviz received Casa Familiar's Abrazo Award for her role in this study.



Courtesy of Vanessa Galaviz

# OUR donors

The individuals, corporations, foundations, and family foundation donors listed below contributed to the Department of Environmental and Occupational Health Sciences between July 1, 2009 and June 30, 2011.

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 are honored to be the recipient of two new endowment funds initiated during this biennium in memory of long-time faculty member Peter Breyse, and in memory of Sean Quigley, an alumnus and former staff member. We sincerely appreciate these gifts and the generosity of our donors.

If you are interested in supporting our programs and students, visit:

<http://depts.washington.edu/envhlth/giving.php>

## \$1,000 OR MORE

### Individuals

John Anicetti  
Patrick and Jill Breyse  
Sheila and Matt Breyse  
Janice Camp\* and Steven Gilbert  
Russell Castner\* and Svanhild Swasand  
Molly Breyse Cox and Kevin Cox  
David Eaton  
Jack\* and Betty Hatlen  
Cecilie Hudson and David Kalman  
Thomas McHugh\* and  
Michelle Karpman McHugh  
Cynthia Rogers  
Mansour Samadpour and Dalia Alfi  
Charles Treser

### Corporations and Foundations

Chevron Corporation  
Enertechnix, Inc.  
Hewlett-Packard Company  
Logitech  
Microsoft Corporation  
Veritox, Inc.

\* *Alumni*

## UP TO \$1000

### Individuals

Nancy Beck\*  
Michael Bilello  
Ronald Bishop  
Linda and Don Blackstone  
Miriam Bowers\*  
Michael Box\* and Kristen Mitchell  
Carl\* and Kayla Brodtkin  
William Budd\* and Martha Bishop  
Stephanie Carter\*  
Michelle Catlin\*  
Harvey and Anne Checkoway  
Walter\* and Billie Cothran  
William and Susanne Daniell  
Andrew Doyle  
Samual Dreyer  
Charles and Nancy Easterberg  
Roger and Barbara\* Erickson  
Elaine Faustman  
Richard Fenske and Carol Jackson  
Donald\* and Debra Garvey  
Richard Gleason\*  
Marjory\* and Michael Gouthro  
Rolf and Carolyn Hahne  
Maureen Hamilton  
Gary\* and Christina Irvine  
Patricia and Donald Janssen  
Janice Jeter

Matthew John\*  
Laura Johnson and Stephen Mason  
Peter Johnson  
Kimball\* and Elaine Jones  
Joel Kaufman\* and Anna Wald  
Terrance Kavanagh and  
Angelika Grossmann  
Matthew Keifer\* and Susan Kline  
Joy Keniston-Longrie\* and  
Mark Longrie  
John Kissel  
Margaret Leland  
Thomas Lewandowski\*  
Ulrike Luderer\* and Kevin Olson  
John McCroban  
James Meadows  
Gretchen and Lee Monteith  
Deanna and Michael Moran  
David\* and Mary Noguchi  
Victor Okereke  
Bradley Prezant\*  
Cecil and Jane Quigley  
Robert Rams  
Xue Ren\*  
John Rosenberger  
Alan Rossner  
John\* and Ruth Sechena





Pat Janssen

## FRIENDS OF SEAN QUIGLEY TOXICOLOGY ENDOWED FUND

The Friends of Sean Quigley Toxicology Endowed Fund was established by the friends and family of Sean Quigley (MS, Toxicology, 1997) to honor his memory and affect the lives of many new toxicology students. Quigley was an integral and respected member of the department, both as a graduate student and as a research scientist in the Toxicology program's Functional Genomics Laboratory. The fund will give financial support to students working on their Master of Science degree in Toxicology.

### UP TO \$1000

#### Individuals (continued)

Marguerite Seeley\*  
Noah Seixas and Dana Standish  
Amy Sly\*  
Lindsay Smith-Munoz\*  
Patricia and Mark Stenzel  
Margaret Sundman  
Gregory Taylor  
Terry and Minnie Van Wormer  
Dorothy Vollmerhausen  
Robert and Linda Wheeler

Michael\* and Cristine Yee  
Michael and Nancy Yost

#### Corporations and Foundations

Dow Chemical  
Dunn Family Trust  
Rohm & Haas  
Simpson Investment Company

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](mailto:esharpe@u.washington.edu).

We appreciate the opportunity to correct our records.

## ENDOWED LECTURESHIP IN HONOR OF PETER BREYSSE

In memory of Associate Professor Emeritus Peter Breyse, who died on May 10, 2010, at the age of 87, his family and the department established an endowed lectureship to honor and recognize his dedication to worker and public health. He was one of the department's founding faculty members, and he was instrumental in the development of the industrial hygiene program. Active nationally and in local professional communities, Breyse was a tireless advocate for improving people's health. Over a 40-year tenure in the profession, Breyse mentored students and influenced many of them to enter the field. He can be credited with populating the ranks of industrial hygienists throughout the country. This endowed lectureship enables the department to recruit national and international speakers to share new ideas and inspire faculty, staff, and students to continue Peter Breyse's legacy.



Courtesy of Mike Breyse

# DEPARTMENT advisory committee

## 2009–2011

President, Washington State Labor Council

*Represented by Rebecca Johnson, Governmental Affairs Director (2010–2011)*

*Represented by Al Link, Secretary-Treasurer (2009–2010)*

President, Association of Washington Business

*Represented by Grant Nelson, Governmental Affairs Director*

President, Washington State Medical Association

*Represented by Timothy Gilmore, Medical Director,*

*Occupational Medicine, Group Health*

Director, Washington State Department of Labor & Industries

*Judy Schurke*

Dean, University of Washington School of Engineering

*Represented by Richard Storch, Professor and Chair,*

*Department of Industrial & Systems Engineering*

Secretary, Washington State Department of Health

*Represented by Nancy Napolilli, Director, Office of*

*Environmental Health, Safety and Toxicology*

Dean, University of Washington School of Public Health

*Howard Frumkin (2010–2011)*

*Patricia Wahl (2009–2010)*

Chair, University of Washington Department of

Environmental and Occupational Health Sciences

*David Kalman*



Al Link was recognized by the department for his outstanding dedication and service to the Advisory Committee, where he represented the Washington State Labor Council from 1994 to 2010.

back cover: Graduate students, l to r: Rachael DeSouza, Zachariah Guerrette, and Cody Cullison

*Sarah Fish*

The soulcatcher, logo of the School of Public Health, is a Northwest Coast Indian symbol of physical and mental well-being (artist: Marvin Oliver).

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