UNIVERSITY OF CINCINNATI OCCUPATIONAL SAFETY AND HEALTH EDUCATION AND RESEARCH CENTER

ANNUAL REPORT

July 1, 2006 – June 30, 2007

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SUBMITTED BY:
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UNIVERSITY OF CINCINNATI
EDUCATION AND RESEARCH CENTER

ANNUAL REPORT 2006-2007

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II. Introduction and Executive Summary

The University of Cincinnati Education and Research Center trains professionals in the didactic and research skills necessary to provide leadership in the occupational safety and health disciplines. Results of research are translated to action through the outreach program and shared with professionals and practitioners in the region and elsewhere through continuing education, publications, presentations and other activities. The UC ERC includes programs in Environmental and Occupational Hygiene, Occupational Health Nursing, Occupational Medicine, Occupational Safety and Health Engineering, Pilot Research Project Training Program, Hazardous Substance Academic Training, Biological Monitoring, Continuing Education and NORA Research Support.

The ERC is administered in the Department of Environmental Health by Dr. C. Scott Clark, Director, utilizing a Steering Committee composed of directors of each of the program areas and an External Advisory Committee that includes members from the private sector, professional and labor organizations and government. All ERC programs are on the University of Cincinnati campus, enhancing opportunities for collaboration and interaction. Specific opportunities for interdisciplinary interaction include NORA research seminars, class projects at local industries, classes and workshops with other disciplines, research activities and field trips. The Pilot Research Project Training offers many opportunities for interdisciplinary interaction within the ERC, with Training Program Grantees in the region, with historically black universities and colleges, and with other institutions in the tri-state region. Working within the requirements of its department, the faculty in each of the academic programs has developed a strong environment for training. All students are exposed to the research environment and the majority of MS and all Ph.D. students conduct original research.

A. Selected Major Accomplishments and Faculty Activities

- Since the PRP program's inception through the end of the 2006-07 fiscal year, 121 projects have been funded for a total of over $500,000. Sixty-Eight (68) peer-reviewed articles and conferences presentations directly resulted from their PRP pilot research grant activities. During the 2006-07 fiscal year, we received 22 applications and awarded 14 projects totaling about $91,000. Since our last reporting period, there have been 9 peer-reviewed articles and conference presentations directly resulting from PRP pilot research grant activities. As a result of PRP grant support, many awardees have garnered follow-up grant support from agencies and programs independent of PRP greater than $3.5 million. This reflects a return on the investment equaling 7:1. Additionally, PRP also allowed bringing in 16 new investigators from other fields of expertise to the area of occupational safety and health research.

- The 8th Annual UC Pilot Research Project Symposium, held October 12-13, 2006, was attended by 140 people. Keynote speakers were DeLon Hull, PhD, Associate Director for Research and Technology Transfer at NIOSH, "*Moving Research to Practice at NIOSH* and Gurumurthy Ramachandran, PhD, University of Minnesota—Twin Cities,"*Evaluating Professional Judgment in Industrial Hygiene Decision-Making"*. There were 14 podium and 13 poster presentations given by investigators from the various PRP institutions who had previously received pilot project grants.

- In our efforts to build the grant writing skills of trainees and junior faculty, we facilitate an annual PRP grant writing workshop; the third of which was held in 2007.

- During 2006-2007 the Environmental and Occupational Hygiene faculty, students, staff, alumni and advisory board members contributed to the ABET site visit and follow-up responses to the draft report. Recent communication from ABET shows that we have again received accreditation.

- During the past year a new component program, Biological Monitoring, was initiated. This program includes M.S, Ph.D. and post-doctoral trainees and is directed by Dr. Glenn Talaska a member of the Environmental and Occupational Hygiene faculty. New courses are being developed for this program and it is expected that these and current courses in Biological Monitoring will be attended by trainees in several of the ERC programs as well as others from the Department of Environmental Health (e.g. toxicology and epidemiology) and elsewhere in the University of Cincinnati and the local community.

- Faculty of several ERC programs, in partnership with NIOSH and a number of other organizations, were involved in the organization of the International Conference on Nanotechnology: Occupational and Environmental Health and Safety (Cincinnati, Ohio December 2006) and participated as speakers. Faculty involved included Occupational Safety & Health Engineering (Drs. Richard Shell and Ash Genaidy), Continuing Education (Dr. Judy Jarrell), Occupational Medicine (Dr. James Lockey) and Environmental and Occupational Hygiene (Dr. Sergey Grinshpun).

- A continuing project to provide information and training to community residents regarding environmental hazards through the NIEHS supported Midwest Consortium for Hazardous Waste Worker Training (directed by Dr. Carol Rice) has initiated development of a school bus anti-idling program, incorporating data from the NIEHS supported - Cincinnati Childhood Allergy and Air Pollution Study (Dr. G. LeMasters, PI).

- The unexpected discovery of high levels of lead in new paints offered for sale for consumer use in a number of Asian countries poses a major risk to workers, children and others from both present and past use. In response to this finding a concerted effort is being made to widely publicize this information with the intent on promoting bans on such use in the countries where it is still offered for sale.

- Occupational Health Nursing faculty assisted five organizations with disaster planning and working with the Red Cross with their disaster planning initiatives. Occupational health nurses were provided one workshop and several one hour continuing educational courses.

- Five students from the American Society of Safety Engineers (ASSE) Student Section Southwestern Ohio Chapter, chartered August 31, 2004, attended the Second Annual National Future Safety Leaders Conference held in St. Louis MO November 2-4, 2006.

- Occupational Safety and Health Engineering (OSHE) faculty have continued to work with

University of Cincinnati Emerging Ethnic Engineers to offer the OSHE program with NIOSH Trainee support to minority students.

- Occupational Health Nursing Masters and doctoral students authored or co-authored 36% of the publications, and 17% of paper and poster presentations in the College of Nursing. These outcomes demonstrate the degree of engagement in faculty research and scholarship as well as the quality of faculty mentorship.

- Dr. Judy Jarrell developed three additional training modules for Occupational Medicine for on-line delivery. These training modules are increasingly being utilized and were developed in response to requests by the participants in the in-class four (4)-week Occupational Medicine Training Program. Three more modules are planned for development and offering on-line in the next year.

- Work by Environmental and Occupational Hygiene students Sung-Chul Seo, Ph.D. and Yulia Iossifova, Ph.D., under the direction of Drs. Reponen and Grinshpun, has resulted in a new field-compatible method for the collection and analysis of fungal fragments.

- As part of M.S. thesis research, Cara Pennline (Environmental and Occupational Hygiene) identified overexposures to hexavalent chromium; after informing the employer, the process was changed immediately to eliminate exposure.

- Additional training content not available in existing courses was included in a recently-developed new course, Special Topics in Preventive Medicine, by Dr. C. Sue Ross. The course covers a number of important topics covered by the residents' board-certification examination, including food and water safety, travel medicine, immunizations, health and wellness programs, patient safety and disaster preparedness.

- Dr. James Lockey received a Presidential appointment to serve on the National Advisory Board on Radiation and Worker Health.

- Dr. Carol Rice (Environmental and Occupational Hygiene and Hazardous Substances Academic Training) continues as co-chair of the planning committee for the annual meeting of Collegium Ramazzini.

- Dr. C. Scott Clark was appointed as the ACGIH representative on the Research Committee for the 2008 International Occupational Hygiene Association scientific conference to be held in Taipei February 2008. Dr. Kermit Davis received the International Society of Biomechanics Promising Young Scientist Award and the Hallman Visiting Professorship at the University of Waterloo. Dr. Amit Bhattacharya was elected a Fellow in the inaugural class of the Biomedical Engineering Society. Dr. Sergey Grinshpun was guest editor of a special issue of the Journal of Aerosol Science, Measurement and Characterization of Bioaerosols. Dr. Tiina Reponen has been elected to the Board of Directors, American Association for Aerosol Research. Dr. Carol Rice was a co-arranger for Living in a Chemical World III, Bologna Italy and is the Convenor of the annual meeting of Occupational Hygiene Women Faculty. Dr. Glenn Talaska has been appointed to the

International Scientific Advisory Group to plan the International Society for Biological Monitoring 7th Meeting to be held in Peking China, October 2007.

- Dr. James Lockey (Occupational Medicine) serves on the United Auto Workers-GM Occupational Health Advisory Board and the United States Armed Forces Defense Health Board. He helped organize and will serve as a moderator at an upcoming conference regarding the food flavoring industry.

- Dr. Glenn Talaska (Biological Monitoring, Environmental and Occupational Hygiene and Hazardous Substances Academic Training) has been a member of the ACGIH Biological Exposure Indices (BEI) committee since 2000 and since 2003 has served as the group's the Vice-Chair.

- The following Environmental Health and Occupational Hygiene students won awards at the 2007 American Industrial Hygiene Conference and Exposition (AIHce): Chunhui He, best poster in occupational epidemiology; Matt Hammer, Tichauer Award for best student poster in ergonomics; Susan Kotowski, the Tichauer Award for best student podium presentation in ergonomics; Yulia Iossifova, the H. Kenneth Dillon Memorial Award for biosafety and environmental microbiology poster. Ph.D. candidate Robert Eninger received the John J. Bloomfield award from ACGIH. Yulia Iossifova, Ph.D., received a Strategic Training in Allergy Research (STAR) award from the American Academy of Allergy, Asthma and Immunology and an NIH National Graduate Student Research Festival travel grant.

- The Masters in Industrial Hygiene and Safety –based at the Sardar Patel University in the State of Gujarat, India, which was developed by an ERC alumnus (Maharshi Mehta MS (UC 1983), CIH, CSP and aided continuously by EOH faculty, alumni and others, accepted its tenth entering class in September 2006. Its graduates are now recognized by the Government of the State of Gujarat India (population 48 million) as qualifying as safety engineers under its Factories Act. This program is the first such program in India.

B. Significant Changes since July 1, 2005 – June 30, 2006

- New training content offered included a revised and expanded interdisciplinary course, Survey of Occupational and Environmental Toxicology, developed by an interdisciplinary team, chaired by Dr. C. Sue Ross of Occupational Medicine.

- In the Occupational Safety and Health Engineering Program, several changes have occurred. Dr. Mital has left the program to focus all of his efforts on manufacturing and Dr. Salem of Civil and Environmental Engineering has joined the program. Dr. Salem has developed a new course on Construction Health and Safety (20-CEE-698), which will be offered beginning in the 2007-2008 school year. During 2006-2007, plans were developed to bring Drs. Jay Kim and Henry Spitz into the Occupational Safety and Health Engineering Program beginning in the 2007-2008 years as co-deputy program directors to replace Dr. Genaidy who resigned as Deputy Director effective January 30, 2007.

- The American Society of Safety Engineers (ASSE) Student Section Southwestern Ohio Chapter, chartered in 2004 (Dr. Shell serves as Faculty Advisor) has made excellent

progress, such as publishing a newsletter and participating in national activities such as the Annual National Future Safety Leaders Conferences such the 2nd Annual Conference held in St Louis, MO November 2-4, 2006

- During 2006-2007 the faculty, students, staff, alumni and advisory board members of the Occupational and Environmental Hygiene program contributed to the ABET site visit and follow-up responses to the draft report. Recent communication from ABET shows that this program has once again been successful as it has been continuously since the accreditation program initially began.

- A Biological Monitoring component was added to our Education and Research Center in August 2006. Biological Monitoring is an emerging technology that utilizes occupational exposure and medical professionals to use body products from exposed persons to determine the magnitude of their exposure. It potentially includes exposures from all routes and begins to take into account individual differences in absorption, distribution and metabolism that are so elusive when using external levels as the exposure metric. The goal is to better identify persons truly at risk, so their exposures can be reduced (the effectiveness of the exposure intervention can be monitored by an ongoing biological monitoring program) so that disease can be prevented. This is an exciting program that represents a "sea-change" from the exposure disease paradigm that we have struggled with for years.

- The Biological Monitoring component program has collaborated with investigators at the University of Arizona to determine the increase in the levels of urinary 1-hydroxypyrene in Native American firefighters in Arizona-and is-conducting a study with an investigators at the Roswell Park Cancer Institute, Columbia University to determine whether reported use of hair dyes is related to increases in carcinogen-DNA adduct levels in exfoliated urothelial cells.

Selected Program Products (see Program Reports for more complete information)

- A continuing project to train site workers and emergency responders through the NIEHS supported Midwest Consortium for Hazardous Waste Worker Training directed by Dr. Carol Rice documents that 60% of site workers and 80% of emergency responders implement changes in the workplace. Also as part of this project, an initiative has been developed to support community training in setting up school bus anti-idling programs; this program, incorporates data from the Cincinnati Childhood Allergy and Air Pollution Study (G. LeMasters, PI, supported by NIEHS).

- Master's students in Occupational Health Nursing planned, presented and evaluated a workshop on migraines in the workplace. The program was able to accommodate 30 participants, and the capacity was reached. They have been requested to repeat the offering and the ERC Continuing Education Program has agreed to work with the students to design a web-based program.

- Faculty planned and presented three one-hour continuing education sessions for occupational health nurses in the region. Additionally, students presented programs to other professional nursing groups (Sigma Theta Tau, Emergency Room Nurses) providing implications for

- occupational health and safety in a practice setting.

- Occupational medicine faculty members have provided consultations on a wide variety of clinical issues, including ongoing medical monitoring programs and evaluation of potential worker exposures at an aluminum mining site.

- Occupational Safety and Health Engineering faculty and Continuing Education played major roles in the International Nanotechnology Symposium held in Cincinnati, Ohio in December 2006.

- Work by Dr. C. Scott Clark on the continuing use of lead in paint in Asia and elsewhere has resulted in international interest, including invitation to meet with international officials to devise plans to ban these products. Efforts are underway to encourage professional associations in occupational and environmental health and hygiene to promote bans on the residential use of lead in paints.

- Students participated in a simulated Dirty Bomb attack at the Great American Ball Park, completed Community Emergency Response, National Incident Management System and CPR Training, attended local meetings regarding site selection for the proposed NIOSH facility to better understand the NEPA/EIS process, and toured and participated in exercises at the EPA National Decontamination facility.

Example of Future Plans (see Program Reports for more information on Future Plans)

- Beginning July 1, 2007, Drs. Jay Kim and Henry Spitz will become Deputy Directors of the Occupational Safety and Health Engineering program.

- Dr. C. Sue Ross (Occupational Medicine), in conjunction with Drs. Judy Jarrell (Continuing Education) and L. Sue Davis (Occupational Health Nursing) will develop online continuing education modules and a DVD from the taped lectures related to occupational health issues for primary care providers, including common occupational dermatology and pulmonary issues, selected occupational health issues, workers' compensation and return to work issues.

- The Occupational Medicine program will continue to develop further collaboration with the Medical Toxicology program in the University of Cincinnati Medical Center and with the local medical toxicology community.

- The Department of Environmental Health continues its national search for a new chair of the Division of Occupational Medicine.

- Strengthen Occupational Safety and Health Engineering research focus in the following areas:
  - Noise induced hearing loss, and vibration hazards
  - Radiation protection and measurement, and health physics
  - Construction

- Appoint as Occupational Safety and Health Engineering Co-Deputy Program Directors effective July 1, 2007: Dr. Kim and Dr. Spitz.

- Develop selected changes to the core Occupational Safety and Health Engineering Program curriculum to better align with the revised research focus.

- The Biological Monitoring component program is increasing its student recruitment efforts. Plans were made to visit several local colleges and recruit top students in biology and chemistry programs into the Biological Monitoring program. Recruitment trips completed to date include with the Department of Biology at Wilmington College in Ohio and the Just Society, a group of Xavier University (Ohio) students majoring in Biology, Chemistry, Mathematics and Physics.

C. ERC Website

University of Cincinnati ERC
http://eh.uc.edu/erc/

The following are direct links to the major component programs that make up the University of Cincinnati ERC:

Environmental and Occupational Hygiene
http://eh.uc.edu/erc/programs_Industrial_hygiene.asp

Occupational Health Nursing
http://eh.uc.edu/erc/programs_occupational_health_nursing.asp

Occupational Medicine
http://eh.uc.edu/erc/programs_occupational_envir_med.asp

Occupational Safety and Health Engineering
http://eh.uc.edu/erc/programs_safety.asp

Continuing Education/Outreach
http://eh.uc.edu/erc/programs_cont_ed.asp

Pilot Research Project Program
http://eh.uc.edu/erc/programs_pilot.asp

III. Program Reports

A. Program Title: **Center Administration, Outreach, Interdisciplinary Coordination and NORA Research Support**

B. Program Director: **C. Scott Clark PhD, PE, CIH**

C. Program Description

The administration of the University of Cincinnati Education and Research Center is based in the Department of Environmental Health in the College of Medicine. The Director and Deputy Director (Carol H. Rice PhD CIH) are assisted by Amber J. Twitty, ERC Program Coordinator and by Business Office staff of the Department of Environmental Health and of the Colleges of Engineering and Nursing. The UC ERC programs are located in a total of three colleges. In addition to the Center Administration, the programs in Continuing Education, Environmental and Occupational Hygiene, Occupational Medicine, Hazardous Substance Academic Training, Biological Monitoring, NORA research support and the Pilot Research Project programs are also located within the Department of Environmental Health of the College of Medicine. The Occupational Safety and Health Engineering program is located in the College of Engineering Department of Mechanical Engineering and the Occupational Health Nursing program is located in the College of Nursing.

The Directors and Deputy Directors of the ERC programs serve as the Internal Advisory Committee. The ERC is also served by an External Advisory Committee which meets about once a year. Current members of the External Advisory Committee are:

Ken Bloemer, Ph.D.
Director, Innovation and Strategic Services
Techsolve

Cheryl Christensen, MD
Corporate Manager of Occupational
Medicine International
Procter and Gamble

Melody A. Clark, Ed.D.
Academic Director, Distance Education &
SR. VP & Provost Office
University of Cincinnati

Mike Donahue, MS
Safety Consultant
Ohio Bureau of Worker Compensation
Division of Safety and Hygiene

Richard Fulwiler, Sc.D., CIH
President
Technology Leadership Association

Richard T. Gilgrist, MS, CIH
US Dept. of Labor
OSHA

Michael Gunn, REM, Ph.D., CSE/WSO (Chair)
Office of Environmental Management
City of Cincinnati – Retired

John Hochstrsser, Ph.D., PE, CIH, DEE
American Tool - Retired

Nan Migliozzi, RN, MSN
Ohio Department of Health

Tim Ping, MS, CSP
GE Aircraft Engines

Jim Price, MS, CIH
ACGIH

William Wagner
NIOSH/ACGIH – Retired

Faculty in the College of Nursing have been actively encouraged and mentored to partner with other

Faculty in the College of Nursing have been actively encouraged and mentored to partner with other occupational and environmental health researchers in the ERC to expand efforts of nursing and other disciplines to focus on NORA research priorities. Three nursing faculty, one in women's health and one in psychiatric nursing and one in nutrition have partnered with either occupational health nurses or other ERC disciplines.

During the past year Occupational Health Nursing doctoral students worked on interdisciplinary research projects with faculty in the College of Medicine, Engineering, Education and Sociology. The addition of the two new adjunct Research Scientists from the Cincinnati Children's Hospital and Medical Center, one a graduate of the Occupational Safety and Health Research program, increased the number of opportunities for such work and has opened new opportunities for student and faculty occupational health research. For example, a doctoral student studying postural load of nurses has been working with Dr. Daraiseh; Dr. Davis (Occupational Health Nursing) and Dr. Daraiseh are preparing a pilot study of bio-indicators of stress and musculoskeletal disorders. This student will be completing her dissertation and she has been working with another doctoral student in ergonomics. A second doctoral student is completing a study of violence against personnel in a pediatric emergency room.

Interdisciplinary interaction was also fostered by providing support for trainees to attend research training courses and other programs and support for inviting outside research experts to present seminars and other training to trainees. These activities also resulted in the acquisition and development of new research skills which are described in the next section.

Examples of Research Skill Development

Interdisciplinary Research Training Support of Academic Programs included providing support for trainees to attend research training courses and other programs, support for inviting outside research experts to present seminars and other training to trainees.

An essential research skill which all investigators need to acquire and continuously update is that of successful grant-writing. The third Grant Writing Workshop was conducted with NORA support by the Pilot Research Project Program to improve the grant writing skills of ERC trainees and faculty and of other occupational health and safety related personnel from the institutions participating in the PRP program. This Workshop is described in more detail in the Pilot Research Project program report.

A number of special research methods training projects were undertaken. Among these were projects for: interdisciplinary ergonomics research skills, methods to investigate vibration damping of intervertebral segments in an animal model, methods for fungal spore identification.

Methods to investigate vibration damping of intervertebral segments training was conducted at the University of Waterloo. It involved learning how to perform a protocol for dissecting the C3/C4 and C5/C6 vertebral segments from a pig carcass, mounting them in fixtures in an Instron mechanical testing machine, attaching four accelerometers to the motion segment, loading the segment repeatedly until failure occurred, then dissecting and cleaning the motion segment to determine the type and location of failure. This training provided the opportunity to learn how the properties of the

injury. It was also useful in what is changing biologically during loading. This will be useful in aiding in the determination of when and to what level pain due to injury is sensed and how pain ratings or measures of biological pain responders can be used to also aid in the prediction of a low back injury.

Two Environmental and Occupational Hygiene trainees attended a workshop on Fungal Spore Identification and Bioaerosol Sampling at Harvard University. The purpose of this course was to provide the students with a comprehensive knowledge of airborne pollen and spores, including identification and counting procedures. Skills were acquired to identify common outdoor and indoor genera of fungi and pollen**.** The training was also useful in helping to develop a better understanding of total exposure to these harmful environmental agents and to help develop sampling strategies for exposure assessment.

In addition, a doctoral candidate visited the NIOSH Pittsburgh research facility to learn new techniques for assessment of ergonomic exposures.

The Pilot Research Project Program was enhanced through NORA support in several ways:

- Promotion of attendance at the annual Symposium through efforts of the Continuing Education program to publicize the program and to secure continuing g education credits for various disciplines.
- Development and distribution of a CD of proceedings of the Symposium.
- Improvement in quality of grant proposals through Grant Writing Workshop described elsewhere.

E. Program Products

Outreach for Research to Practice

- A number of manuscripts were developed and/or submitted and a number of research proposals have been developed and/or submitted/funded as has been indicated in the reports of the various ERC programs. For example, the products of the interdisciplinary research collaborations of occupational health nursing doctoral students with faculty in the College of Medicine, Engineering, Education and Sociology include the funding of five out of seven submitted intramural, interdisciplinary grants. Three students presented papers or posters of research in progress. One student published a paper on his research topic of incivility, and two other publications are in preparation.

- Several outside occupational health and safety research investigators/practioners were invited to present seminars and interact with faculty and trainees. These visitors are sometimes hosted by an individual ERC program and sometimes by the ERC as a whole. In all cases their presentations are open to all ERC programs and others at the University of Cincinnati and nearby. The following ERC Research Seminars were presented:

2006-07 ERC Special Seminars

Date	Guest Lecturer(s)	Title	Host/Hostess
November, 8, 2006	Gediminas Mainelis, PhD Assistant Professor, Department of Environmental Sciences,	Application of Portable Samplers for Estimating Exposure to Biological	Sergey Grinshpun, PhD

	Rutgers University	Aerosols	
May 22, 2007	Bobby Joseph, MD Head, Division Of Work Environment, Department Of Community Health, St. John's National Academy Of Health Sciences, Bangalore, India	Occupational Health Conditions In The Garment Industry In South India	C. Sue Ross, MD, JD

- A CD for the Seventh Annual Pilot Research Project Symposium held in October 2006 was developed and has been widely distributed.

F. Future Plans

Outreach for Research to Practice

- Local, state, national and international outreach activities described above are expected to continue and expand the impact of ERC research on the occupational health and safety.

- A special issue of the journal "Human Factors and Ergonimics in Manufacturing" will be prepared consisting of publications co-authored by Occupational Safety and Health Engineering faculty and students.

Interdisciplinary Research Development

The efforts underway during the past year to develop interdisciplinary research activities will continue during the next year. These activities are expected to result in the submission of a number of interdisciplinary research proposals involving faculty from each of the ERC academic programs as well as other investigators at the University of Cincinnati and elsewhere. For example, a project initiated earlier by Occupational Medicine faculty (Dr. C.S. Ross), related to research involving the Americans with Disabilities Act and issues for workers with disabilities, will be further developed with College of Law faculty and submitted to the National Science Foundation. Dr. Tiina Reponen (EOH) and Dr. Jones (Nursing faculty at Western Kentucky University) will submit a proposal to study respiratory protection among farm workers.

Research Skills Enhancement

A Workshop on Research Proposal Preparation was held in April 2007 for ERC trainees and junior faculty and for recipients of previous Pilot Research Project Training Program grants. Such training is increasingly needed as the competition for research support becomes increasingly competitive. There were about fourteen participants in this program.

Pilot Research Project Program Enhancement

The compact disk of the PRP Symposium proceedings will be developed using resources within the Department of Environmental Health in an effort to make the editing process more efficient. The expansion of the program to include two additional educational institutions in Ohio will be considered. Future pilot projects will include addressing the potential impact on occupational health and safety.

A. Program Title: PILOT PROJECT RESEARCH TRAINING PROGRAM (PRP)
B. Program Director Amit Bhattacharya, PhD, CPE
C. Program Description

The Pilot Research Project Training Program at the University of Cincinnati was established on July 1, 1999 to provide timely support for training to students in the many areas of occupational health and safety-related research including statistical and epidemiological aspects, sampling and analysis methods, comprehensive survey methods, evaluation of research design and results, and research approaches. In response to the NIOSH requirements to involve other institutions in the region, in particular NIOSH Training Program Grantees, the Cincinnati ERC Pilot Program now includes eleven other academic institutes. Many doctoral students receive research training in such areas as experimental design and hypothesis development. Since the qualifying examination process for many doctoral programs often requires that candidates prepare research proposals, the Pilot Research Project Program provides an excellent opportunity to gain experience in this area which is vital for a successful research career. Students at collaborating institutions in programs, most of which do not currently have NIOSH training grant support are also eligible for the pilot project grants. Junior investigators at all collaborating institutions, and senior investigators seeking support for extending their research to occupational health and safety areas are also eligible to participate.

Pilot projects are intended to enable the following objectives:

1. **Develop research expertise, capacity, and understanding in Education and Research Center research trainees and new investigators and within regional occupational safety and health research training programs.**
2. **Provide initial support for new occupational safety and health investigators to establish new areas of research that address National Occupational Research Agenda (NORA) topics.**
3. **Encourage investigators from other relevant research areas to apply their expertise to NORA topics.**

Participating Institutions

As initially established, the University of Cincinnati PRP, in response to NIOSH guidelines, included three other universities in the region: Purdue University, University of Kentucky and Western Kentucky University. During the five-year competitive renewal of the PRP for July 1, 2000 to June 30, 2005 the program was expanded to include four other institutions: Central State University, Eastern Kentucky University, Kentucky State University and Murray State University. In 2004, two more regional universities were added: Bowling Green State University and University of Toledo – Medical Science Campus (formerly Medical University of Ohio). Two of the institutions are historically black universities (Central State University and Kentucky State University). During 2006-07, two more regional institutions were added: Ohio University located in Athens, Ohio and U.S. Air Force Institute of Technology located at the Wright Patterson Air Force Base, Dayton, Ohio.

Responsible Conduct of Science Training

PRP Symposium

Last year's Pilot Research Project Symposium was held October 12-13, 2006 here at the University

of Cincinnati's Kettering Laboratory Kehoe Auditorium with 140 people registered. We had 2 keynote speakers: DeLon Hull, PhD, Associate Director for Research and Technology Transfer at NIOSH who spoke on, "*Moving Research to Practice at NIOSH* and Gurumurthy Ramachandran, PhD, University of Minnesota—Twin Cities who spoke on, *"Evaluating Professional Judgment in Industrial Hygiene Decision-Making"* (http://www.eh.uc.edu/erc/2006_PRP_Symposium.pdf). There were 14 podium presentations and 13 poster presentations given by investigators from the various PRP member colleges and universities, who had previously received pilot project grants. Sue Jones, PhD, Western Kentucky University and Kermit Davis, PhD, CPE, University of Cincinnati, served as our symposium moderators. The next symposium will be held, October 11-12, 2007.

2007 PRP Grant Writing Workshop

In our efforts to build the grant writing skills of trainees and junior faculty, we facilitate an annual grant writing workshop. In 2007, we offered the third grant writing workshop. Each PRP partner university is allowed to send 2 researchers to attend the 2-day workshop. We strongly encouraged each university to send 1 doctoral trainee or junior faculty (up to the rank of Assistant Professor) with some exposure to occupational safety and health area and 1 senior faculty (Associate or Full Professor) with no prior experience in occupational safety and health research. The 2007 workshop was held April 2-3, 2007 (*please refer to PRP Attachment 1)* at the Marriott Kingsgate Hotel located on the University of Cincinnati campus.

There were 13 people who registered for the workshop, of which 4 submitted 5 proposals for 2007-08 grant year funding and 3 made presentations at the 2007 8th Annual PRP Symposium. The workshop participants represented the University of Cincinnati, Bowling Green State University, Eastern Kentucky University, Western Kentucky University, Ohio University, and the University of Toledo – Medical Science Campus. Dr. Jack Kues, Assistant Senior Vice-President for Continuing Professional Development, Assistant Dean for Continuing Medical Education and Professor of Family Medicine served as a presenter on the "nuts and bolts" of grant writing for researchers and facilitator. Dr. Amit Bhattacharya, PRP Program Director, provided "hands-on" review of a sample "grant" and then provided step by step procedure for developing an effective grant proposal.

A panel of senior researchers and faculty members provided the participants insight into "Creating a Research Career Path." The panel members, Drs. Tiina Reponen, Carol Rice and C. Scott Clark, all of the University of Cincinnati ERC, were able to provide insights from a senior researcher and/or study section members' viewpoint, served as panelists in a round table discussion. Participants were also allowed to network and ask additional questions on a one-on-one basis with all of the workshop presenters. The purpose of the presentations and Round Table Discussion was to familiarize participants with best use and practices of grant writing, the review process and key items to identify in a grant Request For Proposals (RFP).

Faculty participation

Faculty members representing all 12 universities participate in various aspects the PRP activities including, participation in the PRP Advisory Board, assistance in review of PRP grant applications from the students and junior faculty, service as mentors on the PRP grant applications for their advisees, providing encouragement to their students and faculty to develop research proposals for submission to PRP, assist in PRP symposium activities, participation in the annual grants writing

workshop (see above section for details) and providing encouragement for collaboration among participating institutes for the development of multidisciplinary research project.

D. Program Activities and Accomplishments

Since the program's inception through the end of the 2006-07 fiscal year, 121 out of 138 applications projects have been funded totaling $535,470. Sixty-Eight (68) peer-reviewed articles and conferences presentations directly resulted from their PRP pilot research grant activities. During the 2006-07 fiscal year, we received 22 applications and awarded 14 applications totaling. Since our last reporting period, there have been 9 peer-reviewed articles and conference presentations directly resulting from PRP pilot research grant activities. As a result of PRP grant support, many awardees have garnered additional grant support from agencies and programs independent of PRP in the amount of $3,535,378. This reflects a return on the investment equaling 6.6:1. Additionally, PRP also allowed bringing in 16 new investigators from other fields of expertise to the area of occupational safety and health research.

Research capabilities at collaborating institutions

As indicated in our 5 year competitive renewal grant, the research collaboration continues between Dr. Kermit Davis (UC) and Drs. Jim McGlothlin and Shirley Rietdyk of Purdue University as well as graduate students from both schools to perform a project utilizing the expertise of both universities and allowing interaction between researchers and students. The focus of the project is to investigate the biomechanical and physiological responses that occur while handling beverage shells of different designs used in the beverage industry. Both groups have had the opportunity to learn about and use the other university's equipment through training.

Research projects completed that had significant trainee involvement

All PRP grants require participation by the PhD students as well as some Master's students working under the mentorship of a faculty.

E. Program Products

Please refer to the Attachment section.

F. Future Plans

The 2007 PRP Symposium is scheduled for October 11-12, 2007 at the University of Cincinnati's College of Medicine's Kresge Auditorium. Keynote speakers have been already identified and all symposium related activities are on schedule. During the upcoming symposium PRP Advisory Board will discuss the agenda for 2008 Grant writing workshop. The evaluation form currently used for grant writing workshop will be reviewed by the Board and necessary changes will be made. The PRP Advisory Board will also discuss the requirement for PRP awardees (and their mentors) to explore the IMPACT of their research findings in Specific Improvements in OS&H. Also discuss the requirements of PRP awardees (along with mentors) to explore new project ideas dealing with R2P.

PRP Table 1
Pilot Research Project Presentations and Manuscripts
July 1, 2006 - June 30, 2007

Name	Presentation or Manuscript
Olga Clark, PhD Bowling Green State University	**Presentations:** Clark, O., PhD, ***"Compliance With Safety Practices Among Nurses"*** (October 2006), 7th Conference of the European Academy of Occupation Health Psychology, Dublin, Ireland Clark, O. PhD, Poster Submitted to 2008 Annual Conference of the Society for the Industrial/Organization Psychology, San Francisco, Ca.
Dianne Felblinger, EdD, MSN, WHNP-C, CNS, RN University of Cincinnati	**Publications:** Felblinger, D.M. (in press 2007), ***"Incivility, Bullying, And Shame Responses Of Nurses In The Workplace"***, *Journal of Obstetric, Gynecologic and Neonatal Nursing*. Felblinger, D. M., & Gates, D. (2007***), "Domestic Violence Screening and Treatment in the Workplace"***, Manuscript submitted for publication.
Jennifer Z. Gillespie Bowling Green State University	**Presentations:** Gillespie, J.Z.***, "The Emotional Labor of Direct Care Providers of People With Dementia"***, Brown Bag, (September 14, 2007) conducted at Wayne State University, Detroit, Michigan Gillespie, J.Z., ***"The Emotional Labor of Direct Care Providers of People with Dementia"***, Brown Bag Presentation, (March 30, 2007), Michigan, State University, East Lansing, Michigan Gillespie, J.Z., Barger, P.B., Conley, C.J., Yugo, J.E. & Ritter, L., ***"The Emotional Labor of Direct Care Providers of People with Dementia"*** (under review)
Jay Kim, PhD University of Cincinnati	**Publications:** Kim, J., Zhu, X., Bhattacharya, A., Bornschein, R., ***"Study of the Effect of Early Lead Exposure on Postural Balance by Advanced Signal Processing Methods***", Int. J. Biomedical Engineering and Technology, Vol. 1, No :, 86-100, 2007.
Mark Schulz, PhD University of Cincinnati	**Publications:** Yun, Y., Dong, Z.,, Shanov, V.,Heineman, W., Halsall, H.B., Bhattacharya, A., Conforti, L., Narayan, R.K., Ball, W.S. & Schulz, M.J.***, "Carbon Nanotube electrodes and Biosensors"***; Invited Review Paper, NanoToday Online Journal, in press Yun Y., Bhattacharya, A., Shanov, V., Watts, N. and Schulz, M.J***., "A Label-Free Immunosensor for the Detection of a Bone Turnover Marker, C-Terminal Telopeptides"***, to be submitted.

PRP Table 2
Research Project Grants Funded and
Submitted Based on Results from Pilot Grants
July 1, 2006 – June 30, 2007

Name	Grant
Dianne M. Felblinger, EdD, MSN, WHNP-C, CNS University of Cincinnati	Felblinger, D. M. & Gates, D. Shame Levels in Domestic Violence (Intimate Partner Violence) Screening and Treatment/ Dean's Research Challenge Award, College of Nursing, University of Cincinnati. Funded January 17, 2006: $4,000

PRP Table 3
Pilot Research Project
Awardee List
Funding Period: July 1, 2006 – June 30, 2007

Principal Investigator	Department	University Affiliation	Title of Project
Scott Schneider	Environmental Health	University of Cincinnati	Manganese and Hearing Loss
Jie Chen	College of Nursing	University of Cincinnati	Energy Expenditure, Heart Rate and Perceived Physical Exertion in ER Nurses
Devender Singh	College of Engineering	University of Cincinnati	Postural Strain in Obese During Standardized Holding Task
Sung-Chul Seo	Environmental Health	University of Cincinnati	B-glucan Level in Sub-Micrometer Particles Released form Different Moldy Buildings
Rickey Yuet-Kin Leung, PhD	Environmental Health	University of Cincinnati	Genetic Susceptibility of Organophosphate-Induced Toxicity
Robert Eninger	Environmental Health	University of Cincinnati	Filtration Performance of N99 & N100 Facepiece Respirators Against Nanoparticles
Scott Hutton	College of Nursing	University of Cincinnati	A Longitudinal Study of Workplace Incivility in Hospitals
Tracey Yap	College of Nursing	University of Cincinnati	Tailored Messages and Their Effects on Intentional Physical Activity
Lisa Lemen, PhD	Radiology	University of Cincinnati	A Novel Approach to Understanding the Link Between Low Back Pain and Brain Response
Mark Schulz, PhD	College of Engineering	University of Cincinnati	A Nanotube Immunosensor for Rapid Screening of Bone Health in Occupational Safety
Heather Schwetschenau	Psychology	Bowling Green State University	Reducing Job Stress: A comparison of CBT and ACT Based Work Stress Interventions
Gordon Gillespie	College of Nursing	University of Cincinnati	Violence Against ED workers in a Pediatric Hospital
Jennifer Yugo	Psychology	Bowling Green State University	Understanding Strain in Teaching: Determining Age Related Differences
Ying Wai Lam, PhD	Environmental Health	University of Cincinnati	Development of a Novel Biomarker for Organophosphate in Urine
Total Number of PRP Grants Awarded in 2006-07	**Total Amount of 2006-07 Newly Funded PRP Proposals**	**Average Weighted Score of Funded Proposals**	
14	**$91,577**	**1.52**	

2006 PRP Symposium
Podium and Poster Presentation Schedule

Time	Title	Speaker	Affiliation
	Thursday, October 12, 2006		
	Moderator: Dr. Kermit Davis *University of Cincinnati*		
1—1:10 pm	Welcome and Opening Remarks	Dr. Shuk-Mei Ho, Director, Department of Environmental Health C. Scott Clark, Ph.D., PE, CIH, Director, Education and Research Center	University of Cincinnati
1:10-1:15 pm	Introduction of Keynote Lecturer: Dr. R. Delon Hull, NIOSH	Amit Bhattacharya, Ph.D., CPE	University of Cincinnati
1:15—2:00 pm	Keynote Address: *"Moving Research To Practice at NIOSH"*	R. DeLon Hull, Ph.D.	National Institute for Occupational Safety and Health (NIOSH)
2:00-2:10 pm	Keynote Q & A		
2:10-2:30 pm	*"Physical and Psychosocial Demands on Day and Night Shift Workers"*	Chunhui He	Environmental Health University of Cincinnati
2:30– 2:50 pm	*"Evaluating Vapor Intrusion from Gasoline Underground Storage Tanks"*	Sheryl Milz, Ph.D.	University of Toledo–Medical Science Campus
2:50—3:10 pm	*"Obesity Effects of Postural Stability During Standing"*	Woojin Park, Ph.D.	College of Engineering University of Cincinnati
3:10-3:30 pm	*"Trunk Postural Load in Nurses-Can it BeMeasured?"*	Jie Chen	College of Nursing University of Cincinnati
3:30—4:15 pm	Poster Session I and Break		
4:15-4:35 pm	*"Health and Safety Training for Direct Care Providers of People with Dementia"*	Jennifer Gillespie, Ph.D.	Psychology Department Bowling Green State University
4:35-4:55 pm	*"Comparison of Two Methods for Measurement of Fungal (1-3)-β-d-Glucan"*	Yulia Iossifova	Environmental Health University of Cincinnati
4:55—5:15 pm	*"The Effects of Jet Fuel (JP-8) on Dermal Absorption of Used Engine Oil"*	Gerald Kasting, Ph.D.	College of Pharmacy University of Cincinnati
5:30—7:00 pm	*PRP Networking Picnic* *Sponsored by the Academy of Kettering Fellows* *Kettering Lawn*		
	Friday, October 13, 2006		
	Moderator: Sue Jones, Ph.D.		

	Western Kentucky University		
8:00-8:10 am	Opening Remarks	Amit Bhattacharya, Ph.D., CPE	University of Cincinnati
8:10—8:15	Introduction of Keynote Lecturer: Dr. Gurumurthy Ramachandran, University of Minnesota—Twin Cities	Amit Bhattacharya, Ph.D., CPE	University of Cincinnati
8:15– 9:00 am	Keynote Address: *"Evaluating Professional Judgment in Industrial Hygiene Decision-Making"*	Gurumurthy Ramachandran, Ph.D., CIH	School of Public Health University of Minnesota – Twin Cities
9:00—9:10 am	Keynote Q & A		
9:10-9:30 am	*"Workplace Incivility Among Nursing Staff and Losses in Productivity"*	Scott Hutton	College of Nursing University of Cincinnati
9:30—9:50 am	*"Do Optical Properties of Obstacles Affect the Risk of Tripping in Construction Workers?"*	Christopher Rhea	Department of Health and Kinesiology Purdue University
9:50—10:10 am	*HEPA Filter Efficiency Testing During Filter Installation"*	Farhang Akbar-Hhanzadeh, Ph.D.	University of Toledo– Medical Science Campus
10:10-10:30 am	*"Relationship Between Indoor and Outdoor (1-3)-β-d-Glucan, Fungal Spore and Pollen"*	Taekhee Lee	Environmental Health University of Cincinnati
10:30—11:00 am	Poster Session II and Break		
11:00- 11:20 am	*"Predicting Farm Youth Injury: A Psychological Perspective"*	Jennifer Yugo	Psychology Department Bowling Green State University
11:20—11:50 am	*"Evaluating the NOSH Lifting Equation for Obese Workers"*	Devender Singh	College of Engineering University of Cincinnati
11:50-12:10 pm	*"Effectiveness of Work Compatibility in Evaluating and Improving Worker Health"*	Setenay Tuncel	University of Cincinnati
	Closing Remarks and Program Evaluation		

2006 PRP Symposium
LIST OF POSTERS

No.	Title	Author	University
1	Reducing Job Stress: A Comparison of CBT and ACT Based Work Stress Interventions	Heather Schwetchenau	Psychology Department Bowling Green State University
2	A Nanotube Immonosensor for Rapid Screening of Bone Health in Occupational Safety	Mark Schulz, Ph.D.	College of Engineering University of Cincinnati
3	A Longitudinal Study of Workplace Incivility in Hospitals	Scott Hutton	College of Nursing University of Cincinnati
4	Filtration Performance of N99 & N100 Facepiece	Robert Eninger	Environmental Health University of Cincinnati
5	Maganese and Hearing Loss	Scott Schneider	Environmental Health University of Cincinnati
6	Energy Expenditure, Heart Rate and Perceived Physical Exertion in ER Nurses	Jie Chen	College of Nursing University of Cincinnati
7	Genetic Susceptibility of Organophosphate-Induced Toxicity	Rickey Yuet-Kin Leung, Ph.D.	Environmental Health University of Cincinnati
8	β-Glucan Level in Sub-Micrometer Particles Released from Different Moldy Buildings	Sung-Chul Seo	Environmental Health University of Cincinnati
9	Tailored Messages and Their Effects on Intentional Physical Activity	Tracey Yap	College of Nursing University of Cincinnati
10	Postural Strain in Obese During Standardized Holding Task	Devender Singh	College of Engineering University of Cincinnati
11	A Novel Approach to Understanding the Link Between Low Back Pain and Brain Response	Lisa Lemen, Ph.D.	Radiology University of Cincinnati
12	Ergonomics of Electronic Medical Records	Susan Kotowski	Environmental Health University of Cincinnati
13	The Impact of Injury Status on Pain Response During Physical and Mental Stress	Kari Dunning, Ph.D.	CAHS- Rehabilitation Sciences University of Cincinnati

Poster Sessions are held in the Kettering Laboratory on the Ground Floor.

7th Annual

PILOT RESEARCH PROJECT SYMPOSIUM

October 12-13, 2006

Kehoe Auditorium

KEYNOTE LECTURE

"Moving Research to Practice at NIOSH"

Thursday, October 12th, 1 pm

Dr. R. DeLon Hull, PhD

Associate Director for Research

& Technology Transfer

National Institute for Occupational Safety and Health (NIOSH)

Dr. R. DeLon Hull is the Associate Director for Research and Technology Transfer at NIOSH. In this capacity, he leads the Research to Practice (r2p) effort and facilitates and develops partnerships between NIOSH and stake-holders. Research to Practice is an initiative to enhance the relevance and impact of NIOSH funded research and applies to all research conducted or funded by NIOSH. He is also responsible for diversity efforts in NIOSH, research related to economics of safety and health, and the Institutional Review Board.

University of Cincinnati Education and Research Center (ERC)

Supported by the National Institute for Occupational Safety and Health (NIOSH)

For More Information Call Amber Twitty, ERC Program Coordinator, at (513) 558-5710

7th Annual

PILOT RESEARCH PROJECT SYMPOSIUM

October 12-13, 2006

Kehoe Auditorium

KEYNOTE LECTURE

"Evaluating Professional Judgment in Industrial Hygiene Decision-Making"

Friday, October 13th, 8 am

DR. GURUMURTHY RAMACHANDRAN, PhD, CIH

Professor,
Environmental Health Sciences

University of Minnesota—Twin Cities

Gurumurthy Ramachandran, Ph.D., CIH, is currently a Professor of Industrial Hygiene in the Division of Environmental and Occupational Health in the School of Public Health at the University of Minnesota, Minneapolis. His research involves using Bayesian methods for exposure reconstruction, as well as, for occupational hygiene decision-making, developing mathematical methods for modeling and analyzing occupational measurements, retrospective exposure assessment, and conducting fundamental physical studies of the performance of sampling devices for aerosols. The focus of these interests is the development of more effective and accurate methods to asses health-related human exposure. Dr. Ramachandran has a Bachelor's degree in Electrical Engineering, a Master's degree in Environmental Engineering, and a Ph.D. in Environmental Sciences and Engineering from the University of North Carolina.

University of Cincinnati Education and Research Center (ERC)
Supported by the National Institute for Occupational Safety and Health (NIOSH)

For More Information Call Amber Twitty, ERC Program Coordinator, at (513) 558-5710

A. Program Title: ENVIRONMENTAL AND OCCUPATIONAL HYGIENE
B. Program Director: Carol Rice, Ph.D., CIH
C. Program Description

The educational goal of the program is to provide an exemplary academic program for students that will enable them to become leaders in the field of environmental and occupational hygiene. As part of this program, students engage in ongoing state-of-the-art faculty research and service. The educational program provides a curriculum that enables graduates to achieve the following:

1. **Demonstrate a high level of technical and scientific competence in the anticipation, recognition, evaluation and control of occupational and environmental exposures, including the design and development of long-range goals and programs. This may include participation in global professional activities.**

2. **Solve real-world problems by combining observation, evaluation of the literature, measurement and other data collection and analysis of data.**

3. **Communicate effectively regarding potential hazards, risk reduction approaches and required actions within the health and safety team, with varying levels of organizational management and other affected stake-holders.**

4. **Apply the professional code of ethics in all aspects of their practice.**

5. **Demonstrate an appreciation for the limits of their graduate education and experience by participating in the continuous process of professional development, including continuing education and professional certification.**

All trainees participate in the University-mandated training relative to the ethical conduct of their research, if animals or humans are involved. In addition, two courses are required: Academic Conduct, Ethics in Research.

Detailed course Goals and Outcomes formats for each course allows students to better understand the goals of the course and the specific educational outcomes that are expected. Outcomes are further refined to distinguish between expectations of knowledge or skill gain or development of appropriate professional attitudes. All seven full-time faculty teach required courses; their efforts are supplemented by two adjuncts who teach required courses and two other adjuncts who provide major input to required courses. The curriculum includes a required thesis at the M.S. level, and a dissertation for the Ph.D. A complete listing of courses is shown at www.eh.uc.edu/ih.

D. Program Activities and Accomplishments

Progress towards goals and objectives: During 2006-2007 the faculty, students, staff, alumni and advisory board members contributed to the ABET site visit and follow-up responses to the draft report. Recent communication from ABET shows that we have received accreditation.

We have documented success in accomplishing our Measurable Objectives in the areas of Teaching

and Professional Development (this includes: high rate of feedback on course evaluations and response by faculty; professional development activities of students measured by attendance at meetings, membership in professional organizations and tracking of CIH exam completion), Research (this includes: faculty publication goals for student research and annual reviews), Service (this includes: CE course participation, outreach, consultations and other service), and Program Development (this includes: graduate activity in the major aspects of practice described in our educational goals, structured recruiting plan, increased alumni communication, response to any program critiques).

Among applicants who do not accept our offer of admission, we continue to document reasons for the decision. For the incoming class, one student went to another ERC IH program that offered a larger stipend and one decided to continue working as the summer job proved very rewarding. At Orientation, we collect information on why those enrolling as new student selected UC from other schools to which they applied. These data help us better understand our recognition in the academic/professional.

Trainee honors and awards: The following Environmental Health and Occupational Hygiene students won awards at the 2007 American Industrial Hygiene Conference and Exposition (AIHce): Chunhui He, best poster in occupational epidemiology; Matt Hammer, Tichauer Award for best student poster in ergonomics; Susan Kotowski, the Tichauer Award for best student podium presentation in ergonomics; Yulia Iossifova, the H. Kenneth Dillon Memorial Award for biosafety and environmental microbiology poster. Ph.D. candidate Robert Eninger received the John J. Bloomfield award from ACGIH. Yulia Iossifova, Ph.D., received a Strategic Training in Allergy Research (STAR) award from the American Academy of Allergy, Asthma and Immunology and an NIH National Graduate Student Research Festival travel grant.

Faculty honors/awards/special appointments: The full-time Environmental Health and Occupational Hygiene faculty were recognized for their work throughout the year. Examples for each follow.

- Dr. Kermit Davis continued as the Hallman Visiting Professorship at the University of Waterloo.
- Dr. Amit Bhattacharya was elected a Fellow in the inaugural class of the Biomedical Engineering Society and served as a reviewer for several NIOSH study sections and panels.
- Dr. Tiina Reponen is a member of the Mold Stuies Infomratin Group at the NIEHS National Toxicology Program and continues as a member of the Board of Directors of the American Association fro Aerosol Research.
- Dr. Carol Rice serves as a consultant to NIOSH on beryllium exposure metrics and continues as a member of the program committee for Collegium Ramazzini.

Trainee dissertation and thesis titles: were awarded during the year. Titles follow:

- (1-3)-B-D-Glucans In Indoor Environments—Laboratory Analyses And Wheeze In Infants-Yulia Iossifova, Ph.D. (Reponen, chair)
- Work Compatibility and Musculoskeletal Disorders Among Construction Workers, Tarek Sobeih, Ph.D. (Bhattacharya, chair)

- Bioaerosols In Homes Without Visible Mold Growth: Relationship Between Indoor And Outdoor Levels Determined By Different Methods - Taekhee Lee, Ph.D. (Reponen, chair)
- Evaluation Of Bioaerosol Components, Generation Factors, And Airborne Transport Associated With Lime Treatment Of Lead-Contaminated Sediment For Beneficial Use Purposes, Edwin Barth, Ph.D. (Clark, chair)
- Patterns Of Cistern Drinking Water Collection And Use Among Residents In A Semi-Rural Community Who Previously Indicated That Cisterns Were A Primary Source Of Their Drinking Water: Implications For Exposure Assessment - Emma Jane Fennel, M.S. (Clark, chair)
- Determination Of The Association Between Ergonomic Mismatch And Musculoskeletal Pain In School-Aged Children—Joyce Brewer, M.S. (Davis, chair)

New faculty positions: None

New courses or content: The content of two courses has been enhanced to include topical areas: Principles of Occupational Exposure Assessment, 26-EIH-707 (Talaska) includes a 1.5 hour lecture on Control Banding; Hazardous Materials Management, 26-EIH-834 (Clark) includes coverage of the National Incident Management Plan and requirement that students successfully complete the on-line course, IS-700 in the National Incident Management System. The Graduate School approved a new course, Workplace Exposure Measurements—follow-up, 26-EIH-971 (Rice) during which students review their graded comprehensive survey reports from Evaluation of Workplace Exposures, 26-EIH-775 (Rice), and cover advanced topics including an ethics scenario.

Trainee recruitment, including diversity: In 2004 the program implemented a structured recruitment plan after consultation with professional recruiters and a self-study of the market. The plan describes a student-centered approach with annual visits by teams of two current students or recent graduates. Schools in the region include: University of Cincinnati, University of Findlay, Bellarmine University, Western Kentucky University, Eastern Kentucky University, University of Dayton, Central State University and Wittenberg University. We maintain a recruiting effort by "mail" with Clarkson University in Potsdam, NY, due to a history of past applicants and have established a relationship with Xavier University here in Cincinnati. Professional recruiters have told us that 6 years of consistent and repetitive implementation is needed to see benefits. At the end of three years of implementation, we can report that of the applications received this year were largely from the targeted schools. Of those accepted for the 2007-08 year, the majority are from these schools. Our association with Central State University is improving, as evidenced by a summer call from science faculty, asking when we are coming to recruit this year. In addition, we have identified specific University of Cincinnati named contacts in the Departments of Chemistry, Physics and Biology for continued communication.

E. Program Products

Publications and Presentations: See Appendix B.

Conferences/symposia sponsored: The program participated in a joint meeting with the Ohio Valley AIHA section in March 2007. Students had opportunity to discuss their program with local

hygienists and present their research. Students preparing to present posters or platform talks at national meetings used this as an opportunity to get feedback by posting drafts or providing overviews verbally.

Continuing Education courses faculty participated in:
Dr. Amit Bhattachary served as primary technical director for the OSHA ergonomics course # 2250: "Principles of ergonomics applied to work-related musculoskeletal and nerve disorders", July 24-26, 2006, University of Cincinnati.

Successful R2P projects:

- Work by Dr. Scott Clark on the continuing use of lead in paint in Asia has resulted in international interest, including invitation to meet with international officials to devise plans to ban these products.
- Work by students Sung-Chul Seo, Ph.D. and Yulia Iossifova, Ph.D., under the direction of Drs. Reponen and Grinshpun has resulted in a new field-compatible method for the collection and analysis of fungal fragments.
- As part of M.S. thesis research, Cara Pennline identified overexposures to hexavalent chromium; after informing the employer, the process was changed immediately to eliminate exposure.
- A continuing project to provide information and training to community residents regarding environmental hazards through the NIEHS supported Midwest Consortium for Hazardous Waste Worker Training directed by Dr. Carol Rice has initiated development of a school bus anti-idling program, incorporating data from the Cincinnati Childhood Allergy and Air Pollution Study (G. LeMasters, PI, supported by NIEHS).

Research projects completed that had significant trainee involvement
Students had substantial opportunity to participate in funded research, including: Aerosolization and Collection of Fungal Fragments of *Aspergillus versicolor* and *Stachybotrys chartarum* funded by NIOSH and directed by Dr. Tiina Reponen included substantial involvement of Sung-Chul Seo; Methodology for Fungal Fragments-A new exposure assessment tool for Gene-Mold interaction studies funded through the NIEHS Center for Environmental Genetics and directed by Dr. Tiina Reponen involved Yulia Iossifova; A Novel Post-menopausal Osteoporosis Screen Tool funded by NIAMS and directed by Dr. Amit Bhattacharya included substantial involvement by Susan Kotowski, Chunhui He and Qiang Zheng.

Unique Training courses: Students participated in the tri-county emergency response drill for a Dirty Bomb attack at the Great American Ball Park in September 2006, attended the public NEPA hearing regarding the Environmental Impact Statement describing site selection for a new NIOSH facility in Cincinnati and completed Community Emergency Response Training.

F. Future Plans
During the coming year, the faculty will review student feedback on coverage of the educational outcomes and adjust program content, as needed. We will continue the recruiting plan and continue

contact with alumni regarding completion of the CIH exam.

IV. Specific improvements in Occupational Safety and Health

- Awareness of continued use of lead in new household paint has increased.
- Exposure to small, respirable fragments of mold/fungus can now be measured to better evaluate risk of health effects.
- Implementation of anti-idling programs is becoming more widespread.
- Chrome-containing rod use was discontinued by one company to reduce exposure to hexavalent chromium among welders.

A. Program Title: **OCCUPATIONAL HEALTH NURSING (OHN)**
B. Program Director: **L. Sue Davis, RN; PhD**
C. Program Description

The OHN Master's Program (MSN) prepares clinical nurse specialists to function collaboratively with interdisciplinary occupational health and safety teams; affect the health and safety of diverse working populations through planning, delivering and evaluating workplace programs; understand and use policy mandates affecting the workplace; and provide leadership in addressing issues impacting workers and the community. The PhD program prepares nurses to conduct and disseminate the results of rigorous research in occupational health and safety within an interdisciplinary framework.

The specific goals of the Occupational Health Nursing program for the reporting period are:

1) Recruit students, emphasizing underrepresented racial and ethnic groups.
2) Increase student publications and presentations.
3) Continue mentoring students in grant submissions.
4) Continue faculty and student outreach efforts within the region.
5) Maintain excellence in academic and research training through continuous internal and external evaluation of students, faculty, research, and curriculum; and maintenance of strong community OHN relationships.

Faculty participation. The core Faculty has functioned as a team for nine years, and has knowledge and skills essential for preparing advanced practice occupational health nurses and researchers: occupational nursing, epidemiology, policy, ethics, administration, and research excellence. Supportive faculty members teach courses in community & environmental health, administration & management, and research methods. The Dean and Associate Division Deans are supportive of the OHN team efforts to make changes for the benefit of the program. A wide range of adjunct professors and community partners serve as preceptors for research and practice opportunities.

Responsible conduct of science training. All graduate students are responsible for understanding and complying with responsible conduct of science. Graduate students are required to take the CITI course in the protection of human subjects. Additionally, doctoral students receive more in-depth content in the Pro-Seminar courses, are tested over the content in the preliminary examination following completion of foundational doctoral courses, and are supervised closely by faculty in their compliance with the College of Nursing Standard Operating Procedures for the Conduct of Research. PhD students must also take the HIPAA, Post Approval Monitoring, and Compliance Training courses.

Curriculum: Master's Program (MSN)

Clinical Nurse Specialist option: The master's OHN program is five quarters in length; and consists of 64 quarter credits. The focus is development of an OHN manager. The curriculum is shown in Appendix A: Program Curricula. Three OHN courses are web-based: Introduction to Occupational Health Nursing (29ANCH810); Managing Occupational & Environmental Diseases and Injuries (29ANCH811); and Managing Occupational Health Programs (29ANCH813). Previously existing web-based courses are Epidemiology (29ANCH851), Health Planning (29ANCH814), and Data Base Management (29NURS819). The statistics and research on-line courses are in pilot testing.

Moving to web-based courses provides greater access for nurses interested in the MSN or Post-Masters OHN Certificate. Student evaluations show that live-time virtual classroom improves student/faculty and student/student interactions. However, students prefer a blend of classroom and electronic learning. The newest on-line course, toxicology, was revised and implemented by an interdisciplinary team of medicine, nursing and industrial hygiene faculty. The outcome was highly evaluated by students and faculty.

Nurse Practitioner (NP) Option: Students interested in OHN nurse practitioner role have two options. In the first option, students complete the OHN master's degree and then an FNP post-master's certificate of 38 credits. In the second option, students combine their OHN master's with the NP master's. The OHN and FNP Program directors jointly plan a program of study that includes core courses, specialty and interdisciplinary courses. Practicum experiences incorporate FNP and occupational health and safety experiences. Option one can be completed in three additional quarters. Option two requires 25 additional quarter credits and can be completed in two additional quarters. Students are eligible to take the ANCC certification examination for family nurse practitioner.

OHN Post-Master's Certificate: This program is for nurses with an MSN in another nursing specialization. The certificate program is 30 quarter credits and includes occupational health nursing, management, and environmental health. Graduates are prepared to practice in occupational health and safety environments, with the same skills as the clinical nurse specialist. We currently have one FNP in the program. We also work with Dr. Susan Jones from Western Kentucky University to accommodate students in their nursing master's program. (See Appendix A for Curriculum Plans)

Curriculum: Doctoral Program (PhD)

The Doctor of Philosophy (PhD) prepares nurse scientists in clinical and health care systems research. Students take core research, theory and policy courses and an individualized program of courses relevant to their area of research interest. Recent examples of study emphasis are workplace behavioral change, violence and incivility in the workplace, musculoskeletal disorders. Post-baccalaureate students pursuing the PhD degree complete the Master's core requirements and take 45 credit hours of Master's level course work in occupational health nursing. MSN to PhD students take electives in OHN and select the majority of cognate credits from courses in the Department of Environmental Health, Occupational Medicine, or Industrial Engineering. In addition to regular course work, students are expected to attend and participate in Scholarship Roundtables which are held twice a month (See Appendix A: Scholarship Roundtable).

Students develop a research focus, by working with established interdisciplinary research teams in the College, ERC, University, NIOSH and industry. Procter and Gamble, Dow Chemical, NIOSH, Kellogg Foundation along with professional and industry associations have recently supported doctoral student research. Students are expected to complete pilot studies or work on established studies as they progress through their program. Examples of pilot projects this past year include risks related to employment in hospital emergency departments, stress response of emergency responders, developing tailored e-mail messages to increase physical activity, secondary traumatic stress in nurses, obesity in the workplace, and ergonomic factors contributing to work-related musculoskeletal disorders in nurses. These pilot studies resulted in numerous presentations and

publications (See Appendix B: Faculty/Student Publications).

D. Program Activities and Accomplishments

Enrollment for the Academic Year (AY) 07 included six (6) MSN students, and five (5) PhD students. MSN students contributed significantly to the occupational health of our community in the areas of disaster planning, health promotion, continuing education, and employer reports of in-house versus contracted occupational health services. Research efforts of PhD students continue to grow (see Table 1), and faculty are active in submitting grants. The College currently has on-going research funding of $1,263,794 and $5,330,219 pending on submitted research grants.
Two MSN students graduated and are employed in an occupational health and safety capacity.

Table 1: Trainee grants

Grant/Project; PI & Faculty Mentor	Funding Source
Workplace incivility among nursing staff and losses in productivity (Hutton; Mentor: Gates)	Pilot Research Project grant, Educational and Research Center, National Institute for Occupational Safety and Health
Trunk postural load in nurses (Chen; Mentor: Davis)	Pilot Research Project grant, Educational and Research Center, National Institute for Occupational Safety and Health
Trunk postural load in nurses (Chen; Mentor: Davis)	University of Cincinnati Graduate Student Summer Fellowship
Tailored Messages and their Effect on Intentional Physical Activity (Yap, T; Mentor: Davis)	Pilot Research Project grant, Educational and Research Center, National Institute for Occupational Safety and Health
Energy Expenditure, Heart Rate, and Perceived Physical Exertion in ER Nurses: A Comparison of A 12- and 8-hour Day Shift (Chen, J; Mentor: Davis)	Pilot Research Project Grant, Educational and Research Center, National Institute for Occupational Safety and Health
Violence against nurses in pediatric settings (Gillespie, G; Mentor: Gates)	Pilot Research Project Training Grant, Educational and Research Center, National Institute for Occupational Safety and Health

Trainee honors, awards, scholarships

Student honors, awards and scholarships are shown in Table 2.

Table 2: Trainee honors, awards and scholarships

Trainee	Honor/Award/Scholarship
P. Berry	OSHA Nurse Internship, Washington, D.C., May-June, 2007 UC & College Disaster Preparedness Committees.
Trainee	**Honor/Award/Scholarship, Continued.**
J. Chen	University of Cincinnati Graduate Student Summer Fellowship
G. Gillespie	Immediate Past President, Ohio State Council Emergency Nurses Association President, Ohio State Council Emergency Nurses Association Treasurer, Greater Cincinnati Emergency Nurses Association Co-Chair, Communications Committee, & Member of Trauma Committee,

	Ohio Council Emergency Nurses Assoc. Delegate, General Assembly of Delegates representing Ohio Emergency Nurses Assoc. Member, Education Committee, Greater Cincinnati Emergency Nurses Assoc. Distinguished Leadership Award, 2006; Emergency Nurses Association. Emergency Nurses Association Foundation (ENAF) Pamela Stenson Kidd Memorial Doctoral Scholarship.
S. Hutton	Chair of the research committee at the Veterans' Affairs Medical Center (VA); Director of the prevention and management of disruptive behavior program at the VA which is a program to increase employee safety at work
T. Yap	Medtronic Academic Scholarship, American Association of Occupational Health Nurses, $3,000, March, 2007; Student representative to College Curriculum Council

Faculty honors, awards appointments

Davis, L. Sue, RN; PhD:

- Greater Cincinnati Health Council, Research Consultant
- Children's Hospital & Medical Center, Research Consultant

Gates, Donna, RN; PhD:

- Greater Cincinnati Health Council (Two committees)
- Invited Grant Reviewer, CDC Health Protection Research Initiative: Evaluation of Workplace Health Promotion Research Projects , CD07-004, July 17th, 2007. Atlanta, GA
- Oregon Center for Applied Science, Consulted on development of video for entitled, *Caring Skills for CNAs*, 2005, 2006. Principal Investigator: Blair Irvine.
- Editorial Panel Reviewer, *Nursing Research*
- Editorial Panel Reviewer, *American Association of Occupational Health Nurses Journal*

Meyer, Ursula, RN; MSN:

President, SWOAOHN and Board Member, OAOHN

Trainee theses and dissertations

No doctoral students graduated during the 2007 AY. Masters students Capstone projects were:

- Barnette, Marre (2007). Designing Continuing Education Programs: Essentials and Example. Committee Members: Davis, LS; Meyer, UM.

- Badia, Jennifer (2007). Crisis Management Preparedness for a Major Packaging Distribution Organization. Committee Members: Davis, LS; Meyer, UM.

E. Program Products

- Occupational Health Nursing Masters and doctoral students authored or co-authored 36% of the publications, and 17% of paper and poster presentations in the College of Nursing. These outcomes demonstrate the degree of engagement in faculty research and scholarship as well as the quality of faculty mentorship.

- A Master's student provided leadership for the College of Nursing Pandemic Preparedness Committee. The outcome was a College Pandemic Response Plan, and an invitation to the

student to sit on other University disaster preparedness committees. Continuity of Business Disaster Plans were prepared for three local business, and recommendations for workers compensation transitional work plans were provided to two businesses. Additionally a team of students presented a report to a restaurant in response to an analysis of workplace hazards. Lastly, a group of students provided a cost analysis of in-house occupational health services versus contracted services.

- Master's students in Occupational Health Nursing planned, presented and evaluated a workshop on migraines in the workplace. The program was able to accommodate 30 participants, and the capacity was reached. They have been requested to repeat the offering and the ERC Continuing Education Program has agreed to work with the students to design a web-based program.

- Faculty planned and presented three one-hour continuing education sessions for occupational health nurses in the region. Additionally, students presented programs to other professional nursing groups (Sigma Theta Tau, Emergency Room Nurses) providing implications for occupational health and safety in a practice setting.

- Doctoral students have been active in seeking and receiving funding for their doctoral research. Four NIOSH ERC Pilot Research grants were submitted for competitive funding. All four were awarded (See Publications/Presentations). One highly competitive Summer Research Fellowship was funded by the University of Cincinnati Research Council to support doctoral student research.

F. Future Plans (Include in summary form plans for the next budget period.)

Plans for the future include completing an OHN program needs assessment for the coming five year renewal. Another priority is to recruit for master's and doctoral students.

IV. Report on Specific Improvements in OS&H Resulting from ERC Programs (Include any specific project or activity that demonstrated a specific impact on worker safety and health.)

Occupational Health Nursing faculty assisted five organizations with disaster planning and working with the Red Cross with their disaster planning initiatives. Occupational health nurses were provided one workshop and several one hour continuing educational courses.

A. Program Title: OCCUPATIONAL MEDICINE RESIDENCY TRAINING PROGRAM (OM)

B. Program Director: Clara Sue Ross, MD, JD

C. Program Description:

The Occupational Medicine Residency Training Program continues to focus on recruitment of highly-qualified residents into the program, ongoing refinement of clinical, academic and practicum training opportunities and faculty participation in outreach activities. The program's objectives are:

1. **To continue to offer a residency program that offers flexible, yet focused, high quality academic, clinical and research training.**

2. **To expand training in medico-legal affairs, and the interfaces between clinical practice and regulatory issues.**

3. **To continue to encourage research training and pursuit of academic careers by program graduates, and provide additional funding and encouragement in support of research training.**

4. **To continue to develop cooperative arrangements with industries and state and federal institutions to broaden the funding support for the training program, while simultaneously enhancing the clinical practicum training.**

5. **To utilize the competency-based evaluation program to assure optimally personalized and complete training.**

The curriculum for the program consists of a combination of academic coursework, clinical rotations, practicum experiences and completion of a Master of Science project. Required academic courses include Epidemiology, Biostatistics, Basics of Occupational Medicine, Basics of Environmental Medicine, Occupational Health Management, Lung and the Environment, Environmental Health Seminar, Design and Management of Field Studies, Survey of Environmental Toxicology I and II, Principles of Ergonomics, Principles of Occupational Exposure Assessment, Medicolegal Skills, Special Topics in Preventive Medicine and Occupational Health, Hygiene & Safety Workshop. Clinical rotations include general occupational medicine, occupational pulmonary, occupational dermatology and various clinical electives. Available practicum experiences are varied and include rotations at NIOSH, OSHA, Bethesda Care, Procter and Gamble, Hillenbrand and University Health Services. Occupational Medicine Residency Training Program faculty members provide clinical and academic training for the residents and serve as academic and research advisors. Instruction in the responsible conduct of science includes a required course, Design and Management of Field Studies, as well as University of Cincinnati online module training requirements and joint resident-faculty journal clubs held on a regular basis. The Master of Science research project completed by the residents is supervised by program faculty with guidance from the Department of Environmental Health Degrees Committee. The program also has a number of volunteer faculty members who assist with the residents' academic and clinical training.

D. Program Activities and Accomplishments

The program's progress towards its outreach goals and objectives includes faculty participation in

occupational health and safety continuing education efforts, lectures and consultations. New training content offered included a revised and expanded interdisciplinary course, Survey of Occupational and Environmental Toxicology, developed by an interdisciplinary team, including Dr. Ross. Resident professional development goals met included the enrollment of residents in professional occupational health and safety groups and support of their attendance at regional and national occupational health conferences.

Dr. Lockey continues with a diverse research program, including studies of the health effects of refractory ceramic fibers, pulmonary health effects of occupational exposure to artificial food flavorings, vermiculite exposure health effects and development of environmental sensors for personal workplace exposure assessment. He serves on the United Auto Workers-GM Occupational Health Advisory Board and the National Advisory Board on Radiation and Worker Health and the United States Armed Forces Defense Health Board. He helped organize and will serve as a moderator at an upcoming conference regarding the food flavoring industry. Dr. McKay continues to serve on the American Industrial Hygiene Association Respiratory Protection Committee, ANSI Z88 Respiratory Protection Committee and the ANSI Z88.10 Respirator Fit Testing Committee. He provided a number of national training courses related to respirators, fit testing and spirometry.

Ongoing recruitment efforts during 2006-07 resulted in the recruitment of two new residents into the program beginning on July 1, 2006, one resident into the program in September 2007 and the recruitment of one other resident who will begin training on January 1, 2008.

We continue to recruit additional volunteer faculty members, who participate in a wide variety of teaching roles within the program. Additional faculty members were recruited to assist with resident education activities related to independent medical examinations and workers' compensation issues.

Dr. Ross assisted in hosting the ERC visit for Dr. Bobby Joseph, from the Department of Community Health, St. John's Medical College, Bangalore, India. Dr. Joseph provided several lectures regarding occupational health issues in India for ERC students and faculty members.

E. Program Products

Dr. Ross and Dr. Gates (from the Occupational Health Nursing Program) had an article based upon their work from an ERC-funded project related to workplace violence in emergency department settings published.

Drs. Ross, Jarrell and Linda Sue Davis collaborated on the development of an occupational health conference curriculum for primary care providers. The format was changed from a live conference to taped lectures which will be utilized in online continuing education and in the development of a DVD of the lectures to be provided to selected local primary care providers, residents and students.

Occupational faculty members have provided consultations on a wide variety of clinical issues, including ongoing medical monitoring programs and evaluation of potential worker exposures at an aluminum mining site.

F. Future Plans

Dr. Ross, in conjunction with Drs. Jarrell and Sue Davis will develop online continuing education modules and a DVD from the taped lectures related to occupational health issues for primary care providers, including common occupational dermatology and pulmonary issues, selected occupational health issues, workers' compensation and return to work issues.

Program curriculum updates in the future will include revisions to the Special Topics in Preventive Medicine course in response to resident input. Additional volunteer faculty members (program graduates Drs. Robert Boyer and Thomas Forte) will provide more clinical education for the residents in the areas of occupational musculoskeletal disorders and independent medical evaluations. The program will continue to develop further collaboration with the Medical Toxicology program at the University of Cincinnati and with the local medical toxicology community. Dr. Ross will be developing a Special Topics in Corporate and Consulting Medicine, in conjunction with several volunteer faculty members. Dr. Anne Like, a volunteer faculty member who is a program graduate and previous ERC trainee, developed a hospital/medical center employee health practicum experience in conjunction with Dr. Ross.

The program resides in the Division of Occupational and Environmental Medicine. Dr. Lockey stepped down as Division chair in 2005 and the Department of Environmental Health continues its national search for a new division chair. Dr. Lockey will continue with his ongoing clinical and research programs. Dr. Freeman has been serving as Acting Division Director.

The program continues to track its graduates' progress in occupational medicine board examination testing. Two recent resident graduates took the examination in fall 2006 and passed with excellent scores. One resident graduate took the board examination in 2007 and is awaiting results. In addition, the program will continue to utilize the American College of Preventive Medicine yearly in-service examination as a means of monitoring residents' progress and as a program evaluation tool.

The program will continue its efforts to develop additional sources of funding for the program, including its Channing Meyer Memorial Fund, to support the residents and faculty in the program. In addition, the program will continue to focus on recruiting residents specifically for the NIOSH and Procter & Gamble residency tracks and from the military, as additional resident funding opportunities.

A. Program Title: OCCUPATIONAL SAFETY AND HEALTH ENGINEERING (OSHE)

B. Program Director: Richard L. Shell, PhD, CPE

C. Program Description:

The Occupational Safety and Health Engineering (OSHE) program encompasses a wide range of University of Cincinnati (UC) courses and faculty. The majority of courses are taught by faculty from the colleges of Engineering (COE) and Medicine through the departments of Mechanical, Industrial and Nuclear Engineering (MINE) and Environmental Health (EH). OSHE has been a NIOSH ERC sponsored multi-disciplinary program since 1987. The MINE Department has offered safety engineering courses at the graduate level since 1975.

The primary objective of the OSHE research and training program is to provide graduate engineers from various disciplines with core courses and experiences that will enable them to become practicing safety and health practicing professionals or researchers in the field. Additionally a secondary objective of the program is to provide some exposure (limited courses) to occupational safety and health for engineers in other specializations who should be aware of and include safety and health considerations in their work conduct.

The OSHE program core and supporting faculty are outlined in Table 1. The curriculum includes a combination of science and engineering. Table 2 lists the required MS core courses and the assigned faculty. A curriculum change was recommended by the OSHE Advisory Board to allow an additional mathematics or technical elective for the program. The faculty reduced the core requirement from 30 to 27 credit hours as depicted in Table 2. Commonly selected electives are listed in Table 3. Other mathematics or technical electives are shown in Table 4.

The program of study for the MS degree with Thesis option and Non-thesis option is shown in Tables 5 and 6 respectively. Table 7 depicts the requirements for admission into the MS program for those students without a BS degree in engineering. Courses for the PhD are determined by the student and his/her advisor to align with research and career objectives.

D. Program Activities and Accomplishments:

One of our measures of performance is the number of quality students in the program (including NIOSH Trainees). During 2006-07, 17 MS and 10 PhD students were enrolled. In addition, approximately 60 senior undergraduate, 3 MS and 2 PhD students not in the OSHE program enrolled in one or more safety and health engineering courses. During this time period, 4 MS and 1 PhD students were graduated.

The American Society of Safety Engineers (ASSE) Student Section Southwestern Ohio Chapter was charted August 31, 2004 (Dr. Shell serves as Faculty Advisor). Since that time the student membership has made excellent progress and accomplishments. For example, the Chapter officers and other members attended the First Annual National Future Safety Leaders Conference held in Cleveland, OH 2005, and five students attended the 2nd Annual Conference held at the Hilton Hotel in St Louis, MO November 2-4, 2006. During 2005-06 the Student Section Newsletter was established. One example of excellence, two of the OSHE students, Farman Moayed and Tushyati Maudgalya, were awarded ASSE $1,000 scholarships. Both Farman and Tushyati are members of the Student Section Southwestern Ohio Chapter. The awards are highly competitive nationally and

indicate high professional recognition.

There have been some personnel changes in the COE. First, Dr. Carlo Montemango was appointed on July 1, 2006 as the Dean, College of Engineering becoming the 18th Dean of the College. Dean Montemango joins UC from the faculty of UCLA, where he has been serving as the Chair of the Department of Bioengineering. He holds a PhD in Civil Engineering and Geological Sciences from the University of Notre Dame. Second, Dr. Mital has left the OSHE core faculty to focus all of his effort on manufacturing. He has been replaced by Dr. Salem, Associate Professor, Civil and Environmental Engineering who has considerable occupational safety experience with specialization in construction management. Dr. Genaidy and Dr. Shell have been working with Dr. Salem on an increasing basis for the past three years. These activities have been largely directed toward safety and health issues in the construction industry including research proposals, publications, student advising and graduate committees.

One new course has been developed and will be taught by Dr. Salem during 2007-08: Construction Health and Safety (20 CEE 698).

The faculty have continued to work with Ken Simonson, Director of UC Emerging Ethnic Engineers to offer the OSHE program with NIOSH Trainee support to minority students. During 2005-06 two minorities, one African-American and one Native-American, were offered admission and both accepted. They both completed their MS degree requirements in 2007.

E. Program Products:

A second measure of performance is the number of publications authored by faculty, and by faculty with OSHE students. The journal publications for 2006 totaled 19. Of these 14 were co-authored with OSHE students. In addition journal publications for 2007 totaled 14. Of these, 12 were co-authored with OSHE students (reference OSHE Appendix).

Another major program product was the planning and organization of the International Conference on Nanotechnology, Occupational and Environmental Health & Safety: Research to Practice. The Conference was jointly sponsored by NIOSH and the University of Cincinnati, and was held at the Cincinnati (Duke Energy) Convention Center December 3-8, 2006. The Conference co-chairs were from NIOSH and the University of Cincinnati. The Conference was attended by over 400 participants. The web site for the Conference was: **www.uc.edu/nochs/abstractsubmission**.

F. Future Plans for 2007-08:

- Continue diversity recruitment efforts
- Strengthen OSHE research focus in the following areas:
  - Noise induced hearing loss, and vibration hazards
  - Radiation protection and measurement, and health physics
  - Construction
- Plan and organize to accommodate Dr. Shell's retirement effective July 1, 2008 as full-time faculty and OSHE Program Director; and Dr. Genaidy's resignation effective June 30, 2007 as Associate Program Director.

- Appoint Associate Program Directors effective July 1, 2007; Dr. Kim and
- Dr. Spitz.
- Develop selected changes to the core curriculum to better align with the revised research focus.
- Enhance elective course listings
- Name faculty to replace Dr. Shell as Faculty Advisor for the ASSE Student Section Southwestern Ohio Chapter

- Plan and organize to accommodate the restriction of graduate enrollment for the Industrial Engineering Program effective August 2006, and the MINE Department name change to Mechanical Engineering (ME) scheduled for October 2007.
  - Change safety and health course numbers from MINE or INDS to ME
  - Update appointments and titles for adjunct faculty
- Schedule and meet with the OSHE Advisory Committee August 3, 2007
  - Revise and update the OSHE Program Booklet

Activities/accomplishments, products and future plans related to each of the above four goals are presented in the remainder of this section. (It should be noted that many of these activities are inter-related. Many of the activities to achieve one of these goals are also effective to achieving one or more of the other goals. For example, one of the activities to enhance the impact of the Pilot Research Project program, the development and dissemination of a CD of the proceedings of the Annual Pilot Research Project Symposium, is also part of our outreach to help put into practice results of the pilot research projects. Increasing the occupational health and safety research skills of trainees and faculty is achieved through efforts to enhance the Pilot Research Project program). Faculty support was provided under the NORA program for promoting interdisciplinary research and coordinating outreach efforts in research to practice.

D. Examples of NORA Program Activities and Accomplishments

TABLE 1: OSHE CORE AND SUPPORTING FACULTY

The following full-time faculty, partially supported on the training grant, are working to administer and facilitate the occupational safety and health engineering program:

Richard L. Shell, Professor of Industrial Engineering and Professor of Environmental Health (Program Director)

University of Iowa, B.S.M.E. (I.E. Option), 1961
University of Kentucky, M.S.M.E., 1963
University of Illinois, Ph.D., 1970

Occupational safety/management, health and human performance, and manufacturing engineering

Jay H. Kim, Professor of Mechanical Engineering (Co-Deputy Program Director)

Soul National University, B.S.M.E., 1977
Korea Advanced Institute of Science and Technology, M.S.M.E., 1979
Purdue University, Ph.D., 1988

Acoustics, noise induced hearing loss, human exposure to excessive vibrations

Henry B. Spitz, Professor of Nuclear and Radiological Engineering (Co-Deputy Program Director)

New York University, B.A., 1967
New York University, B.S., 1969
New York University, Ph.D., 1978

Health physics, radiation protection and measurement, internal radiation dosimetry, occupational radiological safety and health

Ash M. Genaidy, Associate Professor of Industrial Engineering and Associate Professor of Environmental Health

Cairo University (Egypt), B.S., 1980
University of Miami, M.S., 1983
University of Miami, Ph.D., 1987
University of Cincinnati, Ph.D., 2004

Epidemiology, safety and health engineering, and biological ergonomics

Sam Salem, Associate Professor of Construction Engineering and Management

Alexandria University (Egypt), B.S., (Civil Engineering)
Clemson University, M.S., 1992
University of Alberta (Canada), Ph.D., 1998

Transportation and construction health and safety, lean construction and infrastructure systems

In addition to the above COE faculty several full-time EH and other COE faculty hold adjunct appointments in Industrial Engineering and lecture in specific classes and serve on graduate committees. These include:

Dorothy F. Byers, Ph.D., Engineering Librarian and Adjunct Professor of Industrial Engineering
Amit Bhattacharya, Ph.D., Adjunct Professor of Industrial Engineering
C. Scott Clark, Ph.D., P.E., CIH, Adjunct Professor of Industrial Engineering

Kermit Davis, Ph.D., Adjunct Associate Professor of Industrial Engineering

In addition to full-time faculty in the COE and EH, the following off-campus adjuncts have taught courses, served on committees, and/or interfaced with student research in areas relating to the program.

Janet C. Haartz, Adjunct Professor of Industrial Engineering
University of Michigan, B.S. Chem., 1960
University of Cincinnati, M.S. 1964
University of Cincinnati, Ph.D., 1972
Occupational Safety and Health

Thomas R. Huston, Adjunct Associate Professor of Industrial Engineering
University of Cincinnati, Engineering Science, B.S., 1980
University of Cincinnati, M.S.M.E., 1981
University of Cincinnati, Ph.D., 1985
Product liability/safety engineering, statistics, and engineering economy

Steven L. Sauter, Adjunct Professor of Human Factors
University of Wisconsin-Madison, B.A., 1968
University of Wisconsin-Madison, M.A., 1972
University of Wisconsin-Madison, Ph.D., 1975
Occupational stress, safety and health

Rodney J. Simmons, Adjunct Associate Professor of Industrial Engineering
California State University, B.S., 1975
California State University, M.S., 1976
Harvard University, S.M., 1978
Texas A&M University, Ph.D., 1993
System and occupational safety engineering/management

Philip A. Stuebbe, Adjunct Assistant Professor of Industrial Engineering
University of Cincinnati, B.S.C.E., 1982
Xavier University, M.B.A., 1988
University of Cincinnati, M.S.I.E., 1989
University of Cincinnati, Ph.D., 1994
System safety and occupational safety engineering

Naomi G. Swanson, Adjunct Associate Professor of Industrial Engineering
Dakota Wesleyan University, B.A., 1980
University of Wisconsin-Madison, M.A., 1983
University of Wisconsin-Madison, Ph.D., 1989
Ergonomics and psychosocial stressors

Thomas R. Waters, Adjunct Professor of Industrial Engineering
University of South Florida, B.A., 1975

University of Cincinnati, M.S., 1981
University of Cincinnati, Ph.D., 1987
Ergonomics and psychophysiology

A. Program Title: NORA RESEARCH SUPPORT
B. Program Director: C. Scott Clark, Ph.D., PE, CIH
C. Program Description

The University of Cincinnati ERC National Occupational Research Agenda (NORA) support program has several inter-related goals, including to:

1. **To expand Pilot Research Grant support for the University of Cincinnati investigators and partnering institutions.**
2. **To disseminate research and the PRP program though development and distribution of a CD form the Annual PRP Symposium.**
3. **To encourage attendance to the Annual PRP Symposium through obtaining professional certificates and publicizing the symposium to the professional associations and others.**
4. **To support the annual grant writing workshop conducted by the PRP program.**
5. **Conduct an ERC Seminar Program**
6. **Enhance opportunities for research training of faculty and trainees by supporting attendance at research training events.**
7. **Support interdisciplinary research coordination and outreach of ERC programs through faculty support (5%).**

The accomplishments of the NORA Research Support are interwoven into each of the ERC program reports throughout this annual report.

Outreach Activities for Research to Practice

The Outreach for Research to Practice activities include, outreach activities by faculty from each academic program and dissemination of the results of the Pilot Research Project Training Program. A state wide conference on presenteeism was offered in conjunction with the Ohio Association of Occupational Health Nurses and faculty presented three of the conference sessions. Evaluations indicated that the conference was one of the best in the last 15 years, addressing contemporary occupational health issues. Examples of these outreach activities are presented in the individual program reports.

Examples of Interdisciplinary Interaction and Coordination

Interdisciplinary interaction among trainees and interdisciplinary research development is fostered through a number of courses and workshop activities. A major component of the interdisciplinary interaction occurs through the Occupational Health, Hygiene and Safety Workshop in which all ERC trainees interact in multidisciplinary teams over a three quarter period. Dr. Kermit Davis (EOH) is the Workshop coordinator and faculty from each of the other programs, participate as Advisors. The activities in this Workshop were focused on conditions at particular workplaces on which the teams focused to identify potential problems and begin to develop solutions.

A. Program Title: HAZARDOUS SUBSTANCES ACADEMIC TRAINING (HSAT)

B. Program Director: Carol Rice, Ph.D., CIH

C. Program Description

The educational goal of the program is to provide an exemplary academic program for students that will enable them to become leaders in the field of environmental and occupational hygiene. As part of this program, students specialized hazardous substances classes, complete the 40-hour HAZWOPER program, and engage in ongoing state-of-the-art faculty research and service. The educational program provides a curriculum that enables graduates to achieve the following:

1. Demonstrate a high level of technical and scientific competence in the anticipation, recognition, evaluation and control of occupational and environmental exposures, including the design and development of long-range goals and programs. This may include participation in global professional activities.
2. Solve real-world problems by combining observation, evaluation of the literature, measurement and other data collection and analysis of data.
3. Communicate effectively regarding potential hazards, risk reduction approaches and required actions within the health and safety team, with varying levels of organizational management and other affected stake-holders.
4. Apply the professional code of ethics in all aspects of their practice.
5. Demonstrate an appreciation for the limits of their graduate education and experience by participating in the continuous process of professional development, including continuing education and professional certification.

All trainees participate in the University-mandated training relative to the ethical conduct of their research, if animals or humans are involved. In addition, two courses are required: Academic Conduct, Ethics in Research.

Detailed course Goals and Outcomes formats for the majority of courses allows students to better understand the goals of the course and the specific educational outcomes that are expected. Outcomes are further refined to distinguish between expectations of knowledge or skill gain or development of appropriate professional attitudes. The three full-time faculty funded in this component teach required courses; their efforts are supplemented by one adjunct who teaches the required course in risk assessment. A research thesis relevant to HSAT is required. A complete listing of courses is shown at www.eh.uc.edu/ih.

D. Program Activities and Accomplishments

Progress towards goals and objectives: During 2006-2007 the faculty, students, staff, alumni and advisory board members contributed to the ABET site visit and follow-up responses to the draft report. Recent communication from ABET shows that we have received accreditation.

We have documented success in accomplishing our Measurable Objectives in the areas of Teaching and Professional Development (this includes: high rate of feedback on course evaluations and response by faculty; professional development activities of students measured by attendance at meetings, membership in professional organizations and tracking of CIH exam completion), Research (this includes: faculty publication goals for student research and annual reviews), Service

(this includes: CE course participation, outreach, consultations and other service), and Program Development (this includes: graduate activity in the major aspects of practice described in our educational goals, structured recruiting plan, increased alumni communication, response to any program critiques).

Among applicants who do not accept our offer of admission, we continue to document reasons for the decision. For the incoming class, one student went to another ERC IH program that offered a larger stipend and one decided to continue working as the summer job proved very rewarding. At Orientation, we collect information on why those enrolling as new student selected UC from other schools to which they applied. These data help us better understand our recognition in the academic/professional.

The Advisory Board recommended that more effort be made to involve students in local activities. During the year, students participated in Community Emergency Response Training, were "victims" in a large-scale, and visited the National Decontamination Team facility in northern Kentucky. In addition, the Advisory Board recommended that some aids (such as binoculars) be purchased to enhance learning during field trips, and this has been accomplished.

Trainee honors and awards: None

Faculty honors/awards/special appointments: The full-time faculty were recognized for their work throughout the year. Examples follow.

Dr. Carol Rice continues as co-chair of the planning committee for the annual meeting of Collegium Ramazzini and Convenor of the annual meeting of Occupational Hygiene Women Faculty.

Trainee theses: Three M.S. degrees were awarded during the year:

Variations in indoor and outdoor airborne fungal spores, pollen and (1-3)-b-D-glucan—Carlos Crawford, M.S. (Reponen, chair)

Analysis of Retrospective Airborne Beryllium Exposures at a Beryllium Processing Plant—James Couch, M.S. (Rice, chair)

The In-Vitro Effects of Organic Solvents on Dermal Absorption of Used Gasoline Engine Oil-Paul Broering, M.S. (Talaska, chair)

New faculty positions: None

New courses or content: Detailed Course Goals and Outcomes have been drafted for Applied Risk Assessment, 26-TOX-852, and will be available to students prior to the Winter Quarter offering.

Trainee recruitment, including diversity: In 2004 the overall Hygiene program implemented a structured recruitment plan after consultation with professional recruiters and a self-study of the market. The plan describes a student-centered approach with annual visits by teams of two current students or recent graduates. Schools in the region include: University of Cincinnati, University of

Findlay, Bellarmine University, Western Kentucky University, Eastern Kentucky University, University of Dayton, Central State University and Wittenberg University. We maintain a recruiting effort by "mail" with Clarkson University in Potsdam, NY, due to a history of past applicants and have established a relationship with Xavier University here in Cincinnati. The professional academic recruiters have told us that 6 years of consistent and repetitive implementation is needed to see benefits. At the end of three years of implementation, we can report that of the applications received this year were largely from the targeted schools. Of those accepted for the 2007-08 year, the majority are from these schools. . Our association with Central State University is improving, as evidenced by a summer call from science faculty, asking when we are coming to recruit this year. In addition, we have identified specific University of Cincinnati named contacts in the Departments of Chemistry, Physics and Biology for continued communication.

E. Program Products

Publications and Presentations: See Appendix B.

Conferences/symposia sponsored: The program participated in a joint meeting with the Ohio Valley AIHA section in March 2006. Students had opportunity to discuss their program with local hygienists and present their research. Students preparing to present posters or platform talks at national meetings used this as an opportunity to get feedback by posting drafts or providing overviews verbally.

Continuing Education courses faculty participated in: None

Successful R2P projects:
Work by Dr. Scott Clark on the continuing use of lead in paint in Asia has resulted in international interest, including invitation to meet with international officials to devise plans to ban these products.

A continuing project to train site workers and emergency responders through the NIEHS supported Midwest Consortium for Hazardous Waste Worker Training directed by Dr. Carol Rice documents that 60% of site workers and 80% of emergency responders implement changes in the workplace. Also as part of this project, an initiative has been developed to support community training in setting up school bus anti-idling programs; this program, incorporates data from the Cincinnati Childhood Allergy and Air Pollution Study (G. LeMasters, PI, supported by NIEHS).

Research projects completed that had significant trainee involvement: None completed this year.

Unique Training courses: Students participated in a simulated Dirty Bomb attack at the Gread American Ball Park, completed Community Emergency Response and CPR Training, attended local meetings regarding site selection for the proposed NIOSH facility to better understand the NEPA/EIS process, and toured and participated in exercises at the EPA National Decontamination facility. This latter training was facilitated by Advisory Board member, Dr. John Cardarelli.

F. Future Plans:

During the coming year, the Dr. Talaska will complete the detailed Course Goals and Outcomes

descriptions for his required course, Human Biological Monitoring and Bio Markers, 26-EIH-843. We will continue the recruiting plan and initiate contact with alumni regarding completion of the CIH exam. Courses will be updated, as new tools important to hazardous materials are developed and acquired. Additional local opportunities for relevant educational and training activities will be sought and documented, as recommended by the Advisory Board.

IV. Specific improvements in Occupational Safety and Health

Awareness in the wide-spread, continuing use of lead in paint has increased.

Midwest residents completing refresher training for hazardous waste site work or emergency response report that during the year they have been able to practice the skills learned in health and safety training (58 and 74%, respectively) and changed behavior to do a task more safely (60 and 81% respectively). These actions are likely to be related to lower exposures and hence an improvement in safety and health.

A. Program Title: BIOLOGICAL MONITORING PROGRAM (BMON)
B. Program Director Glenn Talaska, PhD, CIH
C. Program Description

Biological monitoring is perhaps the fastest growing component of occupational exposure assessment. This is evidenced by the relatively recent promulgation of national and bodies to develop standards and exposure recommendations. These include the American Conference of Industrial Hygienists (ACGIH) Biological Monitoring Indices Committee (BEI Committee), the German Commission for the Investigation of Health Hazards of Chemicals Compounds in the Work Area Biological Tolerance Values (BATs), as well as national values in Italy, the Netherlands, Sweden, Taiwan and South Korea. In response to the growing need of biological monitoring practitioners and the direction that some of our research is taking, the University of Cincinnati ERC submitted an ERC supplemental grant request to add a formal Biological Monitoring component to our Education and Research Center in September 2005 to NIOSH. In August 2006, we received an official notice from the National Institute for Occupational Safety and Health (NIOSH) to add the Biological Monitoring Training Program to our curriculum in September 2006.

Biological Monitoring is an emerging technology that utilizes occupational exposure and medical professionals to determine use excreta from the exposed persons to determine the magnitude of their exposure. It potentially includes exposures from all routes and begins to take into account individual differences in absorption, distribution and metabolism that are so elusive when using external levels as the exposure metric. The goal is to better identify persons truly at risk, so their exposures can be reduced (the effectiveness of the exposure intervention can be monitored by an ongoing biological monitoring program) and so disease is prevented. This is an exciting program that represents a "sea-change" from the exposure disease paradigm that we have struggled with for years.

The Biological Monitoring Program has the following program objectives:

1. **To train students in a basic grounding in external and internal methods of exposure assessment for industrial hygiene practice.**
2. **Prepare students to lead in the development, use and evaluation of biological monitoring programs in their industrial hygiene practice.**
3. **Prepare students for careers in research, industry, labor and government.**
4. **To expand the research knowledge base of biological monitoring via the Ph.D. and post-doctorate component**

D. Program Activities and Accomplishments

This program's progress is measured by the participation of the faculty, the external advisory board and research in the training and progress of its students. Dr. Glenn Talaska is a certified industrial hygienist who has published over 100 peer-reviewed papers, most pertaining to biological monitoring. His major interests are in carcinogen biomonitoring and in the development of real time of near real time sensors to estimate exposure and effect. Talaska has been a member of the ACGIH Biological Exposure Indices (BEI) committee since 2000 and since 2003 has been the Vice Chair. Dr. Mary Beth Genter (DABT) provides the toxicology training for students She continues her research program in herbicide toxicology. Dr. Erin Haynes continues to teach the Molecular Epidemiology course and conduct her research in effects of human manganese exposure. All of the

faculty of the program have been active participants in the program evaluation by our external advisors.

The External Advisory Board of the Biomonitoring Component has met twice in the last 13 months. The focus of the latest meeting was student recruitment. This board consists of the following members:

Mark F. Boeniger, PhD, CIH
Consultant

Ralph A. Froehlich, MS, CIH, CSP, QEP
Helix Environmental, Inc.

Mary Beth Genter, Ph.D., DABT
Department of Environmental Health
University of Cincinnati

Erin Haynes, DrPh
Director, Clinical Research Training Program
Epidemiology & Biostatistics Division
Department of Environmental Health
University of Cincinnati

Laura Hildreth, M.S.
Assistant Dean
Office of Research and Graduate Education
College of Medicine
University of Cincinnati

Andy Maier, Ph.D. CIH, DABT
Associate Director
Toxicology Excellence for Risk Assessment

John S. Morawetz, PHS, MS, LTJG
Director
Health and Safety Department
International Chemical Workers Union Council/ UFCW

Alan J. Weinrich, CIH, CET, CAE
National Center for Environmental Assessment
Office of Research and Development
US EPA

Nancy Hopf, the first Ph.D. student in the program has already begun to have an impact on the field. She was recently awarded an ERC Pilot Project Grant for her thesis research. She is preparing a manuscript for publication in *Polycyclic Aromatic* Compounds reviewing occupational exposure and biomarkers in aluminum production plants and she recently completed an investigation of these facilities and found that there was no detectable production of fluorinated PAH.

Research capabilities at collaborating institutions

The BMON has participated in several interesting research initiatives. We collaborated with Jeff Burgess at the University of Arizona to determine the increase in the levels of urinary 1-hydroxypyrene in Native American firefighters in Arizona. The data from this work is being analyzed. We are also conducting a study with Christine Ambrosone (Roswell Park Cancer Institute), Mary Wolfe (Columbia University) and their colleagues investigating whether reported use of hair dyes is related to increases in carcinogen-DNA adduct levels in exfoliated urothelial cells. To date, and approximate 2-fold increase has been seen in women who report hair dye use. Another project is the development of a sensitive HPLC-based assay for organophosphate and carbamate pesticides. This assay promises to increase sensitivity at least 10 fold compared to other assays for these materials and also holds out he promise of both near-real time and sensor based analysis for both environmental and human exposure to these materials.

Research projects completed that had significant trainee involvement

Nancy Hopf joined the program as a Ph.D. student. Nancy worked with NIOSH for several years before joining the program. She is trained as a chemist. Another collaboration we look forward to beginning is an investigation of biomarkers of exposure and effects in a German coke oven. Nancy has played a role in several of these projects as part of her training the BMON. Her thesis project will be investigating the polycyclic aromatic hydrocarbon exposure of working involved in cleaning the holds of oil tankers. She will use biomarkers to estimate exposure and work with our collaborators in Norway to determine if there are health effects at the workers' internal dose levels.

E. Program Products

(refer to the BMON Appendix)

F. Future Plans

The External Advisory Board of the BMON met prior to the beginning of classes to discuss the program. The most important topic was student recruitment. Plans were made to visit several local colleges and recruit top students in Biology and chemistry programs into the BMON. Recruitment trips completed to date include Department of Biology at Wilmington College in Ohio. In addition, the Just Society, a group of Xavier University students in Biology, Chemistry and Physics will be visiting the program in November, 2007.

A. Program: **CONTINUING EDUCATION PROGRAM (CE)**
B. Program Director: **Judy Jarrell, EdD**
C. Program Description:

The ERC Continuing Education Program continued with a very active program during FY06-07. Besides regularly-scheduled course offerings for industrial hygiene, safety, medicine and nursing professionals (approximately 134 courses, with 2,985 trainees), the Program collaborated with a number of state-wide and regional organizations to present learning opportunities through conferences and other events. The CE Program:

1. **Working with representatives of the Veteran's Hospital, the U.S. EPA, the Cincinnati Board of Health, and the Southwest Ohio Regional Medical Response System presented a 1.5-day workshop for first responders which included a talk by Richard Hatchett, MD, Associate Director for Radiation Countermeasures Research & Emergency Preparedness, National Institute for Allergy & Infectious Diseases (formerly on the White House preparedness group).**
2. **The CE Program worked with the Building Environment Council of Ohio by co-sponsoring their Annual Fall Conference in October, 2006;**
3. **The American Society of Safety Engineers and Rodney Simmons, PhD (formerly of the UC ERC faculty) to offer a series of 19 safety courses at the annual ASSE conference in August, 2006;**
4. **The National Healthy Homes Training Center and Network is becoming more active in training, and the CE Program is offering assistance/co-sponsorship for their conferences and practitioner courses which are conducted through the University of Cincinnati academic partner in the network (Bill Menrath, Director);**
5. **The Lead-Safe Renovator and Essential Maintenance practices short courses—a new series of these courses are planned with the Cincinnati Board of health for 2007-08.**
6. **Working with the OSHA Training Institute, the Program presented a "Review for Industrial Hygiene Professionals" 4.5-day course for OSHA personnel in March, 2007 in Chicago.**

The CE program also assisted in the presentation of the annual Pilot Project Symposium in October, 2006 for the ERC. Additionally, Dr. Judy Jarrell, director of the continuing education program of the Cincinnati ERC, was instrumental in the development and delivery of a co-sponsored (UC/ERC Occupational Safety Program and NIOSH) international conference on Nanotechnology held December 4-7, 2006, which was attended by over 460 professionals.

Dr. Jarrell, developed additional training modules for Occupational Medicine and Bio-defense issues for on-line delivery. More modules are planned for development and offering on-line in the next fiscal year. The Blood-borne Pathogens on-line course at the University of Cincinnati continues to be well attended, with over 600 persons completing the course during 2006-07. The Occupational Medicine one-day program (Occupational Medicine for the Primary Care Physician) originally scheduled for May, 2007, are now being developed as a series of six on-line modules.

APPENDIX A
PROGRAM CURRICULA

REQUIRED COURSES FOR COMPREHENSIVE PRACTICE CONCENTRATION, PH.D.

Quarter	Course	Number	Credits
Autumn	Environmental Health Seminar	26-ENV-701	1
Year 1	Principles of Occupational Exposure Assessment	26-EIH-707	3
	Practice in Occupational Exposure Assessment I	26-EIH-741	3
	Programmatic Aspects of Occupational Health & Safety	26-EIH-781	1
	Introduction to Biostatistics	26-BE-787	4
	Identification of Potential Workplace Exposures	26-EIH-904	2
	Occupational Safety Engineering [a]	20-INDS-710	3
	Current Topics in Industrial Hygiene	26-EIH-981	1
			18
Winter	Environmental Health Seminar	26-ENV-702	1
Year 1	Practice in Occupational Exposure Assessment II	26-EIH-742	3
	Introduction to Epidemiology	26-BE-776	3
	Survey of Environmental Toxicology	26-TOX-782	3
	Physical Aspects of the Environment	26-EIH-790	3
	Identification of Potential Workplace Exposures	26-EIH-905	3
	Current Topics in Industrial Hygiene	26-EIH-982	1
			17
Spring	Environmental Health Seminar	26-ENV-703	1
Year 1	Physical & Biological Aspects of Aerosols	26-EIH-743	3
	Evaluation of Workplace Exposures	26-EIH-775	3
	Principles of Ergonomics	26-OSE-792	3
	Current Topics in Industrial Hygiene	26-EIH-983	1
	Electives [b]	----	Var
			15 minimum
Summer [c]			
Autumn	Environmental Health Seminar	26-ENV-701	1
Year 2	Occupational Health, Hygiene and Safety Workshop	26-EIH-819	2
	Teaching Practicum in Environmental Health	26-ENV-725	1 (min)
	Hazardous Materials Management	26-EIH-834	2
	Introduction to Nuclear Engineering and Health	20-NUC-640	3
	Current Topics in Industrial Hygiene	26-EIH-981	1
	Research [d]	26-ENV-891	Var
	Electives	---	Var
			15 minimum
Winter	Environmental Health Seminar	26-ENV-702	1
	Occupational Health, Hygiene and Safety Workshop	26-EIH-820	2
	Workplace Exposures Measurements – follow-up	26-EIH-971	1
	Ethics in Research	26-GNTD-730	1
	Current Topics in Industrial Hygiene	26-EIH-982	1
	Effective Methods of Worker Health and Safety Training	26-EIH-846	2
	Research	26-ENV-891	Var
	Electives	---	Var
			15 minimum

Quarter	Course	Number	Credits
Spring	Environmental Health Seminar	26-ENV-703	1
Year 2	Occupational Health, Hygiene and Safety Workshop	26-EIH-821	2
	Current Topics in Industrial Hygiene	26-EIH-983	1
	Design and Management of Field Studies	26-BE-975	3
	(or)		
	Experimental Design	26-BE-789	4
	Research	26-ENV-891	Var
	Electives	---	Var
			15 minimum
Summer			
Year 3 through Graduation			
Fall			
	Environmental Health Seminar	26-ENV-703	1
	Current Topics in Industrial Hygiene	26-EIH-983	1
	Research	26-ENV-891	var
	Electives		var
Winter			
	Environmental Health Seminar	26-ENV-703	1
	Current Topics in Occupational Hygiene	26-EIH-983	1
	Research	26-ENV-891	var
	Electives		var
Spring			
	Environmental Health Seminar	26-ENV-703	1
	Current Topics in Occupational Hygiene	26-EIH-983	1
	Research	26-ENV-891	var
	(or)		
	Dissertation Research	26-ENV-991	var
	Electives		var

a) Acceptable substitutions for this class are: 20 MINE 779 Safety Engineering and Product Liability (winter quarter) or 20 MINE 621 System Safety I.

b) Choose a minimum of 9 credits from the following list:
- Stress and Cognition/ 15 PSYCH 824 (3)
- Human Biological Monitoring & Biomarkers/ 26 EIH 843 (3)
- Biomechanical & Physiological Aspects of Muscular Activity/ 26 OSE 744 (3)
- Applied Risk Assessment/ 26 TOX 878 (3)
- Basic Principles of Environmental Law/ 20 CEE 657 (3)
- Management of Professionals/ 20 MINE 640 (3) or Occupational Health Management/ 26 OCCM 748 (2)
- Methods to Obtain Complete Occupational Histories/ 26 EIH 845 (2)
- Survey of Public Health/ 26 EHS 746 (3) (offered only in academic years beginning with even numbers)
- System Safety I/ 20 MINE 621 (3) (not if taken in place of 20 INDS 771)
- Respirators & Respiratory Protection/ 26 OCCM 854 (2)
- Basics of Occupational Medicine/ 26 OCCM 786 (2) (not offered 2005-06)
- Basics of Environmental Medicine/ 26 OCCM 987 (2) (offered only in academic years beginning with odd number; not offered 2005-06)

c) A summer of internship is recommended for students with no prior EOH work experience. No course credit is given.

d) A form is available in Graduate Studies office must be completed and returned to Graduate Studies. Please refer to the specific sequence of steps for the qualifying process and the completion of the dissertation, contained in this document.

The student is expected to take all courses listed above. Any required course may be waived with the permission of the instructor and advisor when the student has had the equivalent course content; the graduate studies office has a form to document these approvals. Another course with equivalent credit hours must then be selected. The academic advisor will assist in this process.

REQUIRED COURSES FOR
COMPREHENSIVE PRACTICE CONCENTRATION, MS

Quarter	Course	Number	Credits
Autumn	Environmental Health Seminar	26-ENV-701	1
Year 1	Principles of Occupational Exposure Assessment	26-EIH-707	3
	Practice in Occupational Exposure Assessment I	26-EIH-741	3
	Programmatic Aspects of Occupational Health & Safety	26-EIH-781	1
	Introduction to Biostatistics	26-BE-787	4
	Identification of Potential Workplace Exposures	26-EIH-904	2
	Occupational Safety Engineering [a]	20-INDS-710	3
	Current Topics in Occupational Hygiene	26-EIH-981	1
			18
Winter	Environmental Health Seminar	26-ENV-702	1
Year 1	Practice in Occupational Exposure Assessment II	26-EIH-742	3
	Introduction to Epidemiology	26-BE-776	3
	Survey of Environmental Toxicology	26-TOX-782	3
	Physical Aspects of the Environment	26-EIH-790	3
	Identification of Potential Workplace Exposures	26-EIH-905	3
	Current Topics in Occupational Hygiene	26-EIH-982	1
			17
Spring	Environmental Health Seminar	26-ENV-703	1
Year 1	Physical & Biological Aspects of Aerosols	26-EIH-743	3
	Evaluation of Workplace Exposures	26-EIH-775	3
	Principles of Ergonomics	26-OSE-792	3
	Current Topics in Occupational Hygiene	26-EIH-983	1
	Electives [b]	----	Var
			15 minimum
Summer [c]			
Autumn	Environmental Health Seminar	26-ENV-701	1
Year 2	Occupational Health, Hygiene and Safety Workshop	26-EIH-819	2
	Teaching Practicum in Environmental Health	26-ENV-725	1 (min)
	Hazardous Materials Management	26-EIH-834	2
	Introduction to Nuclear Engineering and Health Physics	20-NUC-640	3
	Current Topics in Occupational Hygiene	26-EIH-981	1
	Master's Thesis Research [d]	26-ENV-791	Var
	Electives	---	Var
			15 minimum
Winter	Environmental Health Seminar	26-ENV-702	1
	Occupational Health, Hygiene and Safety Workshop	26-EIH-820	2
	Workplace Exposures Measurements - follow-up	26-EIH-971	1
	Ethics in Research	26-GNTD-730	1
	Current Topics in Occupational Hygiene	26-EIH-982	1
	Effective Methods of Worker Health and Safety Training	26-EIH-846	2
	Master's Thesis Research	26-ENV-791	Var
	Electives	---	Var
			15 minimum

Quarter	Course	Number	Credits
Spring	Environmental Health Seminar	26-ENV-703	1
Year 2	Occupational Health, Hygiene and Safety Workshop	26-EIH-821	2
	Current Topics in Occupational Hygiene	26-EIH-983	1
	Master's Thesis Research	26-ENV-791	Var
	Electives	---	Var 15 minimum

a) Acceptable substitutions for this class are: 20 MINE 779 Safety Engineering and Product Liability (winter quarter) or 20 MINE 621 System Safety 1.

b) Choose a minimum of 9 credits from the following list:

- Stress and Cognition/ 15 PSYCH 824 (3)
- Human Biological Monitoring & Biomarkers/ 26 EIH 843 (3)
- Biomechanical & Physiological Aspects of Muscular Activity/ 26 OSE 744 (3)
- Applied Risk Assessment/ 26 TOX 878 (3)
- Basic Principles of Environmental Law/ 20 CEE 657 (3)
- Management of Professionals/ 20 MINE 640 (3) or Occupational Health Management 26 OCCM 748 (2)
- Methods to Obtain Complete Occupational Histories/ 26 EIH 845 (2)
- Survey of Public Health/ 26 EHS 746 (3) (offered only in academic years beginning with even numbers)
- System Safety I/ 20 MINE 621 (3) (not if taken in place of 20 INDS 771)
- Respirators & Respiratory Protection/ 26 OCCM 854 (2)
- Basics of Occupational Medicine/ 26 OCCM 786 (2) (not offered 2005-06)
- Basics of Environmental Medicine/ 26 OCCM 987 (2) (offered only in academic years beginning with odd number; not offered 2005-06)

c) A summer of internship is recommended for students with no prior EOH work experience. No course credit is given.

d) A form is available in Graduate Studies office must be completed and returned to Graduate Studies.

The student is expected to take all courses listed above. Any required course may be waived with the permission of the instructor and advisor when the student has had the equivalent course content; the graduate studies office has a form to document these approvals. Another course with equivalent credit hours must then be selected. The academic advisor will assist in this process.

REQUIRED COURSES FOR
OCCUPATIONAL SAFETY AND ERGONOMICS

Quarter	Course	Number	Credits
Autumn	Environmental Health Seminar	26-ENV-701	1
Year 1	Practice in Occupational Exposure Assessment I	26-EIH-741	3
	Identification of Potential Workplace Exposures	26-EIH-904	2
	Introduction to Biostatistics	26-BE-787	4
	Principles of Occupational Exposure Assessment	26-EIH-707	3
	Current Topics in Industrial Hygiene	26-EIH-981	1
			16
Winter	Environmental Health Seminar	26-ENV-702	1
	System Safety I	20- MINE-621	3
	Safety Engineering & Product Liability	20- INDS-779	3
	Physical Aspects of Environment	26-EIH-790	3
	Identification of Potential Workplace Exposures	26-EIH-905	3
	Introduction to Epidemiology	26-BE-776	3
	Current Topics in Industrial Hygiene	26-EIH-982	1
			17
Spring	Environmental Health Seminar	26-ENV-703	1
	System Safety II	26-MINE-622	3
	Principles of Ergonomics	26-OSE-792	3
	Introduction to Measurement Techniques in Ergonomics	26- OSE-748	3
	Mgt. of Professionals	20-MINE-640	3
	Current Topics in Industrial Hygiene	26-EIH-983	1
	Electives[a]	-----	Var
			15 minimum
Summer	Ergonomic Internship [b]		
	Environmental Health Seminar	26-ENV-701	1
Autumn	Health Physics	20- NUC-640	3
Year 2	Occupational Health Hygiene and Safety Workshop	26-ENV-819	1
	Hazardous Materials Management	26-EIH-834	2
	Biomechanical and Physiological Aspects of Muscular activities	26-OSE-744	3
	Current Topics in Industrial Hygiene	26-EIH-981	1
	Master Thesis Research[c]	26-ENV-791	Var
	Electives	------	Var
			15 minimum
Winter	Environmental Health Seminar	26-ENV-702	1
Year 2	Teaching Practicum	26-EIH-725	1-3
	Occupational. Health, Hygiene and Safety Workshop	26-ENV-820	Var
	Ethics in Research	26-GNTD-730	2
	Current Topics in Industrial Hygiene	26-EIH-982	1
	Master Thesis Research	26-ENV-791	1
	Electives	------	Var
			15 minimum

Quarter	Course	Number	Credits
Spring	Environmental Health Seminar	26-ENV-703	1
Year 2	Occupational Health, Hygiene and Safety Workshop	26-EIH-821	2
	Current Topics in Industrial Hygiene	26-EIH-983	1
	Master Thesis Research	26-ENV-791	Var
	Electives	---------	Var 15 minimum

a) Student is expected to take all course above and to choose a minimum of 9 credits from the following list:

- Introduction to Biomechanics/ 20-MECH-685 (3)
- Organizational Behavior & Theory / 22-MGMT-711 (4)
- Basics of Occupational Medicine/26-OCCM-786 (2) (offered only in academic years beginning with odd numbers; not offered 2005-06)
- Occupational Safety / 20-INDS-520/710 (3)
- Human Factors Analysis / 20-INDS-624 (3)
- Regression Analysis / 26-BE-788 (3)
- Stress and Cognition / 15-PSYCH-824 (3)
- Basics of Environmental Medicine /26-OCCM-987 (2) (offered only in academic years beginning with odd numbers; not offered 2005-06)
- Nonparametric Statistics / 26-BE-789 (3)
- Human Body Dynamics / 20-MECH-687 (3)
- Human Factors Design / 20-INDS-630 (3)
- Effective Methods of Worker Health and Safety Training/ 26-EIH-846 (2)
- Practice in Occupational Exposure Assessment II/ 26-EIH-742 (3)
- Evaluation of Workplace Exposures/ 26-EIH-775 (3)

b) Students are expected to work as an occupational ergonomic/safety intern or work on his/her thesis during the summer between year 1 and 2. See your advisor for details.

c) A form available in Graduate Studies office must be completed and returned to Graduate Studies.

The student is expected to take all courses listed above. Any required course may be waived with the permission of the instructor and advisor when the student has had the equivalent course content; the graduate studies office has a form to document these approvals. Another course with equivalent credit hours must then be selected. The academic advisor will assist in this process.

MSN in Occupational Health Nursing, Full-Time Program Plan

Autumn	Winter	Spring
Quarter I	*Quarter II*	*Quarter III*
26EIH819* Occupational Health, Hygiene. & Safety Workshop 2 credits 29NURS807 Health Promotion, Risk Reduction 3 credits 29NURS819 Data Base Management Practicum 2 credits = 6 practicum hrs. 29ANCH810 Introduction to Occupational Health Nursing 3 credits 29ANCH851 Epidemiology 3 credits	26EIH820* Occupational Health, Hygiene. & Safety Workshop 2 credits 26TOX782* Survey of Environmental Toxicology 3 credits 29NURS814 Health Planning 3 credits 29ANCH811 Managing Common Occupational & Environmental Diseases and Injuries 3 credits 29NURS804 Statistical Analysis for ANP 3 credits	26EIH821* Occupational Health, Hygiene. & Safety Workshop 2 credits 29NURS805 Research for ANP 3 credits 29NURS816 Human Resources Management 3 credits 29ANCH812 Occupational Health Nursing Practicum 2 credits = 6 practicum hrs. 29ANCH813 Managing Health & Safety Prog in the Wkpl 3 credits
Credits/Quarter: 13 Contact Hours: 17	14 14	13 17
Quarter V	*Quarter VI*	
20INDS710* Occupational Safety 3 credits 26EIH707* Prin of Occupational Exposure Assessment 3 credits 29NURS817 Organization & Management 3 credits 29ANCH814 OHN Practicum 3 credits = 9 practicum hrs. 29NURS808 Health Care Policy & Finance 2 credits	29NURS815 Financial Management 3 credits 29NURS832 Master's Capstone 2 credits 29ANCH815 Occupational Health Nursing Practicum 5 credits = 15 practicum hrs.	*Interdisciplinary courses
Credits/Quarter: 14 Contact Hours: 20	10 20	

TOTAL CREDIT HOURS REQUIRED = 64

Approved: FacOrg 2/25/97, Grad Council6/10/97, Revised 9/13/00, 6/2/03, 6/04, 7/24/06
T:Program_MSN/ MSN__Schema//Occupational Health Schema

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Appendix A
University of Cincinnati
PhD in Nursing Curriculum Schema

Year 1	Autumn		Winter		Spring		Other
	Pro-seminar I	2 credits	Pro-seminar II	1 credit seminar, 2 credits lab	Pro-seminar III	2 credits seminar, 2 credits lab	* Preliminary Exam --Summer after Year 1
	Nursing Inquiry I	4 credits	Nursing Inquiry II	4 credits	Nursing Inquiry III	5 credits	
	Introduction to Quantitative Methods	3 credits	Introduction to Qualitative Methods	3 credits			
	Statistics	3 credits	Statistics	3 credits	Statistics	3 credits	
Total Credits	**12 credits**		**13 credits**		**12 credits**		
Year 2	Autumn		Winter		Spring		
	Pro-seminar IV	1 credit	Proposal Seminar I	3 credits	Proposal Seminar II	3 credits	** Candidacy Exam: Defense of Proposal -- Summer after Year 2 or Autumn Year 3
	Series of required courses can be taken during any quarter during Year 2 or can be taken prior to Year 1: Advanced Methods—3 credits Advanced Design—3 credits Health Services/Health Policy—3 credits Concentration Courses—21 credits (students will take at least 6 credits in concentration at UC CON)						
Total Credits	**13 credits**		**12 credits**		**12 credits**		
Year 3	Autumn		Winter		Spring		
	Dissertation Seminar	1 credit	Dissertation Seminar	1 credit			
	Dissertation	10 credits	Dissertation	10 credits			
Total Credits	**11 credits**		**11 credits**				

Occupational Medicine Residency Program
Required and Recommended Elective Courses

University of Cincinnati Occupational Medicine Residency Program
Sample Educational Curriculum Plan

REQUIRED COURSES	
Basics of Occupational Medicine (Ross) (26-OCCM-786)	Fall quarter in even-numbered years, 2 credits. A survey of various occupational medicine topics for physicians, industrial hygienists, nurses, and other health professionals.
Basics of Environmental Medicine (Ross) (26-OCCM-987)	Fall quarter in odd-numbered years, 2 credits. A survey of pertinent topics, research and case studies in environmental medicine.
Design and Management of Field Studies (LeMasters) (26-BE-975)	Spring quarter, 4 credits. This course provides an opportunity to acquire the knowledge and skills to formulate a research problem, write a research proposal, and evaluate research. Taken in the first year, it is recommended to have thesis ideas ready prior to taking this class.
Environmental Health Seminar (26-ENV-701/702/703)	Fall, winter, and spring quarters, 1 credit for each quarter. This is the departmental grand rounds and the presenter is typically a noted national authority in one of the key areas of environmental health.
Principles of Occupational Exposure Assessment (Talaska) (26-EIH-707)	Fall quarter, 3 credits. This course consists of lectures and demonstrations concerning occupational and environmental problems. Industrial hygiene principles and practices area covered.
Introduction to Biostatistics (Buncher) (26-BE-787)	Fall quarter, 4 credits. This course covers descriptive statistics, probability distributions, estimation, types of error, significance level, test of hypothesis, sample size, correlation, linear regression, and non-parametric methods.

Fall Year 1	Winter Year 1	Spring Year 1	Summer Year 1	Fall Year 2
Env Health Seminar Occ H & S Workshop Basics of Occ Med Prin of Occ Exposure PFTs Intro to Biostats SAS Master's Thesis	Env Health Seminar Intro to Epidemiology Occ H & S Workshop Medicolegal Skills Survey Toxicology Master's Thesis	Env Health Seminar Occ H & S Workshop Des Field Studies Principles of Ergonomics Survey Toxicology Master's Thesis	Mol Epi Master's Thesis	Env Health Seminar Basics of Env Med ID Pot Work Exp Master's Thesis
		Gen Occ Med Clinic	Practicum Rotations Clinical Elective	Gen Occ Med Clinic Practicum Rotation

Winter Year 2	Spring Year 2	Summer Year 2
Env Health Seminar Lung & the Environment Master's Thesis	Env Health Seminar Occ Health Mgt Prev Med Master's Thesis	
Occ Pulm Clinic Practicum Rotation	Occ Derm Clinic Clinical Elective	Practicum Rotations Gen Occ Med Clinic

Practicums	Clinical Electives
Bethesda Care Hillenbrand NIOSH OSHA (local) OSHA (federal) Proctor & Gamble University Health Services Additional options	Allergy Hand Surgery Ophthalmology Orthopedics PM&R Radiology Sports Medicine Toxicology Additional options

OSHE REQUIRED MS CORE COURSES AND ASSIGNED FACULTY*

Safety Engineering Courses	**Faculty**
Occupational Safety Engineering (20-INDS-710)	Huston/Shell
System Safety Engineering I (20-MINE-621)	Stuebbe
Construction Health and Safety (20 CEE 698); or	Salem
Introduction to Nuclear Engineering and Health Physics (20 NUC 640)	Spitz
Ergonomics Courses	
Human Factors (20 INDS 624); or	Genaidy
Ergonomics (26-OSE-792)	Bhattacharya
Interdisciplinary Project Courses	
Occupational Health, Hygiene and Safety Workshop (26-EIH-819, 820, 821)	MINE, OHN & EH faculty
Industrial Hygiene Course	
Principles of Occupational Exposure Assessment (26-EIH-707)	Talaska
Occupational Medicine Courses	
Basics of Occupational Medicine (26 OCCM 786); or	Ross
Basics of Environmental Medicine (26 OCCM 987)	Ross
Research Courses	
Experimental Design for Thesis Option (26-BE-789 or 22-QA-720); or	EH or College of Business
Regression Analysis for Non-Thesis Option (26-BE-788 or 22-QA-876)	Faculty

*27 Credit Hours

TABLE 3: COMMONLY SELECTED ELECTIVE COURSES FOR OCCUPATIONAL SAFETY AND HEALTH ENGINEERING

Course Title and Number

AUTUMN QUARTER

Introduction to SAS Programming (26-BE-778)
Emerging Health Issues (29-ANCH-856)
Biomechanics (20-INDS-752 or 26-OSE-744)
Nuclear Engineering and Health Physics (20 NUC 640)
Radiobiology I (26 MED 941)
Acoustics I (20 MECH 666)

WINTER QUARTER

Safety Engineering and Product Liability (20-MINE-779)
Tissue Biomechanics (20-MECH-686)
Introduction into Epidemiology (26-BE-776)
Survey of Environmental Toxicology (26-TOX-782)
Radiobiology II (26 MED 942)
Mechanical Vibrations II (20 MECH 662)

SPRING QUARTER

System Safety Engineering II (20-MINE-622)
Management of Professionals (20-MINE-640)
Human Body Dynamics (20-MINE-687)
Probability Risk Assessment (20-NUC-680)

SUMMER QUARTER

Safety Engineering Design and Management (20-MINE-780)
TBA
Engineering Information Research (20 ENGR 602)

TABLE 4: OCCUPATIONAL SAFETY AND HEALTH ENGINEERING MATHEMATICS/RESEARCH ELECTIVES

Course Title	Course Number	Credit Hours
AUTUMN QUARTER		
Applied Statistical Inference	15-MATH-531	3
Linear Models and Multivariate Analysis	15-MATH-613	4
Intermediate Analysis of Variance ♦	26-BE-777	3
Introduction to Biostatistics	26-BE-787	4
Rates and Proportions ♦	26-BE-797	3
Fourier Transform Techniques	20-MECH-660	3
WINTER QUARTER		
Applied Regression Analysis *	15-MATH-532	3
SAS Programming	15-MATH-534	3
Linear Programming	15-MATH-524	3
Linear Models and Multivariate Analysis	15-MATH-614	4
Regression Analysis*	26-BE-788	4
Intro to SAS Programming	26-BE-778	2
SPRING QUARTER		
Analysis of Variance	15-MATH-533	3
Linear Programming	15-MATH-525	3
Linear Models and Multivariate Analysis	15-MATH-615	4
Experimental Design ♦	26-BE-789	4
Survey Sampling ♦	26-BE-794	3
Nonparametric Statistics ♦	26-BE-795	3
Logistic Regression	26-BE-871	3

♦ *Course offered alternate years*

* *May have been taken in the OSHE core course requirement*

TABLE 5: PROGRAM OF STUDY, MASTER OF SCIENCE – THESIS OPTION (Occupational Safety and Health Engineering)

Course Title and Number		Credit Hours
AUTUMN QUARTER		
*Occupational Safety Engineering (20-INDS-710)		3
*Basics of Occupational Medicine (26 OCCM 786) or (26 OCCM 987)		2
*Occupational Health, Hygiene and Safety Workshop (26-EIH-819)		2
*Principles of Occupational Exposure Assessment (26-EIH-707)		3
Mathematics or Technical Elective		3
	ST	**13**
WINTER QUARTER		
*System Safety Engineering I (20-MINE-621)		3
*Occupational Health, Hygiene and Safety Workshop (26-EIH-820)		2
Mathematics or Technical Elective		3
MS Research (20-MINE-871)		4
	ST	**12**
SPRING QUARTER		
*Construction Health and Safety (20 CEE 698)		3
*Ergonomics (20-INDS-624) or (26-OSE-792)		3
*Occupational Health, Hygiene and Safety Workshop (26-EIH-821)		2
*Experimental Design (26-BE-789) or (22-QA-720)		4
MS Research (20-MINE-871)		1
	ST	**13**
SUMMER QUARTER		
Thesis (20-MINE-800)		10
	ST	**10**
TOTAL MINIMUM CREDITS		**48**

* Indicate MS core courses, 27 credit hours

TABLE 6: PROGRAM OF STUDY, MASTER OF SCIENCE –NON-THESIS OPTION (Occupational Safety and Health Engineering)

Course Title and Number	Credit Hours
AUTUMN QUARTER	
*Occupational Safety Engineering (20-INDS-710)	3
*Basics of Occupational Medicine (26 OCCM 786) or (26 OCCM 987)	
2 *Occupational Health, Hygiene and Safety Workshop (26-EIH-819)	
2	
*Principles of Occupational Exposure Assessment (26-EIH-707)	3
Mathematics or Technical Elective	6
ST	**16**
WINTER QUARTER	
*System Safety Engineering I (20-MINE-621)	3
*Occupational Health, Hygiene and Safety Workshop (26-EIH-820)	2
*Regression Analysis (26-BE-788) or (22-QA-722)	4
Math or Technical Elective	6
ST	**15**
SPRING QUARTER	
*Construction Health and Safety (20 CEE 698)	
3	
*Ergonomics (20-INDS-630) or (26-OSE-792)	3
*Occupational Health, Hygiene and Safety Workshop (26-EIH-821)	2
Mathematics or Technical Electives	6
ST	**14**
SUMMER QUARTER	
Special Topic-Project (20-MINE-870)	6
ST	**6**
TOTAL MINIMUM CREDITS	**51**

* Indicate MS core courses, 27 credit hours

TABLE 7: REQUIREMENTS FOR ADMISSION INTO THE MASTER OF SCIENCE PROGRAM FOR THOSE STUDENTS WITHOUT A BS DEGREE IN ENGINEERING

All applicants must fulfill general University and Departmental admission requirements as specified in "A Manual for the Guidance of Graduate Students." Applicants possessing non-engineering baccalaureate degrees are evaluated on their individual merits. For engineering admission, the non-engineering baccalaureate degree holder will have completed or will complete as make-up requirements the following minimum number of courses or their equivalent:

Course*	Number	Credit Hrs
Differential Equations (plus pre-reqs.)	20-MATH-273	5
General Physics I, II, III	15-PHYS-201, 202, 203	12
General Physics Lab I, II, III	15-PHYS-211, 212, 213	3
First Year Chemistry	15-CHEM-101, 102	8
Mechanics I, II	20-ENFD-101, 102	6
Computer Language	20-ENFD-111	3
Graphics Fundamentals	20-ENFD-250	3
Basic Electric Circuit Analysis	20-ENFD-371	3
Nature and Properties of Materials	20-ENFD-376	3
Basic Strength of Materials	20-ENFD-375	3
Basic Thermodynamics	20-ENFD-382	3
Basic Fluid Mechanics	20-ENFD-383	3
Basic Heat Transfer	20-ENFD-385	3
Four upper level undergraduate courses	TBD	12

*Equivalent courses are also available in the UC College of Applied Science and/or the McMicken College of Arts and Sciences.

REQUIRED COURSES FOR
HAZARDOUS SUBSTANCES CONCENTRATION, MS

Quarter	Course	Number	Credits
Autumn	Environmental Health Seminar	26-ENV-701	1
Year 1	Principles of Occupational Exposure Assessment	26-EIH-707	3
	Practice in Occupational Exposure Assessment I	26-EIH-741	3
	Programmatic Aspects of Occupational Health & Safety	26-EIH-781	1
	Introduction to Biostatistics	26-BE-787	4
	Identification of Potential Workplace Exposures	26-EIH-904	2
	Occupational Safety Engineering[a]	20-INDS-710	3
	Current Topics in Occupational Hygiene	26-EIH-981	1
			18
Winter	Environmental Health Seminar	26-ENV-702	1
Year 1	Practice in Occupational Exposure Assessment II	26-EIH-742	3
	Introduction to Epidemiology	26-BE-776	3
	Survey of Environmental Toxicology	26-TOX-782	3
	Physical Aspects of the Environment	26-EIH-790	3
	Identification of Potential Workplace Exposures	26-EIH-905	3
	Current Topics in Occupational Hygiene	26-EIH-982	1
			17
Spring	Environmental Health Seminar	26-ENV-703	1
Year 1	Physical & Biological Aspects of Aerosols	26-EIH-743	3
	Human Biological Monitoring & Biological Markers	26-EIH-843	3
	Evaluation of Workplace Exposures	26-EIH-775	3
	Principles of Ergonomics	26-OSE-792	3
	Current Topics in Occupational Hygiene	26-EIH-983	1
	Electives[b]	---	Var
			15 minimum
Summer[c]			
Autumn	Environmental Health Seminar	26-ENV-701	1
Year 2	Teaching Practicum in Environmental Health	26-ENV-725	1 (min)
	Occupational Health, Hygiene and Safety Workshop	26-EIH-819	2
	Hazardous Materials Management	26-EIH-834	2
	Introduction to Nuclear Engineering and Health Physics	20-NUC-640	3
	Current Topics in Occupational Hygiene	26-EIH-981	1
	Master's Thesis Research[d]	26-ENV-791	Var
	Electives	---	Var
			15 minimum
Winter	Environmental Health Seminar	26-ENV-702	1
Year 2	Workplace Exposure Measurements – follow-up	26-EIH-971	1
	Occupational Health, Hygiene and Safety Workshop	26-EIH-820	2
	Ethics in Research	26-GNTD -730	1
	Current Topics in Occupational Hygiene	26-EIH-982	1
	Effective Methods of Worker Health and Safety Training	26-EIH-846	2
	Master's Thesis Research	26-ENV-791	Var
	Electives	---	Var
			15 minimum

Quarter	Course	Number	Credits
Spring Year 2	Environmental Health Seminar	26-ENV-703	1
	Occupational Health, Hygiene and Safety Workshop	26-EIH-821	2
	Applied Risk Assessment	26-TOX-878	2
	Current Topics in Occupational Hygiene	26-EIH-983	1
	Master's Thesis Research	26-ENV-791	Var
	Electives	---	Var
			15 minimum

a) Acceptable substitutions for this class are: 20 MINE 779 Safety Engineering and Product Liability (winter quarter) or 20 MINE 621 System Safety 1.

b) Choose a minimum of 9 credits from the following list:

- Basics of Environmental Medicine/ 26 OCCM 987 (2) (offered only in academic years beginning with odd number; not offered 2005-06)
- Biomechanical & Physiological Aspects of Muscular Activity/ 26 OSE 744 (3)
- Basics of Occupational Medicine/ 26 OCCM 786 (2) (not offered 2005-06)
- Basic Principles of Environmental Law/ 26 CEE 657 (3)
- Management of Professionals/ 20 MINE 640 (3) or Occupational Health Management (2) 26 OCCM 748
- Stress and Cognition/ 15 PSYCH 824 (3)
- Methods to Obtain Complete Occupational Histories/ 26 EIH 845 (2)
- Survey of Public Health/ 26 EHS 746 (3) (offered only in academic years beginning with even number)
- System Safety I / 20 MINE 621 (3)
- Respirators & Respiratory Protection/ 26 OCCM 854 (2)
- GIS Planning Applications/ 23 PLAN 681 (4)
- Introduction to GIS Systems for Planners/ 23 PLAN 780 (4)

c) A summer internship is recommended for students with no prior EOH work experience. No course credit is given.

d) A form available in Graduate Studies office must be completed and returned to Graduate Studies.

The student is expected to take all courses listed above. Any required course may be waived with the permission of the instructor and advisor when the student has already had the equivalent course content; the graduate studies office has a form to document these approvals. Another course with equivalent credit hours must then be selected. The academic advisor will assist in this process.

BIOLOGICAL MONITORING CONCENTRATION

PhD Course Requirements

Course Title/ Number	Cr. Hrs.
Autumn	
Environmental Health Seminar 26-ENV-701	(1)
Principles of Occupational Exposure Assessment 26-EIH-707	(3)
Practice in Occupational Expsosure Assessment I 26-EIH-741	(3)
Programmatic Aspects of Occupational Health & Safety 26-EIH-781	(1)
Introduction to Biostatistics 26-BE-787	(4)
Identification of Potential Workplace Exposures 26-EIH-904	(2)
Current Topics in Occupational Hygiene 26-EIH-981	(1)
Academic Conduct	(0)
Environmental Health Special Topics	(2)
Winter	
Environmental Health Seminar 26-ENV-702	(1)
Practice of Occpational Exposure Assessment II 26-EIH-742	(3)
Introduction to Epidemiology 26-BE-776	(3)
Literature of Biological Monitoring 26-EIH-791	(1)
Physical Aspects of the Environment 26-EIH-790	(3)
Identification of Potential Workplace Exposures 26-EIH-905	(3)
Current Topics in Occupational Hygiene 26-EIH-982	(1)
Environmental Genetics and Molecular Toxicology (EGMT) 26-TOX-782	(3)
Spring	
Environmental Health Seminar 26-ENV-703	(1)
Physical and Biological Aspects of Aerosols 26-EIH-743	(3)
Human Biological Monitoring 26-EIH-791	(3)
Evaluation of Workplace Exposures 26-EIH-775 (P)	(3)
Principles of Ergonomics 26-OSE-792	(3)
Current Topics in Occupations Hygiene 26-EIH-983	(1)
Applied Risk Assessment 26-TOX-878	(3)
Literature of Biological Monitoring 26-EIH-791	(1)
Electives (various)	
Autumn	
Environmental Health Seminar 26-ENV-701	(1)
Occupational Health, Hygiene & Safety Workshop/Team 25-EIH-819	(1)
Teaching Practicum in Environmental Health 26-ENV-725	(2)
Hazardous Wasted Management 26-EIH-834	(2)
Introduction to Nuclear Engineering & Health Physics 20-NUC-640	(3)
Current Topics in Occupational Hygiene 26-EIH-981	(1)
Intro. To SAS Programming 26-BE-778	(2)
Research 26-ENV-891 (various)	
Electives (various)	
Winter	
Environmental Health Seminar 26-ENV-702	(1)
Occupational Health, Hygiene & Safety Workshop/Team 25-EIH-820	(2)
Ethics in Research 26-GNTD-730	(1)
Current Topics in Occupational Hygiene 26-EIH-982	(1)

Effective Methods of Worker Health and Safety Training 26-EIH-846	(2)
Special topics (air pollution) 26-EIH-820	(2)
Methods to Obtain Complete Occupational Histories 26-EIH-845	(2)
Literature of Biological Monitoring 26-EIH-791	(1)
Research 26-ENV-891 (various)	
Electives (various)	
Spring	
Environmental Health Seminar 26-ENV-703	(1)
Occupational Health, Hygiene & Safety Workshop/Team 26-EIH-821	(2)
Current Topics in Occupational Hygiene 26-EIH-983	(1)
Molecular Epidemiology and Biomarkers 26-EIH-975	(3)
Literature of Biological Monitoring 26-EIH-791	(1)
Research 26-ENV-891 (various)	
Research 26-ENV-991 (various)	
Electives (various)	
Electives (Minimum of 9 credits from the following)	
Stress and Cognition 15-PSYCH-824	(3)
Occupational Safety Engineering 20-INDS-710	(3)
Biomechanical & Psysiological Aspects of Muscular Activity 26-OSE-744	(3)
Basics of Occupational Medicine 26-OCCM-854	(2)
Basic Principles of Environmental Law 20-CEE-657	(3)
Management of Professionals 20-MINE-640	(3)
OR Occupational Health Management 26-OCCM-748	(2)
Basics of Environmental Medicine 26-OCCM-987	(2)
Survey of Public Health 26-EHS-746	(3)
System Safety I 20-MINE-621	(3)
Respirators & Respiratory Protection 26-OCCM-854	(2)
Genetics of Complex Diseases 26-BE-868 (falls on even years)	(3)
Workplace Exposure Measurements 26-EIH-971	(1)

MS BIOLOGICAL MONITORING CONCENTRATION

Course Title/ Number	Cr. Hrs.
Autumn	
Environmental Health Seminar 26-ENV-701	(1)
Principles of Occupational Exposure Assessment 26-EIH-707	(3)
Practice in Occupational Expsosure Assessment I 26-EIH-741	(3)
Programmatic Aspects of Occupational Health & Safety 26-EIH-781	(1)
Introduction to Biostatistics 26-BE-787	(4)
Identification of Potential Workplace Exposures 26-EIH-904	(2)
Current Topics in Occupational Hygiene 26-EIH-981	(1)
Academic Conduct	0
Environmental Health Special Topics	(2)
Winter	
Environmental Health Seminar 26-ENV-702	(1)
Practice of Occpational Exposure Assessment II 26-EIH-742	(3)
Introduction to Epidemiology 26-BE-776	(3)
Literature of Biological Monitoring 26-EIH-791	(1)
Physical Aspects of the Environment 26-EIH-790	(3)
Identification of Potential Workplace Exposures 26-EIH-905	(3)
Current Topics in Occupational Hygiene 26-EIH-982	(1)
Environmental Genetics and Molecular Toxicology (EGMT) 26-TOX-782	(3)
Spring	
Environmental Health Seminar 26-ENV-703	(1)
Physical and Biological Aspects of Aerosols 26-EIH-743	(3)
Human Biological Monitoring 26-EIH-791	(3)
Evaluation of Workplace Exposures 26-EIH-775 (P)	(3)
Literature of Biological Monitoring 26-EIH-791	(1)
Current Topics in Occupations Hygiene 26-EIH-983	(1)
Electives (various)	(3)
Autumn	
Environmental Health Seminar 26-ENV-701	(1)
Occupational Health, Hygiene & Safety Workshop/Team 25-EIH-819	(1)
Teaching Practicum in Environmental Health 26-ENV-725	(2)
Hazardous Waste Management 26-EIH-834	(2)
Introduction to Nuclear Engineering & Health Physics 20-NUC-640	(3)
Current Topics in Occupational Hygiene 26-EIH-981	(1)
Master's Thesis Research 26-ENV-791 (various)	
Electives (various)	
Winter	
Environmental Health Seminar 26-ENV-702	(1)
Occupational Health, Hygiene & Safety Workshop/Team 25-EIH-820	(2)
Ethics in Research 26-GNTD-730	(1)
Current Topics in Occupational Hygiene 26-EIH-982	(1)
Effective Methods of Worker Health and Safety Training 26-EIH-846	(2)
Special topics (air pollution) 26-EIH-820	(2)
Literature of Biological Monitoring 26-EIH-791	(1)
Master's Thesis Research 26-ENV-791 (various)	(2)
Electives (various)	
Spring	

Environmental Health Seminar 26-ENV-703	(1)
Occupational Health, Hygiene & Safety Workshop/Team 26-EIH-821	(2)
Current Topics in Occupational Hygiene 26-EIH-983	(1)
Molecular Epidemiology and Biomarkers 26-EIH-975	(3)
Literature of Biological Monitoring 26-EIH-791	(1)
Master's Thesis Research 26-ENV-791 (various)	

Electives (Minimum of 9 credits from the following)

Stress and Cognition 15-PSYCH-824	(3)
Occupational Safety Engineering 20-INDS-710	(3)
Biomechanical & Psysiological Aspects of Muscular Activity 26-OSE-744	(3)
Basics of Occupational Medicine 26-OCCM-786	(2)
Basic Principles of Environmental Law-20-CEE-657	(3)
Management of Professionals 20-MINE-640	(3)
Occupational Health Management 26-OCCM-748	(2)
Basics of Environmental Medicine 26-OCCM-987	(2)
Survey of Public Health 26-EHS-746	(3)
System Safety I 20-MINE-621	(3)
Respirators & Respiratory Protection 26-OCCM-854	(2)
Applied Risk Assessment 26-TOX-878	(3)
Introduction to SAS Programming 26-BE-778	(2)
Genetics of Complex Diseases 26-BE-868 (falls on even years)	(3)
Principles of Ergonomics 26-OSE-792	(3)
Methods To Obtain Complete Occupational Histories 26-EIH-845	(2)
Workplace exposure Measurements 26-EIH-971	(1)

APPENDIX B
PUBLICATIONS BY PROGRAM AREA

EOH PUBLICATIONS AND PRESENTATIONS

Adebamowo, E. O., Clark, C. S., Roda, S., Agbede, O. A., Sridhar, M. K. C., Ademamowo, C. A. (2007), Lead Content of Dried Films of Domestic Paint Currently Sold in Nigeria, *Sci Total Environ.* 388: 116-120.

Bhattacharya, A., Shukla, R., Auyang, E.* Dietrich, K.N., Bornschein, R.L. (2007). Effect of Succimer Chelation Therapy on Postural Balance and Gait Outcomes in Children With Early Exposure to Environmental Lead. NeuroToxicology 28:686-695.

Bhattacharya A, Habes D, Dewees J. (2007). Workplace related lower extremities disorders:workplace adaptations with case studies. Chapter 7e, Musculoskeletal Disorders in the Workplace: Principles and Practice, 2nd ed. Elsevier Health Sciences. Nordin, Anderson and Pope eds.

Burton N, Grinshpun SA, Reponen T. (2007). Physical collection efficiency of filter materials for bacteria and viruses. Annals of Occupational Hygiene 51:143-151.

Campo, P., Kalra, H.K., Levin, L., Reponen, T., Olds, R., Lummus, Z.L., Cho, S-H., Hershey, G.K., Lockey, J., Villarreal, M., Stanforth, S., LeMasters, G., Bernstein, D.I. (2006). Influence of Dog Ownership and High Endotoxin on Wheezing and Atopy During Infancy. The Journal of Allergy and Clinical Immunology 118:1271-1278.

Chew, G.L., Wilson, J., Rabito, F.A., Grimsley, F., Iqbal, S., Reponen, T., Muilenberg, M.L., Thorne, P.S., Dearborn, D.G., Morley, R.L. (2006). Mold And Endotoxin Levels In The Aftermath Of Hurricane Katrina: A Pilot Project Of Homes In New Orleans Undergoing Renovation. Environmental Health Perspectives. 114:1883-1889.

Cho S-H, Reponen T, LeMasters G, Levin L, Huang J, Meklin T, Villareal M, Bernstein DI. (2006). Mold Damage In Homes And Wheezing In Infants. Annals of Allergy, Asthma and Immunology 97:539-545.

Cho, S-H., Reponen, T., Bernstein, D.I., Olds, R., Levin, L., Liu, X., Wilson, K., LeMasters, G. (2006). The Effect Of Home Characteristics On Dust Antigen Concentrations And Loads In Homes. Science of the Total Environment 371:31-43.

Clark, C. S. (Jan 4, 2007). Current Availability of Lead in New Housing Paint: A Global Environmental Health Problem that Does Not Need to Exist. Karnataka State Pollution Control Board, Bangalore, India.

Davis, K.G., Kotowski, S.E. (2007). Understanding The Ergonomic Risk For Musculoskeletal Disorders In The United States Agricultural Sector. Am J Indus Med 50:501-511.

D'Souza, S. H., Menezes, G., Clark, C. S. and Thuppil, V. (2006) Health Hazards by Lead Exposure: Evaluation Using ASV and XRF, *Toxicology and Industrial Health* 22:249-254.

Grinshpun, S.A., Adhikari, A., Honda, T., Kim, K.Y., Toivola, M., Rao, K.S.R., Reponen, T. (2007). Control of aerosol contaminants in indoor air: combining the particle concentration reduction with microbial inactivation. Environmental Science and Technology 41:606-612.

Hu S, McDonald R, Martuzevicius D, Biswas P, Turner JR, Grinshpun SA, Kelley A, Reponen T, Lockey J, LeMasters G. (2006). UNMIX modeling of ambient PM2.5 near an interstate highway in Cincinnati, Ohio, USA. Atmospheric Environment 40:S378-S395.

Iossifova Y, Reponen T, Bernstein D, Levin L, Zeigler H, Kalra H, Campo P, Villareal M, Lockey J, Khurana Hershey GK, LeMasters G. (2007). House Dust (1-3)-β-D-Glucan And Wheezing In Infants. Allergy 62:504-513.

Kim J, Zhu X, Bhattacharaya A, Bornschein R. (2007). Study of the Effect of Early Lead Exposure on Postural Balance by Advanced Signal Processing Methods. *Int. J. Biomedical Engineering and Technology, 27: 86-100.*

Kincl, L.D.*, Dietrich, K.N., Bhattacharya, A. (2006). Injury Trends for Adolescents with Early Childhood Lead Exposure. *J Adolescent Health* 39:604-606.

Lee ,T., Grinshpun, S.A., Kim, K-Y., Iossifova, Y., Adhikari, A., Reponen, T. (2006). Relationship between indoor and outdoor airborne fungal spores, pollen, and (1-3)-B-D-glucan in homes without visible mold growth. Aerobiologia 22:227-236.

Meklin, T., McKinstry, C., Reponen, T., Cho, S-H., Grinshpun, S., Nevalainen, A., Vepsäläinen, A, Haugland, R., LeMasters, G., Vesper, SJ. (2007). Comparison Of Mold Concentrations In Dust, Indoor And Outdoor Air Sampled Simultaneously And Then Quantified By MSQPCR. Science of the Total Environment 382:130-134.

Menrath, W., Clark, C. S., Succop, P., Greenberg, S. (June 3-7, 2007) A Comparison of Three Methods Used for the Collection of Exterior Dust Lead Samples. American Industrial Hygiene Conference and Exposition, Philadelphia, PA.

Reponen, T., Seo, S-C., Grimsley, F., Lee, T., Crawford, C., Grinshpun, S.A. (2007) Fungal fragments in moldy houses: a field study in homes in New Orleans and Southern Ohio. Atmospheric Environment (in press)

Seo, S-C., Grinshpun, S.A., Iossifova, Y., Schmechel, D., Rao, C., Reponen, T. (2007). A New Field-Compatible Methodology For The Collection And Analysis Of Fungal Fragments. Aerosol Science and Technology 41:794-803.

Vesper, S.J., McKinstry, C., Haugland, R.A., Iossifova, Y., LeMasters, G., Levin, L., Khurana Hershey, G.J., Villareal, M., Bernstein, D.I., Lockey, J., Reponen, T. (2007). EPA relative moldiness index© as predictor of childhood respiratory illness. Journal of Exposure Science and Environmental

Epidemiology 17:88-94.

Wang, H., Reponen, T., Lee, S-A., White, E., Grinshpun, S.A. (2007). Submicron size airborne endotoxin – a new challenge for bioaerosol exposure assessment in metalworking fluid environments. Journal of Occupational & Environmental Hygiene 4:157-165.

Wilson, J., Pivetz, T., Ashley, P., Jacobs, D., Strauss, W., Menkedick J., Dixon S, Tsai H-C., Brown V., Friedman W., Galke W., Clark, S. (2006). Evaluation of HUD-funded lead hazard control treatment at 6 years post-intervention, *Environmental Research 102:237-248.*

Yun, YH., Bange, A., Shanov, V.N., Heineman, W.R., Halsall, H.B., Wong, D.K., Behbehani, M., Pixley, S., Bhattacharya, A., Dong, Z., Schulz, M.J. (in press). A Nanotube Composite Microelectrode for Monitoring Dopamine Levels using Cyclic Voltammetry and Differential Pulse Voltammetry, Journal of Nanoengineering and Nanosystems.

Zhong, W., Levin, L., Reponen, T., Hershey, G.K., Adhikari, A., Shukla, R., LeMasters, G. (2006). Analysis of short-term influences of ambient aeroallergens on pediatric asthma hospital visits. Science of the Total Environment 370:330-335.

EOH Presentations:

Adhikari A, Lee T, Grinshpun SA, Reponen T. Effect Of Photocatalytic Oxidation On The Spores Of Aspergillus And Cladosporium. Presented at the Annual Meeting of the American Society for Microbiology, Toronto, Canada, May 2007.

Burton N, Adhikari A, Grinshpun SA, Reponen T. Bioaerosol Collection Efficiency For Different Filter Materials Using Bacillus Antropaeus And MS2 Bacteriophage As Bioterrorism Surrogates. Presented at the International Aerosol Conference, St. Paul, Minnesota, 2006.

Crawford C. Reponen T, Lee T, Iossifova Y, Levin L, Adhikari A, Satwah S, Grinshpun SA. (2007) Spatial Variation of Indoor and Outdoor Airborne Pollen, Fungal Spores and (1→3)-β-D-Glucan. Presented at AIHce, Philadelphia PA, June 2007.

Davis KG. Does Losing Weight Have The Potential To Improve Musculoskeletal Pain? Presented at AIHce, Philadelphia PA, June 2007.

Davis K, Kotowski SE. Weight Management May Potentially Reduce Back And Hip Pain In Overweight Individuals. Presented at International Society for the Study of the Lumbar Spine, June 2007.

Gautam Seth, YeoHeung Yun, Mitul Dadhania, Vesselin Shanov, Mark J. Schulz, Brian Halsall, Adam Bange, William Heineman, Sarah Pixley, Michael Behbehani, Zhongyun Dong, Amit Bhattacharya, "Carbon Nanotube Array Impedance Biosensors" Poster for the Ohio Nanotechnology Summit, April 24-25, 2007.

He C, Davis K. Complex Demands In Shift Work For Nursing Aides In Nursing Home Setting. Presented at AIHce, Philadelphia PA, June 2007.

Iossifova Y, Reponen T, Crawford C, Daines M, Khurana Heshey G. Comparison Of The LAL And EIA Assays For Detecting (1-3)-B-D-Glucan In Purified Glucan Standards, Pure Fungal Cultures, And Home Dust Samples. Presented at AIHce, Philadelphia PA, June 2007.

Kotowski SE, Davis KG. Gender Specific Cue Effectiveness As A Potential Injury Mediator During Lifting Of Unknown Weights. Presented at AIHce, Philadelphia PA, June 2007.

Kotowski SE. The Wide Impact Of Obesity On Workers: Biomechanics, Kinematics And Pain. Presented at AIHce, Philadelphia PA, June 2007.

Kotowski SE, Gallagher S, Davis KG, Baron K, Compton C. Musculoskeletal Stress On Miners Performing Roof Screening Operations. Presented at Human Factors and Ergonomics Society 50th Annual Meeting, September 2006.

Kotowski SE, Davis K. Does Stature Impact The Effectiveness Of Wheelbarrow And Shovel Interventions For Farm Kids? Presented at AIHce, Philadelphia PA, June 2007.

Mitul D, Seth G, Yun YH, Shanov V, Schulz MJ, Halsall B, Bange A, Heineman W, Pixley S, Behbehani M, Dong Z, Bhattacharya A. An Impedance Biosensor For Space Medicine. Presented at the Ohio Nanotechnology Summit, April 2007.

Pennline C*, Rice C, Buncher CR, Clayton B. Evaluation Of Hexavalent Chromium Exposure Among Welders. Presented at AIHce, Philadelphia PA, June 2007.

Revilla FJ, Drucker AP, M HA, Manydbur GT, Gartner M, Cox C, Espay AJ, Bhattacharya A. Deep Brain Stimulation Of The Subthalamic Nucleus Improves Postural Sway In Parkinson's Disease. Presented at Movement Disorder Society International Congress, Kyoto, Japan, October 2006.

Reponen T, Seo S-C, Iossifova Y, Adhikari A, Grinshpun SA. New Field-Compatible Method For Collection And Analysis Of β-Glucan In Fungal Fragments. International Aerosol Conference, St. Paul, Minnesota, 2006.

Reponen T, Seo S-C, Grinshpun SA. 2007. B-Glucan Content Of Fungal Spores And Fragments Released From Different Building Materials. Presented at the American Thoracic Society conference, San Francisco, California, Am. J. Resp. Crit. Care Med. 2007; 175:A83.

Rice C. An Academician's Observations On A Pendulum. Presented at AIHce, Philadelphia PA, June 2007.

Rice C, Berger PK, Bingham E. HAZWOPER Training—An Update On Quality And Impact Metrics For One US Program Entering Year 20, Presented at Collegium Ramazzini, Carpi, Italy October 2006.

Rosenman KD, Monos D, Hertzberg V, Reilly MJ, Rice C, Rossman M. Genetic Susceptibility to Beryllium Toxicity, Presented at American Thoracic Society, San Francisco CA, May 2007.

Schulz MJ, Yeoheung Y, Bange A, Heineman, WR, Halsall HB, Shanov VN, Dong Z, Pixley S, Behbehani M, Bhattacharya M, Mantei T, Tu Y, Wong DKY. Impedance Biosensors Based on Carbon Nanotubes. Presented at The American Academy Of Nanomedicine (AANM), Second Annual Meeting, Washington, D.C, September 2006.

Seo S-C. Reponen T, Crawford C, Iossifova Y, Lee T, Grinshpun SA, Grimsley F, Schmechel D, Rao C. 2007. Laboratory And Field Evaluation Of A New Method For The Sampling And Analysis Of Fungal Fragments. Presented at AIHce, Philadelphia PA, June 2007.

Yun YH, Bange A, Heineman WR, Halsall HB, Behbehani M, Pixley S, Bhattacharya A, Dong Z, Shanov VN, Schulz, MJ. On-Line Carbon Nanotube-Based Biosensor Using Micro-Fluidics. Presented at SPIE Smart Structures Conference, March 2007.

Presentations/Publications (Student; IH ERC-supported student)*

OCCUPATIONAL HEALTH NURSING PUBLICATIONS AND PRESENTATIONS

FACULTY AND STUDENT PUBLICATIONS
(Students underlined; *NIOSH-ERC Supported

Berry, P*. (2007) "What is the appropriate course of action in dealing with employees who have migraines in the workplace?" *AAOHN News*, (28)1, 4.

Chen, J*, Davis, LS, Davis, K, & Daraiseh, N. (In Progress). Trunk postural load in nurses. Manuscript in progress, June, 2007.

Felblinger, D.M. (in press). Clinical Issues: Impact of violence on women's lives. *Journal of Obstetric, Gynecologic and Neonatal Nursing (JOGNN).*

Gates, D., Brehm, B., *Poeppelman, A.*, D'Alessio, D., Singler, M., & Succop, P. (2006). A high prevalence of obesity, overweight, and related risk factors among manufacturing employees in Kentucky. *Journal of the American Dietetic Association, 106*(8) Supplement, p. A-72.

Gates, D.M., Brehm, B., Singler, M., Hutton, S*., & Poeppelman, A. (2006) Changing the work environment to promote wellness: A focus group study. *American Association of Occupational Health Nurses Journal*, (54)12, 515-520.

Gates, D.M., Ross, C.S., and McQueen, L. (2006) Violence against emergency department workers. *The Journal of Emergency Medicine,* (31)3, 331-337.

Gillespie, G. L.*, Elam, M., & Singleton, M. (2006). An innovative EMS partnership to reduce emergency department throughput times. *Journal of Emergency Nursing,* 32(4), 272-273.

Hutton, S* and Gates, D. (2007). Workplace Incivility and Productivity Losses among Direct Care Staff. Manuscript to be submitted to JOHP, March, 2007.

Kennerly, S.M. (2006) Positioning advanced practice nurses for financial success in clinical practice. *Nurse Educator,* (31)5, 218-222.

McGuire, E. and Kennerly, S.M. (2006) Nurse managers as transformational and transactional leaders. *Nursing Economics,* (24)4, 179-185.

Reigle, B.S. (2006) The prevention of disablement: A framework for the breast cancer trajectory. *Rehabilitation Nursing* (31)4, 174-179.

Savage, C. L., Lindsell, C.J., Gillespie, G.L.*, Dempsey, A., Lee, R.J., and Corbin, A. (2006) Health Care Needs of Homeless Adults at a Nurse-Managed Clinic. *Journal of Community Health Nursing,* (23)4, 225-234.

Sommers, M.S., Dyehouse, J.M., Howe, S.R., Fleming, M., Fargo, J.D., and Schafer, J.C. (2006) Effectiveness of brief interventions after alcohol-related vehicular injury: A randomized

controlled trial. *The Journal of Trauma Injury, Infection, and Critical Care,* (61)3, 523-533.

Whitmer, K.M., Pruemer, J.M., Nahleh, Z.A., and Jazieh, A.R. (2006) Symptom management needs of oncology outpatients. *Journal of Palliative Medicine,* 9(3), 628-30.

Yap, T* & Davis, LS. (In press). Process of behavioral change toward intentional physical activity. Manuscript Number is: AAOHN-2007-006

Yap, T* & Davis, LS. (Submitted). Physical Activity: The Science of Health Promotion Through Tailored Messages. In revision 5-25-07, Manuscript Number is: AAOHN-2007-007.

Yap, T* & Davis, LS. (Submitted). Critique of AAOHN articles: health at every size. Submitted 6-8-07.

POSTER PRESENTATIONS

Brehm B, Gates D, Singler M, Poeppelman A; Succop P, & D'Alessio D. "Prevalence of Obesity and Related Risk Factors in Manufacturing Workers: A poster presentation at the 7th Annual Art & Science of Health Promotion Conference; March 28-31, 2007, San Francisco, CA

Chen, J.* "Trunk Postural Load in Nurses". A Poster presentation for Nursing Research Day, July 7, 2006, St. Elizabeth Medical Center, Edgewood, KY.

Chen, J.* "Energy Expenditure, Heart Rate and Perceived Physical Exertion in ER Nurse**s".** A poster presentation for the 7th Annual PRP Synposium, October 12-13, 2006, University of Cincinnati, Cincinnati, OH.

Gates, D., Brehm,. B & Ohlinger, C. "Changing the Food Environment at Worksites." A poster presentation at the 7th Annual Art & Science of Health Promotion Conference March 28-31, 2007, San Francisco, CA

Gillespie, G.L*., Gates, D., Brehm B, & Succop, P., "The Impact of BMI on Absenteeism and Productivity" A poster presentation at the 7th Annual Art & Science of Health Promotion Conference March 28-31, 2007, San Francisco, CA

Gillespie, G.L.*, & Coale, R. (2007, February).Pediatric emergency nurses' self-reported medication safety practices. Poster presentation for Cincinnati Children's Hospital Medical Center Research Poster Day: Cincinnati, OH.

Gillespie, G.L.*, Gates, D. M., & Miller, M. (2007, March). Violence against ED workers in a pediatric hospital. Poster presentation for Midwest Nursing Research Society Annual Conference: Omaha, NE.

Gillespie, G.L*., Gates, D., & Miller, M. Violence against ED workers in a pediatric hospital. 8th Annual University of Cincinnati Graduate Poster Forum, March 2, 2007.

Gillespie, G.L.*, Gates, D., & Miller, M. Violence against ED workers in a pediatric hospital.

MNRS 2007 Annual Research Conference, Innovative Technology: Pioneering Pathways to Health, Omaha, NE, March 23-27, 2007.

Gillespie, G.L.*, Gates, D., Brehm, B., & Succop, P.(2007, March). The impact of BMI on absenteeism and productivity. Poster presentation at the 7th Annual Art & Science of Health Promotion Conference March 28-31, 2007; San Francisco, CA

Hutton, S.* "A Longitudinal Study of Workplace Incivility in Hospitals". A poster presentation for the 7th Annual PRP Synposium, October 12-13, 2006, University of Cincinnati, Cincinnati, OH.

Hutton S.* & Gates D. (2007) Workplace Incivility among Staff and Losses in Productivity. A poster presentation at the Midwest Nursing Research Conference, March 23 - 26, 2007; Omaha, Nebraska.

Savage, C.L. Lee, R.J., Gillespie, G., Lindsell, C.J., & Corbin, A. Maintaining a partnership between a college of nursing and providers of care to the homeless. Association of community Health Nurse Educators Annual Institute, Kansas City, KS, May 31- June 2, 2007.

Shaughnessy, P., Baker, L., and Christianson, J*. "On the Road: Novice to Expert Educator or 'What I Learned on My Summer Vacation.'" Annual Nurse Educator Conference, Breckenridge, CO, July 19-22, 2006.

Yap, T.* "Tailored Messages and Their Effects on Intentional Physical Activity". A poster presentation for the 7th Annual PRP Synposium, October 12-13, 2006, University of Cincinnati, Cincinnati, OH.

PAPER PRESENTATIONS/SYMPOSIA

Barnett, M.* "Migraine Workplace Implications: Presenteeism, Absenteeism, Costs." A presentation at the conference, Migraines: Workplace Implications, January 13, 2007, West Chester, OH

Badia, J.* "Epidemiology and Prevalence of Migraine Headaches." A presentation at the conference, Migraines: Workplace Implications, January 13, 2007, West Chester, OH .

Baker, R., Buschur, C., & Sommers, M.S**.** Cutting edge research-practice interfacing: The forensic sexual assault exam. International Association of Forensic Nurses Conference, Forensic Nursing: A Global Response to Crime, Violence and Trauma, Vancouver, Canada, September 27-October 1, 2006.

Bell, R.* "Migraines: Workplace Practice Implications & Summary." A presentation at the conference, Migraines: Workplace Implications, January 13, 2007, West Chester, OH

Berry, P.* "Workplace challenges and solutions to migraines in the work place." "Migraine

Workplace Implications: Presenteeism, Absenteeism, Costs." A presentation at the conference, Migraines: Workplace Implications, January 13, 2007, West Chester, OH.

Berry, P.*, & Blossom, K. Mapping a strategy of preparedness for avian flu: Partnering with the local Red Cross and public health, Joint Meeting: Dayton Chapter of American Red Cross and Midwestern Ohio AAOHN, Dayton, OH, March 14, 2007.

Bragg, E. "Recent findings from the ADGAP Status of Geriatric Workforce Study" 2007 American Geriatric Society's Annual Scientific Meeting, Seattle, WA, May 2007.

Bragg, E., Warshaw, G., Hazzard, W., Bernard, M., and Hall, W. "The Association of Directors of Geriatric Academic Programs (ADGAP) Status of Geriatric Workforce Study: Trends in U.S. medical school academic programs; the training of medical students, residents, and fellows, and the clinical practice of geriatric medicine," 2007 American Geriatric Society's Annual Scientific Meeting, Seattle, WA, May 2007.

Brehm, B., & Gates, D**.** Environmental intervention to improve workers' lifestyle habits and health. *Worksite Wellness Series*, Nutrition Council, Cincinnati, OH, October 2006.

Brown, B., Van Loon, R., Warren, N.S., Wall, A., Bierschbach, J.L., Smith, R., Breen, P., & Brehm, B**.** Fostering interprofessional teamwork through an interdisciplinary course for health professions students. Navigating Educational Waters: Health Professions Working Together to Bridge Education & Outcomes. Children's Hospital Medical Center Clinical Development & Education Conference, Cincinnati, OH, May 17-18, 2007.

Brown, B., Van Loon, R., Warren, N.S., Wall, A., Bierschbach, J.L., Smith, R., Breen, P., & Brehm, B. Interdisciplinary education for health professions students: Measuring the impact on teamwork skills. Navigating Educational Waters: Health Professions Working Together to Bridge Education & Outcomes. Children's Hospital Medical Center Clinical Development & Education Conference, Cincinnati, OH, May 17-18, 2007

Chen, J.* "Trunk Postural Load in Nurses. Can it be Measured?". A paper presentation for Nursing Research Day, July 7, 2006, St. Elizabeth Medical Center, Edgewood, KY.

Chen, J.* "Trunk Postural Load in Nurses". A paper presentation for the 7th Annual PRP Synposium, October 12-13, 2006, University of Cincinnati, Cincinnati, OH.

Hutton, S*. "Workplace Incivility Among Nursing Staff and Losses in Productivity"". A paper presentation for the 7th Annual PRP Synposium, October 12-13, 2006, University of Cincinnati, Cincinnati, OH

Dennison, R. "Educator's Circle: Teaching EBP." 2006 Summer Institute on Evidence-Based Practice, San Antonio, TX, June 28-July 1, 2006.

Gerhardt, W., & Van Kuiken, D. An environmental assessment using the Nursing Work Index-

Revised survey. Ohio Organization of Nurse Executives, Newark, OH, October 2006.

Gillespie, G.L.*, & Coale, R. Pediatric emergency nurses' self-reported medication safety practices. 2007 Cincinnati Children's Hospital Medical Center's Nursing Research Evidence-Based Practice Poster Day, Cincinnati, OH, June 13, 2007

Lee, R.C. "Planting the Seeds of Transcultural Nursing: The Role of Community Health Experiences in the Education of Undergraduate Nursing Students." Transcultural Nursing Society Conference, Annapolis, MD, November 2006.

Lee, R.C., Savage, C.L., Rose, B.L., Kappesser, M. "'A Shoulder to Lean On': The Importance of Social Support during Pregnancy for Black Women." Transcultural Nursing Society Conference, Annapolis, MD, November 2006.

Pettigrew, A. Keynote speaker, Cincinnati Children's Hospital Medical Center Annual Faculty Development Workshop, Cincinnati, OH, September, 2006. .

Shambley-Ebron, D. "Honoring Our Past by Preserving Our Future: Eliminating Health Care Disparities in America," keynote speaker at Wright-Patterson Air Force Base 31st Annual National Black History Month Kick-off, Dayton, OH, February 5, 2007.

Standridge, JS.* "Migraine History, Evaluation and Treatment Strategies" A presentation at the conference, Migraines: Workplace Implications, January 13, 2007, West Chester, OH

Warshaw, G.A., Bragg, E.J., Thomas, D.C., Ho, M.L., and Brewer, D.E. (2006) Are internal medicine residency programs adequately preparing physicians to care for the baby boomers? A national survey from the Association of Directors of Geriatric Academic Programs Status of Geriatric Workforce Study. *Journal of The American Geriatrics Society*, (54)10, 1603-1609.

Wilson, C. "Watch out for those good ideas! Educating Multidisciplinary Students in an Urban Psychiatric Nursing Clinic for the Homeless." National Nursing Centers Consortium, Delray Beach, FL, October 2006.

Yap, T. L.* Intentional physical activity: the process of behavior change. Sigma Theta Tau meeting, Hamilton, OH, January 17, 2007.

OHN SCHOLARSHIP ROUNDTABLES, COLLOQUIA, AND VISITING SCHOLARS

A. Scholarship Roundtables

October 9, 2006:	Update on Scholarship of Teaching and Learning – Amy Pettigrew
October 23, 2006:	Academic Resources Available through Sigma Theta Tau – Beverly Reigle and STTI staff: Cindy Jo Everett and Mary Ann Scott
November 13, 2006:	Developing a Program of Research for HIV-Prevention in Sub-Saharan Africa – Comfort Enah
November 27, 2006:	My Sister, My Self: Culture and Health for Africana Girls: Community Action for HIV/AIDS Prevention – Donna Shambley-Ebron
December 4, 2006:	*Capstone Celebration with Master's Students;* Picture This! Using Digital Image Analysis as a Measurement Strategy – Kyra Whitmer
January 8, 2007:	Darn Those Pink Sheets: Responding to NIH Critique – Susan Elek
January 22, 2007:	Center for Aging with Dignity – Update and CEU Opportunity – Charles Puchta, Evelyn Fitzwater, Elaine Miller
February 12, 2007:	Research Opportunities Through the Breast Cancer Registry of Greater Cincinnati – Susan Pinney
February 26, 2007:	An Old World Diet for Today: A Clinical Study of High Monounsaturated Fat Diets for Weight Control – Bonnie Brehm
March 13, 2007:	*Capstone Celebration with Master's Students*
March 26, 2007:	Measuring the Effectiveness of a Nurse Managed Clinic for Adult Homeless Persons – Christine Savage
April 9, 2007:	The Effects of Religiosity on Depression in College-age Students – Devon Berry
April 23, 2007:	Diabetes Self-Management in Chinese Populations with Type 2 Diabetes – Yin Xu; From Ship to Shore: Mercy, Mercy, Mercy – Tina Weitkamp
May 14, 2007:	Partnering to Reduce Obesity with Environmental Changes – Donna Gates & Bonnie Brehm
June 4, 2007:	*Capstone Celebration with Master's Students*

B. Colloquia, Specials Topics Classes, and Other Events

Faculty Mentorship – What is it, How do I find one, How can I be a good mentor, What make a good mentor/mentee, Wayne Hall, Vice Provost for Faculty Development, January 29, 2007.

Presentation on NIH grant structure and strategies for grant writing. Ronnie Horner, PhD, Director of the Study of Health, March 28, 2007.

C. Visiting Scholars (Sponsored or Co-Sponsored by Institute for Nursing Research)

October 24, 2007, Lynn Rew, EdD, FAAN, Denton and Louise Cooley and Family Centennial

Professor in Nursing: Presentation related to her research on the homeless and at risk youth

OCCUPATIONAL MEDICINE PUBLICATIONS AND PRESENTATIONS

Campo P, Kalra HK, Levin L, Reponen T, Olds R, Lummus ZL, Cho SH, Khurana, Hershey GK, **Lockey J,** Villareal M, Stanforth S, **Lemasters G**, Bernstein DI. Influence of dog ownership and high endotoxin on wheezing and atopy during infancy. J Allergy Clin Immunol. 118(6):1271-8 (2006).

Gates DM, Ross CS, McQueen L. Violence against emergency department workers. J Emerg Med. 31(3):331-7 (2006).

Genaidy AM, **Lemasters GK, Lockey J**, Succop P, Deddens J, Sobeih T, Dunning K. An epidemiological appraisal instrument - a tool for evaluation of epidemiological studies. Ergonomics. 50(6):920-60 (2007).

Iossifova YY, Reponen T, Bernstein DI, Levin L, Kalra H, Campo P, Villareal M, **Lockey J,** Hershey GK, **LeMasters G**. House dust (1-3)-beta-D-glucan and wheezing in infants. Allergy. 62(5):504-13 (2007).

Laferty E & **McKay R**. Physiologic Effects and Measurement of Carbon Dioxide and Oxygen Levels During Qualitative Respirator Fit Testing. Journal of Chemical Health and Safety pages 22-28, September/October 2006.

LeMasters GK, Genaidy AM, Succop P, Deddens J, Sobeih T, Barriera-Viruet H, Dunning K, **Lockey J.** Cancer risk among firefighters: a review and meta-analysis of 32 studies. J Occup Environ Med. 48(11):1189-202 (2006).

LeMasters GK, Wilson K, Levin L, Biagini J, Ryan P, **Lockey JE**, Stanforth S, Maier S, Yang J, Burkle J, Villareal M, Khurana Hershey GK, Bernstein DI. High prevalence of aeroallergen sensitization among infants of atopic parents. J Pediatr. 149(4):505-11 (2006).

Lockey J, Dunning K, **Freeman A**, Jewell G, Shukla R, Shipley R, Meyer C, and J Luo, Comparison of Chest Radiograph "B" Readings for Pulmonary Asbestosis in the Worker Compensation Setting, Journal of Workers Compensation, Winter 2007

Ryan PH, **Lemasters GK**, Biswas P, Levin L, Hu S, Lindsey M, Bernstein DI, **Lockey J,** Villareal M, Khurana Hershey GK, Grinshpun SA. A comparison of proximity and land use regression traffic exposure models and wheezing in infants. Environ Health Perspect. 115(2):278-84 (2007).

Vesper SJ, McKinstry C, Haugland RA, Iossifova Y, **Lemasters G**, Levin L, Khurana Hershey GK, Villareal M, Bernstein DI, **Lockey J,** Reponen T. Relative moldiness index as predictor of childhood respiratory illness. J Expo Sci Environ Epidemiol. 17(1):88-94 (2007).

OSHE PUBLICATIONS AND PRESENTATIONS

OSHE Student Publications with Faculty, and Faculty Publications*

Acosta-Leon AL, Grote BP, Salem S, Daraiseh N. Risk factors associated with adverse health and safety outcomes in the US Hispanic workforce. *Theoretical Issues in Ergonomics Sciences* 2006; 7(3): 299-310.

Barriera-Viruet H, Sobeih TM, Daraiseh N, Salem S. Questionnaires vs observational and direct measurements: a systematic review. *Theoretical Issues in Ergonomics Sciences* 2006; 7(2): 261-284.

Barriera Viruet H, Genaidy A, Shell R, Salem S, Karwowski W. Effect of forklift operation on lower back pain – an evidence-based approach. *Human Factors and Ergonomics in Manufacturing* 2007; in press.

El-Hosseiny A, Genaidy A, Shell R, Stambough J, Dimov M. Multi-network nanobiosensing: potential approaches in understanding, diagnosing and tracking discogenic pain. *Human Factors and Ergonomics in Manufacturing* 2007; in press.

Flanagan E, Wiggermann N, Genaidy A, Shell R, Stambough J. Does lumbar fusion increase the risk of disc degeneration of adjacent segment? *Human Factors and Ergonomics in Manufacturing* 2007; in press.

Genaidy A, Karwowski W. The emerging field of health engineering. *Theoretical Issues in Ergonomics Sciences* 2006; 7(2): 169-179.

Genaidy A, Karwowski W. Nanotechnology occupational and environmental health and safety: An emerging interdisciplinary field. *Human Factors and Ergonomics in Manufacturing* 2006; 16(3): 247-253.

Genaidy AM, Karwowski W, Ravelo E, Abdallah A, Shell R, Holley MB. Theoretical basis for general mixed object handling equations based on mechanical work required. *Theoretical Issues in Ergonomics Sciences* 2006; 7(5): 469-490.

Genaidy AM, LeMasters GK. The epidemiological appraisal instrument (EAI): A brief overview. *Theoretical Issues in Ergonomics Sciences* 2006; 7(3): 187-189.

Genaidy AM, Shell RL. The experimental appraisal instrument: a brief instrument. *Human Factors and Ergonomics in Manufacturing* 2007; in press.

Genaidy AM, LeMasters GK. The epidemiological appraisal instrument (EAI): A brief overview. *Theoretical Issues in Ergonomics Sciences* 2006; 7(3): 187-189.

Kara K*, Kothari*, Genaidy A, Weckman G, Shell R, Karwowski W. The factors affecting health care costs in manufacturing. *Human Factors and Ergonomics in Manufacturing* 2007; in press.

Maudgalya T, Wallace S, Daraiseh N, Salem S. Workplace stress factors and burnout among information technology professionals: a systematic review. *Theoretical Issues in Ergonomics Sciences* 2006; 7(3): 285-298.

Maudgalya T*, Genaidy A, Shell RL. Productivity – quality – costs – safety: a sustained approach to competitive advantage. *Human Factors and Ergonomics in Manufacturing* 2007; in press.

Maudgalya T*, Genaidy AM, Weckman G, Shell RL, Karwowski W, Wallace S*. A critical appraisal of epidemiological studies investigating the effects of ultrafine particles on human health. *Human Factors and Ergonomics in Manufacturing* 2007; in press.

Moayed FA*, Pauletti GM, Shell RL, Genaidy AM. Experimental design comparison of studies evaluating doxorubicin nanoparticles in breast cancer therapy. *Human Factors and Ergonomics in Manufacturing* 2007; in press.

Moayed F, Daraiseh N, Shell R, Salem S. Workplace bullying: a systematic review of risk factors and outcomes. *Theoretical Issues in Ergonomics Sciences* 2006; 7(3): 329-344.

Paez O, Uahinui T, Genaidy A, Sun L, Karwowski W, Daraiseh N. Estimating uninsured costs of work-related accidents, Part II: An incidence-based model. *Theoretical Issues in Ergonomics Sciences* 2006; 7(3):247-260.

Rinder MM*, Genaidy A, Salem S, Shell RL, Karwowski W. Interventions in the construction industry: a systematic review and critical appraisal. *Human Factors and Ergonomics in Manufacturing* 2007; in press.

Salem O, Solomon J, Genaidy A, Luegring M. Site implementation and assessment of lean construction techniques. *Lean Construction Journal* 2005; 2(2):5-29.
Waters T, Yeung S, Genaidy A, Callaghan J, Barriera-Viruet H, Deddens J. Cumulative spinal loading exposure methods for manual material handling tasks, Part 1: Is cumulative spinal loading associated with lower back disorders? *Theoretical Issues in Ergonomics Sciences* 2006; 7(2):131-148.

Salem S, Paez O, Holley M, Tuncel S, Genaidy A, Karwowski W. Performance tracking through the work compatibility model. *Human Factors and Ergonomics in Manufacturing* 2006, 16(2):133–153.

Salem S, Sobeih T*, Genaidy A, Shell RL, Bhattacharya A, Succop P. Work compatibility and musculoskeletal disorders in the construction industry. *Human Factors and Ergonomics in Manufacturing* 2007; in press.

Salem S, Genaidy A, Albers J, Shell R, Sobeih T*, Rinder MM*. Use and acceptability of reduced-weight Portland cement bags in masonry construction: an observational pilot study. *Human Factors and Ergonomics in Manufacturing* 2007; in press.

Sequeira R*, Genaidy A, Weckman G, Shell R, Karwowski W, Acosta-Leon A*. Health effects of nanomaterials: a critical appraisal and research to practice. *Human Factors and Ergonomics in*

Manufacturing 2007; in press.

Shell RL, Genaidy AM, Safety and health engineering: Research to practice, Guest Editors, *Theoretical Issues in Ergonomics* Sciences 2006; 7(3): 183-186.

Shell RL, Genaidy AM, Evidence-based Safety and health engineering: Research to practice, Guest Editors. *Human Factors and Ergonomics in Manufacturing* 2007; in press.

Sobeih T, Daraiseh N, Genaidy A, Salem O, Shell R. Psychosocial factors and musculoskeletal disorders among construction workers: A systematic review. *Theoretical Issues in Ergonomics Sciences* 2006; 7(3): 329-344.

Sun L., Paez O, Le D, Salem S, Daraiseh N. Estimating the uninsured costs o work-related accidents, part I: a systematic review. *Theoretical Issues in Ergonomics* Sciences 2006; 7(3):227-246.

Tuncel S, Lotlikar H, Salem S, Daraiseh, N. Effectiveness of behavior based interventions to reduce accidents and injuries in workplaces: critical appraisal and meta-analysis. *Theoretical Issues in Ergonomics Sciences* 2006; 7(3):191-210.

Tuncel S, Iossifova Y, Ravelo E, Daraiseh N, Salem S. Effectiveness of controlled workplace interventions in reducing lower back disorders. *Theoretical Issues in Ergonomics Sciences* 2006; 7(3): 211-226.

Tuncel S*, Genaidy A, Shell R, Salem S, Karwowski W, Darwish M, Noel F, Singh D*. Research to Practice: Effectiveness of Controlled Workplace Interventions to Reduce Musculoskeletal Disorders in the Manufacturing Environment – Critical Appraisal and Meta-Analysis. *Human Factors and Ergonomics in Manufacturing* 2007; in press.

Waters T, Yeung S, Genaidy A, Callaghan J, Barriera-Viruet H, Abdallah S, Kumar S. Cumulative spinal loading exposure methods for manual material handling tasks, Part 2: Methodological issues and applicability for use in epidemiological studies. *Theoretical Issues in Ergonomics Sciences* 2006; 7(2):113-130.

Note: Trainees are highlighted in bold; * - other students in the Safety and Health Engineering Program; Faculty mentors are underlined

HSAT PUBLICATIONS AND PRESENTATIONS

Reponen T, Seo S-C, Grimsley F, Lee T, Crawford C*, Grinshpun SA. 2007) Fungal fragments in moldy houses: a field study in homes in New Orleans and Southern Ohio. Atmospheric Environment (in press)

Presentations (Student; HSAT-ERC-supported student*)

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*Note: Trainees are highlighted in bold; * - other students and Faculty mentors are underlined*