

ABOUT US

Field Research and Consultation Group

The Field Research and Consultation Group (Field Group) is part of the University of Washington's Department of Environmental and Occupational Health Sciences (DEOHS) in the School of Public Health.

Our mission is to:

- Provide occupational health and safety consultation services to businesses and labor groups in Washington state to help reduce injuries and illnesses.
- Conduct worksite-based research projects that characterize hazards and identify practical control opportunities.
- Support DEOHS graduate and undergraduate students in developing their technical expertise and research skills.
- Promote the recognition and control of safety and health hazards by employers, workers, and professionals through teaching and publications.

OUR STAFF

Marty Cohen, ScD, CIH, CSP, *Director (current)*

Janice Camp, MSPH, CIH, COHN-S, *Director (1996–2012)*

Gerry Croteau, MS, CIH, *Research Industrial Hygienist*

Allison Crollard, MS, *Research Industrial Hygienist*

Don Lofgren, MPH, CIH, *Research Industrial Hygienist*

Nancy Simcox, MS, *Research Industrial Hygienist (2011–2012)*

Marc Beaudreau, BS, *Research Coordinator*

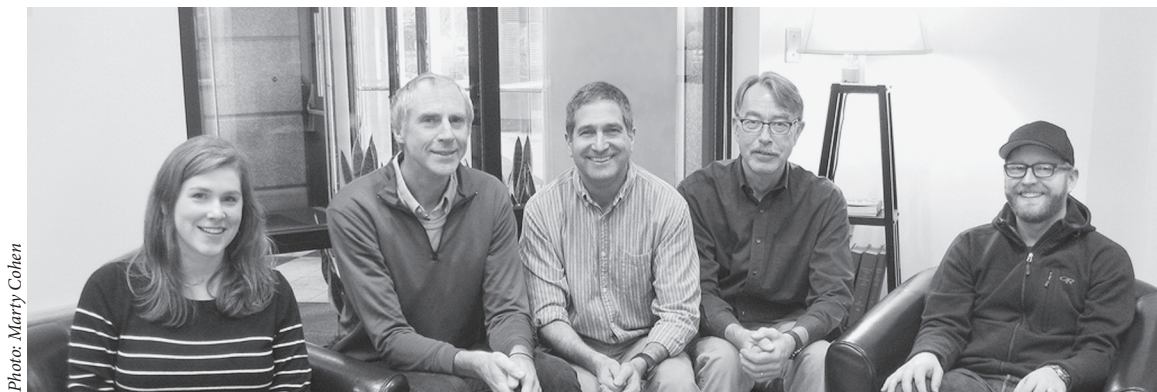


Photo: Marty Cohen

l to r: Allison Crollard, Gerry Croteau, Marty Cohen, Don Lofgren, Marc Beaudreau

EXECUTIVE SUMMARY

JULY 1, 2011–JUNE 30, 2013

The activities of the Field Research and Consultation Group (Field Group) are tangible examples of the Department of Environmental and Occupational Health Sciences' (DEOHS) commitment to its state service responsibilities. The Field Group's primary tasks are to provide high-quality occupational health and safety consultations and to conduct field-based research, particularly in exposure control interventions. We also use our expertise and access to worksites to provide quality, hands-on learning experiences and research opportunities for DEOHS students. Our primary activities during the 2011–2013 biennium included service consultations, research projects, and a variety of teaching activities.

Service Consultations

The Field Group provides occupational health and safety consultations to worksites with potential problems that have been identified by company or labor representatives, regulatory agencies, or researchers. Our intent is to work with companies that have limited resources, present new or emerging health and safety problems, or can provide opportunities for teaching, research, or student experiences. We performed more than 116 consultations comprising 189 site visits during the biennium. Among our clients were manufacturers, construction companies, material and resource recyclers, and museums.

Research & Other Projects

The Field Group conducts pilot projects that originate from faculty, staff, or student research interests, often arising from health and safety concerns identified from work with Washington state employers and employees at their workplaces. Pilot projects may lead to larger research questions and further development of assessment methodology or may serve as a platform for seeking extramural funding. We work with faculty and students interested in field-based research by helping with research design, facilitating workplace access and data collection, and assisting with data analysis and interpretation. Our research focuses on the evaluation of exposure controls and prevention strategies.

During the biennium, we participated in seven new exposure control and prevention projects, which included conducting a survey for methicillin-resistant *Staphylococcus aureus* (MRSA) in fire stations, developing a video showing the importance of wearing a properly fit-tested respirator, and helping evaluate factors that make for an effective health and safety committee.

Teaching, Presentations, Internships, & Publications

The Field Group supports continuing education and student classroom teaching and provides opportunities for graduate and undergraduate student field experiences. During the biennium, we helped teach six departmental courses: ENVH 111: Exploring Environmental Health Connections; ENVH 559: Applied Occupational Health and Safety; ENVH 564: Recognition of Hazards in Industry; ENVH 584: Occupational and Environmental Health: Policy and Politics; and ENVH 580: Environmental Health Seminar. We also contributed to numerous other DEOHS courses as guest lecturers. In addition, we coordinated the DEOHS Graduate Student Internship Program. In the 2011–2013 biennium, 25 students were placed with 15 different companies or agencies. We also published papers in professional journals and made presentations at a number of symposiums, conferences, association meetings, and continuing education courses.

SERVICE CONSULTATIONS

JULY 1, 2011–JUNE 30, 2013

In this section, we briefly describe service consultations conducted during the 2011–2013 biennium.



Photo: Alison Crollard

Electronics recycling: disassembling desktop computers

A primary component of the Field Group’s mission is to serve the health and safety needs of Washington workplaces. Company management or health and safety leadership initiates a written service request, which results in worksite evaluations and exposure assessment by our team members. Our staff assesses a variety of workplace hazards, such as noise, dust, and chemical exposures. These efforts are supported by laboratory analyses conducted by our department’s AIHA-accredited Environmental Health Laboratory. We also evaluate ventilation systems and company health and safety programs, such as respiratory protection and hearing loss prevention programs.

Listed in Table 1 below are the industry sectors (classified by their North American Industrial Classification System [NAICS] codes) that received our services, the number of workers assessed, and the corresponding number of site visits during the 2011–2013 biennium.

The manufacturing sector comprises the largest segment of our consultations. Figure 1 gives a breakdown of the types of companies within the manufacturing sector that we consulted for during the biennium. Figure 2 shows the wide variety of exposures that have been investigated in all industry sectors in the same period.

In addition to on-site exposure assessment and safety evaluations, we also assist companies in developing or evaluating exposure control methods. This may include helping companies reduce noise exposures through the use of barriers or enclosures and reduce solvent or dust exposures through the use of local exhaust ventilation. We make every effort to work with companies to reduce or eliminate workplace exposures.

Table 1. CONSULTATION VISITS BY INDUSTRY SECTOR 2011–2013

INDUSTRY SECTOR (NAICS)	# OF WORKERS ASSESSED	# OF SITES VISITED
Agriculture, Forestry, Fishing and Hunting	8	2
Utilities	2	1
Construction	51	17
Manufacturing	456	63
Wholesale Trade	94	7
Retail Trade	0	1
Transportation and Warehousing	5	3
Professional, Scientific, and Technical Services	6	2
Administration and Support and Waste Management and Remediation Services	19	6
Educational Services	14	3
Health Care and Social Assistance	0	1
Arts, Entertainment, and Recreation	5	4
Other Services (except Public Administration)	11	4
Public Administration	0	2

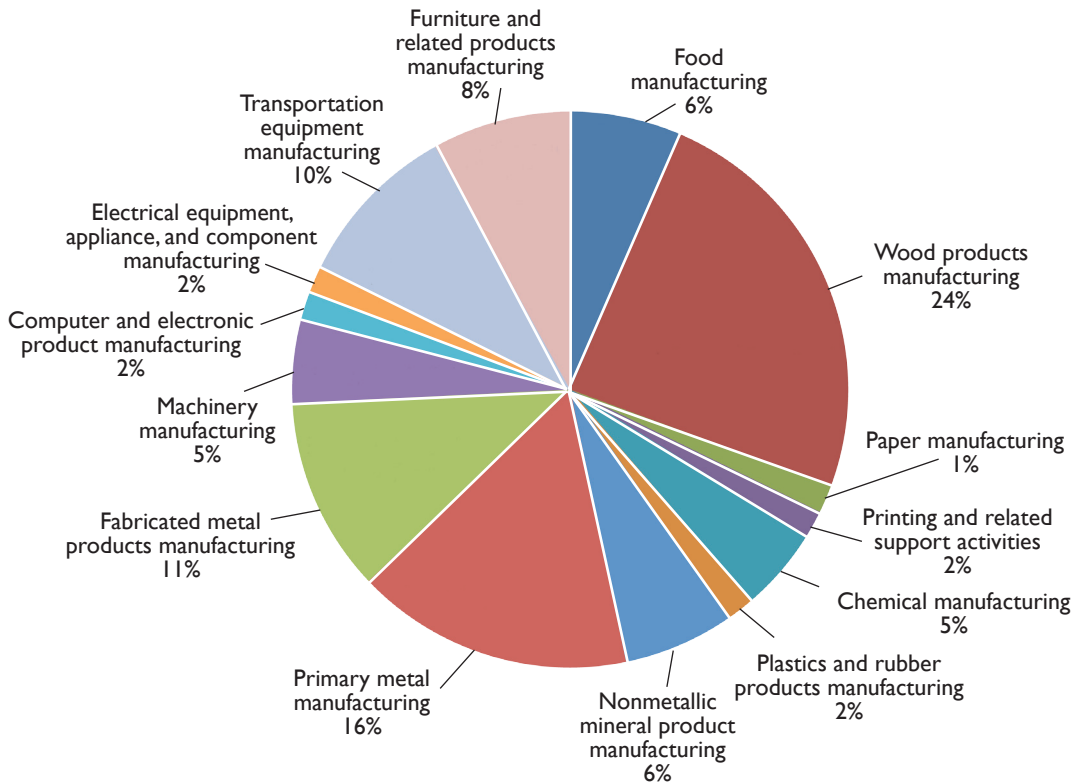


Figure 1. MANUFACTURING SECTOR INVESTIGATIONS, 2011–2013 BIENNIUM

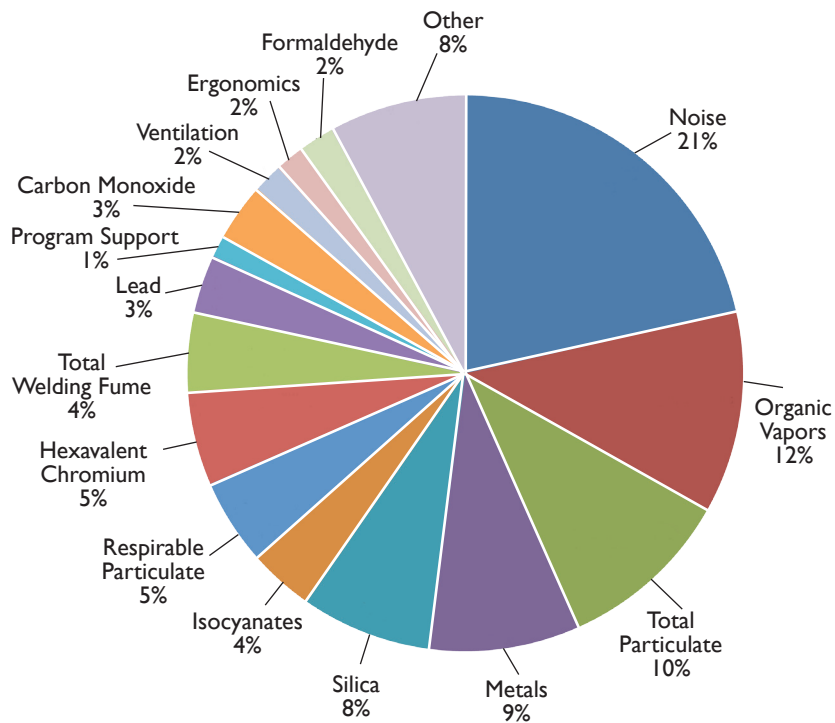


Figure 2. EXPOSURES INVESTIGATED IN ALL SECTORS, 2011–2013 BIENNIUM

INTERVIEW WITH THE FIELD GROUP DIRECTOR

To give a sense of how a typical consultation may proceed, we interviewed the new Director of the Field Group, Marty Cohen.

Can you describe a typical Field Group health and safety consultation?

MC: Sure. Usually, we get a call or an email from a company representative, often someone from human resources or an administrator. They get in touch with us to do an evaluation of their workers' exposure to specific hazardous agents, such as noise, solvents, dusts, gases, or physical hazards during a specific process or work task. We ask questions about their company, what they do, and how they do it. This helps us to determine what we should do to help them in the best way possible. Frequently, we recognize the potential for other exposures and suggest that we also evaluate those hazards.

If there are chemicals involved, we ask for material safety data sheets so we can work with our department's Environmental Health Laboratory to ensure that we have good methods to sample and analyze for the chemicals of concern. Next, we notify the company representative that an industrial hygienist will be calling to get more details and schedule a site visit.

You've set the stage for the evaluation. What happens next?

MC: Now comes the fun stuff. First, the industrial hygienist gets in touch with the company. If he or she has never been to a company in that industry sector before, research is done to better understand the processes and potential exposures. The cool thing about our field is that we're always challenged to learn more. We have a group of well-trained and experienced industrial hygienists, but we don't know everything about all industrial processes. We enjoy this learning and application of the knowledge... Sorry to get off on a tangent here. Anyway, after contacting the company and our lab, we visit the worksite and do our assessment. That work is incredibly varied—air or surface monitoring for contaminants, program evaluation, ergonomic evaluations, worksite hazard assessments, you name it.

Marty Cohen



Photo: Mary Levin

OK. Without going into too much detail (our space here is limited), please tell us what happens after you do an evaluation?

MC: First, we evaluate the data that have been collected, either by downloading from a piece of monitoring equipment, getting results back from our lab, or reviewing our observations. If there's something that should be addressed quickly, we give our company contact a call to notify him or her about what we found. Next, we work on a written report, which generally includes a summary, background, methods, results, and recommendations. We then send the completed written report to the company.

Do the workers get informed of their individual exposure test results?

MC: Yes, of course. We write "Result Letters" to the employees who were monitored with their specific results.

What next? Are you done then?

MC: That's a good question. We generally follow-up the written report with a phone call to see if the representative has questions. If we make recommendations for exposure controls, we also offer to help the employer develop or evaluate these controls. Again, this is the fun part—where companies are making changes.

Thank you for this information. It sounds like you do great work in the state and truly enjoy what you do.

MC: Thank you. Our efforts are geared to helping companies in Washington state reduce or eliminate workplace exposures and hazards. And, we do enjoy our work.

SERVING WASHINGTON STATE

Below is a map (Figure 3) of the counties in which we conducted site visits and consultations during the 2011–2013 biennium, representing industries in both urban and rural areas.

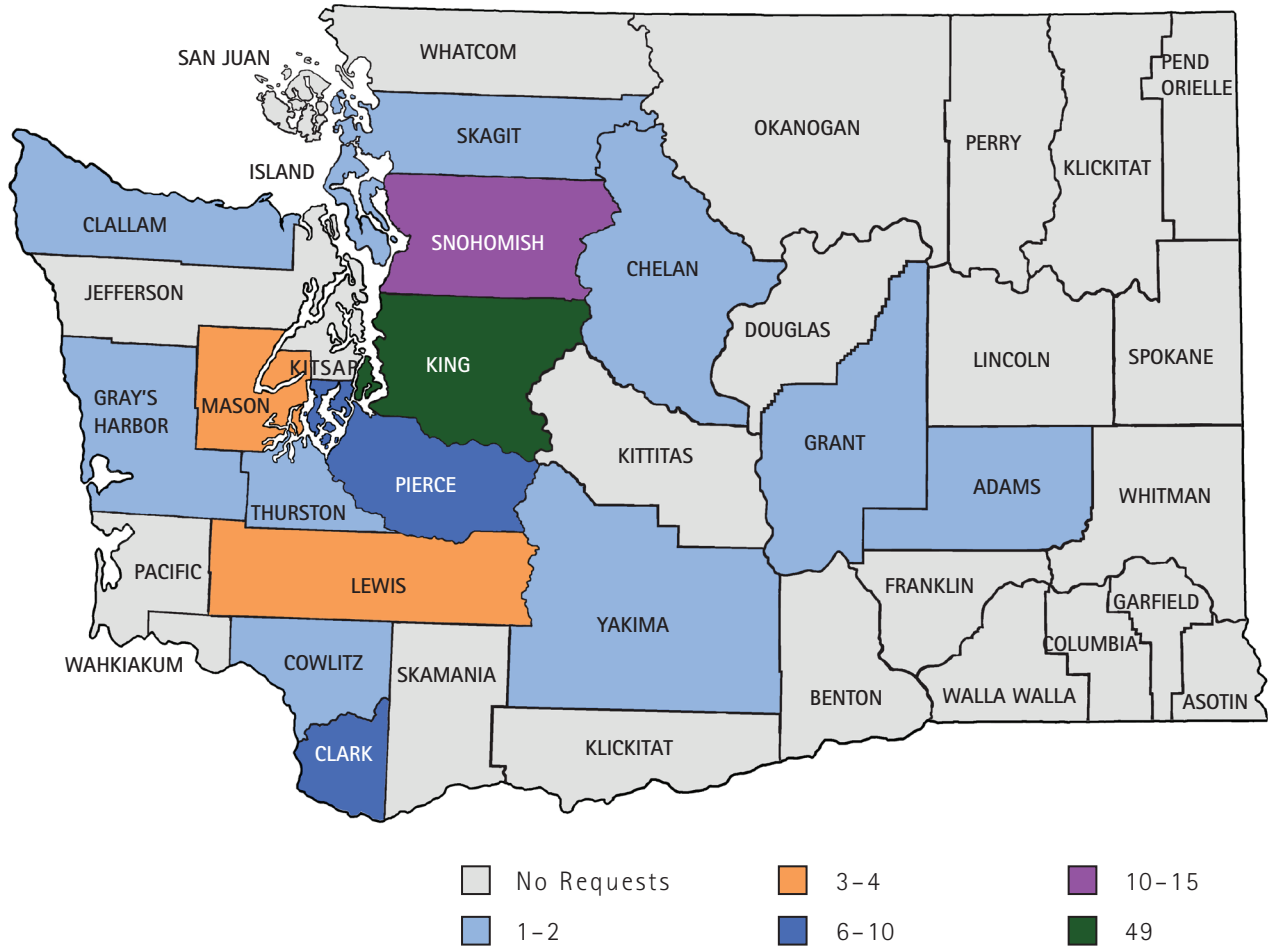


Figure 3. NUMBER OF FIELD GROUP CONSULTATIONS BY COUNTY, 2011–2013 BIENNIUM

CONSULTATION HIGHLIGHTS

New technologies, new occupational health challenges

Along with industry innovations come changing work processes and subsequent potential health hazards. Sometimes these are emerging hazards for which there is still a growing understanding of exposure determinants and health effects, while other times the hazards are familiar, but come from unfamiliar processes. The Field Group has helped a variety of companies evaluate and control worker exposures, including carbon nanotube exposures during a printing process; hazardous gas and noise exposures in fiber manufacturing; and dust, noise, and chemical exposures at a facility manufacturing materials for the solar industry.

Helping to build our infrastructure

A number of large infrastructure construction projects have recently been undertaken in our region. At these sites, different construction trades may work directly next to each other with relatively hazardous materials such as silica, solvents, and isocyanates. The Field Group has helped many of these subcontractors evaluate not only their workers' exposures, but those of the nearby workers as well.

Working the supply chain

On occasion, our consultations take us on a voyage through an industry supply chain—our work in the ship-building industry is a recent example. The common theme of these consultations has been hotwork-related hexavalent chromium exposures. Our work with the

foundries that cast the parts; the fabrication companies that finish the parts, such as ship propellers; and the ship builders that make the finished vessel has provided opportunistic synergies that allow us to apply engineering controls across the supply chain. To round out this work, we completed a project addressing safety issues for Dungeness crab fishermen!

Making the most of our resources

Washington state is home to dynamic recycling industries, which range from metals and electronic waste recycling to wastewater treatment and reclamation. The process of reclaiming valuable materials from used goods and resources can result in exposure to a variety of potentially hazardous components and byproducts, including metal fumes, dust, flame retardants, a range of chemicals, organic solvents, biological hazards, and noise. The Field Group has worked with recycling industry employers to assess and reduce employee exposures to these types of hazards while continuing the important work of maximizing the reuse of materials and resources.

Something smells good here!

Our consultations are a veritable buffet of Washington industries, and nothing compares to working at a food processing facility. Chocolate, trail mix, potato chips, seasonings, fruit (cherries, apples, pears), and fish are a sampling of the food industries where we have consulted. As might be expected, airborne exposures are typically not an issue in these relatively clean industries and most work focused on noise and ergonomic issues.



Photos, l to r: Marty Cohen, Don Lofgren, Don Lofgren

l to r: Lumber awaiting shipment, Mixing hazardous waste, Light-rail transit tunnel

RESEARCH & OTHER PROJECTS

JULY 1, 2011–JUNE 30, 2013

In this section, we briefly describe research projects conducted during the 2011–2013 biennium.



Photo: Gerry Croteau

Furniture refinishing: stripping furniture

The Field Group projects provide an opportunity for our staff to explore industry-wide workplace exposure and control issues in more depth. We often work closely with graduate students on these projects.

MRSA in Fire Stations

In collaboration with a departmental faculty member, the Field Group initiated a project to collect environmental surface samples for methicillin-resistant *Staphylococcus aureus* (MRSA) in Washington state fire stations. The goal was to better understand the presence and distribution of MRSA and to help reduce exposure risk factors.

Thirty-three fire stations with non-volunteer staff participated in this study. Fire station personnel collected 653 samples. Eight percent of the field samples were positive for MRSA, and 19 of 33 stations had at least one positive MRSA sample. Sixty-two percent of the positive MRSA samples were collected from the living quarters. Stations were classified into two groups according to the presence or absence of MRSA. In general, policies,

practices, and cleaning and disinfecting items did not differ significantly between the two groups. Many factors appear to contribute to the presence of MRSA on a surface. Each fire station was given the results of its sampling, educational materials on how to maintain a clean zone in the fire station, and a fact sheet consisting of tools for improving their infection control program. To help fire stations maintain clean zones, the Field Group developed a booklet, *Prevent MRSA*, which is available at the Field Group website: <http://depts.washington.edu/frcg/MRSA.html>.

Healthcare Respirator Training Video

Healthcare workers can be exposed to serious infectious agents in the course of their work. Often, dust mask-type respirators can be an effective method to prevent exposure but only if used properly. They need to be fit-tested for correct size and model. In addition, they can only be used properly without the presence of facial hair because the hair interferes with the seal. The Field Group produced

a video for healthcare workers showing the importance of fit-testing and proper donning of N95 respirators. We worked with personnel from Seattle Children's Hospital, the University of Minnesota, and the 3M Company to develop the video. The video is available online for streaming and down-loading and is also available as a DVD. The work was funded by the Washington State Medical Aid and Accident Funds. Download from: <http://depts.washington.edu/frcg/N95FitTestVideo>

Reducing noise exposure

Reducing occupational noise exposure through engineered controls is a challenging task as there are many different approaches that can be taken for each given situation. Consequently, the seemingly appropriate application of a specific noise control often at considerable expense to the company could provide a negligible reduction in worker exposure. The development of simple models for estimating the efficacy of specific engineered noise controls is essential for identifying the best approach. Furthermore, companies may be more willing to implement an engineered control strategy given some assurance of the anticipated success. The primary objective of this project is to develop a predictive model for estimating the level of noise control that might be achieved in a specific industrial setting. *Project in progress.*

Lead contamination

In lead-using industries, lead deposited on surfaces can contaminate clothing and parts of the body. Some of this lead can be ingested through hand-to-mouth contact. Moreover, the lead can be carried home where family

members, including children, are exposed. Assessment of this exposure hazard entails wiping a surface with a special paper-based wipe material, followed by lab analysis. The sample provides an indication of the mass of lead deposited per unit area of surface. Field Group staff are currently assessing the use of portable x-ray fluorescence (XRF) as a faster (instantaneous) and less expensive method for assessing surface contamination. They are collecting and comparing XRF and surface wipe samples from industries where lead is used, including manufacturing facilities, indoor firing ranges, and sawmills. The Field Group is working closely with the department's Environmental Health Lab in conducting this work. *Project in progress.*

Health & safety committees

Health and safety committees are often heralded as a key element of successful health and safety programs and are thought to be an important mechanism for engaging workers in health and safety efforts. However, there is still much to be understood about what makes committees successful. Departmental researchers and a Field Group staff member conducted an intervention study to better understand the effectiveness of health and safety committees and how to improve their success. Health and safety committees in six small metals businesses in Washington state received training about how to make their committees effective. Training topics included: the roles and responsibilities of the committee and its members, how to improve communication and collaboration between the workforce and management, and potential activities to help identify and address worksite hazards.



Photos, l to r: Don Lofgren, Allison Crollard, Don Lofgren

l to r: Welding with local exhaust ventilation, Stacks of new pallets, Working in a tunnel

TEACHING, PRESENTATIONS, INTERNSHIPS & PUBLICATIONS

JULY 1, 2011–JUNE 30, 2013

In this section, we describe the DEOHS undergraduate and graduate courses that members of the Field Group participated in, presentations they made, student internships they arranged, and publications they produced during the 2011–2013 biennium.



Photo: Marry Cohen

Air monitoring: student collects air samples at a firing range

PRIMARY TEACHING RESPONSIBILITY

ENVH 111: Exploring Environmental & Health Connections

This undergraduate class is an introduction to environmental health concepts. Students examine current events to illustrate and better appreciate the relationship between environment and health and to explore whether an environmental condition is or is not an important threat to health. The class emphasizes the roles of environmental scientists and related professionals. *(Janice Camp, 2011)*

ENVH 564: Recognition of Health and Safety Problems in Industry

Students develop skills in occupational health and safety hazard recognition in a variety of important Northwest industries. The class focuses on understanding processes and hazard recognition skills during walk-through inspections of several local facilities, stressing a multi-disciplinary approach. *(Janice Camp and Marty Cohen)*

ENVH 580: Environmental and Occupational Health Sciences Seminar

This seminar series for students, staff, and faculty highlights the rich diversity of our department's research and activities and is an opportunity to hear from local, national, and internationally known scientists, practitioners, and policymakers on issues of current scientific importance. *(Janice Camp)*

ENVH 584: Occupational and Environmental Health: Policy and Politics

This class provides an understanding of the policy process and policy issues in occupational and environmental health and safety, including exploring the relationships between science, values, and politics in the process of setting public policy. *(Janice Camp)*

ENVH 595: Research Rotation

Research laboratory rotation with a pre-doctoral graduate student to evaluate dust control methods for sanding lead-based paint. *(Marty Cohen)*

ENVH 600: Independent Study

Master's student independent study project to evaluate dust and noise exposures at a worksite. *(Marty Cohen)*

GUEST LECTURER and CONTINUING EDUCATION

ENVH 111: Exploring Environmental and Health Connections; Occupational Health and Safety; *(Marty Cohen)*

ENVH 311: Introduction to Environmental Health; Noise and Hearing Loss Prevention *(Marty Cohen)*

ENVH 511: Environmental and Occupational Health; Occupational Health and Safety *(Marty Cohen)*

ENVH 551: Principles of Human Exposure Science; Noise: Basic Concepts *(Marty Cohen)*

ENVH 554: Biological Monitoring for Chemical Exposures *(Janice Camp)*

ENVH 557: Exposure Controls; Hood Entry and Design, Industrial Ventilation Lab, and Dilution Ventilation *(Gerry Croteau and Marty Cohen)*

4th grade class presentation and lab exercise: What is Noise *(Marty Cohen)*

PACIFIC NORTHWEST OSHA EDUCATION CENTER

Members of the Field Group participate in courses provided by the Pacific Northwest OSHA Education Center at the University of Washington, including the following:

Continuing Education Class: Your Weld as Your Signature, Advances in Research and Practice to Lay It Down Safely; LEV, VEM & HexChEC: How can these acronyms help welders? *(Marty Cohen)*

Continuing Education Class; OSHA 521 Guide to Industrial Hygiene; Air sampling, Toxicology, Direct reading instrumentation, Engineering controls, Ergonomics, and Noise *(Marc Beaudreau, Marty Cohen, Allison Crollard, Gerry Croteau, and Nancy Simcox)*

PRESENTATIONS

2011

October 31

Using video exposure monitoring to show what works and what doesn't

Marty Cohen

American Public Health Association (APHA) Annual Meeting & Exposition, Washington, DC

Engineering controls for reducing wood dust exposures during sanding

Gerry Croteau

American Public Health Association (APHA) Annual Meeting & Exposition, Washington, DC

November 18

Oregon crab fishing safety evaluation

Gerry Croteau

Pacific Marine Expo, Seattle, WA

2012

February 15

Winery health and safety

Janice Camp

Washington Association of Wine Grape Growers

May 1

Organizing symposium: "Is there still industrial in industrial hygiene?"

Marty Cohen

Pacific Northwest Section-American Industrial Hygiene Association (AIHA), Lacey, WA

May 16

Ventilation systems

Marty Cohen

Division of Occupational Safety and Health Washington State Department of Labor & Industries, Wenatchee, WA

June 20

Emission factors and exposures from ground level pyrotechnics

Gerry Croteau

AIHce, Indianapolis, IN

Reducing airborne exposures and community nuisance odors at a foundry

Gerry Croteau

AIHce, Indianapolis, IN

October 11

Oregon crab fishing safety evaluation

Gerry Croteau

Northwest Occupational Health Conference, Bellingham, WA

Emission factors and exposures from ground level pyrotechnics

Gerry Croteau

Northwest Occupational Health Conference, Bellingham, WA

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Photo: Marty Cohen



Fruit production: sorting cherries

2012 *continued*

Environmental sampling for methicillin resistant Staphylococcus aureus (MRSA) in Washington fire stations

Nancy Simcox

Northwest Occupational Health Conference,
Bellingham, WA

November 27

Use of ventilation fans for reducing worker airborne dust exposures at a steel foundry in HaDong, Vietnam

Gerry Croteau

4th International Conference on Occupational and Environmental Health, HaNoi, Vietnam

2013

May 21

Reducing occupational lead exposures in industries where lead is used

Gerry Croteau

Northwest Center for Public Health Practice,
Hot Topics Webinar Series

May 22

The use of video exposure monitoring in a training video to motivate fit-testing and the appropriate use of health-care N95 respirators

Marty Cohen

AIHce, Montreal, Canada

Oregon crab fishing safety evaluation

Gerry Croteau

AIHce, Montreal, Canada



Photo: Marty Cohen

General construction: painting railing in parking garage

UNDERGRADUATE & GRADUATE STUDENT INTERNSHIPS

The DEOHS Exposure Sciences program encourages students to take advantage of full-time internships during the summer after the first year of graduate study. Through internships, students receive invaluable “real-world” experience, which builds on their academic preparation and provides them opportunities to learn from more experienced and practicing health and safety professionals.

Students work with Janice Camp, the DEOHS industrial hygiene internship coordinator, to select internship sites throughout the Puget Sound region and elsewhere based on their long-term career goals and skill development needs. The Field Group uses its professional contacts in industry and government to identify internship opportunities.

Student interns and their site mentors are queried at the end of the internship experience. Universally, students report that the experience is an invaluable addition to their academic training, and site mentors state that interns are well prepared for their duties, and that they look forward to providing future internships.

Student placements for the summers of 2011–2013 are listed at right.

STUDENT	SITE
2011	
Allison Crollard	The Boeing Company
Christa Younkins	SHARP (Safety and Health Assessment & Research for Prevention)/Washington State Department of Labor & Industries (L&I)
Cody Cullison	King County Hazardous Waste
Jeff Walls	Intel Corporation
Jessie Taylor	Intel Corporation
Jonathan Ebert	The Boeing Company
Michelle Eisen	Harborview Medical Center
Nick Clark	King County Environmental Health & Safety
Nicole Van Abel	Environmental Protection Agency, Region X
Shonneesy Gilmore	Seattle Biomedical Research Institute
Will Bond*	Amazon
Jessie Billingham	Snohomish County
2012	
Lyndsey Banks	L&I, Seattle
Lea Duffin	The Boeing Company
Andrew Forbes	Intel Corporation
Steve Jeka	Abbott Labs
Abigail Sutphen	The Boeing Company
Amy Leang	Snohomish County
Lisa Hart	SHARP/L&I
2013	
Veatasha Dorsey	National Institute for Occupational Safety and Health
Sara Lien	UW EH&S
Chris Pyke	L&I, Tacoma
Nazila Shakibaei	L&I, Seattle
Melvin Torres	Washington State Ferries
Kathy Blanks	King County Hazardous Waste

* *undergraduates*

PUBLICATIONS

Allen RW, Adar S, Avol E, Cohen M, Curl C, Larson T, Liu LJS, Sheppard L, Kaufman J. Modeling the residential infiltration of outdoor PM_{2.5} in the Multi-Ethnic Study of Atherosclerosis and Air Pollution (MESA Air). *Env. Health Persp* 2012 120(6):824–30.

Crollard A, de Castro AB, Tsai JHC. Occupational Trajectories and immigrant worker health. *Workplace Health Saf* 2012 60(11): 497–503.

Crollard A, Neitzel RL, Dominguez CF, Seixas NS. Training for an effective health and safety committee in a small business setting. *New Solut* 2013;23(3):485–503.

Kaufman JD, Adar S, Allen R, Barr RG, Budoff M, Burke G, Casillas A, Cohen M, Curl C, Daviglius M, Diez Roux A, Jacobs D, Kronmal R, Larson T, Liu

SLJ, Lumley T, Navas-Acien A, O’Leary D, Rotter J, Sampson P, Sheppard L, Siscovick D, Stein J, Szpiro A, Tracy R. Prospective study of particulate air pollution exposures, subclinical atherosclerosis, and clinical cardiovascular disease: The Multi-Ethnic Study of Atherosclerosis and Air Pollution (MESA Air). *Am J Epidemiol* 2012 176(9): 825–837.

Neitzel RL, Crollard A, Dominguez C, Stover B, Seixas N. A mixed-methods evaluation of health and safety hazards at a scrap metal recycling facility. *Safety Science* 2013 51(1):432–440.

Seixas NS, Crollard A, Neitzel R, Stover B, Dominguez C. Intervening at the bottom: Can a health and safety committee intervention influence management commitment? *Policy and Practice in Health and Safety* 2013 18(1): 61–78.



Photo: FRCG Archives

Wood production: cutting boards