



AIR POLLUTION: INSIDE AND OUT

The Department of Environmental and Occupational Health Sciences has been studying air quality for more than half a century. This issue of Environmental Health News reviews our department's history and describes several new studies our investigators are conducting into the sources, control, and health effects of indoor and outdoor air pollution.

THE CLEAREST SKIES

The field of air quality research is an example of how University of Washington research benefits the region. The university's role is documented in a new booklet, *The Clearest Skies: A history of Seattle's air pollution control efforts*, published by the Northwest Center for Particulate Air Pollution and Health (PM Center), funded by the Environmental Protection Agency (EPA).

The PM Center, which operated from 1999 to 2006, studied particulate pollution from wood smoke and other sources, in collaboration with other agencies that had already amassed significant data on the health effects of wood smoke.

The university's collaborations date back to 1951, when the fledgling Department of Preventive Medicine contracted with the City of Seattle, which was developing a comprehensive air pollution control program. At the time, the UW's new Environmental Research Laboratory (now Environmental Health Laboratory) provided smoke and dust particle analyses.

At first, the laboratory operated out of leased space north of campus on Blakely Street. In 1966 the lab moved to the newly constructed Health Sciences complex as the Environmental Health Division of the UW Department of Preventive Medicine. James McCarroll, known for his research on New York City air pollution at Cornell University, was hired as director.

One of the best-equipped laboratories of its kind, it owned about \$200,000 worth of air pollution measurement equipment. The lab had mass, e-ray emission, and infrared spectrometers; a gas chromatograph; and an IBM computer, all exotic instruments at the time. The nephelometer, which became standard equipment in studying air pollution, was invented at the UW.

The Environmental Health Division had strengths in basic and applied research. Peter Breyse was editor of the preventive medicine newsletter in 1968 when he wrote a piece about air pollution that caught the attention of *The Seattle*

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I think the university ought to take a more active role in solving community health problems... In many cases, the university is the only place where there are a variety of professional disciplines that could meet to discuss collective answers.

—Peter Breyse,

1976

—continued from page 1

Times. Breyse contended that 1960s-era laws failed to distinguish among pollution sources or particle size, and advocated for accurate measuring devices. Instrumentation and measurement have since become hallmarks of our department.

In 1999 the PM Center became one of five centers in the country funded by the US Environmental Protection Agency to study the effects of particulate air pollution on human health. Our region is important because particulate pollution here is different from that in the eastern US. The main components in the Northwest are from car and truck exhaust and burning vegetation. In the eastern US, a major form of particulate air pollution is sulfuric acid whose source is coal-fired power plants.

The PM Center, directed by Jane Koenig, was an interdisciplinary collaboration, with members from the departments of Atmospheric Sciences, Biostatistics, Environmental and Occupational Health Sciences, Civil & Environmental Engineering, and Epidemiology at UW; Civil & Environmental Engineering at Washington State University; and the Institute for Circumpolar Health Studies in Alaska.

THE CLEAREST SKIES

The PM Center summarized its efforts in an expanded issue of its newsletter, *Smoke, Dust and Haze*. The 36-page booklet, *The Clearest Skies: A history of Seattle's air pollution control efforts*, was edited by PM Center manager Collen Marquist. It can be downloaded at <http://depts.washington.edu/pmcenter/pdf/cleanair.pdf> or requested in print format from Jennifer Gill, 206-685-4076, jenn976@u.washington.edu.



Puget Sound Clean Air Agency

Until controls were put into place, auto wreckers burned old cars to rid them of rubber, oil, and other nonmetallic substances

The PM Center's research, together with that of other groups around the world, contributed to decisions about air quality standards and to the understanding of how we are affected by the air we breathe.

The PM Center summarized its work with a symposium in January 2005, presenting research ranging from source apportionment analyses to infant bronchiolitis.

Today, air pollution research continues in the laboratories of David Kalman, Joel Kaufman, Koenig, Sally Liu, Dan Luchtel, Dennis Shusterman, Christopher Simpson, and Sverre Vedal; in the Environmental Health Laboratory led by Russell Dills; and in the off-campus Controlled Exposure Facility, led by Kaufman. Investigators are continuing to publish papers based on the PM Center's research.

FURTHER READING

Recent PM Center publications

http://depts.washington.edu/pmcenter/res_reports.html

The Clearest Skies: A history of Seattle's air pollution control efforts <http://depts.washington.edu/pmcenter/pdf/cleanair.pdf>

OUR DEPARTMENT'S HISTORY WITH AIR QUALITY

1950s

1951—A \$5000 grant from the City of Seattle funds a study of the city's air pollution problem

1956—The US Public Health Service funds two air pollution research projects: one on paper mill emissions and one on ozone analysis

1958—The Environmental Research Laboratory does the air sampling analysis for the Washington State Health Department; Ross Kusian, director of the laboratory, publishes "Polluted air: A growing Seattle problem," in the August issue of *Puget Sound Engineering*

1960s

1961—Harry Martin is hired as director of the laboratory; his work focuses on lung damage from air pollution

1962—State Senate Bill 323 provides secure funding for the laboratory and for construction of the F wing of the UW Health Sciences Building

1964—Martin's research program on chronic lung disease receives support from the National Institutes of Health; unfortunately, he dies in July

1965—Peter Breyse hosts a public television program, "Seattle's Air Pollution Problem: The Way Out" with Slade Gorton and others

1966—James McCarroll is recruited from Cornell University Medical College to head the Environmental Health Division; his work is among the first to examine the long-term effects of air pollution on mortality

1968—A new study of the health effects of air pollution uses a climatically controlled exposure chamber

1970s

1970—The renamed Department of Environmental Health becomes part of the new School of Public Health and Community Medicine

1974—Jane Koenig joins the faculty

1980s

Jane Koenig, William Pierson, David Covert, Timothy Larson, and others study the effects of air pollutants on adolescents

1990s

1994—Spokane particulate matter study is funded by the Environmental Protection Agency (EPA) and the Washington Department of Ecology

1998—Sally Liu joins the faculty

1999—Northwest Research Center for Particulate Air Pollution and Health (PM Center) is funded by EPA

2000s

2000—Koenig publishes her book, *Health Effects of Ambient Air Pollution: How safe is the air we breathe?*

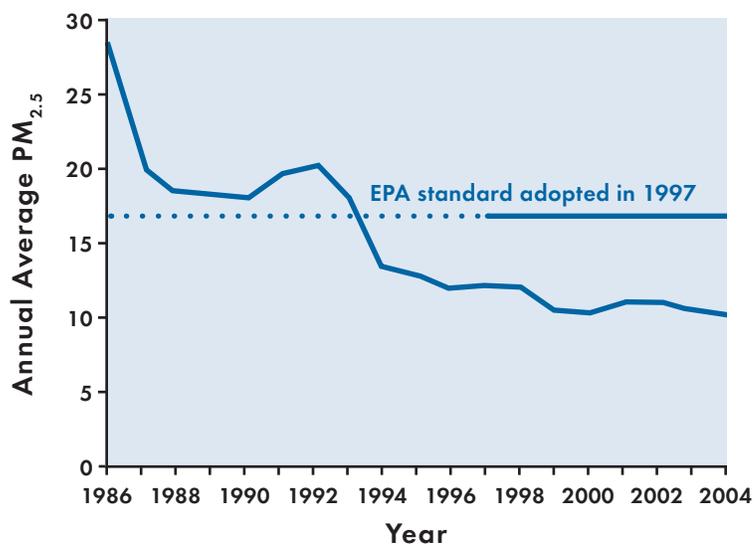
2001—PM Center sponsors a workshop on health effects of wildfires

2004—Joel Kaufman receives a \$30 million EPA grant to examine links between air pollution and heart disease; Liu wins an EPA grant to study diesel emissions from school buses; Sverre Vedal, Dennis Shusterman, and Joellen Lewtas join the faculty

2006—Liu's research team pinpoints crankcase emissions as the source of most pollution on school buses; Vedal publishes on mortality from wildfires

2007—Kaufman's seven-year study of postmenopausal women suggests that urban air pollution may be more dangerous than previously believed

TWO DECADES OF PROGRESS



The UW worked collaboratively with federal, state, and regional agencies to reduce the amount of fine particulate matter in Seattle's air (Graph: Jane Koenig)

M EASURING HEALTH EFFECTS

COVERAGE OF KAUFMAN STUDY

Professor Joel Kaufman received wide coverage for a study his research team published in the Feb. 1 edition of the *New England Journal of Medicine* on the association between fine particulate air pollution and cardiovascular disease and death among postmenopausal women.

Stories were carried by all three major television networks, National Public Radio, the *Wall Street Journal*, *US News and World Report*, and as far away as England, Australia, China, and India. It was also the top story on the National Institutes of Health's (NIH) Research Matters column.

The study found that the magnitude of health effects may be larger than previously recognized, which could provide impetus for policy change.

The study, led by Epidemiology doctoral student Kristin Miller, evaluated long-term exposure to air pollution and the incidence of cardiovascular disease in the Women's Health Initiative, a large prospective cohort study. Unlike prior research, the study examined not only differences between cities, but also between communities within a city. Study results linked a woman's first cardiovascular event, such as coronary heart disease, heart attack, or stroke, with

the smallest particulate air pollution—particles of less than 2.5 microns in diameter and invisible to the human eye (PM_{2.5}).

The team studied healthy women who lived in 36 US cities, following them for an average of six years, using medical records to confirm each cardiovascular disease event. Each woman's exposure was determined by a network of 573 air pollution monitors (most lived within six miles of a monitor). These monitors showed the highest air pollution in Riverside, California, and the lowest in Honolulu.

Of the 65,893 women studied, 1816 had one or more cardiovascular events during the study. Each increase of 10 micrograms per cubic meter of fine particulate air pollution was associated with a 24% increase in the risk of heart disease or stroke and a 76% rise in the risk of death.

The researchers found that effects between neighborhoods within a city were often larger than those between cities. They also found that the association between the PM_{2.5} level and cardiovascular disease was stronger with increasing obesity.

The mechanism by which fine particulate air pollution increases the risk of cardiovascular disease is still unknown, although Kaufman's ongoing MESA Air Pollution study, as well as studies in his diesel exhaust exposure facility, are seeking answers.

The study was funded by the Environmental Protection Agency, through Professor Jane Koenig's Northwest Center for Particulate Air Pollution and Health, and the National Institute of Environmental Health Sciences. The Women's Health Initiative is funded by the National Heart, Lung, and Blood Institute.

FURTHER READING

Miller KA, Siscovick DS, Sheppard L, Shepherd K, Sullivan JH, Anderson GL, Kaufman JD. Long-term exposure to air pollution and incidence of cardiovascular events in women. *N Engl J Med* 2007 Feb 1;356(5):447-458. ■



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Particulate air pollution in some urban neighborhoods puts women at increased risk of cardiovascular disease

TRACKING INDIVIDUAL EXPOSURE

While ambient air monitors can estimate our exposure to air pollution, they can't tell exactly what we breathed or how our body reacted to it. Assistant Professor Christopher Simpson is developing biomarkers that can help identify the exact components of our exposure. Examples of exposure biomarkers developed in Simpson's lab include metabolites of diesel exhaust, wood smoke, and organophosphate pesticides in biological specimens (generally urine or blood samples).

One project traces methoxyphenols, which are produced when the wood polymer lignin is burned. Lignin is specific to wood, so these markers couldn't be confused with compounds from, for example, vehicle exhaust.

Using departmental volunteers, he conducted controlled human exposures to wood smoke, in order to study the dose response and time course of urinary excretion of these compounds. He is now using these urinary methoxyphenols to estimate personal exposure to biomass smoke in occupationally exposed firefighters, and in rural communities in the developing world that use biomass fuels for cooking and heating.

Simpson also uses molecular markers to measure and identify the different components of particulate matter air pollution. Because different sources of air pollution display different types of toxicity in humans, it is important to apportion exposure to air pollution among the different sources, he said.

The Simpson lab is developing new analytical methods to identify and quantify novel marker compounds in air particulate matter, and is evaluating how these markers perform as variables in computer models.

With research scientist/graduate student Mike Paulsen, Simpson is studying biomarkers of exposure to diesel exhaust. Diesel exhaust contains numerous known and suspected cancer-causing components including polycyclic aromatic hydrocarbons (PAHs) and nitro-PAHs. Epidemiological studies suggest links between diesel exhaust and lung cancer, asthma, and other diseases. However, a major limiting factor in studying the connection between



Jennifer Gill

Chris Simpson in his lab

diesel exhaust and disease is the lack of accurate exposure measures, Simpson said. Effective biomarkers will provide researchers with tools to study health effects of exposure to diesel exhaust and to evaluate changes to exposures resulting from environmental protection efforts or workplace exposure control mechanisms.

The Simpson lab, in collaboration with Japanese colleagues Akira Toriba and Kazuichi Hayakawa, is trying to measure diesel exposures by measuring levels of urinary metabolites of diesel-specific types of PAH.

Paulsen's thesis research focuses on 1-Nitropyrene (1-NP), which is also being used as an atmospheric marker because it is formed almost exclusively in diesel engines.

Paulsen and Toriba are developing highly sensitive assays for 1-NP urinary metabolites by using gas chromatography and high performance liquid chromatography coupled with mass spectrometry. The assays require complex sample preparation and optimal performance of analytical instrumentation to measure metabolites at part-per-quadrillion levels in urine. Based on preliminary results, this level of sensitivity appears sufficient to detect several of the 1-NP metabolites from individuals exposed to ambient levels of diesel exhaust. Paulsen and colleagues plan to test the method further on air and urine samples from bus and taxi drivers in Peru and China.

See page 11
for
bibliography

AIR QUALITY

IN THE WORKPLACE

Our department's Field Research and Consultation Group (Field Group) has been working with Washington state employers on several potentially hazardous airborne exposures.

The newest federal and state workplace standard governs emissions of hexavalent chromium, generated largely by welding on stainless steel. The Field Group's Venetia Rummion has been working with seafood processing and shipbuilding companies to help them come into compliance with the standard, which reduced the permissible level of exposure tenfold.

Rummion said, "It's been interesting to learn about the different welding processes used in these industries. In some cases, the welding process cannot be changed, so we're working with employers to improve ventilation systems." Welding helmets with special built-in respirators are also encouraged until engineering controls are implemented.

Wood dust may seem benign, but it is linked to reduced lung function, asthma, bronchitis, and dermatitis. The dust from certain types of wood, such as oak and beech, has been linked to cancers of the nasal cavity, lung, and gastrointestinal tract, while birch, mahogany, teak, and walnut are suspected carcinogens.

Wood dust is an important exposure in Washington state, where the billion-dollar lumber and wood products industry employs 20,000 workers.

The Field Group's Gerry Croteau has measured high levels in cabinet shops where workers use electric hand sanders, which produce fine dust particles. Croteau has been successful in dramatically reducing dust levels when vacuums are attached to the sander or when a downdraft table is used.

A vacuum assembly can cost between \$150 and \$1500, and a downdraft table between \$3000 and \$8000. Croteau is helping businesses optimize their equipment selection, operation and maintenance, and educational programs for workers and management.

The Field Group also has been working with furniture refinishers to control methylene chloride exposures. Methylene chloride is a volatile, colorless liquid with a chloroform-like odor. It is used in various industrial processes including paint stripping, pharmaceutical manufacturing, paint remover manufacturing, and metal cleaning and degreasing.

OSHA considers methylene chloride to be a suspected occupational carcinogen. Exposed employees are at increased risk of developing cancer, adverse effects on the heart, central nervous system, and liver, and skin or eye irritation. Exposure may occur through inhalation or through contact with the skin.

The Field Group found high exposures during in-home bathtub refinishing. Even with extra ventilation, the air concentration remained high, said Industrial Hygienist Mary Ellen Flanagan. An alternative stripper without methylene chloride, used in the aircraft industry, gave equivalent results. "It took longer to work, but the company was happy to adjust their methods to use a less toxic product," she said.

Flanagan has also been working with the construction industry and its trade unions on an education campaign about silica dust exposure.



Venetia Rummion

Welders who work on stainless steel fall under the new hexavalent chromium standard

Bleed air from the engine housing can enter airline passenger cabins, potentially affecting flight attendants

IN THE COMMUNITY

Three papers presented at Semiahmoo (see page 9) address health effects of air pollution.

Victor Van Hee, a senior fellow in Occupational and Environmental Medicine at UW, discussed the association between fine particulate air pollution and congestive heart failure among patients in the National Institutes of Health's (NIH) Multi-Ethnic Study of Atherosclerosis (MESA).

He worked with Professor Joel Kaufman to use information from a noninvasive test to measure left ventricular function. This cardiac magnetic resonance imaging (MRI) is more precise than echocardiography or electrocardiogram (EKG)—and much less invasive than cardiac catheterization—for seeing how well the heart is pumping and detecting subclinical changes in function and mass, he said. In his study, Van Hee found heart weight (which predicts heart failure) is significantly linked to how close people live to a major roadway.

Ryan Allen, a 2004 graduate of our PhD program now teaching at Simon Fraser University, also analyzed data from Kaufman's MESA air study. He looked at CT scans of the abdomens of healthy subjects, and found more calcium deposits in the aorta (a measure of atherosclerosis or hardening of the arteries) among women—but not men—exposed to ambient fine particulate matter from living near high-traffic areas. It is not known whether women are at more risk from pollution, or simply that women stayed at home more, so their residence better predicted exposure—allowing the effect to show up in his research.

Professor Sverre Vedal also studied traffic-related air pollution and mortality, but he used a time series rather than spatial analysis. In a study funded by NIH, called DASH (Denver Aerosol Sources and Health), his team found associations between motor vehicle emissions and health outcomes such as mortality, cardiopulmonary hospitalizations, and asthma in children. He called this an “interesting twist to a time series by focusing on source.”



Association of Flight Attendants

IN AIRPLANES

Airline passengers fear getting sick from other passengers' germs circulating through the ventilation system. However, a more serious threat could come from the outside air introduced to the cabin, Senior Lecturer Steve Hecker told an audience at the Semiahmoo conference in January.

While most of the outside air compressed by the plane's engines is used for thrust, a portion is “bled off” and routed to the air conditioning system to supply air to the cabin. If faulty seals are present, this “bleed air” may become contaminated by constituents of heated engine oils and hydraulic fluids, he said. The frequency of such events, while thought to be rare, is not accurately known.

In his previous position at the University of Oregon Labor Education and Research Center, Hecker was part of a consortium funded by the Federal Aviation Administration (FAA) Office of Aerospace Medicine to study possible links between aircraft air quality and employee health.

The Oregon-led group, the Occupational Health Research Consortium in Aviation, includes researchers and participants from the University of Oregon, the University of California-San Francisco, the University of British Columbia, and the Association of Flight Attendants. The Harvard School of Public Health is also a partner. The final report is expected by the end of 2007.

UW Professor Michael Morgan has a separate role in airplane air quality as a reviewer and project monitor for studies funded by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, and conducted by Battelle.



CONTINUING EDUCATION & EVENTS

To confirm this schedule or find more information about these courses, call 206-543-1069 or visit the Continuing Education website at <http://nwcenter.washington.edu>. Courses are in Seattle unless otherwise noted.

PACIFIC NORTHWEST OSHA EDUCATION CENTER

Not for OSHA rules only! All classes offer training that meets WISHA, OR-OSHA, and Alaska state standards, as appropriate.

- Apr 2-5 OSHA 500: Trainer Course for Construction Industry (*Portland*)
- Apr 3-5 OSHA 2264: Permit-Required Confined Space Entry
- Apr 9-12 OSHA 500: Trainer Course for Construction Industry (*Richland*)
- Apr 9-12 OSHA 6000: Collateral Duty for Other Federal Agencies
- Apr 16-19 OSHA 501: Trainer Course for General Industry (*Portland*)
- Apr 17-19 OSHA 3010: Excavation, Trenching, and Soil Mechanics
- Apr 24-26 OSHA 2225: Respiratory Protection (*Portland*)
- Apr 30-May 3 OSHA 510: Standards for Construction Industry
- May 7-10 OSHA 5600: Disaster Site Worker Train-the-Trainer (*Richland*)
- May 8-11 OSHA 2045: Machinery and Machine Guarding Standards (*Anchorage*)
- May 14-17 OSHA 511: Standards for General Industry
- May 15-17 OSHA 3095: Electrical Standards (*Portland*)
- May 21-24 OSHA 500: Trainer Course for Construction Industry
- May 21-24 OSHA 521: OSHA Guide to Industrial Hygiene (*Portland*)
- Jun 4-7 OSHA 2015: Hazardous Materials
- Jun 5-7 OSHA 2250: Principles of Ergonomics (*Portland*)
- Jun 11-14 OSHA 501: Trainer Course for General Industry
- Jun 12-14 Supervisory Safety & Health Duties (*Boise*)
- Jun 19-21 OSHA 3110: Fall Arrest Systems
- Jun 26-28 OSHA 3010: Excavation, Trenching, and Soil Mechanics (*Portland*)

NORTHWEST CENTER FOR OCCUPATIONAL HEALTH & SAFETY

- Mar 22 Puget Sound Occupational and Environmental Medicine Grand Rounds, *Respiratory and Mental Health Consequences of WTC Exposure*
- Mar 30 Occupational Allergy
- Apr 10 & 11 Ergonomic Quality in Facility Design
- Apr 12 Puget Sound Occupational and Environmental Medicine Grand Rounds, *New Environmental Challenges to Reproductive Health*
- Apr 16 A Small Dose of Toxicology: How Chemicals Affect Your Health (*Anchorage*)
- May 10 Puget Sound Occupational and Environmental Medicine Grand Rounds, *Implementing Safe Patient Lifting Legislation in Washington Hospitals*
- May 15 Current Solutions to Workplace Noise Hazards

PERSPECTIVES IN PUBLIC HEALTH

In 2007, we don't have to worry about yellow fever or smallpox—these dread diseases were wiped out decades ago. We have cleaner air, purer water, safer cars and workplaces. Thanks to public health, we live 30 years, on average, longer than our great-grandparents.

So are we done? Have we solved all the challenges to good health? Come and listen as some of the UW's top public health experts talk about what's out there for our children and our children's children.

Washington Weekend Event

**School of Public Health & Community Medicine
Thursday, April 26, 2007, 6:00 PM, 110 Kane Hall**

Dessert reception to follow in the Walker-Ames Room

To register, go to <https://go.washington.edu/uwaa/events/200704pubhealth/details.tcl>



CONFERENCE PRESENTATIONS

UW/UBC OCCUPATIONAL AND ENVIRONMENTAL HEALTH CONFERENCE SEMAHAMOO, WASHINGTON JAN. 8-9

- Allen R.** Ambient fine particulate matter, traffic, and aortic atherosclerosis
- Butterfield P.** Biofilm's role in capture & persistence of pathogens in drinking water systems
- Hecker S, Van Netten C.** Airplane air quality update
- Johnson P.** Kids, gender and race: Implications for computer input device design
- Meschke S.** Shellfish-associated viral illness and fecal loading in Puget Sound
- Neitzel R.** Retrospective noise exposure assessment incorporating subjective measures
- Ploger J.** Measurement of whole body vibration in King County bus drivers
- Sears J.** Expanding the role of nurse practitioners: Effects on access to care for injured workers
- Sexias N.** Occupational health and safety experience of day laborers in Seattle
- Shin G.** Ultraviolet disinfection in drinking water treatment processes
- Shusterman D.** Nasal NO—A new tool to study nasal patency?
- Takaro T.** The Canadian longitudinal study of asthma and gene-environment interactions
- Van Hee V.** PM air pollution and congestive heart failure
- Vedal S.** Traffic-related air pollution and mortality
- Wickizer T.** Evaluation of a workers' compensation pilot to reduce worker disability & improve outcomes

SOCIETY OF TOXICOLOGY CHARLOTTE, NC, MARCH 25-29

Beibei Cai, a PhD candidate in Zhengui Xia's lab, won an SOT travel award.

- Botta D, McGrath MB, Neff-LaFord HD, Kavanagh TJ.** Upregulation of GCLM expression restores glutathione and protects against APAP-induced liver injury in GCLM null mice
- Corey LM, Baker C, Peck EC, Wilkerson JH, Luchtel DL, Kaufman JD, Kavanagh TJ, Rosenfeld ME.** Plasma cytokine levels are increased in older apolipoprotein E deficient mice following exposure to diesel exhaust
- Faustman EM, Yu X, Griffith B.** The future of genomics in dose response modeling: Useful lessons from systems based approaches

- Garry MR, Deeb SS, Kavanagh TJ, Yu X, Vredevoogd MA, Kim E, Faustman EM.** Differential modulation of stress signaling pathways by cadmium in cultured mouse lung fibroblasts heterozygous for GPx4
- Gilbert SG.** Beyond risk assessment—incorporating our values and ethics in precautionary assessment
- Gilbert SG.** Tips for keeping your cool in a K-12 class: Dos, Don'ts, and Tools
- Gilbert SG, Sette WF, Scarano L, Fortmann R, Mortensen SR.** Scientific and ethical considerations in human exposure studies
- Gilbert SG, Taves DR, Doull J.** Fluoridation: Science meets policy: An historical perspective
- Giordano G, Klintworth HM, Kavanagh TJ, Costa LG.** Apoptosis induced by low concentrations of domoic acid is mediated by the p38 and JNK MAP kinase pathways in mouse cerebellar granule neurons
- Griffith WC, DeFrank NM, Gohlke JM, Faustman EM.** Value of information approach for development of models of the developing neocortex after exposure to low dose radiation from internally deposited radionuclides
- Hayes A, **Gilbert SG.** Toxipedia—connecting science and people
- Hughes CA, **Gilbert SG,** Meischke HW, Litzler E. Perceived risks and hazards of nanotechnology
- Li T, Simmonds L, Woods JS.** Cloning, expression and biochemical properties of CPOX4, a genetic variant of coproporphyrinogen oxidase that modifies the effect of mercury exposure on porphyrin excretion in humans
- Poulton E, Eaton DL, Zhou C, Thummel KE, Bammler TK.** The isothiocyanate moiety is required for sulforaphane (SFN)-mediated inhibition of ligand activation of the human Steroid and Xenobiotic Receptor (SXR)
- Robinson JF, Yu X, Hong S, Kim E, Griffith WC, Faustman EM.** Examination of metal induced toxicogenomic response during neurulation in resistant mouse strains
- Vitalone A, **Giordano G, Fattori V, Costa LG.** Neurotoxicity of methyl mercury and PCBs: an in vitro approach
- Vredevoogd M, Yu X, Griffith B, Faustman EM.** Quantification of genomic data: Value-added assessment and applicability to toxicologically significant endpoints
- Wu H, McBride TJ, Isanhart JP, **Kavanagh TJ,** Hooper MJ. Gamma-glutamylcysteine synthetase optimization and use in wildlife chemical effects assessments
- Yu X, Hong S, Kim E, Faustman EM.** Characterization of male reproductive toxicants in an in vitro 3-D Sertoli cell/gonocyte co-cultures



PEOPLE & PLACES



Carrie Sadovnik



Phillip Buff



James Meadows

Recent alumni placements include **Chris Ballew** (MS, 2006) working at The Boeing Co. and **Elizabeth Hom** (MPH, 2006) with the California Department of Environmental Health.

Roosevelt building receptionist **Phillip Buff** received the King County Combined Fund Drive sustained excellence award for his work on this year's charity drive.

Senior Lecturer **Janice Camp** is on sabbatical until May, experiencing policymaking directly. She is working with Sen. Patty Murray's staff on the US Senate's Health, Education, Labor, and Pensions committee in Washington, DC.

Chris Carlsten, MD (MPH 2006) had an article accepted by the *Journal of the American Medical Association* as first author, "Potential for genetics to promote public health: Genetics research on smoking suggests caution about expectations," *JAMA* 2006; 296:2480-2482.

Professor **Lucio Costa** gave a lecture on "mechanistic studies in developmental neurotoxicology" at the International Conference on Food Contaminants and Neurodevelopmental Disorders held in Valencia, Spain, in December. Early this year, he served on an EPA review panel of the risk assessment of polybrominated diphenyl ethers (PBDE).

Professor **Richard Fenske** had an editorial opinion piece published in the Feb. 2 issue of the *Seattle Post-Intelligencer* titled "Misuse of science serves no one."

Xuemei Geng, a graduate student working with Professor Mike Rosenfeld, received a pre-doctoral fellowship from the American Heart Association that will partially support her for the next two years. Geng is in the interdisciplinary graduate program in Nutritional Sciences.

Lecturer **Rick Gleason** was keynote speaker for Tri State Construction's annual New Year Safety Day and spoke at the NIEHS trainers' workshop

in Las Vegas. His topic was "using humor and case histories in effective training."

Karen Hanson is the new assistant to the chair, replacing **Stephanie Timm**. Hanson comes from the UW School of Public Health and Community Medicine's development team. **Cynthia Curl** (MS, 2000) is the new manager of the MESA Air Pollution project, replacing **Sue Swan**. **Monica Leibrant** from Electrical Engineering replaced **Amy Bomberger** as graduate program coordinator. **Ruth Woods**, manager of the Institute for Risk Assessment and Risk Communication, left to become administrator for the UW Department of Bioengineering.

Assistant Professor **Peter Johnson** and the Industrial Hygiene program received a \$25,000 gift from Microsoft. Johnson and the ergonomics center worked with Microsoft to develop its next generation ergonomic computer mouse, the Microsoft Natural Wireless Mouse 6000, released this January. The gift supports Johnson's research into how workers use computer input devices and helps promote safe and healthful computing work environments. Johnson also attended the NIOSH Educational Research Centers meeting in Charleston, SC, in February.

Sham Juratli, MD (MPH, 2005) had an article published in the November 2006 issue of *Spine* titled "Lumbar fusion outcomes in Washington State Workers' Compensation."

Heather Klintworth (MS, 2005) was accepted on the Environmental Pathology/Toxicology Training Program grant in January. Heather is a PhD candidate. Her training grant is expected to last for five years.

James Meadows, undergraduate program manager, is working with the Seattle Biotech Legacy Foundation to fund an internship with Public Health-Seattle & King County. He is working with the health department on other internship opportunities for undergraduates.

In February, **Rick Neitzel**, research scientist/graduate student, spoke at the annual conference of the National Hearing Conservation Association in Savannah, Georgia, on noise exposure measurement. In March, he led training on hearing loss prevention for the Western Washington Association of General Contractors in Bellingham.

The **Pacific Northwest Agricultural Safety and Health Center** (PNASH) presented a health fair at the Washington Governor's Ag Safety Day in Yakima on Feb. 22. PNASH was joined by partners Columbia Valley Clinic and Yakima Valley Dermatology. The fair included demonstrations of the fluorescent tracer technique for viewing pesticide exposure, a knowledge game about heat stress, and screening exams for blood sugar, blood pressure, and skin cancer.

Carrie (Carrel) Sadovnik (MS, 1996) is the new director of employee health and safety for the New York City Department of Health and Mental Hygiene. She oversees occupational health and safety for about 6000 employees engaged in emergency preparedness day-to-day operations. Carrie worked with the Field Group before moving to New York.

Brian Toal (MPH, 1981) co-authored a book, *What's Toxic, What's Not* (Berkley Books, 2006), a common-sense guide to the confusing world of toxic information for the general public. Toal is supervisor of the Environmental and Occupational Health Assessment Program at the Connecticut Department of Public Health.

Senior Lecturer **Chuck Treser** gave presentations at two conferences in Dublin last June about environmental health workforce needs, the Environmental Public Health Leadership Institute, and the relationship between land use and health. Treser is one of 30 academics who are writing the new certification examination for graduating students from public health schools. He also attended the Washington State Joint Conference, the statewide Environmental Health Directors meeting, the Environmental Public

Health Leadership Institute, and the American Public Health Association meeting, where he chaired the Education Board and co-chaired the APHA Joint Policy Committee.

Professor **Mike Yost** is sponsoring a Mary Gates Scholar, Sarah Widder, a junior in Chemical Engineering. Sarah is studying air pollution from indoor cooking sources in rural China and is spending this year there studying and collecting air samples.

Joseph (Jay) Smith, John Kissel, and Jeff Shirai presented a paper on "Balancing input and output of chlorpyrifos and TCPy in the CTEPP children" at the Society of Risk Analysis conference in Baltimore in December. At the same conference, **Scott Meschke, Nancy Beck, Kissel, Shirai, and Smith** presented a paper on "Assessment of norovirus exposure from consumption of Puget Sound shellfish impacted by large vessel wastewater discharges."

FURTHER READING, FROM PAGE 5

- Clarke M, Paulsen M, Canuz E, Smith KR, and Simpson CD. Urinary methoxyphenol biomarkers and wood smoke exposure: Comparisons in rural Guatemala with personal CO and kitchen CO, levoglucosan, and PM_{2.5}. *Environ Sci Technol* (2007) in press
- Dills RL, Paulsen M, Ahmad J, Kalman DA, Elias FN, Simpson CD. Evaluation of urinary methoxyphenols as biomarkers of wood smoke exposure (2006). *Environ Sci Technol* 40(7):2163-2170.
- Larson T, Gould T, Simpson CD, Claiborn C, Lewtas J, Wallace L, Liu LJS. Source apportionment of indoor, outdoor and personal PM_{2.5} in Seattle, WA using positive matrix factorization (2004). *J Air Waste Manage Assoc* 54:1175-1187.
- Simpson CD, Paulsen M, Dills RL, Liu LJS, Kalman DA. Determination of methoxyphenols in ambient atmospheric particulate: Tracers for wood combustion (2005). *Environ Sci Technol* 39(2):631-637.

STUDENT RESEARCH DAY

Each spring for more than 20 years, the Department of Environmental and Occupational Health Sciences has hosted Student Research Day, an event celebrating the research of graduating master's students.

This year's event will take place on Thursday, May 24, and will include projects representing all of our academic program areas.

This is an opportunity to see some exciting research projects, learn more about activities within the department, recruit new employees, or make contact with faculty.

The seminar will be from 12:30 to 1:20 and the poster session from 1:30 to 3:00 pm in Room 316 of the South Campus Center. Refreshments will be served and there will be ample opportunity to meet students and discuss their work.

Please join us for Student Research Day and pass this information on to your colleagues. If you have any questions, please call the graduate program office at 206-543-3199 or e-mail ehgrad@u.washington.edu.

You can view last year's research at <http://depts.washington.edu/envhlth/news/researchday06.html>

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