

**OCCUPATIONAL SAFETY AND HEALTH ERC (T42/OH008672),  
UNIVERSITY OF ILLINOIS AT CHICAGO**

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## 1. Abstract

The Illinois Occupational and Environmental Health and Safety Education and Research Center (Illinois ERC) is a recognized leader in the national and international movement to promote healthier and safer workplaces and workers. It is the ambition of the Illinois Occupational and Environmental Health and Safety Education and Research Center (Illinois ERC) to improve, promote, and maintain the health of workers and communities. We do this through innovative and interdisciplinary activities that: 1) Educate graduate students to be professionals and researchers in occupational and environmental health and safety; 2) Prepare professionals to be leaders and practitioners in their disciplines through continuing education; 3) Enhance the expertise of employers, worker organizations, and communities through outreach and technical assistance; and 4) Enrich the knowledge base for solving current and future problems. As educators, researchers, and professionals working to promote occupational safety and health, we believe that everyone has the right to healthy work – a job that pays a living wage, a workplace that is safe, an organization that treats them with respect, and access to qualified occupational safety and health professionals; and our public responsibility and charter requires that we give the highest priority to ensuring healthy work for everyone.

The Illinois ERC is comprised of 12 programs: 5 academic programs (Industrial Hygiene (IH), Occupational Medicine (OM), Occupational Safety (OS), Occupational and Environmental Epidemiology (OEE), and Agricultural Safety and Health (ASH-A)); Continuing Education in core OSH disciplines (CE) and Agricultural Safety and Health (ASH-CE); an Outreach Program; Center Wide Activities including a Center Administrative Core, Diversity Recruitment, and Interdisciplinary Coordination (CWA); and two research training programs: Pilot Projects Research Training program (PPRT) and Targeted Research Training program (TRT).

Illinois ERC program directors, faculty, students and advisory board engaged in a strategic planning process beginning in 2009 and culminating in 2013 with four strategic goals:

1. Increase quality and quantity of graduate applicants
2. Develop an ongoing assessment plan for each program in the ERC
3. Maintain existing community partnerships
4. Improve visibility of the Illinois ERC in our region and nationally

Our training program is responsive to the regional and national need for increased occupational safety training. We assessed the need for the program and evaluated our existing programs by examining the literature, soliciting insight from our ERC Advisory Board and our current students, and surveying our recent graduates. There continue to be far too many workplace injuries and illnesses and an unmet need for professionals to address workplace health and safety issues. The Illinois ERC has a long track record of successfully meeting the OSH needs of our region. Over the past 6 years, we have enrolled an average of 21 NIOSH-funded trainees in our academic programs (45 trainees in the 2012-2013 reporting year), with approximately 14% of trainees being from underrepresented minority groups. In the previous project period (2008-2014), 101 trainees have graduated and nearly all of them work in the OSH field. Our CE program reached more than 25,000 OSH professionals and our faculty and trainee research and outreach continues to enrich the knowledge base in OSH and translate that knowledge to practice.

## **2. Section 1 of the Final Progress Report**

### **A. Significant (Key) Findings**

#### **1. Growth of the ERC**

Over the previous 10 years, the Illinois ERC has experienced significant growth. The ERC has expanded from three academic programs (IH/HSAT, OM, OHN) to six, including programs in all four core OSH areas (IH, OS, OM, OHN, OEE, ASH-A). {Note: the OHN program is not funded by NIOSH.} We have added an highly innovative and very productive Targeted Research Training Program. We have expanded Interdisciplinary Interactions of trainees and we have increased the number of trainees in our academic and continuing education programs.

#### **2. Successful new programs**

In the previous project period, the Illinois ERC introduced two new academic programs. The Occupational Safety (OS) program at the University of Illinois at Chicago (UIC) is administratively housed in the Division of Environmental and Occupational Health Sciences (EOHS) within the School of Public Health, and exists in partnership with the Department of Mechanical and Industrial Engineering (MIE). Established as the newest addition to the Illinois ERC in 2008, the program received official University recognition as a program concentration in early 2010.

Since the beginning of the program, 18 trainees have enrolled (17 with NIOSH support). Nine trainees have graduated, 2 trainees left the program, and five trainees are continuing in the program and are expected to graduate in May 2014. Several trainees received scholarships and 2 trainees received awards for their research presentations. All trainees participate in at least one TRT team. Several OS trainees were also involved in individual faculty research projects. Four trainees made research presentations at national meetings. OS faculty published 66 publications; 19 articles included student authors with 4 OS trainees included as authors.

The Occupational and Environmental Epidemiology (OEE) program at the University of Illinois at Chicago (UIC) is administratively housed in the Division of Epidemiology and Biostatistics (EB) within the School of Public Health (SPH). Faculty for the program are drawn from both the Division of EB, and the Division of Environmental and Occupational Health Sciences (EOHS). Students in the program may either have their primary home in EB or EOHS. This is a relatively new program that was added to the Illinois ERC in 2008. A formal MS and PhD concentration in Occupational and Environmental Epidemiology received official recognition by the Illinois Board of Higher Education on May 28, 2010.

The OEE program has grown substantially since its inception in 2008. The OEE has been highly successful in recruiting talented students to our program. All of our funded OEE traineeship positions have been quickly filled whenever there have been vacancies. In the 2008-2013 reporting period, three MS and 8 PhD trainees were supported by the ERC. This program is just beginning to produce graduates, since the majority of our students are in the doctoral program, which on average takes about three to five years to complete. We have had two students complete our MS program (Mary Doi and Kirsten Almberg), and two has finished our doctoral program (Judith Graber and Anissa Lambertino).

The OEE program adds to the strengths and in many ways complements our Illinois ERC programs in Industrial Hygiene, Occupational Medicine, Safety and Nursing. Trainees in the OEE program interact intensively with trainees in the other programs through interdisciplinary activities, which include our weekly EOHS seminar, their required coursework in EOHS, and in our Occupational Epidemiology Targeted Research Training group. As a comparatively young program within the Illinois ERC, we have sought continuous feedback and guidance in the development and growth in these first years from the Illinois ERC Advisory Board and our trainees and graduates.

#### **3. New faculty—increasing strength in OSH—**

Lisa Brosseau, ScD, CIH was hired as Professor of Environmental and Occupational Health Sciences and Director of Industrial Hygiene in January 2013. Dr. Brosseau was a faculty member in the industrial hygiene program (a NIOSH-funded ERC) at the University of Minnesota from 1991-2013 in which she held, at various times, leadership positions including IH and HSAT Program Director, Pilot Projects Research Training Program

Director and ERC Deputy Director. Dr. Brosseau is an active and well-funded researcher, with a focus on respiratory protection device performance and program implementation, industrial hygiene curriculum design, and effectiveness of occupational health and safety interventions in small businesses.

Houshang Darabi, PhD, is the co-director, with Dr. Conroy, of the Occupational Safety program. Dr. Darabi is Associate Professor of Mechanical and Industrial Engineering and an expert on improving efficiency in work flow and manufacturing processes.

Three new tenure-track faculty were hired Rachael Jones, PhD was hired as a tenure-track Assistant Professor in EOHS. Samuel Dorevitch, MD, MPH was hired from the research track as a tenured Associate Professor and Lee Friedman, PhD was hired from the research track into a tenure-track Assistant Professor.

The College of Nursing hired a new tenure-track Assistant Professor in the Occupational Health Nursing Program. Karen Hopcia, ScD, RN is an expert in occupational health protection and health promotion of health care workers.

Dr. Robert Cohen has been affiliated with the Illinois ERC for many years in his role as pulmonologist and Chairman of Pulmonary and Critical Care Medicine at Stroger Hospital of Cook County. Dr. Cohen retired from his position at Stroger Hospital and joined the faculty at UIC in a full-time capacity in August as Clinical Professor in Environmental and Occupational Health Sciences. Dr. Cohen is board certified in Internal Medicine, Pulmonary Medicine, and Critical Care Medicine and is a NIOSH-certified B-Reader (CDC). He has been Principal Investigator (PI) for the DHSS Black Lung Clinics Grant since 1993 and Medical Director of the Black Lung Clinics Coalition since 1995. The administration of this grant moved to UIC with Dr. Cohen's appointment. He is PI on a CDC/NIOSH Contract examining the coal mine dust lung disease among miners killed in the Upper Big Branch Mine Disaster (2011-2014) and is PI on a new grant from the Alpha Foundation for the Improvement of Mine Safety and Health to study how existing data systems can be used and enhanced to develop interventions to improve miners' health. Dr. Cohen has also joined the Division of Respiratory Disease Studies of NIOSH as part of an Intergovernmental Personnel Act assignment to provide consultation to the Coal Worker's Health Surveillance Program as well as assist in the development of an image repository to be used in the development of a new digital B-reader exam and training program. Dr. Cohen has consulted with NIOSH, US-DOL Office of Coal Workers Compensation, HRSA, and the National Academies of Science/Institute of Medicine. Dr. Cohen's addition to our faculty, on a full-time basis, has already been beneficial to trainees. He is including two trainees in his research, is lecturing in several courses and our weekly seminar, and is helping to improve the interdisciplinary clinic experience for all of our trainees.

The School of Public Health hired Dean Paul Brandt-Rauf in 2008. Dr. Brandt-Rauf has over 25 years of research experience investigating the health of high-risk populations exposed to occupational and environmental hazards in the US and around the world. His research focuses on the mechanisms of occupational and environmental carcinogenesis and the molecular epidemiology and prevention of resultant cancers. Over the years, he has mentored over two dozen pre- and post-doctoral fellows, some of whom have gone on to obtain independent funding and been promoted to faculty positions. He has served as the PI on nine federally funded research projects and co-investigator on many others. He was also the PI on an NIH T32 training grant for eight years.

This group of faculty strengthens our already strong research program in industrial hygiene and epidemiology, but more importantly broadens and deepens the expertise of the ERC in other areas of occupational health--injury epidemiology, occupational health and safety surveillance; interventions effectiveness in small business; human factors; molecular epidemiology, and total worker health.

#### **4. Innovative and highly significant Targeted Research Training program**

The Targeted Research Training program provides a stable structure to support interdisciplinary research training. It provides a small amount of salary support to encourage faculty in the Illinois ERC to work on interdisciplinary teams, and more importantly, provides some incentive to bring faculty, staff, and students from complementary disciplines onto the teams. The IOM (2000) report "Safe Work in the 21st Century" highlighted the need to broaden the field of occupational safety and health to include other disciplines such as economics, psychology, social work, etc. Our teams have made a concerted effort to expand the scope of our work to include these disciplines, and it is paying off in terms of broadening both the vision and the expertise that

comes about from bringing transdisciplinary expertise to bear on occupational health and safety problems. Supported faculty make a commitment to the group that ensures that the group is interdisciplinary and provides mentoring and informal training that exceeds what might occur with traditional, one-on-one research mentoring.

Thirty-six trainees, along with 3 post-doctoral fellows and 20 other students are or were engaged on a TRT team. The work of the TRT teams contributed to 7 MS theses, 6 PhD dissertations, and 8 MPH capstones. Across the teams, the TRT program produced 34 conference presentations and 27 publications. Twenty-five grant applications were submitted in research areas supported by the TRT teams.

## **5. Outstanding Trainees**

Illinois ERC trainees achieve great things. As described in the next section, they have received scholarships and research awards and they have presented their work at local, regional, and national research conferences. Several have submitted proposals for and received research funding. All of our graduates have been offered employment in occupational safety and health and nearly all continue to be employed in the OSH field.

### **B. Translation of Findings.**

The primary means of translating the work of the Illinois ERC are: faculty research and research training through the TRT and PPRT programs, continuing education and outreach through our CE and Outreach programs, and placing graduates from our programs into health and safety professional positions.

### **C. Outcomes/ Impact.**

The Illinois Occupational and Environmental Health and Safety Education and Research Center (Illinois ERC) is a recognized leader in the national and international movement to promote healthier and safer workplaces and workers. It is the ambition of the Illinois Occupational and Environmental Health and Safety Education and Research Center (Illinois ERC) to improve, promote, and maintain the health of workers and communities. We do this through innovative and interdisciplinary activities that: 1) Educate graduate students to be professionals and researchers in occupational and environmental health and safety; 2) Prepare professionals to be leaders and practitioners in their disciplines through continuing education; 3) Enhance the expertise of employers, worker organizations, and communities through outreach and technical assistance; and 4) Enrich the knowledge base for solving current and future problems. As educators, researchers, and professionals working to promote occupational safety and health, we believe that everyone has the right to healthy work – a job that pays a living wage, a workplace that is safe, an organization that treats them with respect, and access to qualified occupational safety and health professionals; and our public responsibility and charter requires that we give the highest priority to ensuring healthy work for everyone.

Our training program is responsive to the regional and national need for increased occupational safety training. We assessed the need for the program and evaluated our existing programs by examining the literature, soliciting insight from our ERC Advisory Board and our current students, and surveying our recent graduates. There continue to be far too many workplace injuries and illnesses and an unmet need for professionals to address workplace health and safety issues. The Illinois ERC has a long track record of successfully meeting the OSH needs of our region. Over the past 6 years, we have enrolled an average of 21 NIOSH-funded trainees in our academic programs (45 trainees in the 2012-2013 reporting year), with approximately 14% of trainees being from underrepresented minority groups. In the previous project period (2008-2014), 101 trainees have graduated and nearly all of them work in the OSH field. Our CE program reached more than 25,000 OSH professionals and our faculty and trainee research and outreach continues to enrich the knowledge base in OSH and translate that knowledge to practice. The Targeted Research Training (TRT) program has had a significant effect on the academic training programs and the research directions of the Illinois ERC. The program provided support for Interdisciplinary Research teams and some funds to support field and laboratory studies as a mechanism for providing research training. We have successfully completed a number of projects, many of which have led to other projects, extramural research funding, MS theses, PhD dissertations, and publications. While ERC faculty continue to pursue their individual research interests, the TRT program has resulted in 3 groups of faculty, including faculty from outside the traditional core OSH disciplines, and trainees that are pursuing research activities in an interdisciplinary manner and are providing practical training in interdisciplinary research methods to trainees.

### 3. Section 2 of the Final Progress Report

#### A. Scientific Report

A description of the 2008-2013 goals and objectives and the results for each program are provided below.

##### 1. Center Wide Activities

###### a) Background

The ERC is administratively part of the Environmental and Occupational Health Sciences (EOHS) division at the School of Public Health (SPH). The OHN program is in the Department of Health Systems Sciences (HSS) in the College of Nursing. The OEE program is in the Division of Epidemiology and Biostatistics (EB). The ASH-A program is in the College of Agricultural, Consumer, and Environmental Sciences at the University of Illinois at Urbana-Champaign (UIUC). The OM program is administered through the EOHS Division but enjoys considerable financial and administrative support from the Graduate Medical Education (GME) department in the College of Medicine. The OS program is administered through EOHS in the SPH and MIE in the COE. All other programs are in the EOHS Division.

###### b) Goals and Objectives

The overall objective of the Administrative Core is to provide a supportive structure for accomplishing the activities of the Center. The specific objectives are to:

1. Provide leadership to all aspects of the ERC
2. Coordinate and integrate the components and activities in the Center;
3. Assess productivity, effectiveness, and appropriateness of Center activities;
4. Organize Center planning and evaluation activities;
5. Organize the internal executive committee and external advisory committee;
6. Keep records and coordinate preparation of reports to NIOSH; and
7. Coordinate interactions with other ERCs, NIOSH, and others.

###### c) Results

Dr. Steven Lacey accepted a position as department at Indiana University in August 2012. Dr. Peter Scheff served as interim Industrial Hygiene director for part of the past year. Dr. Scheff had served as IH director for many years, prior to Dr. Lacey taking on that position. We were successful in hiring a new Industrial Hygiene director. Lisa Brosseau, ScD, CIH was hired as Professor of Environmental and Occupational Health Sciences and Director of Industrial Hygiene in January 2013. Dr. Brosseau was a faculty member in the industrial hygiene program (a NIOSH-funded ERC) at the University of Minnesota from 1991-2013 in which she held, at various times, leadership positions including IH and HSAT Program Director, Pilot Projects Research Training Program Director and ERC Deputy Director.

Houshang Darabi, PhD, is the co-director, with Dr. Conroy, of the Occupational Safety program. Dr. Darabi is Associate Professor of Mechanical and Industrial Engineering and an expert on improving efficiency in work flow and manufacturing processes.

Three new tenure-track faculty were hired Rachael Jones, PhD was hired as a tenure-track Assistant Professor in EOHS. Samuel Dorevitch, MD, MPH was hired from the research track as a tenured Associate Professor and Lee Friedman, PhD was hired from the research track into a tenure-track Assistant Professor. Drs. Peter Scheff and Nurtan Esmen retired from UIC and were awarded Emeritus Professor positions. While neither is actively teaching in the IH program, both remain active as research advisors.

The College of Engineering hired a new tenure-track Assistant Professor in the Department of Mechanical and Industrial Engineering. Matthew Bolton, PhD is an expert on human factors and teaches IE/EOHS 441 Ergonomics and Human Factors. The College of Nursing hired a new tenure-track Assistant Professor in the Occupational Health Nursing Program. Karen Hopcia, ScD, RN is an expert in occupational health of health care workers.

ERC faculty with assistance from EOHS faculty and members of the ERC Advisory Board undertook a significant re-organization of the IH curriculum in 2010-2011. Transition to the new curriculum was completed for students entering in September 2012. The new curriculum addressed on-going changes in the industrial

hygiene profession and current faculty expertise. Required credit hours were decreased, providing students with more scheduling flexibility and opportunities for electives.

In the past year, the ERC faculty have reviewed and updated the overall core competencies for trainees in the ERC. The core competencies are shown in Table 1. These competencies were mapped to the learning objectives for the interdisciplinary activities required of all trainees in the ERC (common coursework, weekly interdisciplinary seminar, occupational medicine clinic, process tours and talks, and participation on a TRT team). In some cases, the learning outcomes and activities have been modified in response to this review.

Table 1. Overall Competencies for Illinois ERC Trainees

Health Hazards	<ul style="list-style-type: none"> <li>▪ Anticipate and recognize health hazards in the occupational environment.</li> <li>▪ Describe the adverse human physiological and toxicological effects of physical, chemical, biological, and ergonomic workplace hazards.</li> </ul>
Problem Solving	<ul style="list-style-type: none"> <li>▪ Develop, implement and evaluate evidence-based interventions</li> </ul>
Policy	<ul style="list-style-type: none"> <li>▪ Develop and advocate for policy recommendations</li> </ul>
Teamwork	<ul style="list-style-type: none"> <li>▪ Utilize and collaborate with multidisciplinary teams to foster the provision of effective health and safety programs and services.</li> <li>▪ Appreciate the value of each profession for advocating for improved workplace health and safety</li> </ul>
Communication	<ul style="list-style-type: none"> <li>▪ Communicate effectively with a wide variety of audiences</li> <li>▪ Develop and deliver training on occupational health and safety issues to a wide range of audiences</li> </ul>
Management Practice	<ul style="list-style-type: none"> <li>▪ Apply a systems-based approach to the development and evaluation of occupational safety and health programs</li> <li>▪ Demonstrate the value of occupational safety and health programs</li> </ul>
Ethics and Professionalism	<ul style="list-style-type: none"> <li>▪ Practice occupational safety and health to the highest ethical standards</li> <li>▪ Develop the skills to advocate for and empower workers</li> <li>▪ Engage in professional development activities that advance the practice of occupational safety and health</li> <li>▪ Develop skills and desire to engage in on-going continuing education</li> </ul>

## 2. Pilot Projects Research Training

### a) Background:

The Illinois ERC Pilot Project Research Training Program was established and has been successfully operating since 1999 (FY2000). The program was modeled on a UIC program in existence for 10 years before the PPRTP. The pilot project concept originated at UIC when the ERC at the University of Illinois initiated a mini-grants program that awarded funding to 34 trainees in the occupational health programs at UIC. The program provided small amounts of funding to ERC trainees in occupational health for research training purposes. The original UIC program set the stage for the formally funded PPRTP by providing the experience and culture that encouraged new researchers to pursue original lines of inquiry with limited funds. Input of the ERC Advisory Board and the input of the members of the ERC Research Board and subsequent evaluation have helped shape the program's evolution over time. Since the previous competitive renewal, the program focus has shifted more towards developing new investigators, including the addition of a formal mentorship requirement. In addition, the program has established a limit of two funded projects per investigator, and expanded interdisciplinary outreach to enhance the developmental nature of the program.

This program provides an opportunity for new researchers to:

- Learn how to develop their ideas into competitive proposals;
- Plan research time lines, budgets, and task completion;
- Perform their own research under the supervision of a mentor;
- Develop presentations, posters, and publications from the results of their own research;

- Develop new proposals for expanded research based on their original findings.

### **b) Goals and Objectives**

The purpose of the Illinois ERC Pilot Project Research Training Program (PPRTP) is to encourage new investigators to develop research careers that will address the priority areas described by the National Occupational Research Agenda (NORA).

The PPRTP uses a peer-reviewed process to competitively award funding to PhD candidates, post-doctoral fellows, junior faculty (assistant or associate professor level with less than 10 years of prior occupational health research experience) and senior faculty who are new to the field of occupational health. A formal mentorship requirement was added in 2005 and must now be demonstrated in the application.

The research training objectives of this program are to:

1. Develop research expertise and capacity in new investigators associated with the ERC Program; and
2. Encourage established investigators from other fields to apply their expertise to NORA occupational safety and health topics.

### **c) Results**

The success of the PPRTP program is measured quantitatively for each of the two primary program objectives, which are to develop research expertise and capacity in new investigators, and to encourage established investigators from other fields to apply their expertise to NORA occupational safety and health topics. The number and quality of PPRT proposals submitted by junior faculty and doctoral and post-doctoral trainees in the occupational safety and health fields and from other disciplines are assessed. In addition, follow-up information is tracked about the number and types of grant proposals submitted subsequent to the pilot projects that is based on the pilot project work; the number of proposals funded; the number of research publications produced by the grant; the number of publications and presentations generated from the funded projects; the number of trainees, young investigators, or new investigators engaging in occupational safety and health research as a result of the PPRTP program; and the number of advanced academic dissertations or theses that are attributed to pilot project work.

The program has demonstrated a continuous, steady increase in the project outcomes after project completion. In general, the variety and quality of applications submitted are increasing, with minor variation in numbers apparently based on funding rates for the preceding year.

After the ninth year of funding (FY2008), the PPRTP program at UIC had given 43 awards to fund 39 projects. Two of these awards were withdrawn by the PIs, and one award could not get human subjects approval from NIOSH for foreign research. Funded projects helped support twenty (20) junior faculty, one post-doctoral fellow, eight (8) PhD student principal-investigators, and thirty (30) student research assistants for one semester or more. The projects have generated six (6) subsequent grant proposals based on the pilot project research findings, four (4) of which were successfully funded, twenty-five (25) presentations at regional or national meetings, thirteen (13) reports/abstracts/posters or papers, and fifteen (15) publications. Four (4) Pilot Projects received supplementary funding from other sources and fifteen (15) resulted or are expected to result in findings used toward MS or PhD theses.

In the six years that constitute this reporting period, the PPRTP program at UIC gave 22 awards (excluding pending awards for FY2014, expected to total 6 awards) to fund 22 projects, out of 33 applications submitted. Funded projects have helped support nine (9) junior faculty, three (3) post-doctoral fellows, nine (9) PhD student principal-investigators, one (1) master's level student principal-investigators and at least four (4) student research assistants for one semester or more.

The projects have generated five (5) subsequent grant proposals based on the pilot project research findings., two (2) of which were successfully funded, five (5) presentations at regional or national meetings, seven (7) reports/abstracts/posters or papers, and three (3) publications. No (0) Pilot Projects received supplementary funding from other sources, and eleven (11) resulted or are expected to result in findings used toward MS or PhD theses.

The statistics presented above do not fully reflect potential pilot project outcomes over time, due to the long lead time required to develop lines of study. For example, one investigator who was given an award in FY2008

just received an award (Muramatsu, Naoko, "Promoting Seniors' Health with Home Care Aides: A Pilot" 6/15/2013 - 5/31/2015. Funding: \$430,380, The National Institute on Aging (1R21AG042801-01A1)) based on outcomes from a PPRT-funded project. Another investigator received an NIH award (Hunter, Sandra K, 2011-2014 National Institute of Aging R15 [R15AG039697] "Neuromuscular Fatigue: Sex and Age Differences" Funding: \$411,000) from a line of research related to a PPRT FY2008 award "Cognitive Stress, Mental Attentiveness and Muscle Fatigue" and a colleague's subsequent PPRT award "Cognitive Stress and Neuromuscular Fatigue with Aging" (Noven, M.V., PPRT, FY2009)

### **3. Targeted Research Training**

#### **a) Background**

Training Program of the Program Announcement. For reference, the text of that section is included here:

Interdisciplinary Research Training Programs. Programs to provide interdisciplinary predoctoral research training in NORA-related projects may be supported. The research training must emphasize specialized skills to assist in addressing NORA priorities in occupational safety and health. Supported trainees must be enrolled in approved ERC academic core or allied training programs.

The Targeted Research Training (TRT) program will provide interdisciplinary research training using a combination of required course work (described in each of the academic training programs), elective course work specific to their research area, other didactic training in our weekly Interdisciplinary Seminar, and participation on interdisciplinary research teams addressing NORA research priorities.. This combination of didactic and practical training will provide students with comprehensive research and collaboration skills necessary for professional practice and research careers.

The NIOSH announced National Occupational Research Agenda (NORA) in 1996 as a research framework for NIOSH and the nation (NORA, 2007). The NORA was used to guide internal NIOSH research programs and priorities for the extramural research programs funded by NIOSH. After 10 years of very successful research and partnerships, NIOSH revisited the NORA and announced a revised set of priorities in 2006. The NORA now uses a sector based approach with 8 NORA Sector Programs. The NORA also has fifteen Cross-Sector Programs and seven Coordinated Emphasis Areas. The TRT proposal is responsive to NORA Sector Programs in Agriculture, Healthcare and Social Assistance, Services, Construction, and Manufacturing; NORA Cross-Sector Programs in Respiratory Diseases, Immune and Dermal Diseases, Work Organization and Stress Related Disorders, and Traumatic Injury; and NORA Coordinated Emphasis Areas in Exposure Assessment, Occupational Health Disparities, and Surveillance.

#### **b) Goals and Objectives**

The overall goals of the proposed training are to provide trainees with research training, in general, and with training that entails interdisciplinary expertise and interaction. The specific objectives of the overall research training are to provide training in:

1. qualitative research methods
2. quantitative research methods
3. research ethics
4. research project planning, implementation logistics, and budgeting
5. publication

We are accomplishing these goals and objectives through interdisciplinary teams focused on one or more NORA priority areas. Teams are formed by ERC faculty who collaborate to establish the mission, set practical goals and protocols for executing them, and recruit students whose interests, needs and assets fit the group's agenda. Each team must be interdisciplinary and must include at least two trainees. The team leader works with the academic program directors to identify appropriate trainees. Proposals for new teams are submitted by ERC faculty and reviewed by the Illinois ERC Executive Committee on a yearly basis, deciding on appropriate resource allocation from the overall Targeted Research Training budget.

## c) Results

The TRT program continues to support projects in all capacities across a broad spectrum of research disciplines. Administrative support often includes management of data and Internal Review Board documents. Technical support in the form of tools, technology, and knowledge provides exposure assessments and worker health protection to cooperating partners. The support is available to Interdisciplinary Targeted Research Training teams comprised of faculty and trainees in the ERC. The TRT program continues the coordination of training and research among students, faculty, and staff in Industrial Hygiene, Occupational Medicine, Occupational Health Nursing, Agricultural Safety and Health, Occupational and Environmental Epidemiology, Occupational Safety, Biostatistics, Psychiatry, and related supporting disciplines.

Thirty-six trainees, along with 3 post-doctoral fellows and 20 other students are or were engaged on a TRT team. The work of the TRT teams contributed to 7 MS theses, 6 PhD dissertations, and 8 MPH capstones

Across the teams, the TRT program produced 34 conference presentations and 27 publications. Twenty-five grant applications were submitted in research areas supported by the TRT teams.

- Evaluation Measures
  - Underserved Worker Populations Team
    - *Projects*

*Integration of Clinical Occupational Services and Labor Rights Training and Prevention:* The goal of this project is to improve workplace safety and health for low-wage immigrant workers with three objectives: 1) to improve identification of occupational hazards among outreach volunteers at the Chicago Interfaith Workers' Rights Center; 2) to identify appropriate referral needs and enable at-risk workers to access occupational medicine services; and 3) to improve the ability of the occupational medicine clinic staff to identify and refer patients at the Interfaith Workers' Center for counseling and follow up. A series of interventions with evaluation of the outcomes are planned.

The project involves 1 IH trainee, 2 SPH students, 2 CDC-funded post-doctoral fellows, and 2 ERC faculty members. One publication has resulted from this work and another has been submitted for publication.

*Occupational injuries and hazards among immigrant and minority workers in Chicago:* The goal of this project is to reduce day laborers' exposures to hazards on the job. Components include working with four worker centers to understand how to create good worker health and safety practice and increase day laborers access to occupational health services.

*Intervention effectiveness for reducing injuries and illnesses through workers centers in Chicago:* Day and temporary laborers work in the informal sector (employers are generally "under the radar"). They are mostly Latino males, work in dangerous occupations (demolition, construction, and landscaping), and face a variety of work, community, and home issues. An intervention to reduce injuries and illnesses in this group is planned. The intervention will be conducted in collaboration with 4 worker centers in Chicago.

*Lead poisoning prevention during remodeling and renovation:* The project focused on reducing generation of lead using lead safe work practices (LSWP). Components include working with retail establishments (hardware and paint stores) to ensure that necessary supplies available and their purchase and use is promoted; working with renovators and remodelers to increase awareness and change behaviors in the use of LSWP; and work with day laborers to increase awareness of LSWP in construction. The ultimate goal is to harmonize public health, small business, and worker implementation of LSWP. The results from a pilot study in Chicago was used in a successful application to the US Environmental Protection Agency, Region 5 to expand the project to large cities in Illinois and to other cities and towns in our region.

*Increasing awareness of work place hazards and their control for homecare workers:* This project focuses on an employer, union, and university partnership to increase recognition and reduce exposure of occupational hazards in homecare workers. Using participatory research methods, interventions were identified that were then included in a model training program.

*Blood lead levels in day laborers:* In this study we interviewed day laborers about their job tasks that might expose them to lead dust, and we measured their blood lead levels. The geometric mean blood lead levels

were slightly higher than the NHANES mean for Mexican American men and were not associated with hazardous job tasks.

*PPE distribution:* This study evaluated a PPE distribution program among Chicago day laborers. We conducted informal interviews to help us choose which PPE to purchase. We then held health-fair style distribution sessions during which each participating day laborer received a short training and demonstration of nine types of PPE. After visiting all stations, workers received the PPE in a sport duffel bag.

*Hotel workers:* Researchers from the UIC ERC collaborated with UniteHere union and researchers from two other institutions to create and analyze a dataset comprised of OSHA 300 injury logs and union membership rosters from the five largest hotel chains in the US. We found that female workers, housekeepers, and Hispanics had higher risks of injury compared to their control groups. As a group Female Hispanic housekeepers had the highest odds of injury in multivariable analysis

The TRT teams provides a mechanism for faculty and students to communicate across projects- many of these involve the same set of research methods and tools- intervention effectiveness, training interventions, community based participatory research, etc

Issues, challenges, strategies, problem solving approaches, and methods related to these projects and others are discussed in team meetings, along with other topics such as qualitative research methods, survey design and implementation, IRB protocols, and data analysis.

### Trainee Measures

Trainee measures include number of trainees on Interdisciplinary Teams, number of student theses or dissertations resulting from Interdisciplinary Teams, number of projects involving students in all aspects of the research, and number of publications with trainee authors. Trainee and student involvement on the Underserved Worker Populations team is shown in Table 2 and includes a list of trainees and students who are or were on the team, an indication of their level of involvement, and their thesis or dissertation title where applicable. As seen in Table 2, all of the projects listed above included trainees and other students. Trainee authors are indicated in the Publication list below. Nine IH, 4 OS, 2 HSAT, and 1 OHN trainee, and 3 post-doctoral fellows, and 12 other students were engaged on the Underserved Worker Populations team. The work of the team resulted in 3 MS theses, 4 PhD dissertations, and 4 MPH capstone projects.

### Interdisciplinary Measures

#### ERC faculty and staff on team

- Joseph Zanoni, PhD, MILR, Continuing Education, Curricular Studies, Labor and Industrial Relations
- Leslie Nickels, MEd, Continuing Education, Industrial Hygiene
- Susan Buchanan, MD, MPH, Occupational Medicine
- Rosie Sokas, MD, MPH, Occupational Medicine
- Linda Forst, MD, MPH, Occupational Medicine
- Jennifer McGowan, Political Science, Sociology
- Marsha Love, Training, Occupational Health
- Emily Ahonen, PhD, MPH, Occupational Epidemiology, Qualitative Research
- Lorraine Conroy, ScD, CIH, Industrial Hygiene
- Peter Orris, MD, Occupational Medicine

#### Level of involvement of non-ERC faculty, staff, and students on team

- Kathy Rosependa, PhD, Psychiatry, Survey Research
- Eric Rodriguez, Latino Union
- Jose Oliva, Chicago Interfaith Organization
- Erica Sweitzer, Chicago Interfaith Organization
- Alberto Prieto, Community Volunteer
- Naoko Muramatsu, PhD, Community Health Sciences, Aging
- Lon Berkeley, Community Volunteer
- Sohni Choudhary, Summer Residential Enrichment Program student
- Dr. Janice Hurtig, UIC College of Education

- Beth Gutelius, PhD candidate, UIC College of Urban Planning and Policy Administration
- Muinat Ishowo and Erica Starks, OHIP interns
- Jessica Cook, PhD candidate, UIC Department of Sociology
- Nilda Flores-Gonzalez, PhD, UIC Department of Sociology

Members of the Underserved Worker Populations Team also participate in the UIC Qualitative Research Discussion Group

#### Research Measures

##### Number of Proposals Written

- Zanoni proposal to Sociological Initiatives Foundation, 07/10, with Latino Union for safety exchange and charlas
- Zanoni R01 proposal to NIOSH: Total Worker Health and Home Care Workers, 01/11 (mentored by Linda Forst)
- Zanoni proposal to CPWR: small study on participatory IRB training for Spanish-speaking immigrant construction workers (mentored by Linda Forst)
- Zanoni proposal to Illinois ERC PPRT: Home Care Ergonomics. Submitted 04-01-2011 with SEIU HCII, revised and funded 08-15-2011
- Zanoni carryover funding request to Illinois ERC TRT: Training intervention with Latino Union and domestic workers and SEIU HCII and home care workers, funded 01/13.
- FHI 360 and Zanoni proposal to US DOL: Training intervention and evaluation with Bangladesh workers and building inspectors, 07/13.
- Buchanan (PI). Innovative Intervention to Provide Personal Protective Equipment to Day Laborers at Street Corner Hiring Sites, Center for Protection of Workers' Rights, September 2008.
- Sokas (PI) {now Forst} More than Training: Workers' Rights Centers Empowering Hazard Awareness and Response. NIOSH R18. Funded.
- Zanoni, J. and Ringholm, E. (2010). Workers' center safety exchange proposal to Sociological Initiatives Foundation on August 13, 2010. Maximum budget request: \$20,000.00
- Muramatsu (PI), Zanoni (co-investigator). In Home Exercise with Home Care Aides: Comparing Options for Frail Older Home Care Clients. PCORI, 2013-2016.

##### Papers Delivered at Conferences

- Buchanan S. Occupational Health and Safety Among Street Corner Day Laborers: What We Know We Don't Know. Oral presentation at American Occupational Health and Safety Conference, New York City. May 2008.
- Buchanan S, Gutierrez M: Piloting a Personal Protective Equipment Distribution Program to Prevent Occupational Injuries Among Chicago Day Laborers. Poster presentation, APHA Annual Meeting, San Diego, California, 10/09.
- Ahonen E, Rodriguez E: Partnership and Peer Training As Strategies to Address The Occupational Health of Latino Workers. OSHA National Action Summit for Latino Worker Health & Safety/Cumbre de Acción Nacional Para el Trabajador Latino Salud y Seguridad, April 14-15, 2010 Houston, Texas
- Joseph Zanoni, University of Illinois at Chicago, Gramsci's "Constructive Criticism" in the Dialogue of Organic Intellectuals. Cultural Studies Association Conference, Columbia College, Chicago, IL, Friday, May 24, 2013. International Gramsci Society I, Chair: Joseph A. Buttigieg, University of Notre Dame, Discussant: Julian Ammirante, Laurentian University, Canada, Panelists: Marcus E. Green, Otterbein University, Gramsci on Race, Subalternity, and Lorianism; Michele Fiorillo, Istituto Italiano di Scienze Umane, Naples, Italy; On Gramsci's Democratic Theory of Cultural Apparatures and Integral Journalism.
- Home Care Aides As Agents for Promoting Health and Safety in Long-Term Care, Muramatsu, N., Lukyanova, V., Zanoni, J., Sokas, R. Poster presentation, AcademyHealth Annual Research Meeting, June 24-26, 2012, Orlando, FL.
- Forst, L., Ahonen, E., Beth, A., Tendick-Matesanz, F., Gallardo, J., Rodriguez, E., Kader, A., Castillo, R., and Zanoni, J. Occupational Health Research to Practice with Immigrant Workers. Oral presentation. University of Illinois at Chicago Immigrant Health Research Conference, Chicago, IL, December, 2011.

- Zaroni, J. How Spanish speakers encourage dialogue in participatory occupational health training, Oral presentation (3063.1-236200). American Public Health Association, Washington, DC, October, 2011.
- O'Connor, T., Flynn, M., Zaroni, J., & Weinstock, D.L. Effective approaches to education and training for underserved populations. Oral Presentation (3063.0). American Public Health Association, Washington, DC, October, 2011.
- Holloway-Beth, A., Ahonen, E., Zaroni, J. & Forst, L., Assessing the outcomes of an occupational health and safety training session among Spanish-speaking immigrant day laborers throughout the mid-west. Poster Presentation (3391.0). American Public Health Association, Washington, DC, October, 2011.
- Zaroni, J., Forst, L. Latino peer educators creating dialogue: Documenting capabilities in structural and instructional critical components. Poster presentation. NIOSH first conference to Eliminate Health Disparities at Work, Chicago, IL, September, 2011.
- Forst, L., Ahonen, E., Zaroni, J. Community health workers in occupational health. Poster presentation. NIOSH first conference to Eliminate Health Disparities at Work, Chicago, IL, September, 2011.
- Zaroni, J. Decolonizing dissemination: human capital(ism) and the performativity of efficiency. Oral presentation. American Association for the Advancement of Curriculum Studies, New Orleans, LA, April, 2011.
- Zaroni, J. Workers' centers as partners in occupational health research: Case studies from Chicago. Seminar presentation. Johns Hopkins Bloomberg School of Public Health Education and Research Center, Jackie Agnew, Director, Baltimore, MD, November, 2010.
- Zaroni, J. Charlas (chats) in workers' centers: Dialogue and conflict to promote social justice. Oral presentation (221872). American Public Health Association, Denver, CO, November, 2010.
- Muramatsu N, and Zaroni J: Promoting health and safety to home care aides: A strategy for long-term care workforce development. Aging in America: Annual conference of the National Council on Aging and the American Society on Aging, Chicago, IL March 15-19, 2010, Session 107.
- Zaroni J: Voice and leadership in workers' centers: Critical discourse analysis utilizing Gramsci and Bakhtin of participant informal dialogue. Oral presentation. Rethinking Marxism Conference, International Gramsci Society. Amherst, MA, November 5-8, 2009
- Beth-Holloway A: Implications of workers center on health and safety training for immigrant workers. Oral Presentation. American Public Health Association, Philadelphia, PA, Session 4121.0, Occupational Health Disparities Institute: Immigrant workers in construction. Tuesday, November 10, 2009.
- Conroy, LM: Research to Practice: Underserved Worker Populations in Chicago, NIOSH-ERC Workshop on Research to Practice, 10/09/08 (invited)
- Gutierrez MEs: Self reported occupational injuries among Hispanic construction workers in Chicago. Oral Presentation. American Public Health Association, Philadelphia, PA, Session 4121.0, Occupational Health Disparities Institute: Immigrant workers in construction. Tuesday, November 10, 2009.
- Gutierrez Ms, Forst L, Ahonen EQ, Zaroni J, Sokas R. Training Day Laborers in Construction Safety. APHA Nov 2009, Philadelphia (presentation)
- Zaroni J: Echar platica: A sociolinguistic framework for meaning making and critique in adult Latina/o informal conversation in workers' centers. Oral presentation, The First Triennial Conference on Latino Education and Immigrant Integration, Athens, GA, October 26-28, 2009
- Zaroni J, Kauffman K, McPaul K, Nickels L, Mayden M, Glassman M, Vega L, Sokas R, Lipscomb J: Personal care assistants and blood exposure in the home environment: Focus Group Findings, Oral Presentation by Marilyn Bingham, American Industrial Hygiene Continuing Education Conference, Toronto, Canada, June, 2009
- Zaroni J: Dialogue and hegemony: how adult informal charla conversations lead to critique and praxis. Oral Presentation. Intercultural Dialogue through Education, Third International MESCE Conference, Malta, May 11-13, 2008
- Holloway-Beth ATs, Ahonen EQ, Zaroni J, Forst L, Sokas R: Implications of Workers Center on Health and Safety Training for Migrant Populations. APHA Nov 2009, Philadelphia (presentation)

- Gutierrez M, Forst L, Ahonen EQ, Zanoni J, Sokas R: Training Day Laborers in Construction Safety. APHA Nov 2009, Philadelphia (presentation)
- Zanoni J: Workers' Centers Qualitative Inquiry and Antonio Gramsci and Peer Education. UIC College of Education Conference
- Zanoni J: Day Laborer Learning: Analysis Of Worker Centers' Focus Groups. International Commission on Occupational Health
- Zanoni J: Workers' Centers as sites of critical capacity and cultural development of vulnerable immigrant workers. *Sociology and Equity Studies in Education*

#### Papers published

- Buchanan S, Evens A, Buckley C, Friedman L: Street corner hazard surveillance and health intervention among Chicago day laborers. *Arch of Environ Occ Health* 63(1):9-12,2008
- Fairfax, R, Brown, Ts, Nickels, L, Sokas, R: Case Referrals to OSHA from an Interfaith Workers' Rights Center. *JOEH* 5(1): 7-10 Jan 2008
- Zanoni J: Dialogue and hegemony: sociolinguistic analysis of "charlas" for critique and praxis. *Mediterranean Journal of Educational Studies* 13(1), 39-58, 2008.
- Zanoni, J: Antonio Gramsci and funds of knowledge: Organic ethnographers of knowledge in workers' centers. *International Gramsci Journal*, 1, 1-35, 2008.
- Ahonen EQ, López-Jacob MJ, Vázquez ML, et al. Invisible work, unseen hazards: The health of women immigrant household service workers in Spain. *Am J Ind Med.* 2009;9999.
- Amuwo, S., Sokas, R. K., Nickels, L., Zanoni, J., Lipscomb, J. Implementation and evaluation of interventions for home care aides on blood and body fluid exposure in large group settings. *New Solutions*, Accepted for publication on 08-24-2010.
- Buchanan S, Vossenas P, Krause N, Moriarty J, Frumin E, Shimek JM, Mirer M, Orris P, Punnett L. Occupational health disparities in the U. S. hotel industry. *Am J Industr Med.* 2010 Feb;53(2):116-25.
- Zanoni, J., Rucinski, D, Flores, J., Perez, I., Gomez, G., Davis, R., Jones, R. Latina/o Community Funds of Knowledge for Health and Curriculum, *Journal of Latinos and Education*, Accepted for publication on 10-07-2009 for 10(1), January, 2011
- Forst, L., Masters, D., Zanoni, J., Avila, S., & Miller, A. Medical Interpretation for Immigrant Workers, (2012). *New Solutions*, 22(1), 37-50
- Brown LPt, Rospenda KM, Sokas RK, Conroy L, Freels S, Swanson NG: Evaluating the association of workplace psychosocial stressors with occupational injury, illness, and assault. *Journal of Occupational and Environmental Health.* (in press)
- Forst, L., Ahonen, E., Zanoni, J., Holloway-Beth, A., Oschner, M., Kimmel, L., Martino, C., Rodriguez, E., Kader, A., Ringholm, E. and Sokas, R. More than training: Community-based participatory research to reduce injuries among hispanic construction workers. (2013). *American Journal of Industrial Medicine.* doi: 10.1002/ajim.22187
- O'Connor, T, Flynn, M., Weinstock, D., & Zanoni, J. Education and Training for Underserved Populations. (in press). *American Journal of Industrial Medicine.*
- Zanoni, J. Confronting inequity: Participatory education impacting health at work. (2013). *Journal Of Critical Thought and Praxis* 2(1), 18-39.
- Zanoni, J. Cultivating experiential knowledge: Peer educators working disciplinary borders. (In press). *Postcolonial Directions in Education.*

#### Partnership, Collaboration Measures

##### Partnerships

- Workers Center Partnerships with Chicago Interfaith Workers' Rights Center and Latino Union
- Home Care Workers Partnerships with Addus Homecare Agency and Service Employees International Union
- Lead Safe Chicago Partnerships with US Environmental Protection Agency, Region 5; Chicago Department of Public Health; Illinois Department of Public Health

##### Activities with partners

- Workers Centers and MPH capstone projects (Bello, 2008--Survey on workers' rights training; Haddadin, 2008--English language learning and health and safety training in workers centers)
- IWJ Summit in New Orleans, 2009
- The NDLO training in DC, September, 2009--Worker Leaders led their own workshop.
- OSHA National Action Summit on Latino Health and Safety-- we supported worker center participants and held meetings related to More than Training at the Summit.
- IWJ and NDLO expanding their agendas to include H&S, in addition to wage& hour.
- IWJ is partnering with the Public Welfare Foundation to address worker health and safety rights. Region V IWJ/DOL/UIC meeting as a policy outcome as well, our project had a space on the agenda.
- NDLO is creating a national initiative for worker rights and including health and safety rights in this campaign. They are setting up a way to share resources and models to NDLO centers for dissemination through their website and may also be taking some specific actions with local centers. I believe they hired a national organizer to work on this issue. Models will be based on what LU and New Labor have done in this area.
- N. Muramatu and J. Zanoni worked with Nora Gaines from SEIU HCII to provide a research design for evaluating the impacts for home care worker training on the workers and consumers (Spring, 2013).
- J. Zanoni and M. Love worked with Latino Union to create train-the-trainer and training program for domestic workers. Conducted training for 20 participants on 06/23/13.
- J. Zanoni and M. Love worked with SEIU HCII to present at their labor/management meeting with Addus Homecare, created a train-the-trainer session, and provided training for 485 participants on 06/15/13 and 600 participants on 06/29/13.
- Pandemic Flu Prevention – Train the Trainer Project 11-10/13/14-2010 with SEIU HCII
- Presentation at the February 25, 2011 is the Third Annual Minority Health Disparities Conference at UIC SPH.
- More than Training Spanish OSHA Construction Training on March 5 and 6 at UIC
- Hosted March 15, 2011 seminar, "Mixed Methods Intervention Research with Immigrant and Refugee Populations," Steve Weine UIC College of Medicine, Dept. of Psychiatry
- Interfaith Worker Justice Health and Safety Training sessions March 18, 19 and 20, 2011

#### Proposals with community partners

- Susan Harwood Training Grant Proposals (Ahonen, 2009; Zanoni, 2010)
- Susan Harwood Capacity Building Proposals (IWJ, 2010--Letter of support from Linda Forst)
- Zanoni proposal to Sociological Initiatives Foundation, 07/10, with Latino Union for safety exchange and charlas

#### Occupational Surveillance Team

- *Projects*

A major part of this effort has been to gather databases from federal, state, and local agencies that can be used by trainees for their research. We now have a data library consisting of multi-year datasets from the Illinois Workers Compensation Commission, the Illinois Department of Public Health, the Illinois Hospital Association, the Illinois Poison Center, OSHA, BLS, US Census Bureau, and others. We provide limited datasets to trainees to use for their research training, which consists of both methodological research (e.g., data linkage, application of statistical techniques) and subject-oriented research (e.g., occupational amputations, falls, construction injuries, and others).

#### Trainee Measures

Trainee measures include number of trainees on Interdisciplinary Teams, number of student theses or dissertations resulting from Interdisciplinary Teams, number of projects involving students in all aspects of the research, and number of publications with trainee authors. Trainee and student involvement on the TRT Occupational Surveillance team is shown in Table 3 and includes a list of trainees and students who are or were on the team, an indication of their level of involvement, and their thesis or dissertation title where applicable. Trainee authors are indicated in the Publication list below. Trainees and other students were involved in nine projects coordinated by the Occupational Surveillance team. Trainees and other students are among the authors on three published manuscripts, two submitted publications, and three manuscripts that are

in preparations. Two IH, 2 OEE, 2 OS, and 2 OM trainees or students, and 6 other students participated on the Occupational Surveillance team. The work of the team contributed to 3 MS theses, 1 PhD dissertations, 4 MPH capstone presentations, and 5 manuscripts for publication.

#### Interdisciplinary Measures

##### ERC faculty and staff on team

- Linda Forst, MD, MPH, Occupational Medicine, Injury Surveillance
- Lee Friedman, PhD, Occupational Epidemiology, Quantitative Methods
- Emily Ahonen, PhD, MPH, Occupational Epidemiology, Qualitative Methods
- Jennifer McGowan, Political Science, Sociology

##### Involvement of non-ERC faculty, staff, and students on work group

- Deborah Rosenberg, PhD, Epidemiology

#### Research Measures

##### Papers Delivered at Conferences

- Forst L. Invited Speaker and Participant. NIOSH/BLS sponsored Workers Compensation Workshop. "Data Linkage: Traumatic Injuries in Construction." Washington DC. 9/2009
- Forst L. Invited Speaker. Surveillance among Hispanic Immigrant and Low Wage Workers." OSHA Summit on Hispanic Workers, Houston Texas. 4/2010
- Forst L, Friedman L. Workplace Assaults in Illinois, 1997-2003. EPICOH Conference 2008, San Jose, Costa Rica
- Kunj St, Forst, L: Effectiveness of OSHA's National Emphasis Program on Amputations. Presented at the American Society of Safety Engineers Annual Conference, Baltimore,
- A Artiga, H Darabi Descriptive Analysis of Nonfatal Occupational Injury Cases among Cleaning Service Workers at an Illinois Hospital. Abstract and poster presentation at AIHCe, Montreal Canada, May 2013

##### Publications

- Halpin J, Forst L, Zautcke J. Conditions Causing Burn Injuries in Foodservice Workers. J Foodservice 2008;<http://www.blackwell-synergy.com/toc/fri/0/0>
- Forst L, Erskine T. Agricultural Injuries in Ohio, 2003-2006: A Report from the Emergency Medical Services Prehospital Database. J Ag Safety Health 2009;15(2):171-83
- Friedman L, Forst L. Workers Compensation Costs among Construction Workers: A Robust Regression Analysis. J Occup Env Med 2009
- Friedman L, Forst L. Workers Compensation Costs among Construction Workers: A Robust Regression Analysis. J Occup Env Med 2009
- Friedman LS, Forst LS. Workers Compensation Costs among Construction Workers: A Robust Regression Analysis. J Occup Environ Med 2009 Nov;51(11):1306-13
- Forst L, Avila S, Anozie S, Rubin R. Traumatic Occupational Injuries in Hispanic and Foreign Born Workers. Am J Industr Med 2010;53(4):344-51
- Forst L, Chukwu A, Friedman L. Reliability of the AMA Guides to the Evaluation of Permanent Impairment. J Occup Env Med 2010;52(12):1201-3
- Forst L, Masters D, Zanoni J, Avila S, Chaidez F, Miller A. Medical Interpretation for Immigrant Workers. New Solutions 2012;22(1):37-50
- Friedman L, Krupczak C, Forst L. Workplace Amputations in Illinois. Injury. 2012 Feb 23. [Epub ahead of print]
- Friedman L, Ruestow P, Forst L. Analysis of Ethnic Disparities in Workers Compensation Claims Using Data Linkage. J Occup Environ Med 2012;54(10):1246-52
- Ruestow P and Friedman LS. Relationship Between Acute Measures of Severity and Workers' Compensation Outcomes. (Am J Ind Med; EPUB)

##### Proposals Written/Grants Submitted

The Occupational Surveillance team has submitted eleven grant applications including four with Dr. Forst as principal investigator (PI), five with Dr. Friedman as PI to NIOSH, CDC, NIH, and CPWR, and two with Dr. Ahonen as PI to NIOSH and OSHA. While written by faculty, these proposals budget significant funding for students, complete with tuition remission, allowing us to attract and support highly qualified trainees.

#### Partnership, Collaboration Measures

##### Number of partnerships

The surveillance group is charged with establishing an occupational surveillance program in the State of Illinois. Surveillance team members attended a stakeholders group meeting that met for the first time in October 2010 and will include representatives from:

- Illinois Department of Public Health
- Illinois Workers Compensation Commission
- OSHA Area Offices—Calumet City, DesPlaines
- OSHA Region V Administrators
- Illinois Department of Labor
- Illinois Poison Center
- Interfaith Worker Justice
- National Day Laborers Organizing Network
- Arise Chicago (a Worker Center)
- Stroger Trauma Unit

##### Activities with partners

- We are conducting intervention studies that respond to findings showing an increase in severe injuries among Hispanics. We are working with Worker Centers to conduct health and safety training.
- Dr. Forst is using the results of TRT team analysis of injuries among temporary workers to organize an Occupational Health and Safety among Temporary Workers summit for Fall 2013.

##### Proposals with community partners

- Illinois Occupational Surveillance Program, NIOSH. Stakeholders partnered in writing this document and will be part of the advisory board.
- Susan Harwood grants—one not funded (2009), one in review (2010)
- Susan Harwood Capacity Building grants: one in review (2010)

##### Papers with community partners

- Forst L. Erskine T. Agricultural Injuries in Ohio (see above). The co-author is from the Ohio Department of Public Safety. He provided the dataset and co-authored the article.

#### Occupational and Environmental Epidemiology Team

##### • *Projects*

*Coal mining:* In 2008-2010, the team focused on coal mining exposure and health effects. The team assisted Dr. Cohen and PhD student Kathleen Kennedy on completing analysis and publication of a coal mining study done in the Ukrainian coal mining industry. Trainee Judith Graber used some of these data and some innovative epidemiology methods to examine the healthy worker/survivor effect on our ability to detect disease in this population. She also updated and examined surveillance data for coal miners in the US.

*Traffic Related Air Pollution and Active Transportation:* The team has been studying traffic related air pollution and active transportation (walking, bicycling) for 2 years. The project involves measuring a number of traffic-related air pollutants while bicycling. The team meets weekly during the academic year and discusses related published literature, exposure assessment methods, preliminary results, measurement feasibility, and researcher safety. Some of the sessions involved laboratory and field training in measurement methods, while some sessions were set aside for guest speakers from the Chicago Dept. of Transportation and the Active Transportation Alliance.

#### Trainee Measures

Trainee measures include number of trainees on Interdisciplinary Teams, number of student theses or dissertations resulting from Interdisciplinary Teams, number of projects involving students in all aspects of the research, and number of publications with trainee authors. Trainee and student involvement on the Occupational and Environmental Epidemiology team is shown in Table 4 and includes a list of trainees and students who are or were on the team, an indication of their level of involvement, and their thesis or dissertation title where applicable. Trainee authors are indicated in the Publication list below. Six IH, 1 OM, 1 HSAT, and 5 OEE trainees, and 2 other students participate on this team. One PhD dissertation and one MS thesis resulted from work on this team.

#### Interdisciplinary Measures

ERC faculty, staff, and students on team

- Leslie Stayner, PhD, Occupational and Environmental Epidemiology
- Lorraine M. Conroy, ScD, CIH, Industrial Hygiene
- Robert Cohen, MD, Pulmonary Medicine
- Victoria Persky, MD, Epidemiology and Biostatistics
- Jordan Hepler, ERC Project Coordinator
- Kirsten Almborg, OEE
- Margaret Sietsema, IH
- Matthew Schmitz, OEE
- Hugh Fritz, IH
- Catherine Jett, Community Health Sciences student
- Shewin Pananookooln, Epidemiology student
- Matthew Moy, Undergraduate student

Level of involvement of non-ERC faculty, staff, and students on team

- William Clapp, MD, Pulmonary Medicine
- Sheon MacNeill, RN, OHN-FP, Occupational Health Nursing

#### Research Measures

Proposals written/Grants submitted

- Conroy (PI). Improving Assessment of Near-Road Exposure to Traffic Related Pollution. Faculty and staff co-investigators include Victoria Persky, Leslie Stayner, Donna Kenski, PhD, Adjunct Associate Professor, Environmental and Occupational Health Sciences and Data Analyst, Lake Michigan Air Directors Consortium, and Jordan Hepler. Student investigators: Brian Czarnecki, Mark Wilson, Margaret Sietsema, Quincy Coleman, and from the industrial hygiene program; and Matt Schmitz, Stephanie DeFlorio, and Kirsten Almborg, Ben Booth, Anissa Lambertino, and Margarita Reina, from the occupational and environmental epidemiology program. (submitted to the Health Effects Institute; not funded)
- Almborg (PI). Estimating Personal Exposure to Traffic-Related Air Pollutants and Noise among On-Road Workers. Student co-investigators: Margaret Sietsema, EOHS; Matt Schmitz, EOHS; Brian Czarnecki, EOHS; Jordan Hepler, EOHS. (submitted to Illinois ERC PPRT program; funded 07/01/13-06/30/14)

Presentations

- B. Czarnecki, L.M. Conroy: Near-Roadway Exposure to Air Pollutants. Abstract and poster presentation at AIHCE, Montreal Canada, May 2013.
- K. Almborg, M. Sietsema, J. Hepler, H. Fritz, S. Pananookooln Estimating Personal Exposure to Traffic-Related Air Pollutants Among On-Road Workers (Presentation #0316). EPICOH 2014, Chicago IL

Papers published

- Graber JM, Cohen, RC, Miller BR, Stayner LT. "Health outcomes among underground coal miners; A long history of study" in Current Topics in Occupational Health Epidemiology. Venables KM (Ed.) Oxford University Press. 2013.
- Graber JM, Cohen RA, Basanets A, Stayner LT, Kundiev Y, Conroy L, Mukhin VV, Lysenko O, Zvinchuk A, Hryhorczuk D. Prevalence and predictors of respiratory symptoms among Ukrainian coal miners. Am J Ind Med. 2011 Dec 13. doi: 10.1002/ajim.21997. [Epub ahead of print]
- Stayner LT, Graber JM. Does exposure to coal dust prevent or cause lung cancer? Occup Environ Med. 68(3):167-8:2011 (2012).

#### **4. Industrial Hygiene**

##### **a) Background**

The Illinois ERC is based in the Environmental and Occupational Health Sciences (EOHS) Division in the School of Public Health at the University of Illinois at Chicago (UIC) and involves multiple campuses and colleges at the University of Illinois. Funded by the National Institute for Occupational Safety and Health (NIOSH) since 1977, the Illinois ERC has six academic, two continuing education and two research training programs as well as center-wide activities for outreach, diversity recruitment, research training and interdisciplinary coordination. Center faculty teach academic curricula for MS, MPH and PhD degrees in industrial hygiene (IH), occupational medicine (OM), occupational health nursing (OHN), agricultural safety and health (ASH), occupational safety (OS) and occupational epidemiology (OEE). Today, more than 400 alumni from these programs work throughout the world in a wide variety of public and private sector positions.

The Environmental and Occupational Health Sciences (EOHS) Division includes 21 faculty and approximately 70 graduate students. The Industrial Hygiene (IH) Program has been in existence since 1972 (prior to NIOSH funding) and supports the training of masters (MS and MPH) and doctoral (PhD) students, many of whom receive full or partial support from the Illinois ERC. The masters programs (MS and MPH) have been accredited by ABET since 1993 and were most recently re-accredited for five years in 2008.

##### **b) Goals and Objectives**

The two major goals of the academic training program are: (1) to develop industrial hygiene practitioners with as much practical experience as possible within the limits of an academic program; and (2) to provide a cadre of trainees, who have aptitude for research, with research training in occupational and environmental health. The research-trained group has the capability of entering into research-type activities in industry, as consultants, or in academe. The thrust of the IH training is to give students both an overall appreciation of the whole process of disease detection and risk evaluation leading to hazard control, and a competence in using the methods specific to the IH field. The overall emphasis of the training program is to give our students analytical and quantitative skills to aid them in solving occupational and environmental health problems. For the 2008-2013 project period, our specific goals were:

- Maintain the commitment to the integration of research and hands on-experience within the academic IH training program.
- Maintain the extramural funding base to support the commitment to research in Industrial Hygiene.
- Maintain the current level of minority participation in the IH program.
- Strengthen our collaboration with the UIC Epidemiology and Biostatistics program.
- Develop a research and teaching collaboration with the proposed Occupational Safety program and the College of Engineering.

##### **c) Results**

Important program changes in this reporting period include:

- Dr. Linda Forst, MD, (occupational medicine physician) hired in 2008 as EOHS Division Director.
- Dr. Nurtan Esmen, Professor, retired in 2010. He remains involved in research and doctoral student advising as Professor Emeritus.
- Dr. Lorraine Conroy (ERC Director and IH faculty) took a half-time position as Senior Associate Dean in the School of Public Health in August 2012. She remains actively involved in the IH program and will continue to advise students on research and capstone projects.

- Dr. Rachael Jones was hired in 2010 as a Research Assistant Professor; in 2011 she was appointed to a tenure-track position.
- Dr. Preethi Pratap was hired in 2008 as a Research Assistant Professor.
- Dr. Mark Finn was hired in Spring 2012 as an Adjunct Assistant Professor.

### Trainee Progress and Accomplishments

Annually, 4 to 5 new students enter the IH Program and 3 to 9 graduate. Masters (MS and MPH) students complete the program in two years; doctoral students generally complete their degree in 3 to 5 years. In the last grant period (7/1/08 to 6/30/13) a total of 40 students was enrolled in the IH (32 students) and HSAT (8 students); 31 were supported NIOSH training grant funds (designated with N) and 8 were under-represented minority students (designated with URM) (Table 2). In the same period, 26 students graduated (19 IH and 7 HSAT); 19 were supported with NIOSH training grant funds and 5 were under-represented minorities.

- Abelmann, Anders (IH, PhD) - S. Erdal (Adviser); Graduated 05/2010. Breathing Zone and Aspirated Welding Fume Exposure Assessment: Fractional Factorial Design
- Alabi, Olasunkanmi (IH, MPH, N, URM) - L. Conroy (Adviser): Graduated 05/2012. Evaluation of WHO Protecting Healthcare Workers - Preventing Needlestick Injuries Toolkit
- Ali, Fatai (IH, MPH, N) - L. Brosseau (Advisor): Graduate 05/2014. Evaluation of Hazards at a Community HIV Outreach Provider Sites.
- Bigger, Samuel (IH, MS, N) - S. Lacey (Adviser) - Graduated 05/2008. An Industrial Process Classification Scheme for Exposure Assessment
- Carroll, Timothy (IH, MPH) - L. Conroy (Adviser) - Graduated 05/2012. Inhalation Exposure to Hexavalent Chromium Among Welders in the Petroleum Industry
- Castellanos, Jorge (HSAT, MS, N, URM) - S. Erdal (Adviser) [graduation expected fall 2014]
- Catalin, Bogdan (IH, PhD, N) - S. Erdal (Adviser) - Graduated 05/2010. Size-Fractionated Particulate Matter Area Exposure Assessment Near Urban Single-Family Demolition Sites
- Chin, Brian (IH, MS, N)- Graduated 05/2014.
- Coleman, Quincy (IH, MS, N) - R. Jones (Adviser). A Compartmental Model for the Assessment of Exposure to Methicillin-resistant *S. aureus*
- Czarnecki, Brian (IH, MS, N) - L. Conroy (Adviser) [graduation expected fall 2014]. Near-Roadway Exposure to Air Pollutants - A Pilot Study
- Debaene, Austin (IH, MPH) - S. Erdal (Adviser) - Graduated 05/2012. Formaldehyde Exposure in a Gross Anatomy Laboratory
- Erogbogbo, Lasbat (IH, MPH, N) - S. Lacey (Adviser) - Graduated 05/2012. Understanding Process Safety Management Failures in Industries
- Gribovich, Andrey (IH, MS, N) - S. Lacey (Adviser) - Graduated 05/2012. Assessment of Arsenic Dust Surface Contamination in a Museum Anthropology Department
- Gutierrez-Ospita, Maria (IH, PhD) - N. Esmen (Adviser) - [withdrew]
- Habib, Harris (IH, MPH) – S. Cali (Advisor)- Graduated fall 2013
- Hepler, Jordan (IH, MS, N) - S. Dorevitch (Adviser)- Graduated fall 2013. Rainfall Effects on *E. coli* Concentrations at Chicago Beaches
- Horvatin, Shanna (HSAT, MS, N) - S. Lacey (Adviser) - Graduated 08/2008. An Examination of Occupational History: Reliability of Self-Reported Work History vs. Company Records
- Lopez, Ramon (HSAT, MS, N, URM) - P. Scheff (Adviser) - Graduated 05/2010. Assessing Aerosol Exposure for Recreators on the Chicago Waterways Using a Microbial Indicator
- Lotter, Jason (HSAT, MS, N) - S. Lacey (Adviser) - Graduated 12/2012. Groundwater Arsenic in Chimaltenango, Guatemala
- Lynn, Kristine (IH, MS, N, URM) - L. Conroy (Adviser) - Graduated 12/2009. Assessment of Chlorine Exposure in People Working with Laboratory Animals
- Murisic, Bojana (HSAT, MS, N) - S. Erdal (Adviser) - Graduated 12/2011. Human Health Risk Assessment of Pharmaceuticals in US Surface Waters
- Murphy, Colin (IH, MS, N) - L. Conroy (Adviser) - Graduated 12/2011. Comparing Indoor Air Quality in Newer “Green” Low-Income Housing vs. Traditional Homes
- Oladeinde, Patient (IH, MPH, URM) - L. Forst (Adviser). Evaluation of an Injury Prevention Program at a Power Generation Company

- Pagone, Frank (IH, MS, N) - S. Erdal (Adviser) - Graduated 06/2013. EPA's National Air Toxics Assessment: Emissions and Cancer Risk Analysis in Cook County, IL
- Pagone, Frank (IH, PhD, N) - S. Erdal (Adviser) [continuing]
- Patel, Chirag (IH, PhD, N) - N. Esmen (Adviser) - Graduated 05/2011. Modeling Historical Time Trends with Occupational Hygiene and Contaminant Characteristics as Predictors
- Piatek, James (HSAT, MS, N) - P. Scheff (Adviser) - Graduated 08/2009. Development and Validation of a Method to Quantify Skin Exposure to Water During Non-Contact Recreation
- Pierce, Brennan (IH, MS, N) - S. Dorovitch (Adviser) - Graduated 02/2009. The Use of Sanitary Surveys to Predict Microbial Measures of Water Quality in Chicago Area Surface Waters
- Pierce, Jennifer (IH, PhD) - N. Esmen (Adviser) - Graduated 08/2011. A Novel Method for Reducing the Number of Agents to be Studied in an Occupational Epidemiology Study
- Ramaswamy, Vikrum (IH, MS, N) - S. Lacey (Adviser) - Graduated 05/2013. School Nurses and the Swine Flu Pandemic of 2009-2010
- Saldana, Andres (IH, MPH, URM) - L. Conroy (Adviser) - Graduated 12/2008. Confined Spaces in a Manufacturing Facility
- Schoonover, Todd (IH, PhD) - L. Conroy (Adviser) - Graduated 08/2009. Personal Exposure and Biomarkers Among Production Welders and Non-Welders
- Shimek, Jo Anna (IH, PhD, N) - S. Erdal (Adviser) - Graduated 08/2010. Occupational Chemical Exposure Assessment in a Brain Cancer Case-Control Study
- Sietsema, Margaret (HSAT, MS, N) - L. Conroy (Adviser) - Graduated 12/2011. Recruitment Strategies and a Case Study of Respiratory Protection in Illinois Hospitals
- Sietsema, Margaret (IH, PhD, N) - L. Brosseau (Adviser) [continuing]
- Vroman, Thomas (IH, MS, N) - S. Dorovitch (Adviser). Evaluation of a New Rapid Method for Determining Recreational Water Quality
- Welch, Alison (IH, MS, N) - P. Scheff (Adviser) - Graduated 08/2008. Lead Dust and Total Dust Emissions during Demolition of Single Family Homes
- Wilson, Mark (IH, PhD, N) - L. Conroy [continuing]
- Yavuz, Burcu (HSAT, MS, N) - S. Lacey (Adviser) - Graduated 12/2012. Receiver-Operating Characteristics (ROC) Analysis of Fecal Indicator Bacteria and Pathogens
- Zwanziger, Avraham (IH, MS, N) - S. Dorovitch (Adviser) [continuing]

#### Trainee Presentations

[IH trainees are underlined; IH faculty are italicized]

- Frank Pagone, Sage Kim, Joseph Benitez, Odunayo Olorunfemi, Ifeanyi Beverly Chukwudozie, Serap Erdal: USEPA's National Air Toxics Assessment: Emissions and Cancer Risk Analysis in Illinois and Cook County.
- 5th Annual Minority Health in the Midwest Conference, UIC School of Public Health, Chicago, IL, Fall 2013
- Sietsema M., Conroy L, Brosseau L, Cline K: Scoring Hospital Respiratory Protection Programs using Written Programs and Interview Data. Presented at the International Society for Respiratory Protection Annual Meeting, Boston MA, September 2012.
- Margaret Sietsema, S. Erdal: Using Industrial Hygiene Methods to Estimate Exposures from Brownfield Sites.
- Presented at the American Industrial Hygiene Association Fall Conference, October 29, 2012. Quincy Coleman, Rachael M. Jones: A compartmental model of MRSA transmission among healthcare workers attending an infected patient in a nursing home. Presented at the American Industrial Hygiene Conference and Exposition, May 22, 2013.
- J. Castellanos (MS trainee), S. Erdal: Outdoor Air Exposure of Underserved Urban Chicago Youth to Nitrogen Dioxide and Ozone. Presented at the American Industrial Hygiene Conference and Exposition, May 22, 2013.
- B. Czarnecki, L.M. Conroy: Near-Roadway Exposure to Air Pollutants: A Pilot Study. Presented at the American Industrial Hygiene Conference and Exposition, May 22, 2013.

- P. Oladeinde, L. Forst, L. Friedman: Evaluation of an Injury Prevention Program at a Power Generation Company. Presented at the American Industrial Hygiene Conference and Exposition, May 22, 2013.
- F. Pagone, S. Erdal, S. Kim, I. Chukwudozie, K. Osiecki, J. Benitez, R. Barrett, E. Calhoun: USEPA's National Air Toxics Assessment: Emissions and Cancer Risk Analysis in Illinois and Cook County. Presented at the American Industrial Hygiene Conference and Exposition, May 22, 2013.
- D. Young, R.M. Jones: Quantifying Response Time in Lascar Carbon Monoxide Monitors to Produce High- Resolution Measurements. Presented at the American Industrial Hygiene Conference and Expo, May 22, 2013.
- D. Jacobs, S. Dixon, J. Breyse, E. Ahonen: Moving Into Green Healthy Housing: The Yield in Health (The MIGHHTY Study). Presented at the American Industrial Hygiene Conference and Expo, May 22, 2013.
- L. Brosseau, K. Cline, L. Conroy, M. Sietsema: Respirator Policies and Practices for Aerosol-Transmissible Diseases in Acute Care Hospitals. Presented at the American Industrial Hygiene Conference and Exposition, May 22, 2013.
- J. Lippert, R. Lopez, N. Esmen, L. Conroy, J. Franke, J. Breskey, S. Lacey: Determination of Emission Rate of Medical Laser Generated Air Contaminants in a Simulated Surgical Procedure. Presented at the American Industrial Hygiene Conference and Exposition, May 22, 2013.
- L. Brosseau, K. Cline, L. Conroy, M. Sietsema: Safety Climate and Respirator Practices and Policies in Acute Care Hospitals. Presented at the American Industrial Hygiene Conference and Exposition, May 22, 2013.
- L. Brosseau, A. Bejan, D. Parker, M. Skan: Safety Programs, Workplace Safety Conditions and Employee Safety Practices in Auto Collision Repair Businesses. Presented at the American Industrial Hygiene Conference and Exposition, May 22, 2013.
- J. Hauge, L. Brosseau, M. Roe, C. Colton: Real-Time Fit of a Respirator during Simulated Health Care Tasks. Presented at the American Industrial Hygiene Conference and Exposition, May 22, 2013.
- M. Cohen, M. Roe, L. Brosseau: The Use of Video Exposure Monitoring in a Training Video to Motivate Fit- Testing and the Appropriate use of Healthcare N95 Respirators. Presented at the American Industrial Hygiene Conference and Exposition, May 22, 2013.
- F. Boelter, R. Jones, Y. Xia, L. Dell: Cumulative Exposures to Dusts and Asbestos Fibers from Drywall Finishing. Presented at the American Industrial Hygiene Conference and Exposition, May 22, 2013.

#### Trainee Awards

- John Breskey, NIOSH Pilot Project Award, "Morphological Assessment of Welding Fume from Source to Receptor" (2008)
- Anders Abelmann, Sweden–American Foundation Scholarship (2008)
- John Breskey, Institute for Environmental Science and Policy Graduate Fellowship (2008)
- Chirag Patel, NIOSH Pilot Project Award, "Modeling PAH generation in high speed grinding operations" (2009)
- Jo Anna Shimek, CDC R36 Dissertation Research Grant (2010)
- John Breskey, CDC Interdisciplinary Postdoctoral Fellowship (2010)
- Anders Abelmann, UIC Graduate College Presenter's Award (2010)
- Anders Abelman, UIC Health Professionals' Student Council Travel Award (2010)
- Anders Abelmann, Michael Bruton Workplace Safety Foundation Scholarship (2011)
- Anders Abelmann, University of Illinois Alumni Association Student Leadership Award (2011)
- Anders Abelmann, Alan W. Donaldson Memorial Award (2011)
- Simi Erogbogbo, UIC SPH Scholarship for Disadvantaged Students (2011)
- Anders Abelmann elected to the AIHA Chicago Section Board of Directors (2011)
- Tom Vroman, AIHA Chicago Local Section Fred Tremmel Award for best graduate student poster, AIHA Chicago Section Student Night (2012)
- Simi Erogbogbo, US Department of Education Erma Byrd Scholarship (2012)
- Ola Alabi, US Department of Education Erma Byrd Scholarship (2012)
- Jordan Hepler, US Department of Education Erma Byrd Scholarship (2012)

- Frank Pagone: Award of Appreciation: American Industrial Hygiene Association Annual Conference and Exposition - Social Concerns Committee, Student Poster - "USEPA's Toxic Release Inventory Data: Spatial and Temporal Trends in Illinois" (2013)

#### Research Projects with Trainee Participation

Fundamental Study of Welding Fume Inhalation (PI: S. Erdal) (2007-2010): Study of welding fume exposures and characterization of welding fume aerosols. Supported trainees John Breskey, Bogdan Catalin and IH student Anders Abelmann.

Chicago Health, Environmental Exposure and Recreation Study (CHEERS) (PI: Dorovitch) (2006-2009): This project is designed to help the Chicago Metropolitan Water Reclamation District evaluate appropriate future water quality for recreational use of waterways. MS trainees Ramon Lopez, James Piatek, Brennan Pierce, Thomas Vroman received support from this project.

Safe Drinking Water Intervention (PI: S. Lacey) (2009): Project with UIC Engineers Without Borders Student Chapter in Cerro Alto, Guatemala to evaluate pesticides in drinking water. Ramon Lopez participated in this project.

Exposure Reconstruction of Jet Engine Workers (PI: N. Esmen) (2007-2010): Supported trainees Chirag Patel and Jennifer Pierce.

Lead Dustfall During Single-Family Housing Demolition (PI: D. Jacobs) (2009-2010): HUD-funded study of lead levels in and around homes during demolition. Supported trainees Alison Welch and Bogdan Catalin.

Healthy Housing (PI: D. Jacobs) (2010): HUD-funded project evaluating indoor air exposures in newly-constructed housing. Project supported trainee Colin Murphy.

Clear-Win: An Evaluation of Lead Education and Window Replacement in Illinois (PI: Jacobs): HUD-funded project to evaluate the effect of window replacement intervention on lead dust concentrations on surfaces in the home. MS trainee Quincy Coleman was supported on this project.

Bacterial Indicators in Stormwater at Chicago Beaches (PI: Dorevitch)(2011-2013): This project supported MS trainee Jordan Hepler.

Rapidly Measured Indicators of Waterborne Pathogens (PI: Dorevitch) (2011-2013): Supported trainee Burcu Yavuz.

Evaluation of Respirator Usage among Health Care Workers Exposed to Influenza in Minnesota and Illinois (PI: Brosseau & Conroy) (2010-2012): The goals of this project were to evaluate written respiratory protection programs and interview staff about respiratory protection policies and practices in Illinois hospitals. This project supported MS trainees Margaret Sietsema and Jason Lotter and MPH trainee Lasbat Erogbogbo.

Infectious Diseases Risk Modeling (2012-2013) (PI: Jones): The goal of this project is to estimate the burden of occupational infections in the healthcare sector arising from selected infectious agents. This project supported MS trainee Quincy Coleman.

Illinois Department of Public Health, Illinois Beach Sanitary Surveys (PI: Cali) (2012-2013): Field characterization and data analysis of swimming beach locations to ensure water quality prior to recreation. Trainee Harris Habib was supported on this project.

#### Publications

The following are selected publications by IH faculty and students published or accepted for publication during the reporting period (student authors are underlined; NIOSH trainees are underlined, IH faculty are indicated by italics)

- Brown LP, Rospenda KM, Sokas RK, Conroy L, Freels S, Swanson NG. Evaluating the association of workplace psychosocial stressors with occupational injury, illness, and assault. *J Occup Environ Hyg.* 2011. Jan;8(1):31-7. doi: 10.1080/15459624.2011.537985. PubMed PMID: 21154106.
- Pierce JS, Esmen NA. A novel method for reducing the number of agents to be studied in an occupational epidemiologic study. *J Occup Environ Hyg.* 2011 Apr;8(4):236-48. doi: 10.1080/15459624.2011.564097. PubMed PMID: 21416442.

- Amuwo S, Sokas RK, McPhaul K, Lipscomb J. Occupational risk factors for blood and body fluid exposure among home care aides. *Home Health Care Serv Q.* 2011 Apr;30(2):96-114. doi: 10.1080/01621424.2011.569690. PubMed PMID: 21590568.
- Abelmann A, Lacey SE, Gribovich A<sup>t</sup>, Murphy C<sup>t</sup>, Hinkamp D. Hazard evaluation and preventive recommendations for an unusual confined space issue in an opera set design. *J Occup Environ Hyg.* 2011 Sep;8(9):D81-5. doi: 10.1080/15459624.2011.596470. PubMed PMID: 21810011.
- Jones RM, Liu L, Dorevitch S. Hydrometeorological variables predict fecal indicator bacteria densities in freshwater: data-driven methods for variable selection. *Environ Monit Assess.* 2013 Mar;185(3):2355-66. doi: 10.1007/s10661-012-2716-8. Epub 2012 Jun 27. PubMed PMID: 22736208.
- Gribovich A, Lacey S, Franke J, Hinkamp D. Assessment of arsenic surface contamination in a museum anthropology department. *J Occup Environ Med.* 2013 Feb;55(2):164-7. doi: 10.1097/JOM.0b013e3182717e51. PubMed PMID: 23291998.
- Jones RM, Adida, E. Selecting non-pharmaceutical interventions for influenza. *Risk Anal.* 2012. Doi:10.1111/j.1539-6924.2012.01938.x
- Jones, RM, Graber JM, Anderson R, Rockne K, Turyk M, Stayner LT. Community drinking water quality monitoring data: utility for public health research and practice. *J Public Health Manage Pract.* 2013
- David E. Jacobs, Salvatore Cali, Alison Welch, Bogdan Catalin, Sherry L. Dixon, Anne Evens, Amy P. Mucha, Nicole Stites, Serap Erdal, John Bartlett, Hua Wei, Peter Scheff. Lead and Other Heavy Metals in Dustfall from Single Family Housing Demolition. *Public Health Reports*, 2013.
- Jonathan Wilson, Sherry L. Dixon, David E. Jacobs, Jill Breyse, Judith Akoto, Ellen Tohn, Margorie Isaacson, Anne Evens, Yianice Hernandez. Watts-to-Wellbeing: Does residential energy conservation improve health? *J Energy Efficiency (On-line May 14, 2013, doi: 10.1007/s12053-013-9216-8).*
- Buchanich J, Youk A, Marsh G, Lacey S, Kennedy K, Hancock R, Esmen N, Lieberman F, Fleissner M. Long-term health experience of jet engine manufacturing workers: V. Issues with the analysis of non-malignant central nervous system neoplasms. *J Registry Mgmt* 38:115-119 (2011).
- Lacey S, Lopez R, Frangos C, Khodadoust A. Water quality degradation after water storage at household level in a piped water system in rural Guatemala. *Intl J Service Learning Engineering* 6:118-129 (2011).
- Schoonover S, Conroy L, Lacey S, Plavka J. Personal exposure to metal fume, NO<sub>2</sub>, and O<sub>3</sub> among production welders and non-welders. *Ind Health* 49:63-72 (2011).
- Buchanich J, Youk A, Marsh G, Kennedy K, Esmen N, Lacey S, Hancock R, Cunningham M, Lieberman F, Fleissner ML. Long-term health experience of jet engine manufacturing workers: IV. A comparison of CNS cancer identification using mortality and incidence data. *Annals of Epidemiology* (2010).
- Schoonover S, Conroy L, Lacey S, Plavka J. Personal exposure to metal fume, NO<sub>2</sub>, and O<sub>3</sub> among production welders and non-welders. *Ind Health* (2010).
- Marsh G, Buchanich J, Youk A, Cunningham M, Lieberman F, Kennedy K, Lacey S, Hancock R, Esmen N, Fleissner ML. Long-Term Health Experience of Jet Engine Manufacturing Workers: III. Incidence of Malignant Central Nervous System Neoplasms. *Neuroepid* 35:123-141(2010).
- Samuel Dorevitch, Suraj Panthi, Yue Huang, Hong Li, Angela M. Michalek, Preethi Pratap, Meredith Wroblewski, Li Liu, Peter A. Scheff, An Li. Water ingestion during water recreation. *Water Research.* (2010)
- Dorevitch S, Ashbolt NJ, Ferguson CM, Fujioka R, McGee CD, Soller JA, Whitman RL: Knowledge and gaps in developing microbial criteria for inland recreational waters. *Environmental Health Perspectives.* June 2010 118(6):871-6.
- Ahonen EQ, López-Jacob MJ, Vázquez ML, et al. Invisible work, unseen hazards: The health of women immigrant household service workers in Spain. *Am J Ind Med.* 2009.
- Broz D, Levin EC, Mucha AP, et al. Lessons learned from Chicago's emergency response to mass evacuations caused by hurricane Katrina. *Am J Public Health.* 2009;99:1496-1504.
- Buchanan S, Vossen P, Krause N, et al. Occupational injury disparities in the US hotel industry. *Am J Ind Med.* 2010;53:116-125.
- Buchanich JM, Youk AO, Marsh GM, et al. Methodological issues in a retrospective cancer incidence study. *Am J Epid.* 2009;170:112-119.

- Dong M, Yang D, Kuang Y, He D, Erdal S, Kenski D. PM2.5 concentration prediction using hidden semi- Markov model-based times series data mining. *Expert Syst Appl.* 2009;36:9046-9055.
- Friedman LS, Forst LS, MPH. Workers' compensation costs among construction workers: A robust regression analysis. *J Occ Env Med.* 2009;51:1306-1313.
- Hryhorczuk D, Dardynskaia I, Lukyanova E, et al. Risk factors for wheezing in Ukrainian children: Ukraine European longitudinal study of pregnancy and childhood group. *Paediatr Perinat Epid.* 2009;23:346-351.
- Lacey S. The role of the occupational hygienist in development-oriented public health engineering projects. *Ann Occup Hyg.* 2010;54:5-7.
- Lacey S, Abelmann A, Dorevitch S. Exposure to human waste from spills while servicing aircraft lavatories: hazards and methods of prevention. *Ind Health.* 2010.
- Marsh GM, Esmen NA, Buchanich JM, Youk AO. Mortality patterns among workers exposed to arsenic, cadmium, and other substances in a copper smelter. *Am J Ind Med.* 2009;52:633-644.
- Mucha AP, Stites N, Evens A, MacRoy PM, Persky VW, Jacobs DE. Lead dustfall from demolition of scattered site family housing: Developing a sampling methodology. *Environ Res.* 2009;109:143-148.
- Marsh G, Buchanich J, Youk A, Cunningham M, Lieberman F, Kennedy K, Lacey S, Hancock R, Esmen N. Long-term health experience of jet engine manufacturing workers: I. Mortality from central nervous system neoplasms. *J Occ Env Med* 50:1099-1116 (2008).
- Marsh G, Buchanich J, Youk A, Cunningham M, Lieberman F, Kennedy K, Lacey S, Hancock R, Esmen N. Long-term health experience of jet engine manufacturing workers: II. Total and cause-specific mortality excluding central nervous system neoplasms. *J Occ Env Med* 50:1117-1129 (2008).
- Kovalsky A, Lacey S, Kaphle U, Vaughn J. Risk perception and water purification practices for waterborne parasitic infections in remote Nepal. *Trop Doct* 38:229-231 (2008).

#### Other Activities

Trainees were active in a number of student professional organizations, including:

- University of Illinois Industrial Hygiene Student Association
- UIC American Society of Safety Engineers Student Chapter
- AIHA Chicago Local Section
- Greater Chicago Chapter of the American Society of Safety Engineers
- Society for Risk Analysis
- Illinois Public Health Association
- UIC Engineers Without Borders

#### Curriculum

Revisions to the industrial hygiene curriculum started in 2011 were fully complete by September 2012; these involved eliminating and reconfiguring several courses and lowering the number of required credits from 59 to 52 semester hours. Trainees complete 29 semester hours in EOHS and IH courses, the latter focused on the core skills of recognizing, evaluating and controlling physical, chemical, biological and psychosocial stressors. Trainees in the MPH program take courses focused on core public health knowledge and skills in biostatistics, epidemiology, behavioral sciences and principles of management; in addition they complete a field experience and capstone research project. Trainees in the MS and PhD program undertake coursework and activities focused on building research skills. (More details on these courses are provided above.)

#### Faculty Activities

##### Awards, Honors, Appointments

- Mr. Salvatore Cali, AIHA Chicago Section Board of Directors (2009-present)
- Steve Lacey, AIHA Board of Directors (2009-present)
- Lorraine Conroy, NIOSH Study Section (2010-present)

## 5. Occupational Medicine

### a) Background

The Occupational Medicine Residency (OMR) at the University of Illinois at Chicago (UIC) has been addressing the training needs of the Midwest region for over three decades. This program was one of the first in the country, becoming established in conjunction with the Cook County Hospital combined Internal Medicine/OM residency when NIOSH funding was received for both programs in July 1978. The two programs shared faculty, clinics, rotations, and didactic training sessions. In 2008, the combined program at Stroger Cook County Hospital closed when the county underwent a budget crisis. The majority of the Stroger Cook County faculty moved their appointments to UIC and remained active in the training program. The UIC program currently graduates three or four residents per year as the only OMR in a four state area. As shown by both local and national publications on availability and training in occupational medicine, there is an on-going need for specialty trained physicians in occupational medicine. Our graduates typically have their choice of numerous employment options upon graduation.

The mission of the UIC Occupational Medicine Program is to advance the field of occupational medicine through training, research, and outreach at the local, regional, and national level. Residency graduates are board eligible in Preventive Medicine/Occupational Medicine. They evaluate, diagnose, and treat occupational illnesses and injuries regardless of occupation. Faculty members engage in occupational and environmental research that evaluates hazardous exposures to workers and communities. Faculty, current residents, and graduates serve as experts in the field of occupational and environmental medicine and actively engage in policy making.

### b) Goals and Objectives

Graduates from the UIC Occupational Medicine Residency will be able to:

- Provide high quality clinical occupational health care to workers from a variety of workplaces settings: manufacturing, mining and construction, transportation, service, and health industries.
- Incorporate objective assessment of the occupational medicine literature into their practices and will be able to evaluate and conduct epidemiologic research.
- Function as occupational medicine consultants. They will be able to offer a professional opinion on the link between workplace or environmental exposure and disease, incorporating weight of evidence, dose-response, and toxicological information.
- Participate in occupational and environmental policy-making at the local, regional, and national level. They will perform clinical, research, and policy activities with a public health/population level approach.

### c) Results

The following are highlights of program accomplishments from the past five years:

- The didactic curriculum was redesigned and now follows a monthly curriculum topic schedule taken from the ACOEM competencies. The curriculum lasts for 24 months. Each month includes two Grand Rounds, Journal Club, Industrial Hygiene Process talk, Resident Case Presentation, Impairment/Disability Evaluation, and Board Review or Core Content Review, all focusing on the curriculum topic of the month.
- All rotation objectives were re-written to address the ACGME core competencies in occupational medicine.
- The residency evaluation procedures were updated:
  - The monthly resident evaluation forms that are completed by rotation preceptors were changed to address both the ACGME general residency competencies and the rotation objectives.
  - We added evaluations including: a '360 degree' evaluation of each resident annually in which all members of the clinic including administrative staff and nurses submit evaluations of the residents; Core residency faculty complete a written evaluation bi-annually; residents and faculty complete a chart-stimulated self assessment bi-annually.
  - The rotation evaluation forms were updated so residents have the opportunity to anonymously evaluate their rotations.
- A month-long Occupational Medicine resident elective rotation was developed. Two or three resident rotators complete this every year. (This is in addition to 5-10 medical student rotators per year.)

- The applicant pool has increased in quality and quantity. Activities to improved our applicants included:
  - We developed a handout for the interview folder called Benefits of the UIC Occupational and Environmental Residency Program which lists items that are unique to our program such as rotations at Region 5 ATSDR and World Health Organization, the tuition waiver, and the GME education money and ERC support for travel to conferences.
  - We developed an email questionnaire that we send to candidates to whom we offered spots but who declined. There have been no glaring problems with our interview process or negative feedback on our program but we will continue to solicit this feedback.
  - We participate in a residency fair each fall where medical students from all Chicago medical schools (five schools) visit our booth. Our display includes a large poster, slide show, pamphlets, informational folders, and hardhat shaped stress balls with our logo.
- We added an elective rotation at Occupational Medicine Specialists, a busy consulting practice which has provided additional training in private Occ/Env Med practice which caters to corporate settings.
- We added training in disaster preparedness to our program competencies. Staff from the UIC Environmental Health and Safety Office now provide several lectures per year and a tabletop exercise.
- We added a rotation in Occupational Health management which is now required of all senior residents during the last 6 months of the program. During this rotation residents function as the Medical Director of UHS supervising the nurse practitioners and attending hospital management meetings with Dr. Marder.
- We developed a new course which takes place on two Wednesday mornings per month during our regular conference time called “Core Content Review.” Dr. Buchanan chooses occ med knowledge topics and sends specific knowledge questions related to that topic to the residents in advance who research the questions and present the results during the session.
- We created a website with pages for curriculum, research, rotations, and graduates’ careers.
- The RAC was revamped to include members from corporate occupational medicine settings and preceptors of new rotations.
- The pass rate of the Preventive Medicine/Occupational Medicine speciality boards for the past five years is 75%, which is the rate recommended by ACGME for our specialty.

Program accomplishments since the most recent progress report include:

We received full ACGME accreditation with our next self-study scheduled for October, 2018. On July 1, 2013 we hired an Associate Residency Director. Dr. Dan Bakston will spend the year becoming oriented to all aspects of the residency management including the ERC grant responsibilities and the new ACGME accreditation program called the Milestones Project which will replace the current accreditation program in 2014. The transition to this new accreditation program will require numerous changes in the way we evaluate resident performance and track their progress through the curriculum. The Associate Residency Director will prepare a year-long plan for this transition, will create the policies, procedures, and documents necessary, and will train faculty on the new system. Virginia Evans, who is currently serving as the assistant program director, will change her position to assist Dr. Duvall in the residents’ weekly Consultation Clinic. Volume has increased in the clinic and there are major issues of flow and time management that Dr. Evans will address.

The following are highlights of resident accomplishments in the past five years include:

- Chief resident Virginia Evans was invited to present a poster of her Capstone research at the 3rd Global Symposium on IGRAs in Hawaii. Resident Nicole Patino participated in an ILO Work Group on the International Guidance on Diagnostic and Exposure Criteria for Occupational Diseases, contributing to a document from that group, and helped developed the ICD-11 planning document at WHO.
- PGY-2 resident Ana Nobis received a Certificate in Global Health from Vanderbilt Institute for Global Health. She was elected to the ACGME Preventive Medicine Residency Review Committee & will also serve on Council of Review Committee Residents. She also completed a month-long rotation on medical reporting at ABC News in New York City.
- Chief resident Howard Chey co-authored an article for Primary Care: Clinics in Office Practice titled “Toxins in Everyday Life.”

- PG-3 resident Abraham Chukwu's research project was accepted for presentation at the AOHC meeting in May 2010 and he co-authored a publication, "Reliability of the AMA Guides to the Evaluation of Permanent Employment."

Seventy percent of our graduates in the past five years are working in the Occupational Medicine field. In June 2013 the UIC OMR graduated three residents. Anthony Harris was hired as Medical Director of an occupational medicine clinic in Elkhart, Indiana. Amy Allegretti, who was already board certified in Emergency Medicine when she started the program, will be working in urgent care while she investigates occupational medicine opportunities in the Chicago area. Daniel Bakston will be splitting his time between duties as Associate Director of the UIC OMR and an occupational medicine clinic on the south side of Chicago. Dr. Harris' research characterized the differences between workplace injuries that were transported by urgent ambulance ("lights and sirens") for care vs. those that did not require urgent ambulance transport, using the Illinois Trauma Registry database. His mentor was Dr. Peter Orris. Dr. Allegretti's used Illinois Hospital discharge data to compare the outcomes of toxic poisonings in those using a toxicology consult vs. those not using this referral service. Her mentor was Dr. Lee Friedman from EOHS/SPH. Dr. Allegretti's research was selected for presentation at the annual American Occupational Health Conference (AOHC) in Orlando, Florida in May 2013. Dr. Bakston characterized barotrauma cases among pilots and flight attendants presenting to the UIC O'Hare clinic, comparing diagnoses vs. outcomes and work ability. He plans to publish this project with his mentor Dr. Sam Dorevitch. None of the trainees from the previous five years are currently conducting academic research.

The following are highlights of faculty accomplishments from the past five years:

Dr. Buchanan:

- became Medical Advisor to SunCoke Energy
- was appointed to the Children's Health Protection Advisory Committee of USEPA
- serves on the Pediatric Environmental Health Specialty Unit (PEHSU) Steering Committee
- became Medical Advisor to AbbVie, Inc.
- started a children's environmental health blog
- served on the Board of the Association of Occupational Environmental Clinics
- became Director of the Great Lakes Center for Children's Environmental Health
- submitted a grant proposal to HRSA to expand preventive medicine training and to collaborate with Stroger Hospital on resident training

Dr. Duvall

- became Medical Advisor to Hospira Health, Inc. Dr. Orris:
- was elected the 2011 Distinguished Alumnus, Chicago Medical School, Rosalind Franklin University of Medical Sciences
- served as an expert Consultant, Region 5, USEPA
- serves as Physician Advisor for the Retirement Board of the Chicago Policemen's Annuity Benefit Fund
- serves as President of District 6, Chicago Medical Society
- serves as Consultant to the United Nations Development Program Medical Waste Project
- was appointed Chair of the Research Collaborative, Health Care Without Harm Global Health and Safety Initiative, and Advisor, Environmental Working Group of the World Medical Association
- was chair of the Environment Working Group of the World Federation of Public Health Associations

Dr. Kranz

- is the co-medical director of the Healthy Lungs Initiative, a program of the Cook county Health and Hospitals System.

Dr. Forst:

- became director of the Division of Environmental and Occupational Health Sciences at UIC SPH
- developed the Illinois Occupational Surveillance Program, a program funded by NIOSH and working in partnership with State agencies

- testified before the Illinois State Legislature on the use of the AMA Guides for Evaluation of Permanent Impairment in the State's new Workers Compensation legislation
- trained new arbitrators at the Illinois Workers Compensation Commission
- sits on the ILO committee developing criteria for diagnosis of occupational diseases on the ILO's recommended list.
- sits on the WHO working group to define occupational diseases in the upcoming ICD 11
- is the director of the WHO Collaborating Center in Occupational Health at UIC School of Public Health
- took over directorship of the on-line curriculum offered through EOHS, Global Program in Occupational Health and Hygiene Practice
- was the invited Speaker on "Surveillance among Hispanic Immigrant and Low Wage Workers" at the OSHA Summit on Hispanic Workers, Houston Texas, and the keynote Speaker at the 11<sup>th</sup> Annual Pilot Research Project Symposium, University of Cincinnati

Dr. Dorevitch

- received a grant from the CDC titled: "Building Resilience Against Climate Effects in Illinois"
- was co-PI on the UIC Area of Excellence in "Urban Water Infrastructure, Policy, and Infectious Diseases"
- testified at the City of Chicago City Council joint meeting of the Energy, Environmental Protection and Public Utilities Committee and the License and Consumer Protection Committee, Regarding "A Resolution in support of the water quality improvements proposed for the Chicago and Calumet River Systems"

Dr. Marder :

- became the Medical Director of Workers' Compensation for OHSI
- developed a presentation on the use of Quantiferon testing for pre-placement and annual tuberculosis surveillance among hospital personnel. He presented this at conferences in Chicago, New York, and Atlanta
- updated the University Health Service protocols on fit testing and H1N1 surveillance

## **6. Occupational Safety**

### **a) Background**

In 2008, the Illinois ERC proposed and was approved to offer a Master of Science (MS) and Doctorate in Philosophy (PhD) degree in occupational safety. The concentration in Occupational Safety at the University of Illinois at Chicago is a viable, fully- functioning degree option administratively housed within the Division of Environmental and Occupational Health Sciences (EOHS), and exists in partnership with the Department of Mechanical and Industrial Engineering (MIE).

### **b) Goals and Objectives**

The overall goal of the OS program is to train research-oriented safety professionals at the master and doctoral level. We plan to support six OS trainees. The specific objectives of the training program are: 1) to train occupational safety practitioners with a knowledge base grounded in engineering and public health, 2) to provide these practitioners with as much practical experience as possible within the limits of an academic program, and 3) to produce practitioners who have the skills to conduct research in occupational safety and health. The OS research-trained graduate is anticipated to have the capability of entering into research-type activities in industry, as consultants, or in academe.

The emphasis of the OS training is to give students both an overall appreciation of the whole process of hazard identification leading to hazard control, and competence in applying these methods to occupational safety and health. The overall impetus of the training program is to give our students quantitative skills to aid them in solving occupational problems.

### **c) Results**

Trainees

Trainee Progress

- Elizabeth Contreras (MS-EOHS) was a NIOSH-funded trainee and entered the program in August 2008. Her research advisor was Dr. Susan Buchanan and her research project was titled PPE Distribution Program to Prevent Occupational Injuries Among Chicago Day Laborers: A Pilot Study. Ms. Contreras graduated 02/12/2010 and is employed as a Safety Coordinator at JBSS, INC.
- Surabhi Kunj (MS-EOHS) was a NIOSH-funded trainee and entered the program in August 2008. Ms. Kunj did not complete the program; she was last registered Summer 2010.
- Hyoung Frank Ryou, (MPH) was a trainee from Korea and did not receive NIOSH funding. He entered the program in August 2007. His research advisor was Dr. Steven Lacey and his capstone project was titled An Historical Examination of Occupational Injury in Jet Engine Manufacturing Using Narrative Text Analysis. Mr. Ryou graduated 05/09/10 and returned to Korea. He is employed in the OSH field.
- Matthew Hornyak (MS-EOHS) was a NIOSH-funded trainee and entered the program in August 2009. His research advisor was Dr. Lee Friedman and his research project was titled Auto Manufacturing Injuries and Workers Compensation. Mr. Hornyak graduated 05/06/12 and is employed as a Safety Engineer at Ascend Performance Materials.
- Colin Krupczak (MS-EOHS) was a NIOSH-funded trainee and entered the program in August 2009. His research advisor was Dr. Lee Friedman and his research project was titled Comparison of Work-Related Amputations in Illinois to National Estimates. Mr. Krupczak graduated 05/06/12 and is employed as a Compliance Consultant at Environmental Resources Management.
- Julia Lippert (PhD-EOHS) was a NIOSH-funded trainee and entered the program in January 2010. Her research advisor was Dr. Steven Lacey and her dissertation was titled Determination of Laser Generated Air Contaminant Emission Rates in a Simulated Surgical Procedure. Dr. Lippert graduated 05/10/13 and is working part-time as an OSH consultant and seeking an academic position.
- Ramon Lopez (PhD-EOHS) was a NIOSH-funded trainee and entered the program in January 2010. His research advisor was Dr. Steven Lacey and his dissertation was titled Size Selective Characterization and Particle Emission Rates During a Simulated Medical Laser Procedure. Dr. Lopez graduated 05/10/13 and is currently a post-doctoral fellow at Indiana University Purdue University Indianapolis.
- Katelynn Tonn was a NIOSH-funded trainee and entered the program in August 2010. Her research advisor is Dr. Steven Lacey. Ms. Tonn's funding ended in summer 2012 when she took a position as Safety Engineer for Intel Corp. She is working on her project-- Characterization of Medical Laser-Related Occupational Injuries in the US FDA MAUDE Database and graduated Fall 2013.
- Eseosa Orumwense (MPH) received NIOSH funding for the second year of her MPH program. She entered the program in August 2010. Her capstone project advisor was Dr. Steven Lacey and her project was titled Assessing Information Quality of First Reports of Injury/Illness (FROI) Form. Ms. Orumwense graduated 05/06/12 and is employed as a Safety Management Associate at Gerdau Corp.
- Adriana Artiga (MS-EOHS) is a NIOSH-funded trainee and she entered the program in August 2011. Her research advisor is Dr. Houshang Darabi and her project is titled Descriptive Analysis of Nonfatal Occupational Injury Cases among Cleaning Service Workers at an Illinois Hospital. Ms. Artiga is scheduled to graduate in Fall 2014 and is working as a safety engineer for Caterpillar, Inc.
- Paul Dworzanski (PhD-MIE) was a NIOSH-funded trainee for one year. He entered the program in August 2011 and completed some of the required courses, but left the program at the end of his first year.
- Ryan Cole (MS-EOHS) is a NIOSH-funded trainee and entered the program in August 2012. His academic advisor is Dr. Lorraine Conroy. Mr. Ryan graduated in August 2014.
- Stephanie Ngan,(MPH) ) is a NIOSH-funded trainee and entered the program in August 2012. His academic advisor is Dr. Lorraine Conroy. Ms. Ngan graduated in August 2014.
- Three new OS trainees entered the program in August 2013. Dana Madigan is a PhD student in EOHS, Mariana Lever-Ortiz is an MS student in EOHS, and May Kaewken is an MS student in MIE. Gabriela Gracia entered the program as a new PhD student in EOHS in January 2014.

#### Scholarships

- Several OS trainees were awarded Erma Byrd Scholarships from the US Department of Education— Matthew Hornyak (2010), Colin Krupczak (2010), and Julia Lippert (2011)
- Matthew Hornyak (2009, 2010), Katelynn Tonn (2011), and Julia Lippert (2011) were awarded scholarships by the American Industrial Hygiene Foundation.
- Matthew Hornyak received the Michael Bruton Workplace Memorial Scholarship from the UIC SPH in 2011.
- Katelynn Tonn received the AIHA Chicago Local Section Scholarship in 2011
- Julia Lippert received an American Society of Safety Engineers Foundation Scholarship in 2011.

#### Research Awards

- Julia Lippert received the AIHA John A. Leonowich Award for Educational Excellence in Non-ionizing Radiation in 2011 for her presentation of her dissertation research.
- Adriana Artiga received two awards at the American Industrial Hygiene Conference and Exhibition for her poster presentation “Descriptive Analysis of Nonfatal Occupational Injury Cases among Cleaning Service Workers at an Illinois Hospital.” She received the best graduate student poster from the Social Concerns Committee and the best graduate student poster from the Occupational Epidemiology Committee.

### Faculty

#### Honors and Awards

- In 2013, Dr. Darabi was selected as Scholar in the Institute for the Development of Excellence in Assessment Leadership
- Dr. Darabi serves as Program Committee Member, IEEE Conference on Automation Science and Engineering
- Dr. Darabi is Co-Chair and Co-Founder, Technical Committee on Healthcare Management, IEEE Robotics and Automation Society
- Dr. Steven Lacey served on the AIHA National Board of Directors.
- Mr. Salvatore Cali served on the AIHA Chicago Section Board of Directors.
- Dr. Lorraine Conroy served on the NIOSH Study Section.
- Dr. Mark Finn served on the ABIH National Board of Directors and is the incoming Board Chair for the organization.

#### Faculty appointments

- Dr. Lee Friedman was appointed Assistant Professor of EOHS and has joined the OS faculty; he teaches EOHS 571 Injury Epidemiology & Prevention.
- Dr. Samuel Dorevitch was appointed Associate Professor of EOHS
- Dr. Rachel Jones was appointed Assistant Professor of EOHS
- Dr. Lisa Brosseau joined the faculty as Professor of EOHS in Jan 2013.
- Dr. Steven Lacey left UIC to accept the position of Division Director and Associate Professor at Indiana University Purdue University Indianapolis
- Dr. Leslie Nickels retired from UIC and accepted a position with the Communications Office at NIOSH.

### OS Program

#### Program Progress and Activities

- In January 2010 the OS program received official University recognition as an approved area of concentration, which may now be noted on a graduate’s university transcript.
- The UIC ASSE Student Chapter was chartered in April 2009.
- OS trainees remain active in the UIC American Society of Safety Engineers Student Chapter, the UIC Industrial Hygiene Student Association, the AIHA Chicago Local Section, the Greater Chicago Chapter of the American Society of Safety Engineers, the Society for Risk Analysis, and the Illinois Public Health Association.

- In summer 2010, 2012, and 2014 all current OS trainees successfully completed the required First Responder training course; the course was hosted at UIC and presented by the American Red Cross of Chicago.
- In fall 2009 we formalized our “Process Talk & Tour” series, where an OS, IH, or HSAT trainee gives an industrial process talk to our Occupational Medicine Conference, followed by a site tour to a related industrial facility. Recent process talk/tours include medical device manufacturing, agricultural operations, a public transportation repair and maintenance facility, and food service operations. Participation in the Process Talk & Tour is now a requirement for all OS trainees.
- OS trainee Ramon Lopez and OS Program Director Dr. Lacey have been active with the UIC Engineers Without Borders Student Chapter.
- We successfully recruited three regional Certified Safety Professionals to the ERC Advisory Board to provide advice, information, and guidance to the implementation of this new training program: Roger Brauer, PhD, CSP, PE of the Board of Certified Safety Professionals; Stephen Thompson, MS, CSP of ArcelorMittal USA; and Linda Rhodes, CSP of Commonwealth Edison. Dr. Brauer has since retired and has been replaced by Treasa Turnbeaugh, PhD, MBA, CSP, CET, Chief Executive Officer, Board of Certified Safety Professionals
- The safety professional sub-committee of the ERC Advisory Board met in February 2010 to review the OS program progress to date and to discuss recruitment. Mr. Thompson and Ms. Rhodes also reviewed a draft of this competing renewal application and Mr. Thompson participated in a day-long discussion of all program plans in July.

### Curriculum Changes

- In our 2010 competitive renewal application (project period starting in July 2011), an expansion of the Occupational Safety program was approved by NIOSH for the OS MPH degree awarded by the SPH, as well as OS MS and PhD degrees awarded by the UIC Department of Mechanical & Industrial Engineering.
- The industrial hygiene program undertook a review and made a number of curricular changes to update the curriculum, align the courses with current needs and strengths, and to streamline the curriculum. These curricular changes described in the Industrial Hygiene section also improved the Occupational Safety program.

### Trainee recruitment including efforts toward minorities

- MS OS trainee Elizabeth Contreras and PhD OS trainee Ramon Lopez were recruited through the UIC Graduate College Summer Research Opportunity Program (SROP) for minority scholars.
- Adriana Artiga was recruited from the undergraduate MIE program.
- Eseosa Erumwense was recruited from the HCOP program in the SPH
- OS Program Director has increased recruitment activity targeting undergraduate EOHS programs, which resulted in matriculation of MS OS trainees Matthew Hornyak from Millersville University and Colin Krupczak from the Illinois ERC agricultural safety program at UIUC, and Katelynn Tonn from Ohio University.
- The Illinois ERC had a booth in the exhibition hall during the AIHCE and ASSE annual conferences
- In fall 2009, Instructor Salvatore Cali, MS, CIH and PhD IH trainee John Breskey traveled to visit undergraduate environmental and occupational health students at Illinois State University to discuss graduate training at the Illinois ERC.

### Significant Program Products

#### Research projects having significant trainee involvement

- Dr. Lacey was awarded a cooperative agreement from the U.S. Air Force Surgeon General’s Office to examine product safety issues regarding directed energy devices (lasers) marketed for medical applications; this project supported PhD OS trainees Julia Lippert and Ramon Lopez.
- Colin Krupczak served as Research Assistant to a NIOSH Dissertation Grant awarded to PhD IH trainee JoAnna Shimek; in fall 2010 he began his MS research with Dr. Forst on her recently awarded NIOSH grant to establish an Illinois occupational injury surveillance program.

- Matthew Hornyak served as Research Assistant to ERC Deputy Director Leslie Nickel's WHO project concerning health and safety hazards in the green energy industry; in fall 2010 he began his MS research with Dr. Lacey involving a training needs assessment for the Illinois Medical Emergency Response Team (IMERT).
- Elizabeth Contreras worked with Dr. Buchanan on a pilot project examining safety and health hazards and use of personal protection equipment among day laborers.
- All OS trainees participate in one or more of the TRT teams.

#### Student presentations at local, regional and national conferences

- A Artiga, H Darabi: Descriptive Analysis of Nonfatal Occupational Injury Cases among Cleaning Service Workers at an Illinois Hospital. Abstract and poster presentation at the American Industrial Hygiene Conference and Exhibition, Montreal Canada, 2013
- J. Lippert, R. Lopez, N. Esmen, L. Conroy, J. Franke, J. Bresky, S. Lacey: Determination of Emission Rate of Medical Laser-Generated Air Contaminants in a Simulated Surgical Procedure. Abstract and presentation at the American Industrial Hygiene Conference and Exhibition, Montreal Canada, 2013
- E. Orumwense, S. Lacey: Assessing Information Quality of First Reports of Injury Forms. Abstract and poster presentation at the American Industrial Hygiene Conference and Exhibition, Indianapolis, IN 2012
- M.E. Hornyak, L. Friedman, L. Forst: Auto Manufacturing Injuries and Workers Compensation. Abstract and poster presentation at the American Industrial Hygiene Conference and Exhibition, Portland OR. 2011.

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- Pierce J, Lacey S, Lippert J<sup>†</sup>, Lopez R<sup>†</sup>, Franke J, Colvard M. An Assessment of the Occupational Hazards Related to Medical Lasers. J Occ Env Med 53:1302-1309 (2011).
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- Contreras E<sup>†</sup>, Buchanan S. Piloting a personal protection equipment distribution program among Chicago day laborers. Am J Ind Med. 2012 Feb;55(2):159-66.
- Forst L, Masters D, Zaroni J, Avila S, Chaidez F, Miller A. Medical Interpretation for Immigrant Workers. New Solutions 2012;22(1):37-50

- Friedman L, Krupczak C<sup>t</sup>, Brandt-Rauf S, Forst L. Occupational amputations in Illinois 2000-2007: BLS vs. data linkage of trauma registry, hospital discharge, workers compensation databases and OSHA citations. *Injury*. 2012 Feb 23. [Epub ahead of print] PubMed PMID: 22365596
- Friedman L, Krupczak C<sup>t</sup>, Forst L. Workplace Amputations in Illinois. *Injury*. 2012 Feb 23. [Epub ahead of print]
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- Friedman L, Ruestow P, Forst L. Ethnic Disparities in Construction: Data Linkage of Workers Compensation Claims. *J Occup Environ Med*. 2012 Oct;54(10):1246-52.
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## 7. Occupational and Environmental Epidemiology

### a) Background

In 2008, we proposed and obtained approval for the MS and PhD degree programs in Occupational and Environmental Epidemiology. The program is housed in the Epidemiology and Biostatistics Division (EB), within the University of Illinois at Chicago (UIC) School of Public Health (SPH) but was jointly developed by faculty from EB and EOHS. Faculty for the program are drawn from the Environmental and Occupational and Health Sciences (EOHS), which houses the Illinois ERC Core Administration component as well as the Industrial Hygiene, Occupational Medicine, and Continuing Education Programs.

### b) Goals and Objectives

The primary goal of this academic training program will be to develop highly qualified scientists with training and an interest in research on OEE. In order to achieve this goal our intent is to offer trainees a highly multidisciplinary program that includes training in epidemiology, biostatistics, exposure assessment, industrial hygiene and toxicology. At the completion of the program our MS and PhD graduates will have developed a thorough understanding of: 1) the fundamental principles of epidemiologic study design and data analysis and how to apply these to the study of environmental and occupational diseases and injuries, 2) the theory and use of statistical methods commonly used in occupational and environmental epidemiology, 3) industrial hygiene and biologic methods used for assessing exposures in the workplace and general environment, 4) the toxicological and biological basis for occupational and environmental diseases, and 5) how to critically evaluate the epidemiologic literature on occupational and environmental health and safety hazards. In addition, our PhD students will have knowledge of the most advanced methods in occupational and environmental epidemiology and how to develop a research proposal for a study of occupational and environmental hazards; they also will gain experience in teaching epidemiology, and develop the capability to conduct independent research.

### c) Results

Substantial progress has been made in building the OEE program during the past funding period. Revisions have been made in the curriculum in response to comments from the reviewers of our previous funding proposal, students and our faculty. Briefly we have substantially reduced the number of required courses for our MS students to allow them more flexibility in their program. The course requirements for the PhD students have also been slightly reduced, and changes have been made in the required courses to make the program more relevant to the needs of our students. These changes in our curriculum were approved by the University on These changes were approved by the University on March 8, 2012.

The number of students in our program has also nearly doubled over this period of time. We currently have six doctoral students (Kirsten Alberg, Benjamin James Booth, Stephanie DeFlorio, Peter Ruestow, Matt Schmitz, Anissa Lambertino) who are actively in the program; whereas, at the time of our last renewal application we had just three (Judith Graber, Anisa Lambertino, and Emile Jorgensen). Several of our students have successfully completed their studies during this time. We have had two graduates from our MS program (Mary Doi and Kirsten Alberg), and two from our doctoral program (Judith Graber, Anissa Lambertino). The other doctoral students are all making good progress on their programs of studies. One of our former doctoral

students (Emile Jorgensen) is no longer active in our program. He has taken a position in the Chicago Department of Public Health's lead program. He plans to return to our program at a later date, but due to personal reasons is not currently pursuing the degree and is not being supported by our program. Further details on the progress of each student who received support from our program are detailed below.

- Judith Graber (Mentor: Leslie Stayner) entered our program in 2007 and successfully defended her doctoral dissertation in May of 2012. Her thesis was entitled "Morbidity and Mortality among Underground Coal Miners". The study utilized data from a Ukrainian study of respiratory morbidity, and a NIOSH mortality study of underground coal miners. The NIOSH study involved the update and extension of their coal workers study, and very close collaboration with Dr. Michael Attfield at NIOSH/DRDS. The findings from her studies have been published in several peer reviewed journal articles [Stayner and Graber 2011, Graber et al. 2012, Graber, Attfield and Stayner 2012] and in a book that is in press [Graber, Stayner and Cohen, in press]. Another paper that has been submitted to a journal has received favorable reviews and is currently being revised for resubmission [Graber et al. 2013]. Her study of respiratory among Ukrainian miners was the first study of its kind demonstrated a much higher risk of non-malignant respiratory diseases (NMRD) among retired workers than among active workers that was reflective of a strong healthy worker survivor effect. A novel finding from the study of the U.S. coal miners was evidence of an increasing risk of lung cancer with cumulative exposure to coal dust. Dr. Graber is continuing to pursue research on coal dust and other occupational health issues in her position as an Assistant Research Professor in the Environmental and Occupational Health Sciences Institute at Rutgers, University in Piscataway, New Jersey.
- Kirsten Almborg (Mentor: Leslie Stayner) started as a Masters student in our program in the fall of 2010 and successfully defended her Masters thesis and graduated the program in the spring of 2012. She was subsequently admitted to our doctoral program in 2012. Her MS thesis was entitled "A Study of Adverse Birth Outcomes with Agricultural Land Use Practices in Missouri". She is currently preparing a paper for submission to the Journal of Environmental Research. She has completed all of the coursework requirements for the doctoral program, and is currently preparing to take her doctoral qualifying examinations in August. After her exams she is planning on submitting a proposal for research on expanding her study to examine the effects of agricultural practices on reproductive outcomes.
- Benjamin Booth (Mentor: Leslie Stayner) entered our doctoral program in the fall semester of 2009. He has successfully completed his coursework, passed his doctoral qualifying exams. His dissertation proposal was approved in 2012 and the topic for his study is "Potential Associations between Agrichemicals and Childhood Leukemia, Central Nervous System and Brain Cancers". He will explore these associations by using data that we have collected in our CDC funded study of agrichemicals and adverse birth outcomes in the Midwest, and an international collaborative study of children's cohorts and cancer (the I4C). The latter study will be conducted in collaboration with Dr. Mary Ward at the National Cancer Institute (NCI), Division of Environmental and Occupational Epidemiology in Bethesda, Maryland. Mr. Booth has received an award from the NCI to work there as a predoctoral fellow, which he started in March.
- Mary Doi, MD, MPH (Mentor: Sam Dorevitch) entered our Masters program in the fall of 2008 and completed our program in the spring of 2010. Her thesis was entitled ""The relationship between indicator organisms' qPCR and culture levels with pathogen levels in fresh water" which was also published in a peer review journal (Dorevitch, Doi et al. 2011). Since graduation she has been working as a medical officer in the Division of Neurology Products in the Center for Drug Evaluation and Research, Food and Drug Administration.
- Anissa Lambertino (Mentor: Victoria Persky) entered the program in 2008 and defended her dissertation in the fall of 2013. Her dissertation is entitled "Steroid Hormone Disruption, bone mineral density and persistent organic pollutants in postmenopausal women". In this thesis she is analyzing data from NHANES and from her work with an ongoing cohort of Great Lakes Fish Consumers. The general focus on hormone related conditions is an extension of her paper on the endocrine related condition, uterine leiomyomata, published while in the program, also based on data from the Great lakes Fish consumer cohort. She received a BFR Award for her presentation on brominated flame retardants at the BFR 2009 conference in Canada.
- Peter Ruestow (Mentor: Linda Forst). Peter Ruestow matriculated in the PhD program in Fall of 2010 and immediately became involved in research activities in EOHS. Because of his strong background in

data analysis, he has been able to contribute significantly to our NIOSH funded State Based Surveillance Program. He has published two papers, one as first author, and presented at one conference. He also has been involved in our Targeted Research Training Surveillance Group and has taught and mentored more junior students. He is working environmental epidemiology research using data from Family and Children of Ukraine, part of the ELSPAC cohort.

- Matt Schmitz (Mentor: Paul Brandt-Rauf). Matt Schmitz is a doctoral student in EOHS. He is currently completing his coursework and will be taking his doctoral preliminary exams in the Fall. He has spent the past year working in Dr. Brandt-Rauf's laboratory where he has mastered the necessary laboratory techniques for molecular epidemiologic studies. He is currently participating in a NIOSH-funded research project (R21 OH010311 – Novel Biomarkers of Asbestos Carcinogenesis) developing new biomarkers for the development of cancer in asbestos-exposed workers.
- Stephanie DeFlorio (Mentor: Sam Dorevitch). Stephanie joined the OEE PhD program in Fall, 2012. She has a strong background in molecular biology and obtained her Masters degree at the UIC SPH in Epidemiology. Stephanie has strong an interest in water quality and population health. For her PhD she is working with Sam Dorevitch of EOHS on the economic burden of waterborne infectious disease.

## **8. Agricultural Safety and Health**

### **a) Background**

The agricultural safety and health special emphasis academic program is within the University of Illinois College of Agriculture, Consumer and Environmental Sciences (ACES) and administered through the Department of Agricultural and Biological Engineering (ABE). This is not a core program but a special emphasis academic program. Graduate and undergraduate trainees take courses that may or may not be required within their respective curriculum. This provides students with a basic technical background in agricultural safety and health that they can utilize within their chosen careers in the agricultural industry or rural health care. The academic program consist of 3 core upper level agricultural safety and health courses, independent study courses, an internship, and 21 other elective courses available throughout the university system. Each year since 2003 resources have allowed for support on average of 2 graduate and 3 to 4 undergraduate trainees. Students receive a partial NIOSH traineeship which includes a stipend for the graduate students and partial tuition reimbursement for both the undergraduate and graduate trainees. This is in addition to the students who enroll in one or two of the core courses who are not funded trainees. There are two primary faculty members of the ABE department who are involved in the program and several faculty members within the ABE department and the NIOSH ERC who assist with instruction. This includes three online courses available in the areas of industrial hygiene and environmental health taught by three University of Illinois Chicago ERC faculty members. A minor for undergraduate students has been developed and approved by the ABE department and the College of ACES and at the University level.

### **b) Goals and Objectives**

The main program objectives are to 1) provide students with a strong base of understanding of the occupational safety and health hazards and issues facing production agriculture; 2) familiarize students with the primary injury control methodologies of behavioral persuasion, engineering design, and regulation or enforcement and their related strengths and weaknesses of effecting injury and occupational illness rates among agricultural populations; and, 3) students will be capable of developing an agricultural safety risk management plan for a farm or agricultural business.

### **c) Results**

During the reporting period all three core courses were offered once each year and 7 students participated in independent study courses and one did an internship for credit. Furthermore, during this period 40 students were trainees. This included 13 graduate students and 27 undergraduate students. We were able to support more trainees than originally budgeted for the 5 years because additional students were able to be supported from carryover funds available from other center programs. Trainees had program majors in 10 different programs including veterinary medicine, technical systems management, community health, economics, crop sciences, natural resources and environmental sciences, agricultural and biological engineering, agricultural education, animal science, and professional sciences. The graduate students consisted of 7 master degree students, 5 doctor of veterinary medicine students and 1 PhD student in economics. All trainees graduated except for those who are still completing their degrees.

Most of the trainees are involved in careers for which they have significant responsibilities for safety either directly for workers and themselves or because of their involvement in training of employees or agricultural customers. Four of the 5 veterinary students are in private rural practices that involves the treatment of farm animals and have the opportunity to train their customers on the safe handling of animals. One of the veterinary students is currently completing an MPA at UIC while working part time for a veterinary clinic. The trainee who received a PhD in economics has a position at USDA in their national rural health program. As a result of her traineeship program she developed a special interest in developing better national data collection on agricultural injuries and disabilities among the farm population as well as the economic impact occupational injuries and illnesses have on the agricultural industry. Her PhD research focused on the evaluation of national data basis and their strengths and limitations to collect agricultural injury and cost data. She was recently selected by the national Rural Health Association for one 11 young leader's fellowships. She will have the opportunity over the next 2 years to attend a series of special conferences, travel programs and meetings with policy makers that will provide her with training on current issues affecting rural health. She has the potential to have significant influence on agricultural safety and health issues on a national basis. Six of our undergraduate trainees were offered elevator management positions within the grain industry. These trainees helped fill a need for managers with training in occupational safety and health who also had an agricultural background. OSHA has in recent years have put significant pressure on the grain industry to improve their safety programs. These students informed us that they felt one of the primary reasons they were offered these positions was because of their academic training in agricultural safety and health. The company's they are working for include ADM, Monsanto, Cargill, Bunge and local grain coops. Four of our undergraduate student trainees are operating relatively large farms and have related that they are implementing significant improvements in their on the farm safety program. Three of our undergraduate trainees are working for farm equipment manufactures where a significant portion of their work involves product safety. One undergraduate is a manager for and agricultural genetics company and has major responsibilities for safety and has also allowed two of our recent trainees to conduct a safety risk management assessment of one of their facilities for their TSM 425 class project.

There has been significant growth in enrollment in the 3 core agricultural safety and health courses. Total enrollment in the 2008 to 2009 academic year for all 3 courses was 55 and for the current year it is 156. This a 2.8 times increase in the past 5 years. There are two major factors according to our interviews with students. The first is that students who have taken the courses have expressed to other students their high quality and second in recent years students are getting positions because of taking one or more of the core courses. Our department has provided us the largest classroom in our building to hold our TSM 421 and TSM 425 courses which has a maximum capacity of 65 students. There was a waiting list of 5 students to enroll in the TSM 421 course in Spring 2013. Due to the large number of students taking our course this past year our department supported the cost of a quarter time graduate teaching assistant to help with the grading and some limited teaching.

## **9. Continuing Education and Outreach and Agricultural Safety and Health Continuing Education**

### **a) Background**

The CE program at the Illinois ERC exists to be a resource on occupational health and safety issues for all and to support the goals and objectives of the NIOSH Training Grants Program and the WHO Global Plan of Action on Workers' Health 2007-2017. Recognizing that there are limited resources, we partner with other programs engaged in education and training; respond to needs, especially in underserved populations, and look to make widely available education, training and technical materials through web-based initiatives such as the GeoLibrary. We have been successful at far exceeding the minimum number of 400 trainees per year in continuing education in the traditional occupational safety and health disciplines as well as reaching others active in health and safety in our region.

### **b) Goals and Objectives**

1. Maintain and develop partnerships with local occupational and environmental health and safety professional associations, government agencies, and non-governmental organizations (advocacy groups, labor organizations and trade associations) to conduct needs assessments and training programs.

2. Develop training and outreach programs using the best learning context including, conferences, workshops, seminars, laboratories, small group activities, one-on-one mentoring, self-study, and field trips. Identify the most effective training methods and tools for delivering training including case studies, small group activities, presentations, demonstrations, videos, web-based, CDROM, video conferencing and problem solving scenarios.
3. Maintain, promote, and enhance GeoLibrary, an electronic library of training materials and practice tools.
4. Identify underserved and minority populations and develop continuing education and outreach initiatives to meet their needs.
5. Develop teaching and training knowledge and skills in students in the academic program areas.
6. Increase resources (financial and faculty) for program development and implementation.
7. Evaluate for student satisfaction, instructor and material quality, implementation outcome and program effectiveness.

Additionally, the ERC proposed four goals for this project period: 1) Improve visibility and branding; 2) Improve relationships with local employers; 3) Integrate additional practice based learning opportunities into curriculum; and 4) Improve program evaluation and data tracking methods

### **c) Results**

Faculty participation in CE continues to be extensive in occupational medicine, industrial hygiene, safety, nursing and occupational and environmental epidemiology. Faculty have developed and taught in short courses and provide valuable liaison to professional associations. Courses offered by specialty area The Illinois ERC has been successful at far exceeding the minimum number of 400/600 trainees (participants) in continuing education (CE) in the traditional occupational safety and health disciplines as well as reaching others active in health and safety in our region. Over the past five years (2008-2012) the Illinois ERC has offered training courses for 20559 trainees including 1183 industrial hygienists, 1980 occupational health nurses, 1669 occupational medicine physicians, 6050 safety professionals, and 9677 other occupational safety and health professionals, paraprofessionals, technical workers and health and safety committee members in all CE programs including hazardous substance training (through 2011) and agricultural health and safety.

#### **ERC 1-Visibility**

In this first area of CE program goals needs and visibility were accomplished by co-sponsorship of regional or national conferences and also with specific local events to meet identified needs. These events demonstrate CE program capabilities that are the foundation of the future program plan. The CE program cosponsored the SPH HIV Research Forum on October 10, 2012 for 150 participants as part of the SPH 40<sup>th</sup> Anniversary celebration inviting alumni to share and learn about the broad HIV impacts. Dr. Conroy met with panelists at a reception before the program and encouraged a discussion about occupational aspects of HIV exposure.

The Bioneers Conference for 218 participants was a first of its kind environmental conference hosted by the UIC Office of Sustainability which is led by that the CE program co-sponsored. Continuing contact hours were offered for specific events reviewed by CE based upon the theme of the session and the qualification of the presenters.

To continue our strong relationship with local professional organizations the CE program co-sponsored the November, 2012 PDC on the topic of nanotechnology hazards that was presented by Dr. Thomas M. Peters, PhD, CIH The University of Iowa, College of Public Health, Department of Occupational & Environmental Health, at Argonne National Laboratory in collaboration with Dr. Anders Abelman, PhD, EOHS graduate.

For occupational health nurses the CE program offered the OHN certification review course presented by Ms. Annette Haag, RN who is nationally known for her efforts on OHN certification on May 21-23 for 14 participants at SPH.

In 2011 Dr. Samuel Dorevitch, MD, MPH, collaborated with CE to apply for and receive an Area of Excellence In Research Award from the UIC Office of the Vice Chancellor for Research Services on environmental water pollution. The CE program organized two types of programming: a series of ten lunch seminars in the Spring of 2012 for a total of 220 participants featuring important water researchers as well as the April 10 Water Research Forum in collaboration with Dr. Karl Rockne, PhD, UIC College of Engineering for 50 faculty and students who presented posters and engaged in research dialogue.

Labor and workers were the focus of the next set of events. The CE program partnered with the National Committees on Occupational Safety and Health to endorse the 2012 National conference; CE presented in a session developed by the United Steel Workers on stress resulting from management efficiency programs. The conference had 295 participants on December 5 and 6, 2012 held in Maryland.

The CE programs ongoing relationship with workers centers and labor organizations resulted in two regional events. The first was a day long meeting introducing the labor community to workers centers and the community approach to organizing workers held on March 7 at the UIC Student Center East for 125 participants. Health and safety was highlighted in several sessions with a key note address provided by Mr. Richard Trumka, President, AFL-CIO. To address collaborative relations between researchers and unions the Labor Research Action Network held a regional forum on April 28, Workers Memorial Day, where CE presented about the long standing partnership to provide and evaluate health and safety training interventions.

The current program year's events amplified events from previous years in this project period. The first was the International Environmental Nanotechnology Conference (<http://emsus.com/nanotechconf/index.htm>) held in Chicago on October 7-9, 2008 for 193 participants.

The EPA planning committee led by Dr. Charles Marice, PhD, approached the CEO program to provide logistics for this event. Regarding evaluation and impacts, a set of monographs was published from the conference presentations and surplus funds generated enabled CEO to hold an EOHS credit course in special topics in Environmental Health led by Dr. Irina Darynskaia, MD, PhD for four School of Public Health graduate students in the Summer of 2009. A partnership with nurse leaders of AFSCME led to the successful Trends in Nursing Practice: Working Together for Quality and Respect-2010 conference for 125 participants in September, 2010. High quality national nursing researchers including former SPH Fellow Dr. Butch DeCastro, now Director of Occupational Health Nursing for the University of Washington ERC presented and promoted dialogue with participants.

CE has worked with Dr. Robert Cohen, MD, MPH as a leader in the National Black Lung Association to hold a series of annual conferences; there were 66 participants in 2008 and 120 participants in 2009. NIOSH-funded translational research funding led to regional and national training by peer educators and OSHA authorized trainers for OSHA 10 Hour Spanish Language Construction Safety training in 2009-2011 in Chicago, Milwaukee, Cincinnati, Memphis, Houston, Austin and Phoenix for 408 Spanishspeaking immigrant construction worker participants of workers centers.

### ERC 2-Partnerships

Two events in 2012 complemented the discussion above about relationship with employers. AHAC Youth Violence Prevention was a health promotion event on September 27, 2012 for 34 participants where healthcare and community employers along with local NGOs participate in a networking meeting to share initiatives and communicate to advance health promotion coordinated by the Cook County Department of Public Health. Planners invited CE to present an example of a small group activity from the curriculum developed to address workplace and community violence prevention and evaluated in the International Quarterly of Community Health Education. The products were disseminated through the CE program tools webpage (<http://www.uic.edu/sph/erc/youthviolenceprevention.html> ).

Health care employers also participated in the event developed by HMPRG on care coordination and co-sponsored by the CE program for 162 participants in December, 2012 to address the occupational health and other needs at a time when the Affordable Care Act will impact programs and services for many persons.

Pandemic Influenza Prevention was the theme for a series of successful training with home care employers in partnership with FHI 360. CE partnered with Bethel New Life and Addus Health Care to provide popular education based training for 256 home care workers in 2010.

### ERC 3-Practice Based Learning

The third CE program goal to design events with the best learning context with a focus on expanding practice based experiences is highlighted through the ERC interdisciplinary seminar and specific local and international events with partners IDPL and Performance Arts Medicine Association. In Fall 2012 Dr. Zanoni offered the ERC Interdisciplinary seminar participants a survey on meanings and activities to promote interdisciplinary

learning which he presented during the Spring 2013 seminar course. Interpretations of the qualitative survey data showed that participants wanted shorter presentations with more interaction and a specific focus on how disciplinary perspectives may interrelated. This effort will be expanded in planning for the Fall 2013 seminar series. Through the partnership with IDPL CE planned, presented and evaluated two short courses on health and safety awareness for young workers to seniors in the college preparation course of Rudy Lozano Leadership Academy with Ms. Rachelle Ernst, faculty. Student participants utilized an adaptation of the IDPL health and safety curriculum focused on their needs. For the second group, the activities centered on health and safety protections needed for a school courtyard renovation project where the opportunity for practice learning may be offered to NIOSH trainees to support health and safety training for students participating in selected renovation tasks.

For an international focus, the Cuba Health in the Arts tour is an ongoing week long course led by Dr. David Hinkamp, MD, MPH, faculty member and co-leader of the HARTs program

(<http://www.artsmed.org/cubaprogram.html>). The third tour took place in February, 2013; 18 participants experienced didactic lectures, specific program tours, interviews with artists and the opportunity to provide consultations with Cuban artists and students during a clinic organized and supervised by Dr. Hinkamp. Dr. Cohen and other faculty members have participated in the program which provides a unique cultural and professional learning activity based in practice.

In previous years practice has led to the creation of CE events such as the successful Quantiferon Gold Testing tuberculosis in 2009 for occupational medicine and occupational health nursing providers where Dr. David Marder, MD, MPH, Director of the UIC University Health Service presented the data of the clinic use of the QG testing compared to PPD placement for the employees of the UIC hospital. In the theme of health providers safe lifting and moving in health care was the topic of six sessions for a total of 131 occupational health nurses in 2009.

#### ERC 4-Program Evaluation

The strategic goal of program evaluation was demonstrated in two events that were offered this year. As part of the targeted research training program for under-served and minority workers experiencing precarious employment conditions, Drs. Zanoni and Buchanan created a presentation in November, 2012 for 12 participants across the UIC campus to summarize participatory design for occupational health inquiry featuring qualitative methods. In the presentation they evaluated ERC research efforts to date to collaborate with workers centers that have resulted in several publications including the recent article in the American Journal of Industrial Medicine documenting the More than Training project.

The CE program uses many tools to evaluate events including: participant satisfaction evaluations (PSE), interviews with planning committee, participatory evaluation session with audience response as in the Caring for Kane Kids Conference and the National Worker Health and Safety Conference, CME evaluation, interviews with presenters, participant interview and journal article submission and approval, approval notices and reviews, surveys, research events, large group discussion and documentation, and interviews with partners and sponsors.

The CE program utilized key informant interviews with radon program instructors to propose, develop and evaluate new radon continuing education courses. CE worked with Ms. Lynn Marie Carie to create a new quality assurance radon CE course and with Mr. Calvin Murphy to create the business of radon mitigation course. They course was successfully offered in December, 2012 for 18 radon professionals and the CE program is exploring ways to present them on a distanced based format to meet the CE needs of radon professionals throughout Illinois.

A series of 3 CE programs from 2009 on Youth Violence Prevention for a total of 107 participants provided data for a curriculum evaluation. Partners from the Cook County Bureau of Health Services including Dr. Linda Rae Murray, MD, MPH and Ms. Susan Avila, RN, MPH collaborated on the evaluation of the curriculum that was published in the International Journal of Community Health Education in 2011.

#### ERC 2-Partnerships-Underserved/Minorities

The health and safety needs of low wage workers were addressed in two programs that demonstrate the strong link between outreach program activities and CE relationships and events. CE collaborated with the

United Electrical Workers/Warehouse Workers for Justice to create a report regarding OSHA activities and worker experiences of hazards in warehouse work. Through this process the CE program relationship with Mr. John Newquist, Retired OSHA Region V administrator and safety consultant was strengthened; he invited CE to present on health and safety approaches and competencies at two events for a warehouse worker workforce development program. Though the numbers were small these events demonstrated CE program commitment to partnership and to the importance of providing health and safety capabilities to this group of workers at risk for workplace injury and illness. In the area of home care and domestic work, Dr. Conroy reached out to organizers for the National Domestic Workers Alliance presentation by Executive Director Ai-Jen Poo presentation at the Hull House Museum on the UIC campus for co-sponsorship of this important regional and national event. The Hull House Museum has an exhibit recognizing the work of domestic workers who provide care giving for seniors, children and housekeeping and are often minority or under-served workers. Many of the CE program partners such as Latino Union, ARISE Chicago, Interfaith Worker Justice and Jobs with Justice co-sponsored the program and recognized our ongoing CE and research to practice partnerships.

The CE Program with the guidance and leadership of Ms. Marilyn Bingham, MS, is a founding sponsor of the Midwest Minority Health Conference. Starting in 2009 with 243 participants, CEO has been a constant partner providing logistics and important continuity for the Minority Students for the Advancement of Public Health whose leadership changes each year but has welcomed hundreds of participants needing to expand the conference facilities each year for the growing response.