

Southern California Education and Research Center
CDC/NIOSH Grant Number T42/OH008412

FINAL PROGRESS REPORT

Reporting Period July 1, 2009, to June 30, 2012

Current Programs:

Center Administration
Industrial Hygiene
Occupational and Environmental Health Nursing
Occupational Medicine (UCI)
Pilot Project Research Training
Targeted Research Training
Continuing Education
Outreach

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ABSTRACT

The Region IX NIOSH Education and Research Center for Southern California (SCERC) is composed of three academic programs: one each in Occupational Medicine (OM), Industrial Hygiene (IH), and Occupational and Environmental Health Nursing (OEHN). These programs typically have about 4, 12, and 13 trainees, respectively. The Occupational Medicine program is located at University of California Irvine (UCI); all other programs are at University of California, Los Angeles (UCLA). Additional programs are Center Administration, Pilot Project Research Training (PPRT), Targeted Research Training (TRT) a Hazardous Substances Academic Training (HSAT until June 30, 2010), a Continuing Education (CE) and an Outreach Program. These programs represent a coordinated, interdisciplinary set of professional education, continuing education, research and outreach activities that have a positive impact on the Region's and Nation's occupational health and safety practice.

The primary goals of our Region IX Center are: 1) to educate professionals in the various disciplines of occupational health and safety; 2) to provide continuing education for professionals and others in occupational safety and health field positions; 3) to proliferate occupational health and safety activity through outreach to regional institutions and organizations; and 4) to foster research on issues important to occupational health and safety.

The ERC operates in concert with the UCLA and UCI Centers for Occupational and Environmental Health (COEH). These are state supported centers for research and teaching in occupational safety and health. Together the ERC and COEH represent a unique and effective partnership between state and federal funding.

The programs of the Southern California ERC impact Occupational Safety and Health in three ways. Our graduates contribute directly to worker safety and health through their employment as professionals in the field and many go on to assume leadership positions. Our research contributes to longer term improvements in worker health through improved understanding of workplace exposures, health effects, and their control. Finally our continuing education programs convey up-to-date scientific advances to occupational health and safety professionals.

Dr. Hinds has stepped down as Center Director and retired on July 1, 2009. Dr. Froines served as interim ERC Director until December 31, 2010. Dr. Krause was recruited as new Center Director from the School of Medicine at the University of California San Francisco in January 2011. His phone number is 310-825-2079, and his e-mail niklaskrause@ucla.edu.

SECTION 1

1. Significant Center Changes

Several major changes to the structure of our center have recently been implemented. These changes have improved our overall strength, our interdisciplinary interactions, and they have supported the development of new programs proposed in this application.

Dr. Hinds has stepped down as **Center Director** and retired on July 1, 2009. Dr. Froines served as interim ERC Director until December 31, 2010. After an extensive 3-year search, Dr. Krause was recruited from the School of Medicine at UCSF in January 2011 as new Center Director. A center administrative staff position was upgraded to Academic Administrator and fund management shifted to EHS Department to increase capacities for curriculum and proposal development.

Dr. Que Hee has become **IH Program Director**. The IH curriculum is undergoing changes that allow trainees to better differentiate between professional (MPH, new DrPH degree offered) and research training (MS, PhD) emphasis and to broaden their training experience through more elective coursework. Dr. Yifang Zhu has been hired as **new Assistant Professor** in the Department of Environmental Health Sciences in 2010 and joined the faculty of the IH program.

Our OEHN program has successfully demonstrated feasibility of a **new doctoral level OEHN training** without NIOSH support. In the competing renewal application we have proposed for the first time to provide funding for two of the three doctoral students in this program to make it sustainable. In 2010, Dr. Elizabeth Thomas was hired from the School of Nursing at UCSF as **new OEHN faculty member** further strengthening our expanding OEHN program.

The **OMR program at UCLA has been completely phased out in 2009** and its Director Dr. Phil Harbor has retired in the Spring of 2011. The outcome of negotiations between the School of Medicine and the School of Public Health indicates no commitment for a new OMR program. Our OMR program at the UCLA has the capacity to train 6 residents at any time. Traditionally three residents have received NIOSH support at UCI, and 1-2 at UCLA. Going forward we plan to **expand our occupational medicine training effort in the OMR program at UC Irvine** to compensate for the closure of the UCLA program.

TRT program: In the competing renewal application we proposed a **new Collaborative Research Training Program in Occupational Epidemiology** with the epidemiology programs at UCI and UCLA. This program will be part of the TRT program and would allow supported doctoral students from both campuses to do their thesis work in priority areas identified by NORA and to participate in occupational health and safety courses and interdisciplinary activities of the ERC.

Our **CE/O program has expanded** and was separated into two programs, CE and Outreach, both led by Ms Cass Ben-Levi. Since the fall of 2010 Center Administration provided an additional 0.5 FTE for program development support (Mr. Sayed Shifa) and CE has began to provide new courses with **CME accreditation**, and to expand course offerings beyond Los Angeles and throughout Region IX. Hazardous Substance Training have been developed and taught locally without NIOSH support. We have revised and improved the SCERC website <http://www.ph.ucla.edu/erc/index.html>.

The SCERC prepared a **5-year competitive renewal** application in 2012.

2. Interdisciplinary Activities

The Executive Committee developed and implemented **three new mandatory interdisciplinary activities** (Fall Student 3-Day Student Orientation, Quarterly Clinical Case Conferences, and Professional Ethics webinars) increasing the frequency of structured interdisciplinary activities from two in 2009, over three in 2010, four 2011, to five scheduled in 2012. Contact hours were increased from 11 in 2009 to 45 in 2012.

3. Measures of Productivity and Trainees

The primary productivity assessment is the number of graduates and the number of publications for each academic program. For CE/O it is the number of courses offered and the number of attendees. Information for these metrics is given in the detailed reports for each program. We have met our targets in these areas. Our **trainees** are well qualified academically with high potential for professional and research leadership in the occupational health field. Since 7/1/2009 we have supported 52 ERC trainees in our core programs including 9 occupational medicine post-docs. Nearly two thirds (65%) were women and more than half (57%) were traditionally underrepresented minority students. Trainees won 14 awards. Nearly all of our trainees entered a career in their field or advanced to postgraduate research training.

4. Needs Assessment and Strategic Planning

A comprehensive **needs assessment** survey of occupational health professionals in Region IX was conducted every two years, the most recent being in the fall of 2010. Both the Executive Committee and the External Advisory Board confirmed the surveys' documented need for more interdisciplinary activities and more training in ergonomics and occupational safety, noting that professional training in occupational safety and health on other campuses in the region has been discontinued.

The **strategic planning** process built on the existing plan and focused on areas that 2008 reviewers had pointed out for improvement, namely more involvement of the Executive Committee and the External Advisory Board. During his first six months, the current Center Director convened a series of six in-person meetings with the Executive Committee and three separate in-person meetings with the External Advisory Board (joined by the Executive Committee) to discuss strategic plans for the ERC and its programs. While the results of this planning process provide a solid basis for 5-year planning, we consider strategic planning a continuing process.

5. Response to Emerging Issues in Occupational Health

The complexion of the field of occupational health and safety is continually changing with the growing recognition of new problems such as nanotechnology, neurotoxins, repetitive trauma, changes in gender and age distribution, influence of psychosocial factors, work disability, sexual harassment and violence in the workplace, homeland security and disaster response, and the expansion of occupational health and safety to include more environmental issues. Our Center has responded to these developments by modifying curricula, by providing **hazardous substances** training and **workplace violence prevention** training to industrial hygiene students, workers, and supervisors, by developing a doctoral **Collaborative Research Training Program** with the Epidemiology Programs at UCLA and UCI (see TRT program for details), and by adding seminars, a new rotation for OMR, workshops, and continuing education activities to address these emerging issues. We have increased the emphasis on **research** in the OEHN program through a successfully launched doctoral OEHN training program and the OEHN degree program now includes an emphasis on **aging workers**. Details of these efforts are given in individual program sections.

SECTION 2

Final Progress Reports by Program

Center Administration
Industrial Hygiene
Hazardous Substances Academic Training (?XXX)
Occupational and Environmental Health Nursing
Occupational Medicine (UCI)
Pilot Project Research Training
Targeted Research Training
Continuing Education
Outreach

CENTER ADMINISTRATION AND PLANNING

7/1/2009 – 12/31/2010

Interim Director: John Froines

1/1/2011 – 6/30/2012

Director: Niklas Krause

1. Overall description of the ERC

The Southern California NIOSH Region IX Education and Research Center (ERC) consists of the Center Administration and Planning Core and seven training programs including three core academic programs: Industrial Hygiene (IH), Occupational and Environmental Health Nursing (OEHN), and Occupational Medicine (OM); and four center-wide programs: Outreach, Continuing Education (CE) Pilot/Small Projects (P/SPP) and Targeted Research Training (TRT). The TRT includes a Work Organization Research Training Initiative. The organization of the center is shown in Figure 1 below:

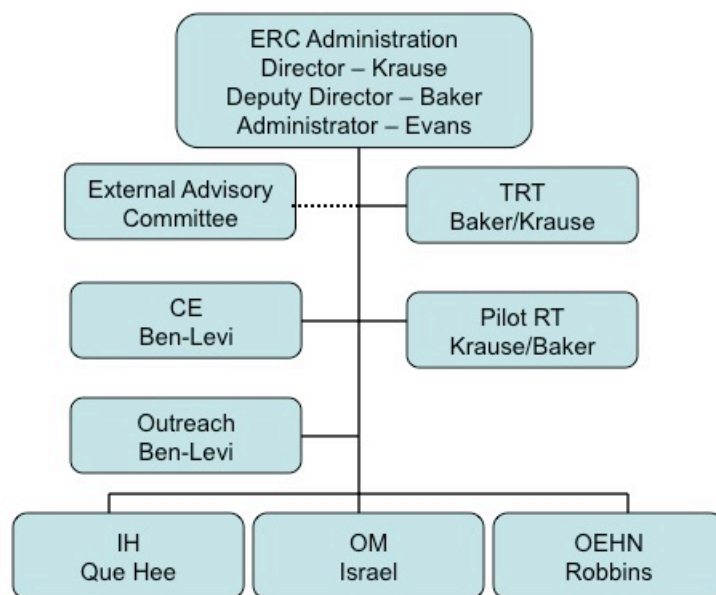


Figure 1. Organizational Chart of the Southern California ERC.

Our Center represents a coordinated, interdisciplinary set of professional education, continuing education, research and outreach activities that have had and will have a positive impact on the Region's and Nation's occupational health and safety practice. The administrative core and four of the seven training programs are housed at UCLA, one (OM) at UC Irvine, and two (PPT and TRT) are jointly administered between UCLA and UCI. A Work Organization Research Training Initiative is part of the TRT program and is also jointly administered at UCLA and UCI. CE, Outreach, Pilot Project and Targeted Research Training Programs cut across the academic training programs. Degrees offered by ERC programs include MPH, MS, MSN, PhD, DrPH, and residency certificates.

The ERC operates in concert with the UCLA and UCI Centers for Occupational and Environmental Health (COEH). These are state supported centers for research and teaching in occupational safety and health. Together the ERC and COEH represent a unique and effective partnership between state and federal funding.

Mission - The mission of the Southern California ERC is to accomplish our core purpose by educating professionals in the fields of occupational medicine, industrial hygiene, and occupational health nursing through academic programs and continuing education; conducting research in occupational and environmental health and related areas; providing outreach and resources to educational and professional organizations, and by educating non-academic stakeholders including business, labor, and vulnerable worker populations.

Center Goals and Objectives - The goals of our ERC are: (1) to educate students to become professionals in IH, OEHN, and OM, (2) to provide continuing education for professionals and non-professionals in the field, (3) to proliferate occupational safety and health activities through outreach to other educational institutions, (4) to conduct and facilitate research addressing occupational health and safety issues, (5) to be an occupational safety and health resource to organizations, (6) to instill an appreciation for the interdisciplinary nature of occupational health in trainees and professionals in the field, (7) to respond to the changing nature of occupational health and safety problems.

Programs - The Region IX Southern California ERC was led by Dr. William Hinds of UCLA from 2000 until his retirement in June 2009, followed by Interim Director John Froines of UCLA until December 2010. The current Director, Dr. Niklas Krause, assumed his position as full professor in the Department of Environmental Health Sciences of the UCLA School of Public Health in January 2011. Dr. Dean Baker of UC Irvine has been Deputy Director since 2000. Ms D.T. Evans has been the Center Administrator since 2005. The educational and research programs, their directors, the degrees offered, and the administrative institutional homes are:

<u>Program</u>	<u>Program Director</u>	<u>Degree(s)Offered</u>	<u>Institution</u>
Administration and Planning	Dr. Niklas Krause	-	UCLA
Outreach (O)	Ms. Cass Ben-Levi	-	UCLA
Pilot/Small Project Training (P/SPP)	Dr. Niklas Krause	-	UCLA/UCI
Targeted Research Training (TRT)	Dr. Dean Baker	PhD	UCI/UCLA
Industrial Hygiene (IH)	Dr. Shane Que Hee	MPH, MS, PhD,DrPh	UCLA
Occup. Envir. Health Nursing (OEHN)	Dr. Wendie Robbins	MSN	UCLA
Occupational Medicine (OM)	Dr. Dean Baker	MPH, MS, certificate	UCI
Continuing Education (CE)	Ms. Cass Ben-Levi	certificate	UCLA
Hazardous Substances Training (HST)	Ms. Cass Ben-Levi	certificate	UCLA

The TRT Program includes a Work Organization Research Training. TRT relies on core academic programs and allied programs at UCLA and UCI for basic coursework, primary thesis advisors, and conferring doctoral degrees, requires participation of ERC program directors in the dissertation committees, and of trainees in all ERC interdisciplinary activities and in elective coursework covering occupational health and safety, epidemiology, or psychosocial stress research methods.

Trainees – Since 7/1/09 we have trained 52 graduate students incl. 9 postdocs. Our trainees are well qualified academically with high potential for professional and research leadership in the occupational health field. The majority of trainees were female and from ethnic minorities.

Table 1: Gender and Ethnicity of ERC Trainees by Academic Program (2009-2012)

Program	All	Female	Male	White	Minority	African-American	Asian/Pac Islander	Hispanic
IH	19	11	8	11	8	1	6	1
OEHN	25	21	4	9	16	5	7	4
OMR	9	2	7	3	6	0	5	1
Total	52	34	22	23	30	6	18	6

Center Environment - Southern California has many petroleum refineries, aerospace industries, service industries, and a large manufacturing base of small and medium-sized companies that represents more than 60% of the manufacturing in California. Los Angeles port and regional distribution centers handle nearly two thirds of US imports. The workforce is very diverse with many immigrant and non-English-speaking groups. This large concentration of industries in Southern California provides an ideal environment for occupational health education and many opportunities for field trips and internships. The wider Region IX provides additional diverse environments with the world's largest agricultural economy in California, mining in Arizona, Nevada, and California, and leading industries in the hospitality sector in all four states in the region including Hawaii.

Interdisciplinary Interaction - As a Center we assure that all of our trainees finish our programs with excellent appreciation for the roles and contributions of all the disciplines to occupational health and safety and the value of working with other disciplines. In addition to interdisciplinary coursework, we organize a 3-day interdisciplinary orientation, an interdisciplinary dinner meeting, and a plant visit and interdisciplinary workshop, quarterly clinical case conferences, and a webinar in Professional Ethics. Details of these activities are described in the Interdisciplinary Coordination section of CWA.

Advisory Committees - Our seven-member **Executive Committee** consists of the Director, Deputy Director, Program Directors, and Center Administrator. The Executive Committee meets at least quarterly to discuss general issues that affect all programs. Interdisciplinary activities are planned. Our **External Advisory Board** consists of 19 members representing each of the core disciplines of our ERC plus labor and continuing education. The committee assists us on a continuing basis and, together with **Advisory Committees of individual programs**, is charged with reviewing the educational programs and activities and advising on modifications that would enhance the impact of the ERC in achieving its goals and objectives in Region IX.

2. Coordination and Integration of ERC Programs

The **Center Director** coordinates and integrates Center-wide activities like assessment of productivity and needs, outreach, continuing education, interdisciplinary interaction, and strategic planning; liaises with the Program Directors; supervises the Center Administrator; calls and chairs the meetings of the Executive Committee and External Advisory Committee; selects members of the External Advisory Board; and represents the ERC in public, for example, making public statements on behalf of the ERC, attending NIOSH Center Director and AUPOHS meetings, liaising with stakeholders, managing the content of the ERC website and news media contact. He functions as principal investigator of the NIOSH ERC training grant, organizes the ERC grant renewal, and replies to NIOSH reviewers. Together with the **Deputy Director**, he manages the center-wide pilot and targeted research training programs. The Center Director assumes primary responsibility for the former, the Deputy Director for the latter program. The Deputy Director deputizes for the Center Director and participates in ERC Director and AUPOHS meetings.

The **Center Administrator** organizes, tracks, manages, and stores all messages, reports (financial, budget, students, student academic progress, ERC research reports, meetings, etc.); facilitates all the details of the Center Administration and its programs under the supervision of the Center Director; attends and takes minutes at Executive Committee and External Advisory Board meetings, interfaces with the UCLA Office of Contracts and Grants, UCLA Extramural

Funding, UCLA Purchasing, and the finance/budget offices of the Department of Environmental Health Sciences and the School of Public Health.

The **Program Directors** manage their specific Programs with the aid of their staff (for CE, OEHN, OM, and IH), their program-specific Advisory Committees, and the Center Administrator; report progress and concerns about their programs to the Center Director at Executive Committee meetings or by direct contact depending on the situation, and provide program reports to the ERC External Advisory Board and their program-specific Advisory Committees; select members of their program-specific Advisory Committees; and reply to NIOSH program reviewers together with the Center Director.

The Center Director, Deputy Director, Center Administrator, and Program Directors together constitute our seven-member **Executive Committee**. The Executive Committee meets at least once an academic quarter to discuss general problems and issues that affect all programs, and plans coordinated outreach and interdisciplinary activities. The ERC **External Advisory Board** (see list of members below) is convened together with the Executive Committee at least once per year. **Advisory Committees of individual programs** are consulted and/or invited to the Executive Committee meetings as needed. Community views are thus been sought to guide the ERC toward new or improved educational programs for both professional training and continuing education.

3. Assessment of Productivity and Need

For each academic program, the primary productivity assessment parameters are the number of publications, number of graduates, and successful career placement. For continuing education, the parameters are the number of courses offered and the number of attendees. For Outreach, parameters are the number, variety and geographical breadth of activities, and the number of publications. Information for these metrics is provided in the proposal for each program.

A comprehensive **needs assessment** survey of occupational health professionals in Region IX is conducted every two years, the most recent being in the fall of 2010. The survey used the Zoomerang web site to conduct the assessment. There were 319 complete responses, 84 were industrial hygienists, 49 were occupational health nurses, 23 were occupational medicine doctors, 148 were occupational safety specialists, and 15 were environmental specialists. Five subject areas, ergonomic risk factors, incident investigation, laws and regulations, musculoskeletal disorders, and personal protective equipment were ranked by each of the four occupational health disciplines with more than 80% saying they were "important" or "very important" (score of 4 or 5 out of 5). Another five topics were rated as "important" or "very important" by 85% or more in three of the four OH disciplines, including accident history, injury causation, chemical hazards/toxicity, risk assessment, and risk communication. While most of these areas are well covered in our programs, ergonomic risk and musculoskeletal disorders are currently addressed in an elective monthly advanced ergonomics webinar CE course and ergonomics and risk assessment are taught in the IH program's EHS 259A. Both the Executive Committee and the External Advisory Board confirmed a need for more interdisciplinary activities and more training in ergonomics and occupational safety, noting that professional training in occupational safety and health on other campuses in the region has been discontinued.

4. Strategic Planning

The previous 5-year strategic plan was developed in 2008 and has been in effect for only 2 years, during two changes in ERC leadership, with the current ERC director being hired in January

2011 just 6 months before the competing 5-year renewal application was due. Therefore, the strategic planning process built on the existing plan and focused on areas that reviewers had suggested for improvement in 2009, namely more involvement of the Executive Committee and the External Advisory Committee. During his first six months in office, the current Center Director convened a series of six in person meetings with the Executive Committee and three separate in person meetings with the External Advisory Board (joined by the Executive Committee) to discuss strategic plans for the ERC and its programs before writing this renewal. While the results of this planning process provide a solid basis for 5-year planning, we consider the strategic planning process a continuing process. We intend to remain responsive to changes in needs, resources, economic conditions, and aim for a high level of flexibility preparing us to take advantage of special opportunities that may arise during the next funding cycle.

Our 2011 strategic plan was developed as a collaborative effort with internal and external input following these steps:

1. Our Mission and Vision statements, our 2008 strategic plan, and the 2009 reviewer's critique were the starting point for the development of our new strategic plan.
2. In 2010, a major needs assessment has been conducted among alumni and among members of the professional associations in Region IX. A total of 357 responses were received. Needs assessments are also conducted by other means, including a survey circulated at the Western Occupation Health Conference, online forms, academic class evaluations, and evaluation responses by CE trainees.
3. In 2011, we scheduled six Executive Committee and three External Advisory Board in-person meetings to revise our 2008 strategic plan and to implement recommendations of NIOSH reviewers. We focused on strategic changes in IH and OEHN curricula, assessing needs and feasibility for expanding doctoral training in allied disciplines, and developing detailed plans to strengthen center-wide activities such as interdisciplinary coordination, diversity recruitment, and the expansion of outreach activities in Region IX beyond Southern California.

5. Interactions with Stakeholders

The SCERC through its program directors and faculty interact directly with stakeholders such as UCLA Labor Occupational Safety and Health (LOSH), COEH, The California Wellness Foundation, Cal/OSHA, and the UCLA School of Public Health. We interact with the Northern California ERC by direct communication between Center Directors and between CE/O program directors. We interact with NIOSH OEP staff by email and telephone and participate in regular monthly conference calls with NIOSH and all ERC Directors. Systematic input from stakeholders and professional communities is sought through bi-annual needs assessment surveys and regular advisory committee meetings.

6. External Advisory Board

The External Advisory Board is charged with reviewing the educational programs and activities of the Center and advising on modifications that would enhance the impact of the Center in achieving its goals and objectives in Region IX. We have selected a distinguished and experienced set of advisors to assist us on a continuing basis. The Board is chaired by Mary Kochie, RN, convened at least once a year, and meets together with the Executive Committee. In 2011, we added one new representative of IH/ (Jackie Luca) one of OEHN (Leif Guerrero) and five new members to strengthen liaison with labor (Chloe Osmer and Andrea Nicholls), UCLA Occupational Health Services (Warner Hudson), Hawaii (James Newberry) and Nevada (Bobette

Bond). The Board consists of 19 members representing each of the core disciplines of our ERC plus occupational safety, labor and continuing education. Chairs and Co-Chairs of individual program advisory committees join the overall External Advisory Board at least once a year.

Records of External Advisory Board and Executive Committee meetings are maintained by the ERC Administrator. The current Board Members are listed below:

Name, Title	Status	Discipline	Organization
Mary Kochie, RN, MSN, COHN-S, CCM	Chair	Occ. Health Nursing	Cal/OSHA
Glenn Azevedo, MS, CSP	Member	Ergonomics, Safety	Steelcase, Inc.
Bobette Bond, MPH	Member	Labor, Public Policy	Culinary Workers Health Fund
Thomas Butler, Jr., CSP, CHMM, PhD	Member	Safety	Butler Health & Safety Inc.
Linda Delp, MPH, PhD	Member	Labor, Worker Training	UCLA LOSH Director
Mary McDaniel, Do, Dj	Chair	CE/O OEM, Risk Management	Mc Daniel Lambert Inc.
Marjorie Drucker, MS, CIH, CSP, CCM	Member	IH, Safety	Drucker Health & Safety Mgmt.
Leif Guerrero, RN, MSN, COHN-S	Chair	CME Occ. Health Nursing	St. Joseph Health System
Annette Haag, MS, RN, COHN-S/CM	Member	Occ. Health Nursing	Haag and Associates
Warner Hudson, MD, FACOEM, FAAFP	Member	Occ. Medicine	UCLA OHS Medical Director
Pamela, Hymel, MD, MPH, FACOEM	Chair	RAC Occ. Medicine	Disney Parks & Resorts
Jackie Luca	Chair	IH	Luca EHS Mgmt.
James Newberry	Member	IH, Safety	Island Insurance Company Ltd
Andréa Nicholls, MPH	Member	Labor, Organized	AFL-CIO, LA County Federation
Chloe Osmer, MPP	Member	Labor, Strategic Camp.	Clean Carwash Campaign
Paul Papanek, MD, MPH	Member	Occ. Medicine	Kaiser Permanente Occ Med
Mary Gene Ryan, MPH, RN, COHN-S	Member	Occ. Health Nursing	MGRyan & Co.
Howard Spielman, PE, CIH, CSP, REHS	Member	IH, HSAT, Safety	Health Science Associates
Richard Warner, MS, CIH, CSP	Member	IH, Safety, CE	Consultant

7. Response to Previous Program Evaluation

The most recent summary statement was issued by the Special Emphasis Panel on January 27, 2009. The main concerns were the **recruitment of a new ERC Director** and the process of establishing the future leadership within the IH program after Dr. Hinds' retirement as both Center Director and IH Program Director effective June 30, 2009. Dr. Froines served as Interim Director until the successful recruitment of Dr. Krause as new Center Director in January 2011. The ERC and EHS department leadership recruited an experienced tenured faculty, Dr. Que Hee, as new **IH Program Director** starting July 1, 2009 thus stabilizing leadership for the IH and a proposed HSAT program.

Another major concern was limited **outreach to areas outside the Southern California region**. As described in more detail in the Outreach Plan, Outreach Coordinator Cass Ben-Levi has been successful in reaching out to Region IX beyond Southern California, including Arizona, Hawaii, and Nevada. Center Administration has supported these efforts by funding a new 0.5 FTE CE program representative position in 2010 and through provision of a 400% larger office space for CE at UCLA in 2011. We also recruited two new External Advisory Board members from Hawaii and Nevada to serve as a liaison for expanding activities.

Reviewers reported a "sense of **domination of public health and IH within the ERC.**" There was one main structural reason for that: only IH provided doctoral training within the ERC. In the meantime, the School of Nursing strengthened its OEHN program by hiring an additional OEHN faculty (Dr. Thomas) and by successfully advancing its first doctoral students to candidacy. In the 5-year competing renewal application we proposed an ERC-supported **doctoral training track in the OEHN program**. In addition, we proposed within the TRT program a new **Collaborative Research Training Program** supporting interdisciplinary training in occupational health for doctoral epidemiology students from UCI and UCLA and dissertation research addressing NORA priorities. We also proposed refunding of the **HSAT** and **HST** programs. These initiatives are expected to lead to more balance between programs.

The reviewers recommended **strengthening interdisciplinary activities** and also noted that interdisciplinary interaction is limited by the travel distances between UCLA and UCI. The ERC has responded with several new initiatives: (1) Since 2010, all incoming students and ERC trainees participate in a **new 3-day Student Orientation** in the week before the fall quarter starts. (2) An **interactive CE Ethics** course for professionals has become mandatory for ERC trainees in 2012 and the ERC pays for the fees. (3) In 2012, the Executive Committee has conducted the first quarterly interdisciplinary clinical **case conferences** at UCI that will become a formal part of mandatory IH, OEHN, and OM courses. (4) Center Administration has pledged support - and CE/O staff has begun - to set up and test **long-distance communication** tools that would allow off-site active participation of UCLA IH and OHN trainees in case conferences, seminars, or grand rounds organized with the OM program at UCI.

Reviewers recommended using the **External Advisory Committee** more fully and effectively. Advisory Committee members have participated actively in the new 3-Day Fall Student Orientation initiated under Dr. Froines' leadership in 2010 and in 2011. Dr. Krause has engaged the committee fully in strategic planning, meeting with the committee four times since his arrival, sharing summary statements, faculty responses, and draft program plans with all members and involving the **Executive Committee** in all aspects of the 5-yr renewal in many meetings. Both Committees also participated actively in NIOSH's online site visit in February 2012.

8. Studies and Results – Center-wide Activities

The Administrative Core and Planning Program does not produce studies or results except through its administered PPT and TRT programs that have their own sections. Therefore, this section will focus on the administrative and planning activities conducted by ERC Administration in fulfillment of the specific objectives.

The administrative core was led by Interim Director Dr. John Froines until December 31, 2010. One of the top priorities of Center Administration has been permanently filling the position of **Center Director**. Concluding a wide-ranging search, the SPH recruited a new full professor, Niklas Krause, MD, PhD, in the EHS department who began serving as Center Director January 1, 2011. He was previously Associate Professor in Residence in the Division of Occupational and Environmental Medicine in the School of Medicine at UCSF. He is interested in epidemiological and community-based participatory research with a focus on chronic cardiovascular and musculoskeletal diseases, ergonomic and psychosocial risk factors, and injury and disability prevention. Pre-existing collaborations with both UCLA and UCI faculty facilitated a resumption of the new leadership role. Dr. Krause represented our ERC at the January 25/26 AUPOHS meeting in Washington, D.C., and he is promoting increased collaboration with other ERCs including our sister organization in Northern California.

Strategic Planning and Needs assessment: See sections 3 and 4 above.

The Director's **discretionary fund** has been used to support:

- External Advisory Board and Executive Committee meetings
- Annual interdisciplinary dinner
- The needs assessment survey
- Improvement of the ERC website
- Increase of CE distance learning capability through online webinars
- Partial payment for an ad in a publication of the American Board of OHNs
- Two part-time staff for Center Administration
- One part-time staff for Continuing Education / Outreach
- One additional pilot project at the School of Nursing

Interdisciplinary Coordination: The Center has continued and expanded its interdisciplinary activities during this reporting period. Some of our academic courses are required for at least two disciplines (e.g. EHS259A for IH and OEHN). While this is important, what is more important is that the trainees in our Center are taking courses, making field trips, solving problems, and writing reports with trainees in other disciplines.

Every year the ERC hosts **interdisciplinary dinner** meeting for Center students and faculty, advisory board members, as well as faculty from the Center for Occupational and Environmental Health (COEH). The Center hosted the annual interdisciplinary dinner in 2010 with a record number of poster presentations. Internationally recognized occupational medicine physician Paul Blanc, MD, MSPH, was the keynote speaker. For the first time the program included addresses by two pilot project grantees. As another innovation in 2011, guests and trainees participated in a hands-on personal protection (glove) training provided by one of our professional CE trainers. The keynote speaker was the new Center Director who discussed the challenges and opportunities of community-based participatory research (CBPR) and research-to-practice based on his extensive participatory research and leadership training experience with hotel workers in San Francisco and Las Vegas. The director of the LOSH program, Dr. Linda Delp, gave an account of how these activities led to Cal/OSHA's first application of the ergonomic standard (in a Los Angeles airport hotel). These presentations were aligned with the Center's objective to address low-wage immigrant worker health in Region IX. In January 2012 the Interdisciplinary Dinner featured a keynote address by the new Chief of Cal/OSHA Dr. Ellen Widess complemented by a short interactive interdisciplinary training on root cause analyses conducted by one of our CE instructors.

Faculty and all ERC-supported trainees also participate each year in a **half-day field trip and interdisciplinary workshop** held at a local industry worksite. Students tour a facility and then divide into four teams (industrial hygiene, occupational health nursing, occupational medicine, and safety). Students are assigned to teams in any of the other disciplines that is not their own. The teams discuss and develop what the role of each core discipline should be, critique the plant from the point of view of their assigned discipline; and present their critique to whole group. This activity requires students to work on a problem as an interdisciplinary team and to think seriously about the roles of disciplines other than their own. These **annual interdisciplinary site visits** took place in 2009 at Exide Technologies secondary lead smelter (battery recycling) in Vernon, in 2010 at the repair facility of the Metropolitan Transit Authority in Los Angeles, in 2011 at the rocket engine production site of Pratt & Whitney Rocketdyne at Canoga Park, CA, and in 2012 at water treatment and waste water recycling plants of the City of Santa Monica.

New initiatives were planned and coordinated to improve the interdisciplinary relationships among the programs. In particular, this includes the interdisciplinary pre-fall quarter **3-day Orientation Program** for incoming trainees led by faculty, senior trainees, and members of the business community and our external advisory board held in 2010 and 2011. In 2012, the Executive Committee conducted new quarterly **Clinical Case Conferences** that are being integrated into the curricula of our three core academic programs and bring together OM, OEHN, and IH trainees to learn to cooperate in a real-world worker clinic setting. They learn to take occupational, medical, and social histories, and plan together further evaluations in terms of medical diagnosis, disability management, occupational exposure assessment, and hazard abatement. The CE **Ethics for Health and Safety Professionals** has become a required activity for Center-Supported students in the Spring 2012, with the Center paying their registration fees.

Diversity Recruitment and Retention: Faculty and IH and OEHN students have recruited for Southern California ERC programs at student association meetings, career courses, and professional meetings. Our Associate Dean for Student Affairs at SPH Dave Clark increased outreach activities six-fold in 2009. Each admissions cycle now uses a three-pronged approach – online resources, personal appearances and mass mailings. Web-based recruiting strategies include resources on the School's websites, hosting and participating in a variety of webinars and successfully linking to other sites to drive prospective applicants to the UCLA-SPH website. Each year the recruiting staff host and/or participate in approximately 60 face-to-face events by traveling circa 50,000 miles from coast to coast. These events include graduate recruiting fairs, prospective student open houses at the School and presentations at regional and national conferences. Four times per year mass mailings (two bulk and two on-line mailings) go to a contact list of over 900 feeder schools and individuals to provide updated information about the School and its programs. Overall, the recruiting plan utilizes a very targeted and strategic approach to our successful feeder schools, reaching out to applicants from underserved populations, connecting to Historically Black Colleges and Hispanic Serving Institutions, and connecting to graduate student advisors/faculty at various institutions. As shown above on page 9 in **Table 1**, the majority of our trainees (57%) came from traditional minority backgrounds. For comparison, students enrolled in graduate higher education in the US comprise 12% African-Americans, 7% Asian-Americans, 7% Hispanic, and 68% White. ERC trainee diversity also compares favorably to our local UCLA-SPH (School of Public Health) which enrolled 7% African-Americans, 26% Asian-Americans, and 11% Hispanics during the past two years. This demonstrates our programs' success in attracting and admitting a highly diverse pool of well-qualified trainees. Therefore, our core diversity recruitment plan is to continue our de-centralized established recruiting activities in each program. These activities include faculty and student

visits and presentations at other universities plus other program-specific activities outlined below.

Continuing Education: The School of Public Health provided **additional office space** for the new Center Director that is being used to house the expanding CE program. We are negotiating with UCLA for a permanent training space on campus for our CE courses. Reinstatement of our partnership with UC San Diego's OSHA Training Institute Education Center resulted in scheduling 19 courses in 2010 and 20 in 2011. In March 2010 CE was approved by the Institute for Medical Quality of the California Medical Association as a **Continuing Medical Education (CME)** provider. A new **CME-accredited quarterly OH dinner** event for clinicians addressing occupational health issues has been started in the fall 2011. The SCERC, together with the NCERC, also supports the exploration of the feasibility of a new complimentary path for occupational medicine training. In September 2010, CE was approved by the California Department of Public Health as an Accrediting Agency for continuing education for **Registered Environmental Health Specialists (REHS)**. Even though our **HST Program** was not funded for 2009/10, we continued to offer HST trainings. The **CE Advisory Committee** was reinvigorated and expanded and a new **CME Advisory Committee** was established.

Outreach: We have contacted professional associations such as ASSE and AIHA sections in Arizona, Nevada and Hawaii about working together to offer some of our courses in their locations to increase the reach of the Center's training programs. We have also contacted the TPG in Region IX for the same purpose. Ms Cass Ben-Levi successfully secured new **CE training sites** outside the LA area in Orange County, and in Tempe and Tucson, Arizona, and is planning to secure sites in Hawaii. The ERC also supports the development of additional **distance learning** capabilities to be used both for region-wide CE/Outreach and for interdisciplinary activities connecting programs at the 3 schools and 2 campuses (UCLA and UCI) of the ERC.

Many of our academic courses, CE courses, and Outreach activities address health and safety issues of **vulnerable populations**. We incorporated presentations relating to low wage service workers into our 2011 interdisciplinary dinner presentations. We also included a session on the aging workforce in our ergonomics webinar. We offer courses on how to communicate safety to a workforce, including "to your Spanish-Speaking workforce." We include additional information in the course material for several courses regarding chemical hazards for pregnant women and driving hazards for older workers. OEHN has integrated clinical training about older workers into the OEHN Adult/Gerontology Nurse Practitioner. Center Director Niklas Krause presented results of his community-based participatory research with immigrant hotel workers at the WOEMA conference in Las Vegas and the ACOEM conference in Los Angeles (**Krause N**, Injuries in Las Vegas hotel workers: Addressing health disparities of low wage immigrant workers in a CBPR study with room cleaners, Western Occupational and Environmental Medicine Association (WOEMA) Conference, Las Vegas, September 10, 2011; **Krause N**, Investigating health disparities with immigrant hotel workers, American Conference of Occupational Health (ACOH), Los Angeles, May 1, 2012)

Under the second year of a three-year grant from The **California Wellness Foundation**, the CE program trained more than 300 hotel housekeepers, kitchen workers, janitors and their supervisors per year in injury and illness prevention. In July 2011 we have submitted an application for an **OSHA Susan Harwood capacity building grant** to expand our Workplace Violence Prevention training to late night retail businesses and health care workers throughout Region IX, including Arizona, Hawaii, and Nevada. Unfortunately, this proposal has not been funded.

Pilot Projects: The Center received 10 pilot project applications in 2009 and five in 2010 and funded nine of them. In 2010, previous projects resulted in new R01 funding in the amount of

\$1,280,000 for a project entitled “Implementing Risk Management Strategies to Prevent Injuries among Firefighters;” and an R21 award “Whole glove integrity and chemical resistance of disposable Nitrile gloves.” For FY 2011/12 we received seven high quality applications and we funded five of them. More details are provided in the Pilot Project Program Section.

Targeted Research Training: The Center’s TRT program has developed **training in work organization and psychosocial stress research** including an academic course. We also plan to establish a **Collaborative Research Training Program in Occupational Epidemiology** within our TRT program including support for occupational health-related courses, ERC interdisciplinary activities, and NORA-topic dissertation support for students in the epidemiology programs at UCI and UCLA. This planned expansion increases interdisciplinary collaboration across both campuses, and leverages existing courses and faculty in these programs as well as the epidemiological expertise and research opportunities of ERC and COEH faculty. More details are provided in the TRT Program Section.

Other Activities: Center Administration is taking the lead in strengthening its CE **ergonomics program**. Center Administration is shepherding such activities as **redesign of the IH curriculum** (including recommendations from the IH Students Association). The Center Administrator and the IH Program Director worked with the EHS Department's newly hired part-time Internship Coordinator, to enhance/expand **internship** opportunities for our trainees. ERC academic trainees are encouraged to attend CE courses and receive a steep discount or stipend to do so.

The Center, in collaboration with EHS/COEH, has hired a **new faculty, Yifang Zhu**, PhD, in aerosols/air pollution to replace William C. Hinds, ScD who retired in June 2009.

Center Administration is initiating a variety of activities, working with individual programs, and **collaborations** of programs to improve communications, education, research, diversity recruitment and retention, and community involvement. We interface with other School of Public Health departments and programs, such as epidemiology, the new UCLA Center for Laboratory Safety, the Centers for Occupational and Environmental Health (COEH), and the Sustainability/Pollution Control Center both funded by the state of California, and the Southern California Particle Center funded by EPA to maximize cooperation, education and innovation.

10. Significance

The organizational significance of the Center-wide Activities is that these initiatives are directed not just at improving the individual programs of the ERC, but through leadership and collaborative efforts, to improve the interconnectivity of the programs. The Center is mindful that developing occupational health and safety professionals requires a cohesive program, multi-disciplined approach and it is the responsibility of Center Administration to generate, promote, and support these efforts. The ultimate goal and regional and national significance of all these efforts is providing leaders in the field of occupational safety and health, and to provide high quality up-to-date continuing education for both academic and non-academic professionals, supervisors, workers, and to be a resource for educational institutions, organized labor, business, and governments in Region IX.

The Southern California ERC together with the Northern California ERC serve the largest economy in the nation and provide the only two training programs in occupational medicine and graduate occupational health nursing in Region IX and the Western United States, and the two out of three graduate industrial hygiene programs.

11. Publications

The Administration and Planning Core does not produce publications. Publications of the programs are listed together in the outreach program report appendix.

INDUSTRIAL HYGIENE

**Program Director:
Shane Que Hee**

1. Background. The UCLA Industrial Hygiene (IH) Program is a research-based graduate academic program designed to produce professional IH practitioners and researchers. The program trains its graduates to be scientifically sophisticated and to perform at an advanced professional level. There is a strong emphasis on basic and applied sciences, but especially hazard measurement, control technology, toxicology, and epidemiology. The training includes classroom instruction, laboratory exercises, field exercises, student oral presentation opportunities, internet informatics, internships, reports, and thesis research. It is the only research-based IH program and the only IH program offering an IH doctorate in Southern California. The program is located in the Center for Health Sciences on the UCLA Campus. The IH Program resides within the Department of Environmental Health Sciences in the UCLA Fielding School of Public Health.

2. Specific Aims. The overall academic objectives of the UCLA IH Program are to produce professional industrial hygienists at the MPH, MS, and DrPH levels, and researchers at the PhD level. Other objectives include conducting research to extend knowledge in the areas of anticipation/identification, recognition, evaluation, control, and prevention of hazards in the workplace; collaborating and supporting other research in the general areas of occupational, environmental, and public health; research to practice transfer; and providing service to the local, state, regional, national, and international occupational health communities to improve worker health and safety.

3. Results and Discussion. The IH Program completed its 27th year as a NIOSH-supported program and 18th year as a fully ABET-ASAC accredited program. Director William Hinds retired in 2009, became Emeritus, and was succeeded by Professor Shane Que Hee. Professor John Froines also retired and became Emeritus as did Professor Philip Harber. Assistant Professor Yifang Zhu joined the faculty and was soon promoted to Associate Professor. Professor Nola Kennedy transferred from a research faculty position to a teaching faculty position. Former Director Hinds continued to assist in teaching EHS252D, the course on aerosols for which Professor Zhu is now the faculty in charge. Professor Froines continued to instruct EHS 200A, the introductory overview of environmental health for our students who major in environmental health sciences. The IH Program receives limited administrative support through the EHS department, it no longer employs its own part-time administrator.

Other accomplishments during the 2009-12 funding period included: (a) Support of five MS and ten MPH students, eight PhD students, one DrPH student, and four core faculty members; (b) graduation of four MS students, six MPH students, and three PhD students; (c) Publication of 25 peer-reviewed faculty publications, 4 of which contained six IH student authors; (d) Reaccreditation of the MS and MPH programs by ABET-ASAC for at least 2 years in 2012; (e) Award of some \$6 million in grants with five SCERC pilot project awards to IH Program students; (f) Award of doctoral students with three SCAIHA Fellows, two AIHF Fellows, and three School of Public Health Awards; (g) Award of Master's students with six SCAIHA Fellowships, three AIHF Fellows, and three Tony Norton Awards; (h) Attendance of the American Industrial Hygiene Conference and Exhibition (AIHCE) by 16 students with seven trainee research presentations (platform/poster) and six faculty presentations; (i) Operation of a recruitment booth at the Portland AIHCE in 2011; (j) Job placement for all graduated students; (k) Organizing a seminar about Cal/OSHA and its regulations for 20 members of the state of Henan, Republic of China delegation; (l) Publication of quarterly alumni newsletters and separate bulletins for students in

residence; (m) Continued operation of the Industrial Hygiene Students Association; (n) Holding at least one annual IH Advisory Board meeting; (o) Creation of new IH Program recruitment materials and revision of respective websites; (p) successful research to practice - our scientific discoveries allowed workers to be better protected: (i) Dr Que Hee's results on glove permeation are immediately usable to protect workers in the field; (ii) Dr. Froines', Zhu's, and Hinds' results on air quality allow a good estimate of likelihood of asthmatic attacks in vulnerable populations and who might be at risk for lung problems; (iii) Dr Kennedy's and Zhu's research on nanoparticles has assessed whether nanoparticles can be measured as accurately and precisely as larger particles.

4. Conclusions. The UCLA Industrial Hygiene Program is the only research-based such program and the only one offering a doctoral degree in Southern California and is the only one with its Master's programs accredited by ABET-ASAC. It produces scientifically sophisticated IH professionals and researchers. In the past three years, ten students have graduated with Master's degrees and three with a PhD. Students won 19 individual awards/fellowships; and six were coauthors in four peer-reviewed journal publications. Faculty published 24 peer-reviewed articles, and obtained about \$6 million in grants in the period July 1 2009 to June 30 2012.

5. Publications and Presentations: see Outreach Appendix at the end of this report.

6. Grants.

Froines J, PI, Cal Department of Pesticide Regulation 08-C0129, Methyl Iodide Review, 03/20/09-06/30/10, \$72,164

Froines J, PI, Southern California Air Quality Management District, *Toxicologic Pathways of Rail Yard Emission Exposure on Non-Cancer Health Impacts*, 04/01/09-03/31/11, \$280,872

Froines J, PI, California Endowment 20082157, *Transportation Impacts on Communities in the Los Angeles Basin*, 06/01/09-05/031/11, \$323,820

Froines J, Interim PI/CoI, CDCP/NIOSH 1 T42 OH008412-06, *UCLA Southern California Education Research Center*, 07/01/09-06/30/012, \$1,270,000

Froines J, PI, TS RTP, *California's Toxics Information Clearinghouse: Implementation Strategies and Scientific Uncertainties*, 07/01/09-06/30/10, \$19,210

Froines J, PI, NIH/Fogarty International Center D43 TW00623-13S1, *UCLA-Mexico Collaborative Training and Research Program*, supplement 09/01/09- 08/31/11, \$43,200

Froines J, PI, Southern California Air Quality Management District 20090799, *Toxicologic Pathways of Rail Yard Emission Exposure on Non-Cancer Health Impacts*, 09/01/09-08/31/11, \$620,480

Froines J, Co-I, Wallace, S. (PI), NIH 1RC1ES018121-01, *Assessment of Local Environmental Risk Training (ALERT)*, 09/28/09 – 07/31/11, \$500,000

Que Hee SS, PI, NIOSH/CDC R01 OH009250, *Whole Glove Permeation/Penetration of Organic Liquids with a Dextrous Robot Hand*, 09/01/09-08/31/12, \$1,060,110.

Zhu Y, PI, California EPA/Air Resource Board, *Effects of Complete Streets on Travel Behavior and Exposure to Vehicular Emissions*, 06/01/12 – 05/31/15, \$250,000.

Zhu Y, PI, California EPA/Air Resource Board, *Reducing Air Pollution Exposure in Passenger Vehicles and School Buses*, 04/01/12 – 09/30/14, \$150,000.

Zhu Y, PI, NSF, *Effects of Volatility and Morphology on Vehicular Emitted Ultrafine Particle Dynamic*, 01/01/09 – 12/20/13, \$400,014.

Zhu Y, PI, The Health Effect Institute - Walter A. Rosenblith New Investigator Award, *Assessing Children's Exposure to Ultrafine Particles from Vehicular Emissions*, 01/01/08 -08/01/11, \$300,000,

Zhu Y, Co-I, NIDA, National Institute on Drug Abuse (NIDA), *Nicotine Delivery to Rodents with Lung Alveolar Region-targeted Aerosol Technology*, 06/01/11-05/31/12, \$100,000

OCCUPATIONAL AND ENVIRONMENTAL HEALTH NURSING

**Program Director:
Wendie Robbins**

1. Program Background and Objectives

The UCLA Occupational and Environmental Health Nursing (OEHN) program is a multidisciplinary program of study that offers a Masters of Science in Nursing (M.S.N.) and Ph.D. UCLA is on a quarter system with classes offered all four quarters.

The goal of the OEHN program is to respond to the national and regional need for qualified OEHN specialists, researchers, managers, leaders, and faculty in OS&H. The specific objectives of the program are to provide graduate nursing education in order to:

1. Prepare nurses for specialty OEHN practice as part of interdisciplinary OS&H teams
2. Prepare nurses for specialty OEHN practice with diverse workforces and workplaces
3. Prepare nurses for management and leadership roles in increasingly diverse and complex occupational settings
4. Prepare PhD nurses who will assume faculty, administrative, and research positions in OS&H

Masters Preparation

Students enter the program in the specialty of Occupational and Environmental Health Nursing, Adult-Gerontology Nurse Practitioner. It takes six quarters of full-time study (two years) to complete the degree. In their last quarter of study, students take a comprehensive take-home examination focused on evidenced-based practice. There is no Masters thesis. Nurse practitioner graduates are prepared to practice at the advanced practice level with legal authority in California to coordinate and manage care including diagnosis, treatment, and prescriptive authority, and they are prepared and eligible to sit for national Certified Occupational Health Nurse Specialist and Adult-Gerontology Nurse Practitioner certifying exams.

Doctoral Preparation

Each PhD student is assigned a faculty advisor in the School of Nursing with expertise in OS&H (Robbins, Thomas, or Leach) for advisement in the first years of doctoral coursework. Students also seek advisement and take cognates from SCERC faculty outside of the School of Nursing. Students can choose to concentrate on qualitative or quantitative methods, or both. They are required to complete a teaching experience as part of the Nursing Education Practicum. All doctoral students complete a written and oral doctoral exam and defend their dissertation. UCLA expects doctoral students to graduate within seven years.

2. Progress and Accomplishments

During this period, the SCERC OEHN program continued its solid record of graduating Masters prepared OEHN Adult Nurse Practitioners and OEHN Administrators. We graduated a racially

diverse class of seven students in 2012. Graduates are working in the following OS&H positions at a regional level: employee health in manufacturing and distribution; risk management in hospital setting; consulting in OS&H; and managerial positions in healthcare where they are utilizing OS&H knowledge to improve worker health and safety. In the doctoral program, two students continued progress through their program of study and both have passed written and oral qualifying exams are currently in the field collecting data.

Faculty, Curriculum: This year we successfully implemented the first year of the revised advanced practice nursing curriculum in Adult/Gerontology Nurse Practitioner in Occupational Environmental Health. This curriculum is designed to enhance gerontology content in addition to maintaining occupational and environmental health content in clinical adult nurse practitioner preparation and leadership competency. Students report that the content in managing older workers who can have complex chronic health conditions is extremely useful. We also concentrated on recruitment for the PhD research program. Two Masters prepared UCLA nurse practitioner graduates were successfully recruited and will enter the PhD program fall 2012. This will increase our cohort to four OEHN doctoral students in the SCERC OEHN program, an effective critical mass for enriching the research experience.

Trainee Awards, Honors, Scholarships: Several masters students received the Leahy Scholarship and Moseley Scholarship. One doctoral student was awarded an NRSA from National Institute of Nursing Research as well as funding from Office of the Navajo Nation Scholarship & Financial Assistance. The other doctoral student received an SCERC Pilot Training grant.

Trainee recruitment: Trainee recruitment remains ethnically diverse. Of our seven graduates in 2012, three were White, one Black, two Asian, and one Hispanic. Masters trainees remaining in the program are White (1), Asian (3), and Hispanic (2). The continuing PhD students are White and American Indian and the two new PhD students who will enter in the fall are White and Black.

Outreach: In this reporting period, OEHN faculty and students were active at state, regional, and national levels holding Board positions in the California State Association of Occupational Health Nurses (Thomas, Robbins), planning and evaluation committee for the AAOHN conference (Stone), presenting at the AAOHN conference (Stone, Thomas), guest speaker for the Office of the Navajo Nation Scholarship & Financial Assistance program (Samuels-Nakamura), planning committee and presenting at the WOEMA conference (Thomas), invited speaker on work and lifestyle exposures related to reproductive health at the Environmental Mutagen Society annual meeting (Robbins), invited speaker at the IOM workshop on Respiratory Protection Curriculum for Occupational Health Nursing programs (Robbins) and guest speaker for the UC Riverside Graduate Student Toxicology Seminar on the topic of work and environmental exposure effects related to male mediated effects on offspring (Robbins). In addition, Drs. Thomas, Robbins, and Searle-Leach were active in presenting the OEHN program at recruiting sessions at UCLA School of Nursing and in providing guest lectures within and outside the School at which we disseminated OS&H content.

3. Publications and Presentations: see Outreach Appendix at the end of this report.

OCCUPATIONAL MEDICINE (UCI)

**Program Director:
Dean Baker**

A. Background

The UCI OMR was established in 1976 and has trained over 80 physicians. Program graduates include many of the leading occupational medicine specialists in Southern California and the nation, including the director of NIOSH and a recent president of the American College of Occupational and Environmental Medicine. The UCI OMR has been a core program of the Southern California ERC since 1979. The program is accredited by the ACGME to train six physicians per year. The program emphasizes leadership training by providing strong clinical and didactic core training, a large number of practicum field training opportunities, and a rigorous research training experience.

The residency program is sponsored by the UCI Center for Occupational and Environmental Health (COEH), which is a component of the University of California COEH, a comprehensive research and training center established by the California legislature. The Center provides support for faculty and administration that complements the ERC funding. Thus, ERC funding is used almost exclusively to support trainees. The UCI COEH core programs include occupational and environmental medicine, epidemiology, and environmental toxicology. The COEH has affiliated faculty in the Department of Epidemiology, Graduate Program in Environmental Toxicology, Program in Public Health and the occupational safety and health programs sponsored by the UCI Extension Program.

B. Goals and Objectives

The overall goal of the UCI OM Program is to provide training in occupational and environmental medicine to a broad range of trainees, including occupational medicine specialists, medical students, primary care residents, graduate students in toxicology and epidemiology, and practicing physicians through the continuing medical education program. The goal of the UCI OM residency is to prepare specialist physicians for the practice of occupational medicine in a variety of settings including occupational medicine clinical practices, managed health care organizations, corporate medical departments, and public health programs.

Our objective for the UCI Occupational Medicine Residency (OMR) program during the past grant period was to train at least four residents per year. The NIOSH training grant support has been essential for the UCI OMR program to be able to address the significant regional need for occupational medicine specialists.

C. Program Plan and Implementation

1. Program Administration -- The UCI occupational medicine program is based in the Division of Occupational and Environmental Medicine, Department of Medicine, UCI School of Medicine. The program director during the grant period was Dr. Dean Baker and the associate program director was Dr. Leslie Israel. Dr. Baker and Dr. Israel are full-time faculty members and occupational medicine board certified physicians who both devote substantial effort to occupational medicine training. The program faculty collaborate in planning program strategy and evaluating the training program structure and components. Administrative support is provided by the School of Medicine Residency Program Office. The residency has an advisory committee (RAC) that met twice a year to provide program oversight and evaluation.

Training Facilities and Resources. The UCI COEH occupied an 11,000 square feet suite in a building near the School of Medicine with outstanding resources for training, including an active occupational medicine clinical center; offices for faculty, clinical and research staff, and trainees;

conference rooms; and a library with standard occupational safety and health textbooks, a collection of periodicals, and on-line search capabilities.

2. Program Faculty -- The core faculty is multi-disciplinary and highly qualified. Dr. Baker is a physician epidemiologist with many years of research and teaching experience. Drs. Israel, Chang, Fedoruk, and Kornhauser are experienced clinical teachers. Dr. Luderer is an outstanding clinician, teacher, and researcher in toxicology. Stephen Bondy, PhD, is an expert in neurotoxicology, while Robert Phalen, PhD, is a leading expert in pulmonary toxicology and air pollution. Michael Kleinman, PhD, is an expert in toxicology and exposure assessment. Ronald Shank, PhD, is an expert in carcinogenesis. Dr. Schnall is a physician epidemiologist who is an expert on occupational stress and cardiovascular disease. BongKyo Choi, ScD, is an expert on epidemiology and work organization.

3. Training Program and Curriculum -- The residency training consisted of core training activities, clinical OM training, a Master of Science (MS) in Environmental Toxicology, and practicum field site rotations. The core training included a 11 week core training program from July until the beginning of the fall term that consisted of program orientation; baseline assessment; clinical sessions; work site visits; and courses in industrial hygiene and occupational safety. During the rest of the first year, the residents complete the MS degree program course requirements while continuing weekly core training consisting of a bi-weekly clinical case conference, a weekly residency didactic seminar, a bi-weekly journal club, monthly Grand Rounds, and work site visits. The residents also receive clinical training through their participation at two sites: the UC Irvine Medical Center Occupational Health (UCIMC OH) clinic located in the city of Orange and the COEH Occupational and Environmental Medicine (OEM) clinic located at the UCI campus in the city of Irvine.

The UCI OMR offers a Master of Science (MS) degree program in Environmental Toxicology. The residents complete required courses in toxicology and do an individual research project leading to a master's thesis. Options for elective courses in the toxicology program are used by residents to complete the required course work for the occupational medicine residency program.

Residents spend much of the second year completing practicum training. The field site rotations reflect the broad range of real world practice opportunities including corporate (worksite-based) occupational medicine, regulatory (Cal-OSHA), and clinical occupational medicine practice. Meanwhile, residents participate in the weekly core training at the COEH and complete their required residency research project. The training at the COEH provides continuity between the residents' practicum training experiences.

The UCI Occupational Medicine program places great emphasis on interdisciplinary interaction. The UCI OM residents participate in all of the SCERC interdisciplinary meetings and field site visits.

4. Trainee Candidates -- The UCI occupational medicine residency requires that entering residents have completed at least one year in an ACGME accredited clinical residency program and be licensed to practice medicine in the State of California. All of our entering residents during the grant period completed a full primary care residency program or had at least three years of clinical experience before entering the program. During each of the past four years, the program received 8-15 applications from qualified candidates for an average of 2-3 positions. We filled every funded position each year, almost always with our top choices. The pool of well-qualified applicants in the region is relatively small, but it has been stable for the past several years. We were able to fill our positions with well-qualified applicants each year.

D. Accomplishments During the Grant Period

The program was significantly enhanced during the reporting period by the outstanding efforts by Dr. Israel as the associate residency program director to collaborate with Dr. Baker in providing program leadership, by the addition of new clinical faculty and new major clinical contracts, and by the addition of new practicum phase field training sites. During the project period, the university expanded the programs in nursing sciences and public health. These enhancements are based on overall growth on the UC Irvine campus, the growth of the COEH clinical programs, and on continuing support provided by the State of California and university through the COEH.

The program maintained full ACGME accreditation and graduated specialists in occupational medicine, all of whom currently practice full time in the field of occupational medicine. The OM residency program was reviewed by the ACGME in 2010 and received full re-accreditation for the maximum period of five years.

Ninety-three percent of the graduates taking the board exam during the past 10 years have become board certified in occupational medicine. The program's overall objectives, structure, and curriculum were maintained with enhancements because of continued growth in the faculty, outstanding clinical and academic training facilities, training initiatives in workplace psychosocial stressors and, and enhanced opportunities for practicum rotations and interdisciplinary interaction.

The program has made a significant contribution to the regional supply of board certified occupational medicine specialists. Data from the American College of Occupational and Environmental Medicine indicate that 62% of the OM board-certified members of ACOEM practicing in Orange County, CA, graduated from our program or are on the faculty. Our program also has trained 19% of the board certified occupational medicine specialists in Los Angeles County and 14% in San Diego County, as well as OM physicians in other Southern California counties, Northern California, Oregon and Hawaii.

The UCI faculty provided regional, national and international leadership in the field. Dr. Dean Baker was the president of the International Society for Environmental Epidemiology. Dr. Baker also served on the NIOSH Task Force for the Occupational Safety and Health Workforce Assessment Project. Dr. Peter Schnall served as chair of the Committee on Work and Cardiovascular Disease of the International Commission on Occupational Health. Appointed by the governor, Dr. Ulrike Luderer is the chair of the California State Environmental Contaminant Biomonitoring Program Scientific Guidance Panel. Dr. Leslie Israel is Vice President of the Western Occupational and Environmental Medicine. She was chair of the organizing committee for the 2010 Western Occupational Health Conference. In addition, she chaired the national occupational medicine residency program directors group during 2010–11. Dr. Israel and Dr. Baker served on the program committee for the national American Occupational Health Conference for 2012.

1. Trainees and Degrees -- During the period August 2009 to June 2012, there were 8 residents in the UCI OM residency program, averaging more than four trainees per year. NIOSH provided funding for three FTE OM residents and we filled all of these funded positions each year. We have provided training to other residents using funds from other sources, including the COEH faculty clinical practice revenues. During the reporting period, three residents were supported by

the US Navy. These physicians are now serving full time in the US Navy as occupational medicine specialists. Seven of the eight OM residents graduated and one is continuing. Of these residents, seven participated in the MS in environmental toxicology degree program. Two residents previously completed their clinical and academic phase training; one participated in the residency for a one year training period and the other resident selected to train for an additional 6 months to take advantage of environmental toxicology coursework that was of interest.

2. Changes in Curriculum -- The OM residency program curriculum remained essentially the same during the reporting period, although there were minor revisions to enhanced an already outstanding curriculum.

Orientation and initial training period. Beginning in 2010, the orientation and initial training period were extended by one month by changing the residency training year from August-July to July-June. The longer period is primarily used to schedule additional occupational medicine clinical training, which is consistent with the revised ACGME accreditation guidelines (as of July 2011) that require substantial clinical training in each year of the two-year occupational medicine residency programs. The summer orientation period also now includes a SCERC center-wide interdisciplinary orientation, which occurs just prior to the beginning of the fall academic quarter. Thus, this change in the residency training year schedule and orientation period has enhanced the initial training provided to the OM residents.

Academic courses. The Environmental Toxicology MS degree program faculty with the input of the OM residency program faculty revised the MS degree program to include required courses in epidemiology, statistics, and exposure assessment. This change added a course on exposure assessment and enhanced the alignment and efficiency of the environmental toxicology MS degree in meeting the OM residency academic training requirements.

Field site rotations. The basic structure of the practicum phase training and the field training sites has been maintained, but the number and range of field training rotations was expanded. The program established practicum rotations with CompWest Insurance Company for training in utilization review and with two US Navy occupational health clinics for training in treatment of musculoskeletal disorders and medical surveillance.

PILOT PROJECT RESEARCH TRAINING

7/1/2009 – 12/31/2010
Interim Program Director:
John Froines

1/1/2011 – 6/30/2012
Program Director:
Niklas Krause

1. Introduction

The Pilot Project Training Program (PPT) of the Southern California ERC was last renewed starting on July 1, 2009. As shown in the progress report section, our PPT Program has been very successful in supporting high quality pilot projects from a wide range of disciplines and institutions. Support was provided to trainees, junior faculty, and new investigators in the field of occupational health. During the period 2009-11, supported research projects covered 10 NORA programs with 7 programs covered at least twice (see project table in Section 6 and project summaries in Appendix D1). Pilot projects were supported at ERCs, TPGs, and other occupational health programs in Region IX. We have responded to all of the comments and recommendations in the latest summary statement (2009). Specific responses are given in Section 8.

2. Description of Training Program

The objective of the Southern California ERC Pilot Project Research Training Program is to enhance the research training opportunities for ERC and TPG trainees, junior faculty, and young investigators in Region IX by providing funding for pilot research projects. These pilot research projects may be small studies or short-term research projects to explore feasibility, to collect preliminary data, or to develop plans for more extensive research projects supported by other more long-term funding. For the purposes of the PSPP Program, junior faculty members are defined as faculty members within four years of their initial faculty appointment. New investigators are students or faculty members in related areas of science who choose to shift their research focus to an area of occupational health and safety. Another objective is to address NORA related topics and to establish new areas of research in occupational health and safety.

Procedures. A Request for Applications (RFA) for pilot project research training proposals is sent out to all relevant units of the Southern California ERC, the Northern California ERC; and to contact other faculty members in Region IX University of Arizona, University of Nevada, University of Hawaii, UCSF, UCB, UCD, UCI, USD, Loma Linda University, and CalState Northridge. The RFA is sent out each year in the Spring for funding in Fall of that year. The ERC (or TPG trainees), junior faculty, or new investigators submit a letter of intent followed by an application approximately one month later. The application consists of an abstract, a project description (three to five pages), a budget, a budget justification, and biographical sketches. Applications by ERC or TPG trainees or students in others program require a faculty sponsor and both the student and faculty sponsor are identified as such on the application. Usually the institution requires the faculty sponsor to be listed as PI.

When the letters of intent are received they are reviewed by the Program Director, Dr. Krause, and by the Program Co-Director, D. Baker, to determine if they meet the requirements as to type of investigator and the subject area for the peer review process. The Program Director and Co-Director confer and determine who should review the proposals. They identify persons with appropriate expertise to review each proposal from the ERC Executive Committee, if there is no conflict of interest, and from faculty colleagues at UCLA, UCSF, UCB, UCD, UCI, USC, or other universities that participate in the PPT. Standard NIH Initial Review Group procedures to avoid conflict of interest are followed in selecting reviewers. Any Executive Committee member who has submitted a pilot project proposal, either as an investigator or as a sponsor, in the current cycle is excluded from all proposal review discussion and voting. For the 2009-11 cycles we used 29 external reviewers from UCB (2), UCI (2) UCLA (6), UCSF (2), U Cincinnati (1), U Connecticut (1), U Cornell (1), U Illinois Chicago (1), John Hopkins University (1), U Massachusetts-Lowell (1) U Michigan (1), U Rochester-New York (1), U Washington (4), CalState University Northridge (1),

U Southern California (1), California Department of Public Health (1), EPA (1), Kaiser Northern California (1).

When the proposals arrive they are photocopied and sent to designated reviewers with an instruction memo, PPT guidelines for reviewers, and PPT proposal evaluation forms. Proposals are reviewed by at least two independent reviewers and ranked on an NIH scale from 1 to 5. The major review criteria are:

- 1) Relevance to occupational health and safety and potential to identify solutions.
- 2) Scientific quality.
- 3) Stimulation of interdisciplinary activity.
- 4) Likelihood that the project will lead to R01 or other external funding.
- 5) Novelty of ideas and relevance to NORA objectives.
- 6) Likelihood that the project will foster long-term research interests and attract new or young scientists to the field.

Each reviewer evaluates his or her assigned proposals using the evaluation form, prepares written comments, and assigns an overall score based on the NIH point scale of 1 to 5 in 0.1 increments, with 1 being outstanding and 5 being acceptable.

The PPT review committee, which consists of the ERC Executive Committee members without potential conflict of interest plus the invited reviewers, meets to evaluate all of the proposals and determine the priority order. The ERC Executive Committee then determines the cutoff score and the dollar amount for each recommended proposal. In 2009-11 cycles, the cutoff scores were a mean of 2.5 and 3.0, respectively. Appropriate human or animal subjects institutional approval must be received before projects are funded. Records are maintained of all applications and final decisions. A summary table of the proposals evaluated in the 2009-11 cycles is shown below. Applicants are informed of the funding decisions with any budget changes and are sent the reviewer's comments. The award approval letters include a clear notification that the release of funds for the project will not be requested until their institution's IRB approval is received by the Program Director's office.

All UC trainees and faculty are required to take the UC-systemwide on-line training course "Protection of Human Subjects Training & Certification for Medical and Social-Behavioral Sciences.

Records are maintained of all applications, reviewer's scores, and final decisions. Award recipients are contacted periodically during the project period to monitor progress, and at the conclusion of their projects to keep track of publications, grant applications, or funded grants arising from their projects. Award recipients are re-contacted annually for a minimum of three years after completion of the project to determine if any additional publications or grants have been obtained as a result of the pilot project award.

3. Faculty reputation and strength

The Southern California ERC program directors and other ERC faculty are established experts in their respective fields. Specific areas for ERC Program Directors are:

Niklas Krause, MD, PhD, MPH Epidemiology of Musculoskeletal and Cardiovascular Diseases,
Psychosocial Factors, Ergonomics, Injury and Disability Prevention

Dean Baker, MD, MPH	Occupational Medicine, Epidemiology, Toxicology, Work Organization
Shane Que Hee, PhD	Industrial Hygiene, Biological Monitoring, Aerosol Measurement
Nola Kennedy, PhD	Exposure Assessment
Beate Ritz, MD, PhD	Occupational Epidemiology
Wendie Robbins, PhD, RN	Occupational Nursing, Toxicology, Reproductive Toxicology

UCLA and UCI have State-funded centers, called the Center for Occupational and Environmental Health (COEH), with additional faculty and programs in epidemiology, toxicology, work organization, policy and law. Other participating universities, such as UCSF, UC Berkeley, UC Davis, and USC have outstanding research faculty and educational programs in ergonomics, occupational epidemiology, and other relevant occupational safety and health areas. The combined faculty strength of the participating universities in the PPT is extensive and outstanding.

4. Collaboration with regional research training institutions, including TPG's

Since this program is focused on research training support for occupational health trainees, junior faculty, and new investigators, funding is open to all in these categories in the Southern California and Northern California ERCs, all TPG's in Region IX, and USC, UC Davis, Loma Linda University, and CalState Northridge (CSUN) and the Universities of Arizona, Hawaii, and Nevada. Contacts at each of these institutions have been identified. They and the Southern California ERC Program Directors are notified of the RFA in July by email and regular mail. The program directors for each program in the ERCs and the contacts at the other institutions publicize the RFA to appropriate individuals in their units.

5. Program evaluation

The PPT is reviewed regularly by the ERC Executive Committee and changes are implemented as necessary to best fulfill the objectives of the program. The PPT is on the agenda for regular Executive Committee meetings. The criteria for review are whether the program is meeting its objective that is enhancing the research training opportunities for ERC and TPG trainees, junior faculty, and young investigators in Region IX by providing funding for pilot research projects. As with all other aspects of the ERC, the pilot project program is also reviewed regularly by the ERC Advisory Board.

Measures of Effectiveness

Based on the objectives of the program as stated above we have formulated the following short and long-term measures of effectiveness.

Short-term measures of effectiveness include:

1. Receive at least three qualified proposals in response to our RFA each year.
2. Recommend for funding at least two projects each year.

Long-term measures of effectiveness include:

1. Provide pilot project support to each of the three categories of recipients, ERC and TPG trainees, junior faculty, and new investigators.
2. Provide pilot project support that leads to publications in peer-reviewed journals.

3. Provide pilot project support that facilitates the obtaining of more permanent funding from other sources.

Short-term effectiveness:

During 2009-1012 we received 23 proposals and made 13 awards and thus met our short-term measures of effectiveness.

Long-term effectiveness:

For the evaluation of long-term effectiveness the 3-year funding cycle is not an appropriate metric, instead longer time frames need to be considered including the entire program duration and the last 5 years. Since the beginning of the PPT in 1999 through the 2010-12 cycle we have recommended for funding 53 projects that have included 34 Trainees, including ERC and TPG, 16 junior faculty, and 3 new investigators (see also Tables 2-4 below).

During the last 5 years (July 1, 2007 through June 30, 2012) **Five peer-reviewed articles** have been accepted or published and one peer-reviewed journal article has been submitted as a result of PPT funding (see list below). **Six grants, totaling \$2,473,000**, have been obtained as a result of PPT projects including (1) CDC/NIOSH award R01OH0094691-01 for \$1,280,000, project title "Implementing Risk Management Strategies to Prevent Injuries among Firefighters;" (2) CDC/NIOSH, award R21OH009937-01A2, "Whole glove integrity and chemical resistance of disposable Nitrile gloves" (3) USEPA for \$700,000, "Latent Effects of Gestational Exposure to Heptachlor;" (4) UC Toxic Substances Research and Teaching Program (UCTRTP) for \$50,000, "DNA Adducts of Formaldehyde as a Biological Marker." (5) Nanotox-Toxic Substance Research and Training Grant (TSR&TP) for \$13,000, "Exposure Assessment of Airborne Carbon Nanotubes in the Workplace." (6) Community Environmental Health Stars 2006 Summer Project, for \$5,000 for the project titled: "Identifying Community Groups in the Greater Los Angeles Area at Risk of Exposure to Metal Contaminants." (7) California Air Resource Board for \$150,000 over 30 months (April 1, 2012 through September 30, 2014), "Reducing Air Pollution Exposure in Passenger Vehicles and School Buses." Thus, we have also met our long-term measures of effectiveness.

A. Publications

(Peer-reviewed journal articles for the 5-year period July 1, 2007 through June 30, 2012)

Nicole M. Gatto. S. Rhodes, A. Manthripragada, J. Bronstein, M. Cockburn, M. Farrer, B. Ritz. Increasing Risk of Parkinson's Disease, *Neuroepidemiology* 2010;35:191-195

Eon S. Lee, Bin Xu, and **Zhu Y.** "Measurements of Ultrafine Particles Carrying Different Number of Charges in On- and Near-Freeway Environments", *Atmospheric Environment*. 60: 564-572, 2012.

Xu, W. and **Que Hee, S.S.**, "Permeation of a Metalworking Fluid Through a Latex Glove under Field Use Conditions", *Bull. Environ. Contam. Toxicol.*, 84: 5-7, 2010.

Josyula, A.B., Kurzius-Spencer, M, Littau, S.R., Yucesoy, B., Fleming, J., Burgess, J.L. Cytokine Genotype and Phenotype Effects on Lung Function Decline in Firefighters. *J Occup Environ Med*. 2007; 49:000-000.

Burgess, J.L., Fleming, J.E., Mulenga, E.M., **Josyula, A.B.**, Hysong, T.A., Joggerst, P.J., Kurzius-Spencer, M., Miller, H.B. Acute changes in sputum IL-10 following underground exposure to diesel

exhaust. *Clinical Toxicology* (2007) 45, 1-6.

Xu, W. and Que Hee, S.S., "Permeation of a Straight Oil Metalworking Fluid Through Disposable Nitrile, Chloroprene, Vinyl, and Latex Gloves". *J. Hazard. Mater.*, B147, 923-929, 2007

Phalen, R.N., Que Hee, S.S., A moving robotic hand system for whole glove permeation and penetration: Captan and Nitrile gloves, *Journal of Occupational and Environmental Hygiene*, submitted.

Book Chapters

Robbins, WA, **Young, KE**, Wei F, (2007), Feasibility Study of Metal Effects on the X:Y Ratio in Human Sperm, In: (Eds: D. Anderson and M. Brinkworth) *Male Mediated Developmental Toxicity*, published by the Royal Society of Chemistry Publishing, United Kingdom. (direct contribution)

B. Presentation – Lectures – Awareness Seminars

Gatto NM, Cockburn M, Sinsheimer J, Bronstein J, Ritz, B. Vitamin D Receptor Polymorphism Interacts with Sunlight Exposure in Parkinson's Disease in the Central Valley of California. 23rd Annual Conference of the International Society for Environmental Epidemiology, Barcelona, Spain September, 2011

Mathews A , Que Hee SS: Detection of Micro-Holes and Tears in Disposable [Nitrile Gloves](#). American Industrial Hygiene Conference and Exposition, Indianapolis, IN, Abstract SR-103-2, June 16-June 21, 2012.

Stone, D., Lecture Series: Cancer Survivorship Care Plans: A Map to Navigate Quality Health Care, American Academy of Nurse Practitioners 26th National Conference, Las Vegas, NV, June 22-26, 2011

Stone, D., Poster Presentation: Primary Care of Adult Survivors of Childhood Cancer, American Academy of Nurse Practitioners 26th National Conference, Las Vegas, NV, June 22-26, 2011

Foushee, C., Sustainability in Healthcare, SF State University, San Francisco, CA, May 17th, 2011

Stone, D., Podium Presentation Concurrent Session: Cancer Survivorship Care Plans: A Map to Navigate Quality Health Care, International Council of Nurses: Nurses Driving Access, Quality and Health, Valleta, Malta, May 5-7, 2011

Foushee, C. Evidence-Based Design: Implications for Building State-of-the-Art Hospitals that support Occupational Health & Patient Safety, San Francisco General Hospital, San Francisco, CA, October, 2010

Xu B, **Zhu, Y**: [2010] What Commuters can do to Lower their In-cabin Exposure to Ultrafine particles? American Association for Aerosol Research, 29th Annual Conference, Portland, OR, October.

Zhang Q, Liu S, **Zhu, Y**: [2010] Efficiency of Retrofit Systems on Reducing Ultrafine Particles and Other Pollutants Emitted by Diesel-powered School Buses. American Association for Aerosol Research, 29th Annual Conference, Portland, OR, October.

Liu S, **Zhu Y**: [2010] Impact of Secondhand Tobacco Smoke on In-cabin Passengers' Exposure to Ultrafine Particles in an Automobile. American Association for Aerosol Research, 29th Annual Conference, Portland, OR, October.

Foushee, C., Green Chemistry for Hospitals, California State Association of Occupational Health Nurses Annual Conference, Sacramento, CA, October 16, 2009

Foushee, C., Green Chemistry Implications for Chemicals Purchasing in Healthcare: An In-depth Case Study of Kaiser Permanent's Chemicals Purchasing Guideline, UCSF Doctoral Seminar, SF, Nov 8, 2008

Birkner, J., Expert Reviewer on proposed research entitled: "Metabolic Evaluation of N95 Respirator Use with Surgical Masks for NIOSH, January 31, 2007.

Jennerjohn, N., Zhu, Y., Eiguren-Fernandez, A., Hinds, W.C., "Concentration Measurement of Aerosolized Single-walled Carbon Nanotubes," International Aerosol Conference, St. Paul, MN; October 2006

7. Training and research funding record

The Pilot Project training record for the reporting period (July 1, 2009 to June 30, 2012) is summarized in Tables 2-4 below. For the 2009-12 cycles, 23 applications were received and 13 were recommended for funding. Seven recipients were trainees and six were junior faculty. The principal investigator name and institution, project title, awarded amount, investigator category, priority score, and NORA program areas are given in Table 1.

Gender and minority issues. Because of the high level of diversity in the research communities in California and Region IX no specific plan is needed to increase participation in the PPT by women and minorities. Our track record bears this out. During the reporting period 2009-11, 8 of 13 (62%) funded projects went to women and 5 of 13 (38%) went to minorities.

For the three years we have funded 13 projects covering a wide range of areas within the field of occupational health and safety. Together they cover a total of 11 different NORA program areas with 7 programs covered by more than one project. NORA program areas for funded projects are given in Table 1 below.

Of the 13 pilot projects funded 5 involve junior faculty, 2 new occupational health researchers, and 6 involve students. Five of the funded projects involve researchers from the Southern California ERC, two at the Northern California ERC, one at UC Davis in Northern California, one at the University of Nevada in Reno, and three at University of Arizona (formerly at Region IX TPG).

Due to delays in IRB approval and administration during interim directorship, all but one of the 2009/10 projects and three out of the five 2010/11 were granted no-cost-extensions. Therefore, most 2010 pilot projects have started in 2011 and only future progress reports will fully reflect their progress.