

**Johns Hopkins Education and Research Center
for Occupational Safety and Health**

Annual Report: July 1, 2015-June 30, 2016



October 6, 2016

SECTION 1 – ERC Summary and Relevance

ERC Summary:

The NIOSH-funded Johns Hopkins Education and Research Center for Occupational Safety and Health prepares leaders in occupational safety and health research and practice. Training is provided in five academic program areas: Occupational and Environmental Hygiene (one-and-a-half-year MSPH; PhD, DrPH and ScD), Occupational and Environmental Health Nursing (one-year MPH; one-and-a-half-year MSN/MPH; PhD, DrPH, and ScD), Biomarkers of Occupational Exposure and Susceptibility (PhD and DrPH), and Occupational Injury Epidemiology and Prevention (PhD), in addition to residency training in Occupational and Environmental Medicine, a two-year program that includes completion of an MPH degree. Doctoral programs are four-to-five-years in length. Part-time enrollment has become increasingly popular with our ERC applicants and is an option for the MSPH, MPH, MSN/MPH, and DrPH degree programs. On average per year, this ERC funds approximately 23 students across our five academic programs. However, the aggregate number of students in all programs, regardless of funding source, generally totals about 35 to 55. Continuing Education and Outreach components bring the strengths of our core programs to more than 1,000 practicing occupational health and safety professionals per year, while our Pilot Project Research Training Program provides research education support to students and junior faculty at academic institutions within our region.

A strong interdisciplinary emphasis underlies all of our ERC training activities. The importance of such interaction and collaboration is conveyed to all students in courses, seminars, field experiences, and projects, and is reinforced through research and professional practice in each program. The excellence of the Occupational and Environmental Medicine Residency and the Occupational and Environmental Hygiene Program has been recognized through accreditation by each of their respective accrediting bodies. Each of our academic programs upholds the strong research tradition of our school, and we strive to address the priority areas set by NIOSH in the National Occupational Research Agenda. Research activities in each academic program address topics relevant to the sector-based NORA focus, and our Pilot Project Research Training program also enables faculty and students to advance that agenda.

Relevance:

There are approximately 125 million workers in the United States whose work-related health, quality of life, and productivity are affected directly or indirectly by the expertise of health and safety professionals. The Johns Hopkins Education and Research Center for Occupational Safety and Health accomplishes its interdisciplinary training mission through academic training, continuing education, and outreach. As the sole ERC in U.S. Federal Region III (which includes Maryland, Pennsylvania, Delaware, Washington, D.C., Virginia, and West Virginia), this center build the regional and national capacity to provide care, set policy, design and manage health and safety programs, and conduct research to advance the field of occupational safety and health.

Key Personnel:

Jacqueline Agnew, PhD, MPH
ERC Director 410-955-4037
jagnew@jhu.edu

Peter S.J. Lees, PhD, CIH
ERC Deputy Director
Director, ERC Pilot Project Research Training Program
410-955-3009
Plees1@jhu.edu

Patrick Breysse, PhD, MHS (on leave of absence)
Director, ERC Occupational and Environmental Hygiene Program
410-955-3608
[Pbreys1@jhu.edu](mailto:pbreys1@jhu.edu)

Maureen Cadorette, PhD, RN, MPH, COHN-S
Faculty, ERC Occupational and Environmental Health Nursing Program
410-955-8247
mcadore1@jhu.edu

Cassandra Kercher Crifasi, PhD
Faculty, ERC Occupational Injury Epidemiology and Prevention Program
443-287-8040
ckerche1@jhu.edu

Mary Doyle, RN, MPH, COHN-S/CM
Director, ERC Continuing Education and Outreach Programs
Faculty, ERC Occupational and Environmental Health Nursing Program
410-955-0423
mdoyle6@jhu.edu

Sheila Fitzgerald, PhD, RN-C
Director, ERC Occupational and Environmental Health Nursing Program
410-955-4082
Sfitzge1@jhu.edu

Kirsten Koehler, PhD
Faculty, ERC Occupational and Environmental Hygiene Program
410-955-7706
kkoehle1@jhu.edu

Francesca K. Litow, MD, MPH
Co-Director, ERC Occupational and Environmental Medicine Residency
410-502-2336
flitow1@jhu.edu

Keshia Pollack, PhD, MPH
Director, ERC Occupational Injury Epidemiology and Prevention Program
410-502-6272
kpollac1@jhu.edu

Ana Maria Rule, PhD
Faculty, ERC Occupational and Environmental Hygiene Program
arule1@jhu.edu

Brian Schwartz, MD, MPH
Co-Director, ERC Occupational and Environmental Medicine Residency
410-955-4158
bschwar1@jhu.edu

Paul T. Strickland, PhD
Director, ERC Biomarkers of Occupational Exposure and Susceptibility Program
410-955-4456
pstrick1@jhu.edu

ERC Web Link: www.jhsph.edu/erc

SECTION II – Program Highlights of High Impact

Occupational and Environmental Hygiene:

Dr. Peter S.J. Lees remains as Director of our Occupational and Environmental Hygiene Program. Dr. Lees is a long-term faculty member in OEH, is deputy director of the ERC, and directs the ERC's Pilot Project Research Training Program. Former OEH Program Director Dr. Patrick Breysse is on a leave of absence from the university to direct the Agency for Toxic Substances and Disease Registry and the National Center for Environmental Health at the Centers for Disease Control and Prevention. During the past year, a search was undertaken for two new faculty members. As a result of the search, Dr. Gurumurthy Ramachandran, formerly a professor at the University of Minnesota School of Public Health, joined the faculty prior to the start of academic year 2016-2017. The search for a new junior faculty member continues.

This program has remained stable and continues to be a leader in research and practice education. Trainee enrollments for the 2015-2016 academic year included six doctoral students, eight full-time MSPH students, and 19 part-time online MSPH students. Four post-doctoral fellows are also affiliated with the program. Our online, part-time master's program continues to grow. To support the part-time program, we have increased offerings in our Summer Institute, in which full-term courses can be completed in a condensed, two-week format. In addition, we recruited nine students for a Certificate Program in Occupational and Environmental Health. Eleven MSPH and two doctoral students graduated between December 2015 and May 2016.

OEH faculty have extensive interdisciplinary research support and a productive publication record. During this reporting period, our faculty had 45 ERC-related publications in the peer-reviewed literature, 14 of which included current or past ERC students as co-authors.

Our faculty members are actively involved in continuing education and outreach, such as co-sponsoring the local American Industrial Hygiene Association's Professional Development Conference and the AIHcE conference in Baltimore. Faculty also conduct extensive local, regional, national, and international outreach activities. For example, Dr. Lees and Dr. Ana Rule continue as collaborators on a Fogarty Environmental Health Research Training Grant in Mongolia, for which they have designed courses on occupational and ambient air sampling. Dr. Kirsten Koehler served as the vice chair of the American Industrial Hygiene Association's Aerosol Technology Committee and as the vice chair and incoming chair of the American Association for Aerosol Research's Indoor Aerosol and Aerosol Exposure Working Group. Dr. Rule continued her close relationship with members of Turner Station, a predominantly African-American community in southeast Baltimore County that is situated in an area that is surrounded by many potential sources of metal contaminants. Dr. Rule is working with Turner Station community members on chromium contamination issues. During this period, Dr. Rule served as a member of the Agricultural Air Quality Task Force for the U.S. Department of Agriculture, National Resource Conservation Services, and she testified before the Maryland state legislature and the Baltimore City Council on issues related to hydraulic fracturing, the transport of crude oil by rail, and electronic tobacco products. In addition, our faculty served on numerous grant review committees for the National Institutes of Health, the National Institute for Occupational Safety and Health, and the U.S. Environmental Protection Agency.

OEH program faculty participate in a wide range of interdisciplinary centers and institutes. These important collaborations and interactions afford opportunities to enrich student training and student research, and they also provide practice opportunities. Our collaborating centers and institutes at Johns Hopkins include:

- Center in Urban Environmental Health
- Center for Childhood Asthma in the Urban Environment
- Institute for Global Tobacco Control
- Center for a Livable Future
- Mid-Atlantic Public Health Training Center
- Center for Public Health Preparedness
- Risk Sciences and Public Policy Institute
- Center for Water and Health
- Urban Health Institute
- Institute for NanoBioTechnology

Occupational and Environmental Health Nursing:

The leadership of our Occupational and Environmental Health Nursing Program, directed by Dr. Sheila Fitzgerald, remains stable and continues to provide research, leadership, and practice education. Student participation and performance in the program has been excellent. One student completed the full-time MPH in December 2015, and two students completed the full-time MPH and one student completed the part-time MPH in May 2016. Prior to graduating, one MPH student was selected to complete OSHA's Graduate Nurse Internship Program at the Department of Labor, Office of Medicine and Nursing. In the spring, we accepted five new students (who began the OEHN program in July 2016): one MPH student, one MSN/MPH student, two part-time MSN/MPH students, and one PhD student. Another part-time MPH student is continuing her studies.

OEHN faculty are active contributors to our school and university. Dr. Fitzgerald completed her final term on the University Diversity Leadership Committee, which she held for four consecutive terms. ERC director and OEHN faculty member Dr. Jackie Agnew is an associate director of the MPH program and serves on its executive board and several ad hoc committees, and she also represents that program on the school's Committee on Academic Standards.

OEHN faculty provide significant contributions to required occupational health courses that receive high evaluations and are popular not only with ERC students, but also with others in the school. Dr. Maureen Cadorette teaches the introductory course for all ERC students and others interested in the field, *Fundamentals of Occupational Health*, which has both online and in-class sections. This course is a required component of the OEHN curriculum, as are Drs. Agnew and Fitzgerald's online course *Health of Vulnerable Worker Populations* and the culminating course, *Occupational Health*, taught by Drs. Agnew and Lees. Ms. Mary Doyle is the co-instructor in two sections of the course *Noise & Other Physical Agents in the Environment*. Additionally, Ms. Doyle has been asked to take a leadership role in the Department

of Environmental Health Science's Summer Institute. Dr. Agnew directs the highly popular departmental Certificate in Environmental and Occupational Health, which is available to degree and non-degree students and may now be completed entirely online. The American Board of Occupational Health Nurses now recognizes this certificate as among potential prerequisites for taking the ABOHN certification exam.

OEHN faculty are active in research and outreach projects, most of which are interdisciplinary and engage students. For example, Dr. Fitzgerald is the faculty advisor for the Bienestar Baltimore Tuberculosis Screening Program, part of a tri-school effort dedicated to helping Baltimore's Latino community that is comprised and led by student volunteers from the Johns Hopkins Bloomberg School of Public Health, the School of Medicine, and the School of Nursing. She has also worked with Dr. Kevin Frick, the vice dean of education at the Johns Hopkins Carey Business School, to develop an outcome study of graduates of Marian House, a Baltimore non-profit organization that provides a structured living environment, education, employment readiness, and job placement for homeless and formerly incarcerated women. The purpose of the study is to determine employment attainment following graduation from the Marian House program. An OEHN student and an MBA/MPH student will assist in collecting and analyzing those data. The results of work related to these projects, as well as others carried out by OEHN faculty, have been disseminated in scientific presentations and publications such as *Workplace Health & Safety*, *Frontiers in Public Health*, *American Journal of Industrial Medicine*.

Another ongoing accomplishment that involves interdisciplinary teams of ERC faculty as well as graduates is under the direction of Dr. Cadorette, who is co-investigator for the Los Alamos National Laboratories Former Workers Program and principal investigator for the Sandia National Laboratories Former Workers Program. These medical screening programs for former LANL and SNL workers have been in place since 2000, and the cooperative agreement with the Department of Energy that funds both programs is in the first year of a five-year renewal.

OEHN faculty also contribute to outreach at the regional and federal levels. Dr. Agnew continues her membership on the NIOSH NORA Liaison Committee. At the state level, she and Ms. Doyle serve on the State of Maryland Occupational Health Advisory Committee and have assisted the state in grant writing. Ms. Doyle also serves on the Public Employees Safety Association advisory board, the Chesapeake Regional Safety Council conference advisory board, the American Industrial Hygiene Association/American Society of Safety Engineers Professional Development Conference committee, the National Capital chapter Of Alliance Hazardous Materials Professionals PDC committee, the Regional Occupational Health Conference 2016 committee (presented by the three chapters of the American Association of Occupational Health Nurses in partnership with the Maryland College of American College of Occupational and Environmental Medicine), and the Washington Area Joint Safety Association.

Dr. Cadorette works with several government agencies, including Department of Energy, NIOSH, and the Department of Labor, on a committee titled the Joint Outreach Task Group. She also works with community engagement coordinators in the Johns Hopkins Bloomberg School of Public Health's Department of Environmental Health Sciences at a twice monthly event titled *Day at the Market*, during which she conducts health screening and—given this opportunity to interface with the local community—teaches about occupational health and safety issues that are relevant to both work and home. She has received the George Cohen Research Award to support

a survey to assess the work history of the community members with the goal of developing teaching materials for this urban population. OEHN faculty have received a number of awards in recognition for their contributions to the field of occupational safety and health.

We continue to obtain advice and feedback on new directions and emerging issues from our program's advisory board, which includes representation from the federal and state government, the military, and private and public organizations.

Occupational and Environmental Medicine Residency:

Our Occupational and Environmental Medicine Residency has continued to attract highly qualified applicants, including many from underrepresented populations, and our program had four residents during this reporting period. Our trainees have received recognition for their research efforts. One of our June 2016 graduates presented an oral presentation in the resident research session at the April 2016 American Occupational Health Conference, and our other June 2016 graduate presented a poster at the same conference. Another OEM resident was the 2016 recipient of the Randy E. Bass Award in the Johns Hopkins Bloomberg School of Public Health, Department of Environmental Health Sciences. During this reporting period, our residents gave numerous grand rounds and journal club presentations, as well as having attended meetings of the local ACOEM chapters. We have been able to increase clinical continuity with additional clinical time in the first year of the program, and our residents have spent several months in one-to-two-day-per-week clinics at the Johns Hopkins Hospital and in related research projects.

Since becoming co-director of the residency in April 2014, Dr. Francesca Litow has ensured compliance with the requirements of the Accreditation Council for Graduate Medical Education's "Next Accreditation System" (effective July 1, 2014), including use of additional evaluative tools to assess residents' progress towards competency for independent practice. In addition to her teaching responsibilities at our school, she is an adjunct assistant professor at the Uniformed Services University of the Health Sciences, Department of Preventive Medicine and Biometrics. She is also the clinical preceptor for our resident rotation at the International Association of Fire Fighters. Dr. Litow is president of the Pennsylvania Occupational and Environmental Medicine Society, and was selected as chair of the planning committee for the 2017 AOHC in Denver. A nationally recognized speaker, during this reporting period she was a member of the faculty at national scientific meetings in occupational and preventive medicine and taught board-review courses for certification in occupational and preventive medicine. In addition, Dr. Litow leads the occupational safety and health team for Johns Hopkins Aramco Healthcare, and one of our July 2016 graduates developed an educational program (modeled after the Council for Accreditation in Occupational Hearing Conservation) to train personnel in Saudi Arabia on hearing conservation programs, with attention to quality and reporting pertinent to the Kingdom of Saudi Arabia and Saudi Aramco Corporate policies.

We have continued to recruit clinical faculty to provide additional opportunities for residents to work in specialty occupational medicine clinics. During this reporting period, we added a rotation at the U.S. Department of Homeland Security, as well as a rotation at NIOSH in Cincinnati. Our elective corporate rotation with Chevron, precepted by Dr. Steve Frangos, offers residents the opportunity to participate in disaster preparation, emerging disease response, and management of expatriate health screenings.

Both 2016 graduates of the program had at least one peer-reviewed publication during this period. Overall during this period, OEMR faculty and current and former trainees had 15 peer-reviewed publications, four scientific meeting presentations, and four invited seminar presentations.

Biomarkers of Occupational Exposure and Susceptibility:

With the acceptance of three new doctoral students in September 2015, the Biomarkers of Occupational Exposure and Susceptibility Program is now at full capacity, with 12 full-time trainees who are making good progress toward their educational and research goals:

- Fifth-year trainee J. Brian Harmon returned from a two-year leave of absence for military duty and passed his doctoral oral comprehensive exam in May 2015. Having received a fellowship from the Department of Homeland Security to support his first two years of doctoral training, he is conducting research on rapid detection methods for bacterial contamination of foods handled by food processing workers.
- Fifth-year trainee Sara Rasmussen—who is supported by a fellowship from the Johns Hopkins Integrative Education and Research Training program in Water, Climate, and Health—is currently completing research on the potential respiratory health effects of unconventional natural gas development. She is planning to defend her dissertation in the 2016-2017 academic year.
- Fourth-year trainee Thammisan Ingviya passed his oral comprehensive exam in June 2015 and has obtained an ERC Pilot Project Research Training award and a grant from the Thai Bureau of Occupational and Environmental Disease to fund his research on crude oil exposure and health effects in oil spill cleanup workers. He is also supported by the Prince of Songkla University in Thailand.
- Fourth-year trainee Alexis Brown passed her written comprehensive exam in January 2015 and her oral comprehensive exam in June 2015. She is completing her research on the health effects of infectious agents in swine CAFOs and their effects on workers and surrounding communities.
- Third-year trainees Jeffrey Freeman, Vanessa Coffman, and Miranda Jones-Spratlen all passed their oral doctoral exams in June-August of 2016.
- Third-year trainees Tara McAlexander and Martha Powers have developed research proposals and are preparing for their oral doctoral exams in fall of 2016.
- Second-year trainees Josiah Kephart, Pranay Randad, and Jordan Kuiper all passed their comprehensive written exams in July 2016, and are beginning to develop their research proposals.

Our graduates have successfully transitioned to full-time employment in the fields of occupational, environmental, and public health, and they have remained highly productive in terms of research and publications. Dr. Joan Casey, who was named a Robert Wood Johnson Foundation Health and Society Scholar (2014-16), continues her research on the health effects of unconventional natural gas development (fracking) at the University of California, San Francisco and Berkeley. Dr. Kamau Peters accepted a postdoctoral position in the Division of Cancer Epidemiology and Genetics of the National Cancer Institute, where he is conducting research on

cancer risk in former medical radiologists. Dr. Laura Zheng is continuing her research as a postdoctoral fellow in the Department of Preventive Medicine at the Mount Sinai School of Medicine. Dr. Keson Thepeang was appointed to a senior position at the Occupational Safety and Health Bureau in her native Thailand. Dr. Nicole Cardello-Deizel was awarded a Kaplan Fellowship for Women Scientists in Cancer Research to do an investigation at the National Cancer Institute, Occupational and Environmental Epidemiology Branch. She was subsequently appointed as an assistant professor in the Yale School of Public Health. Dr. Ellen M. Wells is an assistant professor of occupational health sciences at the Purdue School of Health Sciences. Dr. Ann Liu was recently appointed as acting chief of the Center for Environmental & Occupational Epidemiology at the Maryland Department of Health and Mental Hygiene.

Program faculty have demonstrated a high level of research productivity during this 12-month period, as evidenced by more than 50 published papers, review articles, and book chapters—many of which include students as authors—as well as numerous presentations at national and international conferences and participation on professional committees of national and international organizations. Our faculty also have served on numerous advisory committees (e.g., the National Research Council, the Johns Hopkins Center for Global Health, the Joint Geisinger-Johns Hopkins Environmental Health Institute, and the Wayne State NIEHS Center External Advisory Board) and grant review panels (e.g., NIOSH, the Ontario Ministry of Labour, the Medical Research Council (UK), the EPA Science Advisory Board, the New Jersey Commission on Cancer Research, and the Lymphoma Foundation of America). Dr. Strickland has served as a member of two expert review panels of the U.S. Environmental Protection Agency's Science Advisory Board and on the Standing Scientific Review Panel of the Lymphoma Foundation of America. Dr. Ana Navas-Acien continued to serve as a member of the World Health Organization's Expert Panel on Global Burden of Disease Caused by Lead, as well as on the Council on Epidemiology and Prevention of the American Heart Association. She is a member of the National Academy of Sciences Standing Committee on Emerging Science for Environmental Health Decisions, and is the founding editor-in-chief of *Current Environmental Health Reports*. Dr. Brian Schwartz directs the Joint Geisinger-Johns Hopkins Environmental Health Institute and is a fellow of the Post Carbon Institute. He recently contributed to the symposium "Impact of Unconventional Natural Gas Drilling Operations on the Environment and Public Health" at the Center of Excellence in Environmental Toxicology, University of Pennsylvania, and he has advised Maryland Governor Hogan on this topic. Dr. Chris Heaney is a member of the Maryland Commission on Environmental Justice and Sustainable Communities and an advisory panel member of the North Carolina Environmental Inequities/Environmental Justice Working Group. He has also reviewed grants for Occupational Health & Safety, Ontario Ministry of Labour, Canada, and the Antimicrobial Resistance Cross-Council Initiative, United Kingdom.

The BOES Program continues to benefit from input and advice offered by the ERC external advisory committee with respect to future goals and objectives.

Occupational Injury Epidemiology and Prevention:

The Occupational Injury Epidemiology and Prevention Program supported four trainees with NIOSH funding during this reporting period. Trainee Meghan McGinty completed her PhD research on workplace safety concerns in response to Hurricane Sandy and successfully defended her dissertation in December 2015. She is now employed with the National Association of County and City Health Officials, where she works on several policy issues affecting local health departments, including preparedness. DrPH candidate Dionne Williams, who was a part-time student and employed at OSHA, successfully defended her dissertation in May 2016. Her research made significant contributions to the area of needlestick injury prevention among operating room nurses. Trainee Sara Heins completed the second-year of her PhD studies. Under the guidance of her advisor, Dr. Renan Castillo, Sara is growing her interest in the use and misuse of prescription drugs during recovery from injury for workers. During this reporting period, she published multiple papers and gave several publications, as well as completed a summer internship at the RAND Corporation. Trainee Mitch Doucette completed the first year of his PhD training. He published one paper on concussion prevention policies, and has decided to explore workplace fall prevention for his dissertation. During the recent PhD admissions cycle, we were able to successfully recruit a new PhD student, Molly Francis, who completed a fellowship at the U.S. Army Public Health Command. She will begin her PhD studies during the next reporting period.

In addition to her role as director of the OIEP program, Dr. Keshia Pollack serves as the associate director of training and education for the Johns Hopkins Center for Injury Research and Policy at the Johns Hopkins Bloomberg School of Public Health. In March 2016, Dr. Pollack also became director of the school's renowned Institute for Health and Social Policy, which advances research, training, and practice that examines how social policies impact health determinants, health outcomes, and equity. Issues of labor and employment policy are part of the research being conducted by IHSP faculty, and Dr. Pollack is exploring research opportunities in these areas. Although her research now includes a greater emphasis on health and social policy, Dr. Pollack continues to conduct occupational injury research. She is a co-investigator on research exploring the use of risk management to prevent fire apparatus crashes among U.S. rural, suburban, and urban fire departments, and she is principal investigator on research exploring injuries to professional athletes. During this reporting period, Dr. Pollack completed the second year of her four-year term as a member of the NIOSH Safety and Occupational Health Study Section. She also had an article accepted for the Special Issue of the *Journal of Safety Research*, which highlights the best papers from the 2015 NOIRS Conference.

The OIEP Program recently added Dr. Cassandra Crifasi as its assistant director. A former OIEP trainee, Dr. Crifasi previously held a non-tenure track faculty position and was a core member of the OIEP faculty. During this reporting period, Dr. Crifasi, after a national search, was offered a tenure-track assistant professor position in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. One of Dr. Crifasi's areas of expertise is promoting safety and health among law enforcement officers. Her research and practice in this area is bolstered by her newly appointed position as the deputy director for the School's Baltimore Collaborative for Violence Prevention. During this period, Dr. Renan Castillo and Dr. Stephen Wegener continued as co-investigators on a multimillion-dollar research collaborative, Major Extremity Trauma Research Consortium (METRC), which is

supported by the U.S. Department of Defense. Dr. Castillo is also the deputy director for the METRC coordinating center and has several papers under review.

In addition to the core faculty, the OIEP program is strengthened by the active involvement of adjunct faculty members. During the reporting period, Dr. James Weeks and Dr. Robert Dodd both retired from teaching in the OIEP program. While these losses were significant for the OIEP program, Dr. Pollack successfully recruited Dr. Bruce Lippy, an ERC board member, to fill the teaching gap left by Dr. Weeks. Dr. Lippy is director of Safety Research for CPWR, The Center for Construction Research and Training in Washington, D.C. During the 2016-2017 academic year, he will teach the OIEP required course, *Occupational Injury Prevention and Safety Practice*. Dr. Pollack is now teaching our transportation policy course on her own; however, Dr. Dodd will likely be a guest lecturer in the future.

The OIEP advisory board has not met since the sudden death of board member Dr. Andrea Kidd-Taylor in September 2014. Dr. Pollack is involved with ongoing discussions with ERC leadership about adding an OIEP expert to the ERC advisory board, in lieu of re-establishing a program-specific board, which Dr. Pollack believes will support collaboration and interactions across the ERC academic programs.

During this reporting period, OIEP faculty and current and former trainees authored 13 peer-reviewed journal articles and gave presentations at the ACG System Conference in San Diego and the Academy of Health Annual Meeting in Boston.

Pilot Project Research Training:

Our Pilot Project Research Training Program funds research training for doctoral students (often providing data for their dissertations) and junior faculty (often providing preliminary data for other funding applications). We continue to broadcast our annual PPRT request for proposals to all NIOSH-supported institutions and other institutions engaged in occupational safety and health research in U.S. Region III (Maryland, Pennsylvania, Delaware, Washington, D.C., Virginia, and West Virginia). In September 2016, we distributed our RFP via letters and emails to 34 program directors at 15 institutions. In response, we received 10 applications: three from doctoral students at the Johns Hopkins Bloomberg School of Public Health, one from a doctoral student at the University of Maryland School of Nursing, one from a doctoral student in the Department of Agricultural & Biological Engineering at Pennsylvania State University, and five from occupational medicine residents at the University of Pennsylvania School of Medicine. Of these, we selected three proposals for funding:

Name: Pankaj Kuhar, MS
Status: PhD Candidate, Pennsylvania State University
Mentor: Dennis J. Murphy, PhD
Project title: *Evaluation of Airborne Hazards Associated with Harvesting, Storage, Transportation and Processing of Solid Biomass from Switchgrass and Miscanthus*
[Determined to be “Not Human Subjects Research” by the IRB of the Pennsylvania State University; No. STUDY00004410; April 4, 2016]

Name: Ashley Newton, BS
Status: PhD Candidate, Johns Hopkins Bloomberg School of Public Health
Mentor: Kirsten Koehler, PhD
Project title: *Occupational Trace Metal Detection: Development of a Novel, Low-cost Analysis Method Using Microfluidic Paper-based Analysis Devices (μ PADs)*
[Approved by the IRB of the University of Colorado Denver Anschutz Medical Campus; No. PAM001-1; May 10, 2016]

Name: Pranay Randad, MS
Status: PhD Candidate, Johns Hopkins Bloomberg School of Public Health
Mentor: Christopher Heaney, PhD
Project title: *Relative Pathogenesis of Staphylococcus aureus Strains Observed in Livestock Workers Compared to Strains Observed in Community and Hospitalized Populations*
[Approved by the IRB of the Johns Hopkins Bloomberg School of Public Health; No. 00004608; March 3, 2015]

The contributions of our Pilot Project grants to the health and well-being of workers is evidenced, in part, by the broad topics of multiple recent publications stemming from our previous PPRT awards.

Continuing Education and Outreach:

The Johns Hopkins ERC's Continuing Education and Outreach efforts serve as a regional educational resource for addressing occupational and environmental safety and health issues and the prevention of workplace hazards. An interdisciplinary effort coordinated across multiple departments at the Johns Hopkins Bloomberg School of Public Health, our faculty members represent the core areas of occupational and environmental hygiene and safety, occupational and environmental health nursing, occupational and environmental medicine, biomarkers of occupational exposure and susceptibility, occupational injury prevention, and other specialty areas. Our highlights for this reporting period are as follows:

Continuing Education

- The Johns Hopkins ERC delivered 37 continuing education courses attended by 1,254 participants.
- We continued our collaborations with local and regional professional associations, including the American Association of Occupational Health Nurses, the American College of Occupational and Environmental Medicine, the Alliance of Hazardous Materials Professionals, the American Industrial Hygiene Association, and the American Society of Safety Engineers, as well as with Abbott Laboratories and ORCHSE Strategies, LLC, to develop continuing education seminars and programs.
- CE and Outreach Director Ms. Mary Doyle is on the planning committee for the Chesapeake Region Safety Council's annual conference and the biannual Mercer ORC Corporate Health Directors Network meeting.

- Ms. Doyle is also on the planning committee for the 2016 Regional Occupational Health Conference that will be held on October 22, 2016 at the Johns Hopkins Bloomberg School of Public Health.
- The Johns Hopkins ERC sponsored the 3M Hearing Loss Prevention Seminar with the Midwest Center for Occupational Health & Safety on October 6, 2015 in Annapolis, Maryland.
- Ms. Doyle continues as secretary of the advisory board of the Public Employees Safety Association and as treasurer of the Metropolitan Washington Association of Occupational Health Nurses.
- We maintained a subcontract with Healthy Housing Solutions, Inc., as a Healthy Homes Training Center, and we also prepared to provide healthy homes training in Delaware (the first of which are scheduled to occur in October 2016) through a partnership with the Delaware Division of Public Health.
- Ms. Doyle and Dr. Ana Rule are exploring a collaboration with the Johns Hopkins Hospital Biocontainment Unit, in the Division of Pulmonary and Critical Care, to provide healthcare worker infectious disease education. The unit has remote training capabilities that we employ for ERC trainings.
- The Johns Hopkins ERC was awarded a NIOSH grant on “Safety Culture in the Healthcare Sector.” For this, the ERC will: develop an expert panel, workshop materials, and evaluation protocol; conduct and evaluate the workshops; and develop online training materials on promoting a safety culture in the healthcare sector.
- Ms. Doyle also continues as an approved CE provider for the Delaware board of nursing and the District of Columbia board of nursing.

Outreach

- Dr. Jackie Agnew serves on the advisory board of the Maryland Occupational Health and Safety Surveillance program.
- This ERC collaborates with Maryland Department of Health and Mental Hygiene on the Maryland Occupational Health and Safety Surveillance Project, for which we will focus outreach and education efforts on improving provider use of the Prescription Drug Monitoring Program.
- Dr. Paul Locke gave the keynote, titled “Alternatives to Animal Testing: Changes in Science and Law,” at the Animal Law Conference for the Pennsylvania Bar Association on August 19, 2015.
- Ms. Doyle worked with Dr. Ana Rule to host 5th- through 8th-grade girls from the “Girls Engaged in Math & Science” club at the Green Mount School in Baltimore on December 11, 2015. This club seeks to give Baltimore City girls an exposure to science careers.
- The ERC will continue to assist the ACGIH Science and Education Manager to plan future meetings of the ACGIH TLV for Physical Agents Committee. The first was held on April 21-23, 2016.
- Ms. Doyle was on the organizational committee for the National Capital Area Joint Safety Association Group Young Professionals on May 10, 2016 and June 2, 2016.
- We assisted in the planning of the American Industrial Hygiene Association conference, which was held in Baltimore during May 21-26, 2016.

- The ERC hosted an exhibit by occupational health photojournalist Earl Dotter at the Johns Hopkins Bloomberg School of Public Health's annual Anna M. Baetjer Lecture to celebrate the centennial anniversary of the school on April 4, 2016. Mr. Dotter has been photographing American workers on the job for more than forty years.

Other ERC faculty and program achievements, by OSH area, include:

Occupational and Environmental Hygiene

- OEH faculty co-sponsored the local American Industrial Hygiene Association's Professional Development Conference, as well as the AIHcE conference in Baltimore.
- Drs. Peter Lees, Pat Breysse, and Ana Rule continued as collaborators on a Fogarty Environmental Health Research Training Grant in Mongolia, for which they have designed courses on occupational and ambient air sampling.
- Dr. Kirsten Koehler served as the vice chair of the American Industrial Hygiene Association's Aerosol Technology Committee, and as the vice chair and incoming chair of the American Association for Aerosol Research's Indoor Aerosol and Aerosol Exposure Working Group.
- Dr. Rule continued her close relationship with members of Turner Station, a predominantly African-American community in southeast Baltimore County that is situated in an area that is surrounded by many potential sources of metal contaminants. Drs. Rule is working with community members on chromium contamination issues.
- Dr. Rule was appointed as a member of the Agricultural Air Quality Task Force for the U.S. Department of Agriculture, National Resource Conservation Services.
- Dr. Rule testified before the Maryland state legislature and the Baltimore City Council on issues related to hydraulic fracturing, the transport of crude oil by rail, and electronic tobacco products.
- Dr. Rule served as a member of the Maryland Environmental Health Network.
- Faculty served on numerous grant review committees for the National Institutes of Health, the National Institute for Occupational Safety and Health, and the U.S. Environmental Protection Agency.

Occupational and Environmental Health Nursing

- Dr. Fitzgerald worked with Dr. Kevin Frick, the vice dean of education at the Johns Hopkins Carey Business School, to develop an outcome study of graduates of Marian House, a Baltimore non-profit organization that provides a structured living environment, education, employment readiness, and job placement for homeless and formerly incarcerated women. The purpose of the study is to determine employment attainment following graduation from the Marian House program. An OEHN student and an MBA/MPH student will assist in collecting and analyzing those data.
- OEHN faculty also contribute to outreach at the regional and federal levels. Dr. Jackie Agnew continues her membership on the NIOSH NORA Liaison Committee.
- Dr. Agnew and Ms. Doyle serve on the State of Maryland Occupational Health Advisory Committee and have assisted the state in grant writing.
- Ms. Doyle serves on the Public Employees Safety Association advisory board, the Chesapeake Regional Safety Council conference advisory board, the American

- Industrial Hygiene Association/American Society of Safety Engineers Professional Development Conference committee, the National Capital chapter Of Alliance Hazardous Materials Professionals PDC committee, the Regional Occupational Health Conference 2016 committee (presented by the three chapters of the American Association of Occupational Health Nurses in partnership with the Maryland College of American College of Occupational and Environmental Medicine), and the Washington Area Joint Safety Association.
- Dr. Maureen Cadorette works with several government agencies, including the Department of Energy, NIOSH, and the Department of Labor, on a committee titled the Joint Outreach Task Group. She also works with community engagement coordinators in the Department of Environmental Health Sciences at a twice monthly event titled Day at the Market, during which she conducts health screening and—given this opportunity to interface with the local community—teaches about occupational health and safety issues that are relevant to both work and home.

Occupational and Environmental Medicine

- Dr. Francesca Litow consults to the occupational medicine residency as an adjunct assistant professor at the Uniformed Services University of the Health Sciences, Department of Preventive Medicine and Biometrics.
- Dr. Litow serves as president of the Pennsylvania Occupational and Environmental Medicine Society, and she chairs the planning committee for the 2017 AOHC in Denver.
- Dr. Litow has also had an impact on the discipline of occupational medicine as a member of the faculty at national scientific meetings in occupational and preventive medicine, and she taught board-review courses for certification in occupational and preventive medicine.
- In addition, Dr. Litow leads the occupational safety and health team for Johns Hopkins Aramco Healthcare, and one of our recent graduates developed an educational program (modeled after the Council for Accreditation in Occupational Hearing Conservation) to train personnel in Saudi Arabia on hearing conservation programs.
- Other opportunities for OEMR outreach have arisen from specific projects taken on by residents and faculty as part of curriculum rotations. Examples include activities with government agencies such as NIOSH and the U.S. Department of Homeland Security, labor organizations such as the International Association of Firefighters, and private industry, such as Chevron.
- Dr. Brian Schwartz directs the Joint Geisinger-Johns Hopkins Environmental Health Institute and is a fellow of the Post Carbon Institute.
- Dr. Schwartz recently contributed to the symposium “Impact of Unconventional Natural Gas Drilling Operations on the Environment and Public Health” at the Center of Excellence in Environmental Toxicology, University of Pennsylvania, and he has advised Maryland Governor Hogan on this topic.

Biomarkers of Occupational Exposure and Susceptibility

- BOES faculty have provided consultation to other educational institutions that are involved in research and research training in occupational and environmental health. As an example, Dr. Paul Strickland is a member of the Wayne State NIEHS Center External Advisory Board. He has also served on numerous advisory committees (e.g., the National Research Council and the Joint Geisinger-Johns Hopkins Environmental Health Institute) and grant review panels (e.g., NIOSH, the Ontario Ministry of Labour, the U.K. Medical Research Council, the U.S. EPA Science Advisory Board, the New Jersey Commission on Cancer Research, and the Lymphoma Foundation of America).
- Dr. Strickland was a member of two expert review panels of the U.S. Environmental Protection Agency's Science Advisory Board and on the Standing Scientific Review Panel of the Lymphoma Foundation of America.
- Dr. Ana Navas-Acien continued to serve as a member of the World Health Organization's Expert Panel on Global Burden of Disease Caused by Lead, as well as on the Council on Epidemiology and Prevention of the American Heart Association. She is a member of the National Academy of Sciences Standing Committee on Emerging Science for Environmental Health Decisions, and, as a contribution to the development of occupational and environmental health science, she is the founding editor-in-chief of Current Environmental Health Reports.
- Dr. Chris Heaney is a member of the Maryland Commission on Environmental Justice and Sustainable Communities, and he serves as an advisory panel member of the North Carolina Environmental Inequities/Environmental Justice Working Group. As another contribution to this discipline has been his review of grants for Occupational Health & Safety, Ontario Ministry of Labour, Canada, and the Antimicrobial Resistance Cross-Council Initiative, United Kingdom.

Occupational Injury Epidemiology and Prevention

- In June 2016, the Johns Hopkins Center for Injury Research and policy held their Advanced Summer Institute, *Using Evidence in Practice*. The 2.5-day course was completed by 18 students, six of whom received academic credit. Dr. Pollack was one of the core instructors for the course.