

**NEW YORK/NEW JERSEY EDUCATION  
AND RESEARCH CENTER FOR  
OCCUPATIONAL SAFETY AND  
HEALTH**

**ANNUAL REPORT**

**JULY 1, 2006 – JUNE 30, 2007**

**NIOSH Training Grant  
No. T42 OH 008422**

**SUBMITTED BY:**

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**(November 2007)**

## Table of Contents

	Page
Table of contents.....	i
Executive Summary .....	iii
<b>1. Industrial Hygiene Program (Hunter College).....</b>	<b>1</b>
Appendices	
A. Program Curriculum and Course Requirements .....	6
B. Faculty and Trainee Publications.....	7
<b>2. Occupational and Environmental Residency Medicine Program Report (Mount Sinai).....</b>	<b>8</b>
Appendices	
A. Program Curriculum and Course Requirements .....	13
B. Faculty Publications.....	15
<b>3. Occupational Medicine Residency Program (UMDNJ).....</b>	<b>19</b>
Appendices	
A. Program Curriculum and Course Requirements .....	22
B. Faculty and Trainee Publications and Presentations.....	23
<b>4. Occupational Safety and Health Engineering (NJIT).....</b>	<b>27</b>
Appendices	
A. Program Curriculum and Course Requirements .....	32
B. Faculty and Trainee Publications.....	35
<b>5. Graduate Program of Ergonomics and Biomechanics (NYU).....</b>	<b>36</b>
Appendices	
A. Program Curriculum, Course Requirement and Sample Curricular by Academic Programs.	41
B. Faculty and Trainee Publications and Conference Abstracts.....	44
<b>6. Center Administration/Interdisciplinary Activities (Mount Sinai).....</b>	<b>46</b>
Appendices	
A & B Not applicable	
C. Syllabus ERC OSH Seminar Course .....	49
D. Syllabus ERC OSH Site Visits Course.....	50
E. Program: UOSHERC Scientific Conference (2007) .....	51
F. Agenda: UOSHERC Student Research Day (2007) .....	52
G. Itinerary: UOSHERC Northeast Historical Perspectives Course (2007).....	53
<b>7. Continuing Education/Outreach/HST Program (UMDNJ).....</b>	<b>55</b>
No Appendices	
<b>8. Hazardous Substance Academic Training Program (Hunter College).....</b>	<b>61</b>
Appendices	
A. Program Curriculum and Selected Course Outline.....	64
B. Faculty and Trainee Publications.....	65

<b>9. Pilot Projects Research Training Program (Mount Sinai)</b> .....	66
Appendices	
A. Not Applicable .....	
B. Pilot Projects Research Training Program Publications.....	69
<b>10. NORA Research Support Program (Mount Sinai)</b> .....	70
A. Not Applicable.....	
B. No Publications.....	

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## SUMMARY OF TRAINING PROPOSAL

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UOSHERC, the Universities Occupational Safety and Health Education and Research Center, serves Federal Region II, which is comprised of the states of New York and New Jersey, the Commonwealth of Puerto Rico and the U. S. Virgin Islands. The mission of UOSHERC (a/k/a NY/NJ ERC) is to educate professionals in occupational medicine, industrial hygiene, ergonomics and occupational safety and health engineering, so that they are able to understand, evaluate, prevent, manage and treat occupational disease and injury in the workers of our region and across the United States. Center Administration is responsible for the day-to-day operations of the ERC, serves as liaison between the programs and NIOSH, and is responsible for interdisciplinary interaction and coordination among the programs and their faculty and students.

UOSHERC is a consortium of five educational institutions ([www.nynjerc.org](http://www.nynjerc.org)) offering nine programs in occupational health and safety training, covering three of the four essential core areas for ERC's, namely Occupational Medicine, Industrial Hygiene and Occupational Safety/Ergonomics. Our constituent programs are:

- Occupational Medicine at Mount Sinai School of Medicine (New York City, NY);
- Occupational Medicine at the Universities of Medicine and Dentistry of New Jersey (UMDNJ)/Robert Wood Johnson Medical School (Piscataway, NJ);
- Industrial Hygiene and Hazardous Substance Academic Training at Hunter College School of Health Sciences (New York City, NY);
- Occupational Safety and Health Engineering at the New Jersey Institute of Technology (Newark, NJ);
- Continuing Education and Outreach and Hazardous Substance Training at UMDNJ/Robert Wood Johnson Medical School (Piscataway, NJ); and the
- Pilot Project Research Program at Mount Sinai School of Medicine (New York City, NY).
- Occupational Ergonomics and Biomechanics Program at New York University (New York City, NY).

Changes: Given Dr. Jacqueline Moline's new responsibilities as the Director of UOSHERC, Dr. Debra Milek took over Directorship of the Mount Sinai Occupational Medicine Residency Program from her on 7/1/07. Also with Dr. David Kotelchuck retiring from Hunter College, Dr. Jack Caravanos took over from him as Director of the Hunter ERC IH program. In turn Dr. Mark Goldberg took over from Dr. Caravanos as Director of the Hunter ERC HSAT program. Dr. Kotelchuck continues to serve as UOSHERC Deputy Director. Also during this grant year, Dr. Audrey Gotsch, Dean of the New Jersey School of Public Health, stepped down as Director of the UMDNJ Continuing Education and Outreach program and was replaced by her long-time associate, Mitchel Rosen. Thus the ERC Management Committee has changed this grant year with the addition of three new, younger program directors (Caravanos, Goldberg and Rosen), and new ERC leadership under Dr. Moline.

Accomplishments: UOSHERC continues to offer two interdisciplinary courses annually, an OSH seminar in the Fall and a plant visits course in the Spring. Students and faculty from all ERC programs actively participate in both. In the Spring class meetings of the interdisciplinary plant visits course were held by videoconference, as in past years, with the help of NIOSH NORA funds. Site Visits included a pharmaceutical plant, a newspaper printing plant, a power plant and several World Trade Center construction sites. In addition UOSHERC held its 28<sup>th</sup> annual scientific conference on April 13, 2007 on "The Changing Workforce and Occupational Health Disparities". UOSHERC held its annual ERC student research day on May 18, 2007 again at NJIT.

The highlight of this year was our second annual ERC Interdisciplinary Northeast OSH Tour: During the week of June 10-15, 2007, under the leadership of Jack Caravanos (IH) and Mitchel Rosen (CEO), 18 ERC students and interns and 9 faculty traveled across the Northeastern U.S. and Canada to visit industrial sites of current or historical health and safety interest, including a Ford Motor Company auto plant, a Pennsylvania coal mine, the former Homestead Steel Works, and the hydroelectric power plant near Niagara Falls, NY. Students and faculty from every ERC academic program participated. Again a book entitled "Historical Perspectives" recorded the itinerary, the participant names and pictures of the various site visits.

### **III. Program Progress Report (Industrial Hygiene)**

#### **A. Program Title: Industrial Hygiene**

#### **B. Program Director: Jack Caravanos (IH)**

#### **C. Program Description**

##### Mission:

The mission of EOHS is to educate professionals who can anticipate, identify, and assess environmental and workplace health hazards, recommend corrective measures, and institute programs to reduce morbidity and mortality. Given the setting of Hunter College, special attention is paid to hazards affecting urban communities.

##### Educational Objectives:

*Students taking the prescribed course of study within the IH Program will:*

1. Learn about common industrial processes, operations and manufacturing techniques found in the US.
2. Study and assess occupational and environmental hazard notification systems such as MSDS and transportation placards.
3. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes.
4. Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.
5. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.
6. Learn the principles of operation, calibration, and methodology for using basic sampling instrumentation to detect chemical and physical agents in the work environment.
7. Learn to identify and apply appropriate standard sampling and analytical methods such as those developed by NIOSH, OSHA, and EPA.
8. Study the operation and use of various environmental labs including types of analysis, typical costs, sample submittal processes, quality assurance/quality control programs, and laboratory accreditation procedures.
9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.
10. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.
11. Become skilled at evaluating, recommending, and putting into practice administrative and engineering controls and personal protective equipment to reduce or eliminate occupational hazards.
12. Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of environmental and occupational hygiene-related programs
13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community.
14. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease.
15. Learn the fundamental aspects of safety and environmental health
16. Develop an understanding of appropriate ethical practices in environmental and occupational hygiene.
17. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various

- special needs and vulnerabilities and the history of those issues.
18. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents.
  19. Acquire the knowledge needed to attain recognized professional certification

Curriculum:

The EOHS curriculum (ABET Accredited IH Program) consists of 15 credits of Public Health core courses, 25 credits of specialized IH coursework and 8 credits of EOHS electives for a total of 48 credits. All students must also complete an internship and prepared a capstone paper.

Faculty:

The EOHS has 5 full-time faculty; Associate Professor Jack Caravanos, Professor Susan Klitzman, Associate Professor Mark Goldberg, Professor Frank Mirer and Assistant Professor Jennifer Richmond-Bryant. Presently Professor Goldberg is on sabbatical (2007-2008) and Professor Klitzman is on administrative reassignment. Three of the five faculty members are Board Certified in Industrial Hygiene

**Dr. Jack Caravanos** has directed the EOHS-MS program since 1997 and led the ABET accreditation effort for the last cycle. He also directs the EOHS—MPH track, which is accredited by the Council for Education in Public Health. In addition to managing day to day activities within the program, Dr. Caravanos teaches 4-5 courses per year, including Environmental Health and Safety and the Environmental and Industrial Hygiene Laboratory. He was honored in 2006 by the College with the Presidential Award for Excellence in Teaching. His areas of specialty are hazard recognition, instrumentation, exposure assessment, and environmental health. During the 2005-2006 academic year, Prof. Caravanos was on sabbatical and took on 2 projects with the NYC Department of Health (PERC Exposures in Residential Buildings with Dry Cleaners and Non-Paint Related Lead Poisoning). This work has continued into the 2006-2007 academic year and will lead to published manuscripts. While on Sabbatical, Dr. Caravanos also worked with the Blacksmith Institute doing international environmental assessments of hazardous waste sites. He traveled to more than 20 cities in India on 2 separate trips, visited Kenya on a UNEP air quality project and was invited to present at a regional UN-Basel Conference in Trinidad on a Lead Battery Recycling. Presently, he is actively assisting the cleanup of an abandoned Lead-Acid Battery Recycling Facility in a residential community in Haina, Dominican Republic and has traveled there 3 times over the past 1½ years. He continues to do international EHS work and is an invited guest to a World Bank sponsored environmental management symposium in Bellagio, Italy in the Fall of 2007. Prof. Caravanos is commonly sought for expert witness testimony in toxic torts litigation nationally. He has testified on behalf of plaintiffs in asbestos, indoor air, workplace poisonings (FELA), and adult and childhood lead poisoning cases. Dr. Caravanos is board Certified in Industrial Hygiene (CIH) and Safety (CSP).

**Dr. Mark Goldberg** has over twenty-five years of experience as a field IH and as a practitioner and researcher. While at Hunter, he has managed over \$1.9 million in research in environmental and occupational hygiene, particularly related to construction workers. Much of this work has been published in peer-reviewed journals including *Annals of Occupational Hygiene* and *American Journal of Industrial Medicine*. He has worked for OSHA, the New York City Department of Health in its Environmental Epidemiology Unit, labor unions, New York University Medical Center, as a researcher with the Mount Sinai School of Medicine (Department of Community and Preventive Medicine, Center for Environmental and Occupational Health), and as a teacher at Hunter College. His experience in environmental and occupational hygiene is broad: as an OSHA inspector he assessed a wide variety of occupational sites in the northern New Jersey industrial belt. At NYU Medical Center, he managed diverse

industrial hygiene programs, including exposures to operating room personnel and maintenance employees. He was responsible for an \$8 million asbestos removal effort. He has also researched and published widely in the peer-reviewed literature on mercury exposure to hospital personnel and asbestos exposure in South Korean asbestos textile manufactures. Dr. Goldberg teaches core environmental and occupational hygiene courses including Introduction to Occupational Safety and Health, Principles of Industrial Hygiene, Industrial Ventilation, and Environmental and Industrial Hygiene Lab. He has been a CIH since 1987.

**Dr. Susan Klitzman** is Professor of Environmental and Occupational Health and Director of the Urban Public Health program. She has over twenty-five years of experience in the field of occupational and environmental health in academic and government settings. Her expertise is in environmental and occupational health epidemiology and policy development and analysis. Her primary teaching areas are: Environmental Health and Safety, Biostatistics, Epidemiology, Supervised Field Internship/Capstone, and Public Health Policy. Prior to joining Hunter in 1999, Dr. Klitzman was Assistant Commissioner for Environmental Risk Assessment and Communication for the New York City Department of Health, where she oversaw programs in Childhood Lead Poisoning Prevention, Environmental and Occupational Epidemiology and Employee Health and Safety Programs. Dr. Klitzman has published widely on environmental and occupational health issues, such as: adult and childhood lead poisoning and other heavy metal poisoning, impact of the World Trade Center attacks, health education in the workplace, the urban environment and office health and safety.

Currently Dr. Klitzman, along with Dr. Nicholas Freudenberg from Urban Public Health, is leading the inception of the Doctor of Public Health program for CUNY, which will include a track in Environmental and Occupational Health (EOH). It is anticipated that the first doctoral class will be admitted in 2007, with the EOH track beginning in 2009. She is also working on developing a CUNY School of Public Health, to be housed at Hunter College, which is planned for 2010.

**Dr. Franklin E. Mirer** is a toxicologist and certified industrial hygienist. His primary scientific interest is exposure and risk assessment in the occupational environment, and regulatory policy. His current active research concerns the scientific and policy issues regarding promulgation of OSHA chemical exposure and other standards. He is also interested in evaluation of facility injury and illness records for targeting prevention programs and measuring progress. His teaching interests include toxicology, environmental chemistry, occupational and environmental health law, noise and radiation. Dr. Mirer was appointed Professor of Environmental and Occupational Health in September 2006. Previously, he served as Director of the UAW Health and Safety Department from 1982 to 2006, and participated in each round of automobile industry collective bargaining since 1976. He joined the UAW staff in 1975 as an industrial hygienist. Among other results, those negotiations established major labor management administered funds for research and training. Dr. Mirer participated in the distribution of close to \$20 million in funding to university-based investigators since 1984. Dr. Mirer also administered training grants to the UAW from NIEHS, OSHA and the State of Michigan. These grants totaled about \$12 million over two decades. He co-authored 12 papers reporting morbidity and mortality in the US auto industry in peer reviewed journals, including the American Journal of Industrial Medicine, Journal of Occupational Medicine and the American Journal of Public Health. He has published peer reviewed papers on risk assessment and regulatory policy, and reviewing health studies in the auto industry. He authored two chapters in the ILO Encyclopedia of Occupational Safety and Health.

**Dr. Jennifer Richmond-Bryant** has been heavily involved in teaching and research since receiving her Ph.D. from the University of North Carolina at Chapel Hill in 2003. Her expertise is in the use of computational, experimental, and field measurement techniques for assessing

human exposure to airborne pollutants. She served as Principal Investigator of the Brooklyn Traffic Real-Time Ambient Pollutant Penetration and Environmental Dispersion study while performing contract research for the U.S. Environmental Protection Agency. Dr. Richmond-Bryant has also brought this expertise to her position as the Principal Investigator of Asthma Free School Zone to investigate source contributions of vehicular pollution to exposures of New York City school children during school dismissal. Dr. Richmond-Bryant's research has been published in peer-reviewed journals including *Aerosol Science and Technology*, *Indoor Air*, and *International Journal of Numerical Methods in Fluids*. Since arriving at Hunter, she has secured almost \$93,000 in funding to support her research projects. Dr. Richmond-Bryant has taught a variety of core courses for the EOHS-MS students at Hunter, including Supervised Field Internship/Capstone, Ventilation, Noise and Radiation, and Site Visits. She also developed an elective in Outdoor and Indoor Air Quality for MS and MPH students to learn about principles of airflow modeling and how airflow affects pollutant transport and dispersion. She serves on the editorial review board for *Journal of Occupational and Environmental Hygiene*, reviews journal articles for *Aerosol Science and Technology* and *Journal of Aerosol Science*.

#### **D. Program Activities and Accomplishments**

1. Progress Toward Goals and Objectives
  - a. EOHS completed a 250+ page self-study in preparation for ABET reaccreditation
  - b. EOHS completed a student survey and assessed results
  - c. EOHS completed an alumni survey and assessed results
  - d. EOHS completed an employer survey and assessed results
  - e. EOHS held 2 meetings (October and March) with current students to assess effectiveness of program
2. Trainee Honors, Awards and Scholarships
  - a. EOHS student William Pockels was awarded an AIHA achievement scholarship (2006) at the AIHCE conference.
3. Faculty Honors and Awards
  - a. Received \$48,000 in COMPACT money to upgrade equipment for teaching and research during 2007-08: new equipment to be used for demonstrating state-of-the-art equipment to students and for research that can leverage external funds for new research
  - b. Transdisciplinary Research on Urban Health Collaborative, National Institutes of Health, Total Budget: \$621,270, 8/1/04 – 7/30/09, Co-Investigator: Prof. Klitzman.
  - c. CUNY Workforce Development Initiative, Hunter College, CUNY – New York City Department of Health and Mental Hygiene (DOHMH) Community Health Services Initiative, Total Budget: \$32,879 7/1/05 – 6/30/06, PI: Prof. Klitzman.
  - d. Tools and Programs for Improving Occupational Health Conditions in Construction— Diffusion of Masonry Controls, NIOSH, Total Budget: \$250,000, 2004 – 2009, PI: Prof. Goldberg.
  - e. Asthma Free School Zone (AFSZ), NYC Department of Transportation, Total Budget: \$48,119, 9/12/06 – 5/31/09, PI: Prof. J. Richmond-Bryant.
  - f. Dispersion of Threat Agents in a Scale Model of a Subway Station to Inform Exposure Estimates, CUNY Collaborative Incentive Grant, Total Budget: \$40,000, 9/10/07 – 8/31/08. Co-PI: Dr. J. Richmond-Bryant.
  - g. NYC Contaminants in Commercial Fish Study, NYC DOHMH, Total Budget: \$21,840, 2007, PI: Prof. J. Caravanos
  - h. Residential Perchloroethylene Exposures from Co-located Dry Cleaning Establishments in NYC, NYC Dept of Health, \$23,500. Prof. J. Caravanos
  - i. Develop training program for NYC Dept of Health Lead Poisoning Prevention Program: “Assessing Lead Risks from non-paint sources”, \$49,000. 2006-2007 Prof. J. Caravanos
4. Other Faculty Activities toward Program Goals and Objectives

- a. Organized and participated in 2<sup>nd</sup> Annual EOHS Industrial Site Tour – 1,500 mile bus tour through NY, PA, OH, MI and Canada visiting 8 industrial sites / facilities with 18 ERC students and 9 program faculty from all the NIOSH funded programs.
- b. Participated in 2007 AIHCE Annual Conference in Philadelphia (academic display booth)
- 5. New Faculty Appointments - NONE
- 6. Trainee Theses and Dissertations - NONE
- 7. New Courses:
  - a. EOHS 77096 – Construction Health and Safety (John Antonopoulos)
  - b. EOHS 77023 – Environmental and Occupational Health Law (Frank Mirer)
  - c. PH 77077 – GIS in Public Health (Jack Caravanos)
- 8. Trainee Recruitment Including Diversity Efforts  
The EOHS program is as diverse as the City it is located in. Program profile (Spring 2006).

*Gender*

Female	42.3%
Male	57.7%

*Ethnicity*

African American	18.6%
Asian/Pacific Islander	23.7%
Caucasian	42.3%
Hispanic/Latino	10.3%
Other	5.2%

**E. Program Products**

- 1. Faculty and Trainee Publications (Appendix B)
- 2. Conference Sponsored: 28<sup>th</sup> annual UOSHERC Scientific Conference (4/13/07)
- 3. CE Courses presented: See Continuing Education section of this Final Report

**F. Future Plans**

- 1. EOHS, as one of the 5 required content areas of public health, will be a key component of the future CUNY School of Public Health (SPH) at Hunter College (2010)
- 2. Will continue to offer MS *and* MPH degrees in EOHS once the SPH is established
- 3. MS will have dual accreditation ABET and CEPH, once the SPH is established.
- 4. DPH degree in EOHS will be offered beginning in Fall 2009
- 5. Hunter recently allocated for a part-time recruiter for the UPH program to maintain enrollment in the MS, MPH, and DPH degrees
- 6. Joint MS/MPH degree in EOHS is also being considered for the future (note: NYSED will require additional differentiation between MS and MPH prior to approval)

**IV. Report on Specific Improvements in OS&H Resulting from ERC Programs – None**

## Appendix A. Program Curriculum and Course Requirements

### Industrial Hygiene\*

Semester	Course
Semester 1	PH 700: Biostatistics
Semester 1	PH 702: Environmental Health & Safety
Semester 1	EOHS 702: Occupational Health & Safety
Semester 1	EOHS 754: Toxicology
Semester 2	PH 701: Health Care Administration
Semester 2	PH 703: Epidemiology
Semester 2	EOHS 757: Industrial Hygiene
Semester 2	EOHS 762: Noise & Radiation
Semester 3	PH 710: Urban Health Promotion
Semester 3	EOHS 741: Industrial Hygiene Laboratory
Semester 3	EOHS 755: Industrial Ventilation
Semester 3	ELECTIVE or EOHS 745: Hazardous Waste Management (for HSAT students)
Semester 4	EOHS 759: Industrial Site Visits
Semester 4	EOHS 761: Capstone
Semester 4	ELECTIVE or EOHS 770.86: Fire Safety and Emergency Response (for HSAT students)
Semester 4	ELECTIVE

\* All courses required except for those designated as ELECTIVE. HSAT students are required to take EOHS 745 and 770.86, and thus have only one elective course. Other IH students have three electives as indicated.

**Appendix B. Faculty and Trainee Publications during the reporting period.** (Trainees underlined)

Weiss A, Caravanos J, Blaise M, Jaeger R; *Distribution of lead in urban roadway grit and its association with elevated steel structures*; Chemosphere, Vol 65: pp 1762-1771; December 2006

Caravanos J, Weiss A, Jaeger R; Long Term Exterior Dust Lead Loadings in New York City; Environmental Research, Vol 100(2): pp 159-164; February 2006

Caravanos J, Weiss A, Blaise M, Jaeger R; A Survey of Spatially Distributed Exterior Dust Lead Loadings in New York City; Environmental Research, Vol 100(2): pp 165-172; February 2006

Weiss A, Caravanos J, Jaeger R; Lead in Urban Roadway Grit: A Novel Source and it's Implication, The Toxicologist, (abstract) Society of Toxicology Conference, San Diego, CA, March 2006

M. Goldberg and N. Clark, "Controlling an Ancient Occupational Disease in a Modern Urban Setting: Assessing Silica Exposure during Infrastructure Rehabilitation in New York City." In Goldsmith and Sonnino (Eds.), *Rome and New York City: Comparative Urban Problems at the End of the 20<sup>th</sup> Century*. Casa Editrice Universita La Sapienza, Rome, 2006.

Klitzman S, Matte T and Kass D, "The Urban Physical Environment" in D. Vlahov, N. Freudenberg, S. Galea (Eds.), *Urban Health: Cities and the Health of the Public*, Nashville TN: Vanderbilt Univ. Press: 61-84, 2006.

Klitzman S, "Trends in lead exposure in New York City: Challenges and implications for public and environmental health policy and practice." in V. Goldsmith and E. Sonnino (Eds.), *Rome and New York City Comparative Urban Problems at the End of the 20<sup>th</sup> Century*, Rome: Casa Editrice Universita La Sapienza: 249-267, 2006.

Richmond-Bryant J, Eisner AD, Brixey LA, Wiener, R. (2006) Transport of small airborne particles within a room. *Indoor Air*. 16: 48-55.

Richmond-Bryant J, Eisner AD, Brixey LA, Wiener R. (2006) Short-term dispersion of indoor aerosols: Can it be assumed the room is well-mixed? *Building and Environment*. 41: 156-163.

Richmond-Bryant J, Eisner AD, Flynn MR. (2006) Considerations for modeling particle entrainment into the wake of a circular cylinder. *Aerosol Science & Technology*. 40: 42-51.

### **III. Program Progress Report (Occupational and Environmental Medicine Residency Program)**

#### **A. Program Title: Occupational and Environmental Medicine Residency Program (Mount Sinai)**

#### **B. Program Director: Program Director: Debra Milek, MD, PhD, MPH Deputy Program Director: Winston Kwa, MD, MPH**

#### **Program Highlights July 1, 2006-June 30, 2007**

Four students were enrolled in the OEM program, two in each year. Both second year residents having completed two years of training, and graduated the residency program. One resident had completed her MPH prior to starting our program and the other completed his during the residency.

Debra Milek, MD, PhD, MPH, previously the Deputy Director of the Program became the Director of the Occupational Medicine Residency Program beginning July 1, 2006 Winston Kwa, MD, MPH, a graduate of our Program, became the Deputy Director of the Residency Program.

The MPH Program at our institution continues to expand and has come under the leadership of Dr. Emily Senay, a graduate of our Preventive Medicine Residency Program.

Ekong Ekong, MD, MPH a graduate of the Johns Hopkins occupational medicine residency program has joined our faculty.

Michael Crane, MD, MPH, joined the Mount Sinai faculty and stepped down as chair of the RAC and William Schneider, MD, MPH (Memorial Sloan Kettering Employee Health) assumed this position. Additional new RAC members include Jim Cone, MD, MPH (NYC DOH), Julia Klees, MD, MPH (BASF) and Dave Kotelchuk, PhD, CIH

#### **C. Program Description**

##### Goals and Objectives:

The goal of the OEM training program is to provide a two-year, full-time residency in occupational medicine, leading to board eligibility in this specialty. The Mount Sinai Occupational Medicine residency training program has four essential components: (1) a didactic program that leads to a Master of Public Health degree, (2) extensive clinical training in occupational medicine and relevant subspecialties of medicine, (3) field placement in diverse occupational settings and (4) research training.

##### Responsible Conduct of Science Training:

Our residents and faculty participating in research have completed IRB and HIPAA training at our Institution on website [http://www.mssm.edu/irb/edu\\_req/](http://www.mssm.edu/irb/edu_req/) and also at [www.cancer.gov](http://www.cancer.gov) prior to participation in research activities. All resident projects have faculty advisors with supervisory responsibility.

##### Faculty Participation:

Clinical faculty in Occupational & Preventive Medicine, departmental epidemiologists and biostatisticians, industrial hygienists, social workers in the Department of Community and Preventive Medicine are extensively involved on an ongoing basis in the clinical, didactic, and research activities of the residents.

##### Curriculum:

The residents pursue their MPH degree or take required Occupational Medicine courses if they already have an MPH degree. They attend clinical didactic sessions in Radiology, (chest and musculoskeletal), see patients weekly in a dedicated clinic session and present their cases to faculty the following day. Residents attend all departmental lectures as well as Grand Rounds, which were organized by Dr. Hannah Kim, a second year resident, in addition to special conferences applicable to the field of occupational medicine. Residents participate in ongoing faculty research projects as well as independent projects culminating in a thesis.

The Mount Sinai interdisciplinary journal club continues to provide a stimulating environment, with the Preventive Medicine residents in attendance and readings relevant to either or both specialties. Residents rotating in Occupational Medicine from other institutions such as the NYC Department of Health also attend journal club and resident case presentations, further enhancing the breadth of the educational experience.

#### **D. Program Activities and Accomplishments**

##### **1. Progress toward Goals and Objectives:**

Upon completion of the residency program, virtually all of our graduates practice occupational medicine in academic, corporate or clinical locations. A recent graduate is in line to become Medical Director of the Occupational Medicine Division of a Kaiser-Permanente site. Others have joined our own faculty and participate in the World Trade Center Treatment Program. As mentioned previously, Dr. Kwa, a 2005 graduate, is now the Deputy Director of the residency.

Most graduates take the board examination within one to two years of completing the program, and most recent trainees have passed the board on the first attempt, with impressively high scores. Unfortunately in the past year due to illness, one resident did not pass the exam but plans to retake it.

##### **2. Resident and Faculty Honors and Awards:**

Dr. Eli Avila was invited to speak at the annual AMA meeting in Chicago on the importance of availability of translators to the delivery of health care to immigrant populations.

##### **3. Resident Theses and Dissertations:**

Both graduating residents completed research projects and presented their findings at the ERC Scientific Day. Eli Avila, MD, JD, MPH: "Responders to the WTC Disaster and Their Ensuing New York State Workers' Compensation Sequelae" was a record review of 600 WTC responders describing the course of the workers' compensation claims from initiation to adjudication. He is in the process of writing this project for publication in a medicolegal journal.

Hannah Kim, MD, MPH: "Acupuncture as an Adjunct to Standard Conservative Treatment vs Standard Treatment Alone in Work-Related Carpal Tunnel Syndrome: A Randomized Controlled Pilot Study" examined the use of acupuncture in a double blind pilot study of 40 volunteers with work related carpal tunnel. Initial indications are that there appeared to be a modest improvement in symptomatology in those treated with acupuncture compared to those receiving the sham treatment.

##### **4. New Faculty Appointments:**

Ekong, Ekong, M.D., M.P.H. joined the Mount Sinai School of Medicine faculty after he completed the Occupational and Environmental Medicine Residency at Johns Hopkins University. Dr. Ekong is certified by the American Board of Preventive Medicine as a specialist in Occupational Medicine. Dr. Ekong teaches and supervises residents in the Irving J. Selikoff Center for Occupational and Environmental Medicine.

##### **5. New Courses:**

June 10-15, 2007 the NY/NJ ERC conducted its second Northeast Occupational Safety and Health Tour. For one week, ERC students, interns and faculty traveled across the Northeastern U.S. and Canada to visit industrial sites of current or historical health and safety interest. Students and faculty from every ERC academic program were represented. Participants from the Mount Sinai Occupational Medicine Residency Program were faculty members Drs. Afilaka and Moline and residents Eli Avila, Matthew Clarke, and Lori Rolando, as well as recent graduate Hale Yarmohammadi.

A new monthly seminar series of invited guests with diverse careers in different areas of Occupational & Environmental Medicine was initiated so that our residents can understand the many venues in which Occupational Medicine can be practiced. Access to an accomplished colleague's experiences within an intimate setting allows for expanding the residents' knowledge of their career options at an early point in their training. It has been very well received as. Our speakers have included luminaries from government, academia and hospital based OEM positions such as Drs. John Howard (Director of NIOSH), Paul Brandt-Rauf (Chair of OEM at Columbia School of Medicine), and William Schneider (Memorial Sloan Kettering Employee Health). Each have presented numerous insights and multiple examples of the many paths that can be taken in the practice of OEM.

A new field placement was added---BASF, an international chemical corporation with the U.S. headquarters in NJ. The residents obtain exposure to administrative aspects of corporate Occupational & Environmental Medicine including surveillance for new and emerging exposures, risk communication, hearing conservation and emergency procedures.

We offered a practicum experience with OSHA and the Department of Health concurrent with the MPH training year so that the residents can gain a broader practical grasp of the field earlier and begin to make meaningful contributions earlier in their training. This was very successful with one physician in each location.

Residents complete the 10 hr OSHA course on Health and Safety in the construction trades. It was sufficiently valuable to our residents, and we will continue to make this available to them as OSHA permits.

The Mount Sinai Department of Orthopedics offered a weekend course in musculoskeletal problems, which our residents attended, providing additional training in this topic.

The MPH program continues to offer new and innovative courses relevant to issues, which are directly or indirectly relevant to our residents' training. Complex Problems is a new course in the Health Administration category (residents are required to take one course in this area) where the topics include predicaments in where the decision-maker(s) must integrate or reconcile at least two competing priorities that may not be complementary. Also new this year are the electives Refugee Health, which deals with the Public Health impact of displacement and Global Health Conference: Health Consequences of the War in Iraq.

#### 6. Trainee Recruitment Efforts:

Occupational medicine residents at Mount Sinai generally have three years of clinical training prior to entering the residency program; many are board-eligible in internal medicine or family practice. In addition to advanced clinical training, experience and demonstrated interest in occupational and environmental health are viewed favorably in the selection of residents. Trainee recruitment efforts continue through successful past sources such as advertising via AOEC events, faculty lectures at hospital departments of Internal Medicine and Family Practice including inner city programs with significant minority populations. Our program graduates have consistently included trainees from diverse backgrounds under-represented in the field of

Occupational Medicine. Networking with our former graduates continues to be a fruitful source of residents who recommend our training program to other minority colleagues.

## **E. Program Products**

### **1. Trainee Publications and Presentations**

Resident Presentations: Dr. Avila also presented to the COEM residents and faculty a talk on Occupational Eye injuries utilizing his area of expertise prior to the residency to familiarize our faculty with this important area of occupational medicine. Dr. Avila also developed a talk on Work-Related Tuberculosis Infection in Healthcare Settings. Dr. Hannah Kim presented a talk on pesticides to update the COEM regarding critical issues in pesticide exposure. For the Topics In Safety and Ergonomics Class, Dr. Avila presented a talk on Zero Lifting for Healthcare Workers, Dr. Kim presented a talk on Ergonomics in the Public Sector, Dr. Rolando presented on Ergonomic in the Hospitality Industry and Dr. Clarke presented on Health and Safety Programs in the Construction Trades. Additionally, Dr. Clarke presented a talk on Work-Related Back Injuries and another on Diagnosis and Treatment of RSD, while Dr. Rolando presented a lively discussion of relevant aspects of Venous Insufficiency to the COEM faculty. Dr. Rolando also presented a talk on Methicillin Resistant Staph Aureus in a health care worker at a meeting of the NY State Clinic Network of Occupational Medicine Clinics. Dr. Rolando also collaborated with the DOH to produce a manual for the lay public regarding Radiation Hazards.

### **2. Faculty Publications and Presentations (See Appendix B for faculty publications)**

Faculty presentations: The Mount Sinai Occupational and Environmental Medicine Residency Program continue to be active in continuing education and outreach. Clinical faculty members have been invited to present their work throughout the region as well as nationally and internationally. Since 9/11/01, clinical faculty have been extensively interviewed in the print and television media. Drs. Moline, Levin, Herbert, de la Hoz, Szeinuk, Piligian and Milek have presented talks related to World Trade Center health effects at multiple medical centers in the region at Grand Rounds and other conferences, as well as at national meetings. Dr. Phil Landrigan, the chair of Community and Preventive Medicine speaks extensively on Pediatric Environmental issues and Dr. Paul Landsbergis frequently presents his work on stress, cardiovascular disease and the workplace. Our physicians also participate in the Fogarty International Program, providing outreach on occupational medicine topics.

### **3. Conferences/Symposia Sponsored**

The 28<sup>th</sup> annual scientific meeting of the ERC The Changing Work Force and Occupational Health Disparities occurred on June 20, 2007 with attendance by our residents, faculty and the other members of the ERC as well as local labor and political figures.

One of our trainees, Dr. Avila, organized a presentation with participation by legal experts to update Mount Sinai School of Medicine regarding the status of Workers' Compensation and legal aspects related to the World Trade Center injured patients.

### **4. Research Projects having Significant Trainee Involvement**

All residents of the Occupational Medicine Residency Program participate as part of their clinical training in the asbestos screenings, a unique research and training experience due to the volume of workers with decades of exposure seen at our facility. Additionally, a new activity involves a comparison of prior asbestos films with those from Libby, Montana to assess whether the latter is truly a more aggressive form of asbestosis. World Trade Center research projects, another area unique to Mount Sinai, have included that of Dr. Avila and his review of the Workers' Compensation cases of WTC injured workers as previously mentioned.

## **F. Future Plans**

We intend to continue the residents' training in orthopedics and expand musculoskeletal training further to include Physical Medicine and Rehabilitation exposure as well as Radiology of the musculoskeletal system. We plan to initiate a rotation to develop further Pulmonary Function expertise.

As the MPH program has vital new leadership and OEM is a rapidly expanding field, we plan to increase course requirements in Occupational & Environmental Medicine within that program. The OSHA 10 hr construction health and safety seminar will also be mandatory.

Research interests of the faculty continue to include current and newly evolving World Trade Center related disorders and other work-related issues, as well as continuing our known expertise in areas such as musculoskeletal injuries such as carpal tunnel, injury prevention, heavy metals, performing artists' injuries and asbestos including an expansion of mesothelioma research. We likely will also continue to look at the role of Alternative Medicine in treatment of work-related injuries. Future plans continue to include resident involvement in projects with discrete groups of workers with unique sets of occupational problems to address, for example, highway repair and ironworkers.

Although the residents continue to see some WTC patients in their Occupational Medicine clinic, a future rotation in our World Trade Center treatment program is still under consideration because of the experience to be gained in diagnosis, treatment and management of the injury complex resulting from rescue and recovery at the WTC disaster site.

#### **IV. Report on Specific Improvements in OS&H Resulting from ERC Programs**

The residents participated in the newly formed collaborative efforts of Mount Sinai OEM, labor and the city to assess and reduce exposures for DOT workers. The literature describes the increased risk of asthma and heart disease from the types of exposures highway repair workers are exposed to. This first came to our attention through our WTC employees from the DOH who had become ill after their work at the WTC site.

The OEM faculty at MSSM has been instrumental in continuing to develop, expand and maintain screening; monitoring and treatment programs for the WTC related injuries. The residents have been exposed to many facets of this programmatic development, the outcome of which has saved the lives and maintained the health of many thousands of WTC responders.

The residents continue to be involved in asbestos screening evaluations, which includes primary (including general adult health maintenance recommendations), secondary and tertiary prevention opportunities. That our residents often have advanced training proves beneficial to our patients. For example, Dr. Avila's expertise in ophthalmology and Dr. Rolando's in vascular surgery have been invaluable in the treatment of certain patients presenting with such injuries as well as sharing their expertise with our residents and faculty.

## V. Appendices

### Appendix A. Program Curriculum and Course Requirements.

A typical weekly OEM resident schedule is as follows:

	Monday	Tuesday	Wednesday	Thursday	Friday	Weekend
AM	Research/ Clinical Follow-up OR Field Placement	Journal Club for Health Professionals	Inter- Disciplinary Courses	Occupational Health Clinic Center	Clinical Seminar Series OR Resident Case Presentation	Field Survey 2 days/mo
		Radiographs		Research/ Clinical Follow-up	Clinical Case Conference	
PM	Research/ Clinical Follow-up or Field Placement	Research/ Clinical Follow-up or Field Placement	Research/ Clinical Follow-up or Field Placement	Occupational Health Clinic Center	Division Research Seminar/Grand Rounds	
				Research/ Clinical Follow-up		
	Academic Courses	Academic Courses	Academic Courses	Academic Courses		

Academic coursework toward an MPH degree consists of the following core requirements:

Introduction to Public Health, Introduction to Biostatistics, Introduction to Epidemiology, Introduction to Environmental & Occupational Health, Research Methods and one course in each of the following two subject areas: Health Management, Policy, or Economics; and Socio-behavioral Health. (Appendix A) The ERC inter-university Industrial Process and Site Visit course, held annually during the Spring semester, continues to be successful, as is the Fall interdisciplinary ERC occupational safety and health seminar course. Both are required for all OM residents. The Mount Sinai interdisciplinary journal club continues to provide a stimulating environment with the Preventive Medicine residents in attendance and readings relevant to either or both specialties. Residents rotating in Occupational Medicine from other institutions such as the Department of Health, also attend journal club and resident case presentations further enhancing the breadth of the educational experience.

In addition to the MPH requirements, requirements for the Occupational Medicine Track have been revised. The OEM track, which our residents take requires additional coursework entailing rigorous didactic training to complement the clinical aspects of our program. Those coming to the institution will be required to complete those courses in our track, which they have not yet taken. The total course curriculum for our two-year program is as follows:

001 Introduction to Public Health	2 credits	Autumn
002 Disease Prevention & Health Promotion	2 credits	Autumn
115 Business Aspects of Occupational Health Practice	2 credits	Autumn
300 Introduction to Biostatistics	3 credits	Winter
320 Research Methods	1 credit	Winter
400 Introduction to Epidemiology	3 credits	Autumn
415 Case Studies in Epi: Environmental & Occ. Health	3 credits	Spring

500 Introduction to Environmental & Occupational Health	3 credits	Winter
506 Topics on Safety and Ergonomics	2 credits	Spring
525 Pediatric Environmental Health	3 credits	Spring
515 Toxicology	2 credits	Spring
090 Practicum	0 credits	Any
099 Master's Thesis	4 credits	Any
	(30 credits)	

One course in each of the following areas:

Socio-Behavioral Health

- |  |           |        |
|--|-----------|--------|
| ○ 203 Introduction to Medical Anthropology | 3 credits | Spring |
| ○ MSCR Behavioral Medicine                 | 3 credits | Autumn |
| ○ MSCR Culture, Illness & Community Health | 3 credits | Spring |

Health Policy, Management and Economics

- |  |           |        |
|--|-----------|--------|
| ○ 103 Strategic and Program Management | 3 credits | Winter |
| ○ 105 Health Economics                 | 3 credits | Winter |

**(36 credits)**

## Appendix B. Faculty Publications.

### Philip Landrigan

Trasande L, Schechter C, Haynes KA, Landrigan PJ. Mental Retardation and Prenatal Methylmercury Toxicity.

Am J Ind Med 153-158, 2006.

Trasande L, Cronk CE, Leuthner SR, Hewitt JB, Durkin M, McElroy J, Anderson HA, Landrigan PJ. The National Children's Study and the Children of Wisconsin. Wisconsin Medical Journal 105(2):45-49, 2006.

Trasande L, Schapiro ML, Falk R, Haynes KA, Behrmann A, Vohmann M, Stremski ES, Eisenberg C, Evenstad C, Anderson HA, Landrigan PJ. Pediatrician Attitudes and Knowledge of Environmental Health in Wisconsin.

Wisconsin Medical Journal 105(2):50-54, 2006.

Trasande L, Boscarino J, Graber N, Falk R, Schechter C, Galvez, M, Dunkel G, Geslani J, Moline J, Kaplan-Liss E,

Miller RK, Korfmacher K, Carpenter D, Forman J, Balk SJ, Laraque D, Frumkin H, Landrigan PJ. The Environment Study of New York Pediatricians' Attitudes, Beliefs, and Practices towards Children's Environmental Health. J Urban Health 83(4):760-772, 2006.

Grandjean P, Landrigan PJ. Developmental Neurotoxicity of industrial chemicals: A silent pandemic. Lancet 368(9553):2167-2178, 2006.

Landrigan PJ, Trasande L, Thorpe LE, Gwynn C, Lioy PJ, D'Alton ME, Lipkind HS, Swanson J, Wadhwa PD, Clark EB, Rauh VA, Perera FP, Susser E. The National Children's Study: A 21-year prospective study of 100,000 American children. Pediatrics 118(5):2173-2186, 2006.

Herbert R, Moline J, Skloot G, Metzger K, Baron S, Luft B, Markowitz S, Udasin I, Harrison D, Stein D, Todd A,

Enright P, Stellman JM, Landrigan PJ, Levin S. The World Trade Center Disaster and the Health of Workers: Five-Year Assessment of a Unique Medical Screening Program. Environ Health Perspect 114:1853-1858, 2006.

Landrigan PJ, Golden AL, Simpson HJ. Toxic substances and their impacts on human health in the Hudson River Watershed. Chapter 28. In: The Hudson River Estuary. Levinton J, Waldman J (eds). Cambridge University Press, 2006.

Landrigan PJ, Benbrook CM. Impacts of the Food Quality Protection Act on Children's Exposures to Pesticides. Presented at the AAAS Symposium on Opportunities and Initiatives to Minimize Children's Exposures to Pesticides. St. Louis, Missouri, February 19, 2006.

Landrigan PJ. Essays in Public Health and Preventive Medicine. *Mount Sinai Journal of Medicine* 73:564, 2006.

Landrigan PJ. Environmental Pediatrics and the Ecological Imperative. (Editorial) *EcoHealth* 3:75-76, 2006

Landrigan PJ, Trasande L. Economic Implications of Metal Neurotoxicity. Presented at an International Workshop on Neurotoxic Metals: Lead, Mercury and Manganese from Research to Prevention. Brescia, Italy, June 17-18, 2006.

Landrigan PJ. Our Most Vulnerable. Chapter 12. In: Child Honoring. How to Turn this World Around. Cavoukian R, Olfman S (eds). Praeger Publishers, 2006.

Landrigan PJ, Pronczuk DeGarbino J, Newman B. Introduction. In: Living in a Chemical World. *Ann NY Acad Sci* xvii-xviii, 2006. Framing the Future in Light of the Past. In: Living in a Chemical World. *Ann NY Acad Sci* 1-3, 2006.

Landrigan PJ. Ruth Lilis (1926-2006). *Am J Ind Med* 49:607-608, 2006.

Landrigan PJ, Woolf AD, Gitterman B, Lanphear B, Forman J, Karr C, Moshier EL, Steiner JF, Godbold J, Crain E. The Ambulatory Pediatric Association Fellowship in Pediatric Environmental Health: A Five-Year Assessment. *Environ Health Perspect* 115:1383-1387, 2007.

Chemtob CM, Conroy DL, Hochauser CJ, Laraque D, Banks J, Schmeidler J, Cruz MD, Nelson WC, Landrigan PJ. Children who lost a parent as a result of the terrorist attacks of September 11, 2001: Registry construction and population description. *Death Studies* 31:87-100, 2007.

Magdo HS, Forman J, Graber N, Newman B, Satlin L, Amler R, Winston JA, Landrigan PJ. Grand Rounds: Nephrotoxicity in a Young Child Exposed to Uranium from Contaminated Well Water. *Environ Health Perspect*, available online at <http://dx.doi.org/> (doi:10.1289/ehp.9707), 2007.

Landrigan PJ, Kotelchuck D, Grandjean P. Principles for Prevention of the Toxicity of Metals. Chapter 16. For inclusion in: Handbook of Toxicity of Metals. Nordberg GF, Fowler BA, Nordberg M, Friberg LT (eds). Academic Press, Inc. 2007.

Landrigan PJ, Forman JA. Chemical Pollutants. Chapter 707. In: Nelson Textbook of Pediatrics. Kliegman, Behrman, Jenson, Stanton (eds.). 18<sup>th</sup> Edition. Philadelphia, PA: Saunders Elsevier, Inc., pp. 2906-2909, 2007.

Landrigan PJ, Nordberg M, Lucchini R, Nordberg G, Grandjean P, Iregren A, Alessio L. The Declaration of Brescia on Prevention of the Neurotoxicity of Metals. *Am J Ind Med* 50:709-711, 2007.

Tornheim JA, Morland KB, Landrigan PJ, Cifuentes E. Diarrheal Disease Burden Attributable to Water Privatization in Bolivia. (Poster). Presented at CMCA Conference, December 7, 2006.

Landrigan PJ. Doctor David V. Bates (1922-2006). *Eur J Oncol* 11:265, 2006.

Robbins A, Landrigan PJ. Safer, Healthier Workers: Advances in Occupational Disease and Injury Prevention. Chapter 10. In: Silent Victories. Ward JW, Warren C (eds). Oxford University Press, pp 209-229, 2007.

Landrigan PJ. The 2<sup>nd</sup> ADAO Abestos Conference Proceedings. Preface. *Am J Ind Med* 50:51, 2007.

Landrigan PJ. Valediction. (Editorial) *Am J Ind Med* 50:243-244, 2007.

Landrigan PJ. Benzene. Chapter 71. In: *Environmental and Occupational Medicine, Fourth Edition*, edited by William N. Rom, Lippincott-Raven Publishers, Philadelphia, 2007.

Landrigan PJ, Claudio L. Pesticides. Chapter 21. In: *Environmental Toxicants: Human Exposures and Their Health Effects*. Lippman M (ed.). 3<sup>rd</sup> Edition. New York: John Wiley, 2007.

Trasande L, Landrigan PJ, Schechter CB, Bopp RF. Methylmercury and the Developing Brain. (Letter to the editor) *Environ Health Perspect* 115:A396-A397, 2007.

Grandjean P, Bellinger D, Bergman A, Cordier S, Davey-Smith G, Eskenazi B, Gee D, Gray K, Hanson M, van den Hazel P, Heindel JJ, Heinzow B, Hertz-Picciotto I, Hu H, Huang T T-K, Jensen TK, Landrigan PJ, McMillen IC, Murata K, Ritz B, Schoeters G, Skakkebaek NE, Skerfving S, Weihe P. The Faroes Statement: Human Health Effects of Developmental Exposure to Chemicals in Our Environment. *Basic & Clinical Pharmacology & Toxicology* doi: 10.1111/j.1792-7843.2007.0014.x.

### **Paul Landsbergis**

Johanning E, Landsbergis PA, Fisher S, Christ E, Gores B, Luhrman R. Whole-body vibration and ergonomic study of U.S. railroad locomotives. *Journal of Sound and Vibration* 2006;298:594-600.

Fischer FM, da Silva Borges FN, Rotenberg L, de Oliveira Latorre MRD, Soares NS, Santa Rosa PLF, Teixeira LR, Nagai R, Steluti J, Landsbergis P. Work ability of health care shift workers: What matters? *Chronobiology International* 2006;23(6):1165-1179.

LaMontagne AD, Keegel T, Louie AM, Ostry A, Landsbergis PA: A systematic review of the job stress intervention evaluation literature: 1990-2005. *International Journal of Occupational and Environmental Health* 2007;13(3) 268-280. Open access at [www.ijoe.com/pfds/IJOEH\\_1303\\_Lamontagne.pdf](http://www.ijoe.com/pfds/IJOEH_1303_Lamontagne.pdf). Full details of reviewed studies available electronically (but not in print) at [http://www.ijoe.com/pfds/IJOEH\\_1303\\_LamontagneAppdx.pdf](http://www.ijoe.com/pfds/IJOEH_1303_LamontagneAppdx.pdf).

Fang S, Herbert R, Dropkin J, Triola D, Landsbergis PA. Workers' compensation experiences of computer users with musculoskeletal disorders. *American Journal of Industrial Medicine* 2007;50:512-8.

Santa Rosa PLF, Fischer FM, da Silva Borges FN, da Silva Soares N, Rothenberg L, Landsbergis P. Perceived sleep duration and fatigue among nursing personnel (Portuguese). *Revista Enfermagem UERJ* 2007;15(1):100-106.

Collins S, Warren N, Landsbergis PA, LaMontagne AD. Stopping stress at its origins addressing working conditions (letter). *Hypertension* 2007;49(5): e33.

### **Jacqueline Moline**

Trasande L, Boscarino J, Graber N, Falk R, Schechter C, Galvez M, Dunkel G, Geslani J, Moline J, Kaplan-Liss E, Miller RK, Korfmacher K, Carpenter D, Forman J, Balk SJ, Laraque D, Frumkin H, Landrigan PJ. The Environment in Pediatric Practice: A Study of New York Pediatricians' Attitudes, Beliefs, and Practices towards Children's Environmental Health. *J Urban Health*. 2006 Jul;83(4):760-72.

Herbert R, Moline J, Skloot G, Metzger K, Baron S, Luft B, Markowitz S, Udasin I, Harrison D, Stein D, Todd A, Enright P, Stellman JM, Landrigan PJ, Levin S. The World Trade Center Disaster and the Health of Workers: Five-Year Assessment of a Unique Medical Screening Program. *Environ Health Perspect*. 2006 Dec;114(12):1853-8.

Mitchell C, Gochfeld M, Shubert J, Kipen H, Moline J, Langlieb A, Everly G, Udasin I, Wartenburg D, Paulson G. "Surveillance of Workers Responding under the National Response Plan", *J Occup Environ Med*. 2007 Aug;49(8):922-927.

### III. Program Progress Report

#### A. Program Title: Occupational Medicine Residency Program (UMDNJ-Robert Wood Johnson Medical School)

**B. Program Director: Michael Gochfeld, MD, PhD**  
**Associate Director: Omowunmi Osinubi, MD, MPH**

#### C. Program Description

The Occupational and Environmental Medicine Residency at UMDNJ-Robert Wood Johnson Medical School admitted its first resident in 1984. The residency is a two-year program giving strong preference to candidates who are board eligible or board certified in a primary care discipline, thereby serving as a fellowship. The academic and practicum components are now integrated. Residents enroll in the UMDNJ-School of Public Health MPH program. Recently the program celebrated its 22st year receiving full five-year accreditation from the Residency Review Committee.

The field can be defined as “The recognition and prevention of adverse health effects caused or aggravated by exposure to hazardous substances or conditions in the home, community, or workplace environment.”

Not only is New Jersey the most densely industrialized state, but it has consistently had a high level of public awareness and concern about environmental matters related in large part to its industrial history..

The residency provides experience in clinical and administrative aspects of Occupational Medicine and Environmental Medicine.

##### Objectives of the Residency:

1. Residents will obtain the knowledge, abilities, and skills which are deemed essential for the practice and future development of the field of occupational medicine.
2. Through academic course work residents will learn the basic principles and skills of public health, preventive medicine, epidemiology, biostatistics, health education and health care organization, as well as the specific content areas of environmental health and occupational health, toxicology, occupational medicine, industrial hygiene and risk assessment.
3. Through their clinical experiences residents will learn how to evaluate individual patients with respect to the actual or suspected hazards they encounter at work or elsewhere, and will learn how to assess work-relatedness and manage difficult cases, including allowing individuals to maintain gainful employment, identifying work restrictions or suitable alternative jobs, and recognizing criteria for disability.
4. Through their practicum experiences residents learn how occupational health and safety are practiced in organizations, how to maintain the profile of the profession, how to assure effective hazard recognition and interventions, and how to deal with the individual employee/patient with regard to exposures, compensation, and disability.
5. The required field-work research offers residents the opportunity to design, implement, and report on a research project at substantial depth. Interestingly, many residents have chosen to study the interface between social aspects of occupational medicine or the organization and delivery of occupational health services, rather than more specific technical or toxicological topics. Residents are required to complete an on-line training certification program in the protection of human subjects and must submit their research proposal to the RWJMS Institutional Review Board.

Competency-based learning is an increasingly important part of graduate medical education. We have been incorporating it into the residency as a way of more clearly defining the learning objectives and expectations.

The academic experience (see description of academic program in Appendix A) is spread more or less equally over the two years. Residents obtain the MPH degree with an emphasis in the Department of Environmental and Occupational Health. The practicum experience is a series of longitudinal placements (one day a week), which affords continuity of experience.

Over the past 20 years the program has had 39 graduates, 32 of whom practice full-time in the field of occupational - environmental medicine. Two others are full-time preventive medicine practitioners.

#### **D. Program Activities and Accomplishments**

##### **1. Progress Toward Goals and Objectives:**

The program continues to recruit excellent residents, many of whom have already completed primary care residencies, and join the program as fellows with board eligibility in Internal Medicine or Family Medicine. Most graduates are taking the board examination within two years of completing the program, and all recent trainees have passed the board on the first attempt.

The interdisciplinary seminar and the inter-university Industrial Site Visit course continue to be successful. All residents are required to take these two inter-university courses.

##### **2. Trainee Honors, Awards, Scholarships:**

Recent graduates have received academic awards from the School of Public Health for the highest grade point average of all MPH candidates.

##### **3. Faculty Honors, Awards, Appointments:**

The director, Dr. Gochfeld, was honored by ACOEM in 2006 with its Health Achievement Award.

##### **4. Trainee Theses and Dissertations: Resident fieldwork projects required for the MPH degree.**

- a. **Damir Mazlagic, MD, MPH.** Title: "Skin-Test Reactivity to Allergens and Neuropsychological effects Attributed to Indoor Mold Exposure: Pilot Study". Dr. Mazlagic studied clinic patients with reported neuropsychologic responses to mold, using a combination of skin-testing and a neuropsychology test battery.
- b. **Michelle Roberston, MD, MPH.** Title: "The Maywood Medical Monitoring Program after 5 years: Is Lung Cancer Screening Worthwhile?". Dr. Robertson reviewed the literature on the sensitivity/specificity of CT Screening and consequent radiation exposure, and then analyzed the imaging results from a five-year lung-cancer screening program in a population exposed to inhaled alpha emitters.
- c. **Anthony Grippo, MD, MPH.** Title: "Measurement of Exhaled Pentane in Asthmatics after Diesel Exhaust Inhalation." This project, funded by the ERC (Grippo PI, 2006/7), involved measuring nitric oxide and pentane in exhaled breath collected from volunteers before and after controlled exposure to diluted diesel exhaust or clean air control. Dr. Grippo built the breath-collection device and piloted collection of breath and subsequent analyses on six subjects, demonstrating the feasibility of these methods for use in future studies.

##### **5. New Faculty Positions:**

- a. Joseph Romano, MD, recently retired corporate medical director of American Express, joined the faculty on a part-time basis to teach a course in occupational medicine program management, as a required module. Dr. Romano participates in the Divisions weekly

conferences.

6. New Courses:
  - a. Dr. Joseph Romano (see above) has introduced a course module on the management of occupational health programs, which has now been integrated into the Occupational Health Practices course required of all trainees.
7. Recruitment of Minorities:
  - a. The program continues to maintain a pro-active approach to maintaining demographic diversity among its trainees. Minorities have been well-represented in the program over the years. However, of the three African-Americans offered positions in the July 2007 class, one opted to go to another program (Harvard), one deferred admission for a year, and one decided not to pursue OEM training.

**E. Program Products (See Appendix B for Faculty and Student Publications and Presentations)**

CE Course Presented: Dr Gochfeld is the course director for the Spirometry training course operated by the ERC-CE program.

**F. Unique Training Courses Presented: None**

**G. Future Plans**

In keeping with the University's commitment to enhance clinical and translational research, the program will seek to recruit at least one new resident each year with a strong research proclivity. Research interest of the faculty ranged from pulmonary disease to biomarker epidemiology.

**IV. Report on Specific Improvements in OS&H Resulting from ERC Programs**

The residents play an active role in the EOHSI Clinical Center, including activities in a major assessment program for 9/11 responders who were at the World Trade Center site. This work is funded in part by NIOSH. Largely through the dedication and talents of Iris Udasin, MD, the New Jersey component of the WTC surveillance program has had a very high participation and re-visit rate. This has involved early detection of some medical conditions as well as extensive consultation regarding personal health risks.

## **V. Appendices**

### **Appendix A. Program Curriculum and Course Requirements**

All trainees are enrolled in the UMDNJ-School of Public Health leading to the MPH degree. Most trainees complete the MPH concurrently with the two year residency/fellowship program. However, trainees may elect to complete the MPH after completing the residency.

This program has always required a 45-credit MPH degree. The curriculum is as follows (course titles are abbreviated and credits are in parentheses):

#### **Required Core courses (15)**

Environmental Health (3)  
Biostatistics (3)  
Epidemiology (3)  
Health Care Organization (3)  
Health Education/Behavioral Sciences (3)

#### **Required Track Courses (19)**

Environmental and Occupational Epidemiology (3)  
Environmental and Occupational Toxicology (3)  
Environmental Risk Assessment (3)  
Industrial Hygiene (3)  
Interdisciplinary Seminar (1) Joint with other ERC programs  
Industrial Site Visits (3) Joint with other ERC programs  
Occupational Health Practices and Management (3)

#### **Elective courses (5)**

(includes Historical Tour jointly with other ERC programs)

#### **Practicum Research (6)**

## Appendix B. Faculty and Trainee Publications and Presentations

### Presentations by Students:

**Julie Caruth** poster: “Seaport Injuries in a Developing Country”

Julie Caruth MD, MPH(2006): Advisor: Michael Gochfeld, MD, PhD

UMDNJ-Robert Wood Johnson Medical School Occupational Medicine Residency, NY-NJ Education and Research Center

**Damir Mazlagic** poster: “Skin-Test Reactivity to Allergens and Neuropsychological Effects Attributed to Indoor Mold Exposure: Preliminary Results”. Annual ERC Meeting 2006

**Robert Laumbach** poster for the pilot grant: “Skin-Test Reactivity to Allergens and Neuropsychological effects Attributed to Indoor Mold Exposure: Pilot Study” Annual ERC Scientific Meeting 2007

**Anthony Grippo** poster for the pilot grant: “Measurement of Exhaled Pentane in Asthmatics after Diesel Exhaust Inhalation.” Annual ERC Scientific Meeting 2007

### Publications and Book Chapters by Faculty:

#### **Michael Gochfeld - Residency/Fellowship Director**

Burger J, **Gochfeld M**, Jewett SC. Radionuclide concentrations in benthic invertebrates from Amchitka and Kiska Islands in the Aleutian Chain, Alaska. *Environ Monit Assess.* 2007 May;128(1-3):329-41.

Vahter M, **Gochfeld M**, Casati B, Thiruchelvam M, Falk-Filippson A, Kavlock R, Marafante E, Cory-Slechta D. Implications of gender differences for human health risk assessment and toxicology. *Environ Res.* 2007 May;104(1):70-84

Klein W, **Gochfeld M**, Davis B. Background on the Scientific Group on Methodologies for the Safety Evaluation of Chemicals and Workshop 16: Gender differences. *Environ Res.* 2007 May;104(1):2-3.

**Gochfeld M**. Framework for gender differences in human and animal toxicology. *Environ Res.* 2007 May;104(1):4-21.

Burger J, **Gochfeld M**, Kosson D, Powers CW, Friedlander B, Stabin M, Favret D, Jewett S, Snigaroff D, Snigaroff R, Stamm T, Weston J, Jeitner C, Volz C. Radionuclides in marine fishes and birds from Amchitka and Kiska Islands in the Aleutians: establishing a baseline. *Health Phys.* 2007 Mar;92(3):265-79.

Burger J, Campbell KR, Murray S, Campbell TS, Gaines KF, Jeitner C, Shukla T, Burke S, **Gochfeld M**. Metal levels in blood, muscle and liver of water snakes (*Nerodia* spp.) from New Jersey, Tennessee and South Carolina. *Sci Totl Environ.* 007 Feb 15;373(2-3):556-63

Burger J, **Gochfeld M**, Jeitner C, Burke S, Stamm T. Metal levels in flathead sole (*Hippoglossoides elassodon*) and great sculpin (*Myoxocephalus polyacanthocephalus*) from Adak Island, Alaska: potential risk to predators and fishermen. *Environ Res.* 007 Jan;103(1):62-9

Burger J, **Gochfeld M**, Powers CW. Integrating long-term stewardship goals into the remediation process: natural resource damages and the Department of Energy. *J Environ Manage.* 2007 Jan;82(2):189-99

Burger J, **Gochfeld M**, Jewett S. Selecting species for marine assessment of radionuclides around Amchitka: planning for diverse goals and interests. *Environ Monit Assess*. 2006 Dec;123(1-3):371-91

**Gochfeld M**, Volz CD, Burger J, Jewett S, Powers CW, Friedlander B. Developing a health and safety plan for hazardous field work in remote areas. *J Occup Envir Hyg*. 2006Dec;3(12):671-83.

Burger J, Jewett S, **Gochfeld M**, Hoberg M, Harper S, Chenelot H, Jeitner C, Burke S. The use of biota sampling for environmental contaminant analysis for characterization of benthic communities in the Aleutians. *Sci Total Environ*. 2006 Oct 1;369(1-3):393-402.

Burger J, **Gochfeld M**. Locational differences in heavy metals and metalloids in Pacific Blue Mussels *Mytilus [edulis] trossulus* from Adak Island in the Aleutian Chain, Alaska. *Sci Total Environ*. 2006 Sep 15;368(2-3):937-50

Burger J, **Gochfeld M**. Mercury in fish available in supermarkets in Illinois: are there regional differences. *Sci Total Environ*. 2006 Aug 31;367(2-3):1010-6

Burger J, Mayer HJ, Greenberg M, Powers CW, Volz CD, **Gochfeld M**. Conceptual site models as a tool in evaluating ecological health: the case of the Department of Energy's Amchitka Island nuclear test site. *J Toxicol Environ Health A*. 2006 Jul;69(13):1217-38

Book chapter by Gochfeld:

Fiedler, N., Burger, J., **Gochfeld, M**. Neurobehavioral Toxicity. In: Maxcy-Rosenau's Public Health and Preventive Medicine 15<sup>th</sup> Edition. J. Last, R. Wallace eds. Norwalk, CT. Appleton & Lange. In press.

#### **Omowunmi Osinubli – Associate Director**

**Osinubi, O.Y.O.**, Gandhi, S.K., Ohman-Strickland, P., Boglarsky, C., Fiedler, N., Kipen, H., Robson, M. Organizational factors and office workers' health after the world trade center terrorist attacks: Long-term physical symptoms, psychological distress and work productivity. *J Occup Environ Med*. Accepted, 2007.

#### **Howard Kipen – Division Director (Acting Department Chair)**

Ozakinci G, Hallman WK, **Kipen HM**. Persistence of symptoms in veterans of the First Gulf War: 5-year follow-up. *Environ Health Perspect*. 2006 Oct;114(10):1553-7

Osinubi, O.Y.O., Gandhi, S.K., Ohman-Strickland, P., Boglarsky, C., Fiedler, N., **Kipen, H.**, Robson, M. Organizational factors and office workers' health after the world trade center terrorist attacks: Long-term physical symptoms, psychological distress and work productivity. *J Occup Environ Med*. Accepted, 2007.

Sunil V, Patel KJ, Laumbach R, Turpin BJ, Lim HJ, **Kipen H**, Laskin JD, Laskin DL. Pulmonary Effects of Inhaled Limonene Ozone Reaction Products in Elderly Rats. *Toxicol Applied Pharmacol* 222:211-220, 2007.

Mitchell CS, Gochfeld M, Shubert J, **Kipen H**, Moline J, Langlieb A, Everly GS, Udasin I, Wartenberg D, Paulson G. Surveillance of Workers Responding Under the National Response Plan. *JOEM* 49:922-27, 2007.

**Kipen HM**. In memoriam: Ruth Lilis. *Am J Ind Med*. 2006 Jul 7;49(8):702

**Kipen HM**. Book Review: How Everyday Products Make People Sick: Toxins at Home and in the Work Workplace. *Environmental Health Perspectives* 115 (3):A166, 2007.

Book chapters by Kipen:

**Kipen HM** and McDiarmid M. Gulf War Illness. pp 882-90. *Environmental and Occupational Medicine*. Rom R and Markowitz S eds. Lippincott Williams and Wilkins, 2007. 4<sup>th</sup> edition.

McConnell E, Dixit R, Dorman D, Feuston M, Harkema J, **Kipen H**, Koller L, O'Donoghue J, Tsuji J, Watson A, Willhite C. Emergency and Continuous Exposure Guidance Levels for Selected Submarine Contaminants: Volume 1, The National Academies Press, Washington, DC, 2007.

Laskin D, Sunvil V, Laumbach R, **Kipen, HM**. Inflammatory Cytokines and Lung Toxicity in Cytokines In Human Health: Immunotoxicity, Pathology and Therapeutic Applications. pp 83-113. eds. R.V. House and J. Descotes., Humana Press, 2007.

### **Nancy Fiedler**

**Fiedler, N.**, Ozakinci, G., Hallman, W., Wartenberg, D., Brewer, N.T., Barrett, D.H., Kipen, H.M. Military deployment to the Gulf War as a risk factor for psychiatric illness among US Troops. *Br J Psychiatry*. 2006;188:453-459.

**Fiedler, N.**, Kelly-McNeil, K., Ohman-Strickland, P, Zhang, J., Ottenweller, J., Kipen, HM. Negative Affect (NA) and Chemical Intolerance (CI) as risk factors for building related symptoms: a controlled exposure study. *Psychosom Med*. In press.

**Fiedler, N.**, Kipen, H., Ohman-Strickland, P, Zhang, J, Weisel, C., Laumbach, R., Kelly-McNeil, K., Lioy, P. Sensory and cognitive effects of acute exposure to hydrogen sulfide. *Environ Health Perspect*. Accepted pending revision

Osinubi, O.Y.O., Gandhi, S.K., Ohman-Strickland, P., Boglarsky, C., **Fiedler, N.**, Kipen, H., Robson, M. Organizational factors and office workers' health after the world trade center terrorist attacks: Long-term physical symptoms, psychological distress and work productivity. *J Occup Environ Med*. In press 2007.

Shubert, J., Ritchie, E.C., Everly Jr., G.S.; **Fiedler, N.**, Williams, M.B., Mitchell, C.S., Langlieb, A.M. A missing element in disaster mental health: behavioral health surveillance for first responders. *Int J Emergency Mental Health*. Submitted.

Book chapters by Fiedler:

Baker, Jr., E.L. **Fiedler, N.** (2006) Neurologic and Psychiatric Disorders. In: Occupational and Environmental Health: Recognizing and Preventing Disease and Injury. 5<sup>th</sup> Edition. B.S. Levy, D.H. Wegman, S. Baron, R. Sokas (eds.) pp. 570-586.

**Fiedler, N.**, Burger, J., Gochfeld, M. Neurobehavioral Toxicity. In: Maxcy-Rosenau's Public Health and Preventive Medicine 15<sup>th</sup> Edition. J. Last, R. Wallace eds. Norwalk, CT. Appleton & Lange. In press.

**Fiedler, N.**, Lerman, S. Organic Solvents & Fuels. In: Environmental and Occupational Medicine. W.N. Rom & S. Markowitz, ed. Lippincott Williams and Wilkins, Philadelphia. 4<sup>th</sup> edition. 2007.

### **Iris Udasin**

Herbert R, Moline J, Skloot G, Metzger K, Baron S, Luft B, Markowitz S, **Udasin I**, Harrison D, Stein D, Todd A, Enright P, Stellman JM, Landrigan PJ, Levin SM. The World Trade Center disaster and the health of workers: five-year assessment of a unique medical screening program. *Environ Health Perspect*. 2006 Dec;114(12):1853-8

### **Robert Laumbach**

Sunil V, Patel KJ, **Laumbach R**, Turpin BJ, Lim HJ, Kipen H, Laskin JD, Laskin DL. Pulmonary Effects of Inhaled Limonene Ozone Reaction Products in Elderly Rats. *Toxicol Applied Pharmacol* 222:211-220, 2007.

Book Chapter by Laumbach:

Laskin D, Sunvil V, **Laumbach R**, Kipen, HM. Inflammatory Cytokines and Lung Toxicity in Cytokines In Human Health: Immunotoxicity, Pathology and Therapeutic Applications. pp 83-113. eds. R.V. House and J. Descotes., Humana Press, 2007.

Presentations by Faculty:

**Laumbach RJ, Fiedler N**, Kelly-McNeil K, Gandhi S, Pham P, Gong J, Ohman-Strickland P, Zhang J, Lioy PJ, Laskin DL, **Kipen HM**. Combined effects of diesel exhaust and psychological stress on inflammation and the acute phase response in normal humans. The Role of Air Pollutants in Cardiovascular Disease, EPA and NIEHS-sponsored meeting at USEPA, RTP, October 12-13, 2006.

**Laumbach RJ, Kipen HM**, Kelly-McNeil K, Gandhi S, Pham P, Gong J, Ohman-Strickland P, Zhang J, Lioy PJ, Laskin DL, **Fiedler N**. Effects of diesel exhaust and stress on systemic inflammation and the acute phase response in humans. Presented at the American Thoracic Society (ATS) 2006 International Conference, San Francisco, CA. May 19-24, 2007

Hua Qian, Sheng-Wei Wang, **Fiedler N**, Clifford Weisel. Organic solvent exposure level among bridge painters in New York City and New Jersey. Annual Conference of the International Society of Exposure Analysis, Durham/Research Triangle Park, North Carolina, 2007.

Chao MW, Pettit A, Koslosky JC, Sont R, Gerecke D, **Laumbach RJ**, Gordon MK. The Effects of Diesel Particles on Capillary Endothelial Tubes Grown in Vitro. Society of Toxicology (SOT) Annual Meeting, Charlotte NC, March 25-29, 2007.

**Kipen HM, Laumbach RJ**, Zhang J, Lioy PJ, Phillip C, Shindler D, Gandhi S, McNeil KK, Ohman-Strickland P, Laskin DL. Triggering acute vascular responses to air pollution: endothelial and platelet responses to fresh aerosol inhalation. Presented at the American Thoracic Society (ATS) 2006 International Conference, San Francisco, CA, May 19-24, 2007.

McWilliams R, Prezant D, Wartenberg D, Hallman W, Andreasen G, Kelly K, **Kipen H**. Evaluation of Responders to a Terrorist Attack, International Conference on Environmental Epidemiology & Exposure, Paris, France, September 1-7, 2006.

**Kipen H, Laumbach R**, Zhang J, Fan T, Lioy P, Philipp C, Schindler D, Pham P, Ohman-Strickland P, Gandhi S, Kelly-McNeil K, Laskin D. Triggering Acute Myocardial Infarction: Acute Endothelial And Platelet Responses To Fresh Aerosols, EPA-NIEHS Meeting on the Role of Air Pollutants in Cardiovascular Disease, Research Triangle Park, North Carolina, October 12, 2006.

### **III. Program Progress Report**

**A. Program Title: Occupational Safety and Health Engineering (OSHE) at NJIT**

**B. Program Director: Arijit K. Sengupta, Ph.D**

**C. Program Description**

Goals and Objectives of Oshe Program at NJIT:

The Occupational Safety and Health Engineering (OSHE) Program at New Jersey Institute of Technology (NJIT) leads to a Master of Science degree in OSHE. The objective of this program is: (1) To train degreed engineering graduates and safety professionals with science background at the graduate level to anticipate, identify, evaluate and resolve occupational safety and health hazards through engineering design, (2) To advance knowledge of safety and ergonomics through faculty and student research, and (3) To provide outreach services to the regional area and to occupational safety and health professionals nationally and internationally.

This field involves the application of engineering principles to the design and maintenance of workplaces in order to minimize the spectrum of hazards which may arise in connection with job performance. The program covers virtually all of the general areas which a safety professional might encounter. It has a practical orientation and aims to train students so that upon graduation, they are able to assume both the technical and managerial responsibilities borne by safety professionals.

Responsible Conduct of Science Training:

The NJIT Academic Honor Code defines those behaviors that violate the principle of academic integrity, describes a range of appropriate sanctions for offenses, and identifies the method for promoting the principle of academic integrity on campus. Academic integrity is emphasized throughout the student's career at NJIT.

The candidates for the degree who choose Masters Thesis option must submit an acceptable thesis on an approved subject that contributes to the literature of the field. While original research may not always result, the thesis should provide a new conclusion or application. Any experimental research involving human subjects must obtain approval from NJIT's Institutional Review Board (IRB), and all research personnel must be certified by the Office for Human Research Protections, which requires them to study and take an online certification test.

Faculty Participation:

Dr. Arijit K. Sengupta, OSHE Program Director, is an Associate Professor in the Department of Engineering Technology and has a joint appointment in the Industrial and Manufacturing Engineering Department (IME) at NJIT. Dr. Sengupta has earned his doctoral degree from the Department of Industrial Engineering at the Dalhousie University, Halifax, Canada, majoring in Human Factors and Ergonomics. He has published widely in reputable journals and conference proceedings. Dr. Sengupta devotes 50% of his time to this training program. He is in charge of grant administration and liaison with the other ERC programs. He is responsible for course scheduling, student advisement, thesis supervision and teaching. He teaches several core and elective courses for this program (IE 664, IE 665, IE725, IE 700, IE 681 and IE 682).

Dr. George Olsen serves as the Associate Director of OSHE Program. He is the Academic Advisor and Academic Coordinator for Dept of Information Systems (IS) and the Assistant Director of the MS IS Program. Dr. Olsen is a Certified Safety Professional and a Registered Professional Engineer with over 20 years experience in development and logistics engineering, specifically safety engineering. Dr. Olsen devotes 30% of his time to his responsibilities as Associate Program Director. He supervises student research projects and theses, and teaches two required courses: Safety Engineering (IE614) and Systems Safety (IE 685). Both core faculty members (AS and GO) additionally contribute to the activities sponsored

by the ERC. These include presenting seminars for the ERC students, organizing student conferences, student recruitment efforts and giving short courses in the Continuation Education Program at the ERC.

In addition to these two core program faculty, several other NJIT faculty members contribute by teaching courses that are relevant to this program. Dr. G. Bengu, an Associate Professor in IME Department, teaches Advanced Engineering Statistics (IE 604), which is a required course for this program. Dr. George Abdou, Associate Professor of IME, teaches Engineering Cost Analysis (EM502), which is a bridge course for OSHE students. Dr. Abdou has also acted as MS thesis committee member for OSHE program trainees. Dr. A. Bladikas, Chair of IME Department and Associate Professor, participates in the program as an MS thesis committee member. Dr. Norman Van Houten, Director of Health and Environmental Safety at NJIT, teaches a required course, Legal Aspects of Health and Safety (EM 633). He also teaches an elective course of this program, Hazardous Waste Operations and Emergency Response (Ev.Sc. 603). As an adjunct professor, Mr. Williams Biolsi teaches Industrial Hygiene and Occupational Health (IE 615). He comes from Lucent Technologies, where he is the Chemical Hygiene Officer. Dr. P. Patnaik, an Adjunct Professor from Environmental Science, teaches Toxicology for Engineering Science (Ev.Sc. 616), which is an elective course for this program.

#### Curriculum:

The educational program resides within the Department of Industrial and Manufacturing Engineering (IME) of NJIT. The degree is fully approved by the New Jersey State Department of Higher Education. Thirty-six semester credit hours of course work are required for the degree. A research-oriented thesis of six credit hours is required for the NIOSH trainees, whereas this is only 'strongly recommended' in most of other MS programs at NJIT. The OSHE graduate curriculum includes many specialized topics, which are presented as dedicated courses. These include safety engineering, systems safety engineering, ergonomics, industrial hygiene and legal aspects of health and safety. Within the confines of 36 credit hours, students are introduced to these key areas so that upon graduation they are qualified to assume the responsibilities of a safety engineer in a larger corporation, or to take full charge of safety and health functions in a small or medium-sized company. The curriculum of the program has been revised several times in the past few years. The revisions were essential to reflect the rapid change of occupational safety and health issues. The current approved curriculum for this graduate studies program is presented in Appendix A.

#### **D. Program Activities and Accomplishments**

##### 1. Progress Toward Goals and Objectives:

The program enrollment and recruitment was stable during the reporting period. The total trainee enrollment was 18 trainees during the reporting period, with enrollment in Fall 06 and Spring 07 terms at 14 and 13 trainees, respectively. Out of these 18 trainees, 11 came from local industries where they work fulltime in safety-related professions. These 11 entered the program part time to obtain the Masters degree. Nine trainees had BS degrees in engineering. Out of the total of 18 trainees, 6 were fulltime, 11 were part-time and one maintained registration, but took a leave of absence due to personal reasons.

Three trainees graduated from this program during the reporting period. Jason Williams, a full time trainee, entered the program in Fall 04, with a BS in Industrial and Manufacturing Engineering from Indiana Institute of Technology. He graduated in August 06 and obtained full-time employment at Travelers Insurance Company as a Risk Consultant. Tracie Baugh entered the program in Spring 04 with a BS in Electrical Engineering from NJIT. She graduated in January 07 and is now employed as a Project Safety Manager with Turner Construction Company. Jose Alvarez came from Alcatel Lucent, where he works as an EH&S specialist. He

came with a MS in Environmental Science from NJIT and a BS in Environmental Science from Rutgers University. Jose completed the program as a part time student and graduated in May 07.

Four trainees were awarded NIOSH scholarships. NIOSH fellows Mary Monrinville, and Stephen Benstowe have completed their course work and are now working on their MS theses. Amal Shah was awarded the NIOSH scholarship. But during Spring 07 he accepted a full time EHS job for NJ State government. He is now continuing the program on a part-time basis and discontinued his award. Jason Williams was the fourth trainee who received a NIOSH scholarship and graduated from the program.

2. Trainee Honors, Awards, Scholarships:  
None
3. Faculty Honors, Awards, Appointments:  
Dr. Sengupta has been appointed as a member of the editorial board of the Journal “Occupational Ergonomics” published by IOS Press, Netherlands.
4. Trainee Theses and Dissertations:  
Jason Williams completed his MS thesis, “Effect of Glove Port Height on Upper Body Stress for Performing Laboratory Work”.
5. New faculty:  
None
6. New Courses:  
Two new courses, HRM 681 –Organizational Behavior, offered by the School of Management and, IE 672 – Industrial Quality Control offered by the IME department at NJIT were included in the list of elective courses for this program. The organizational behavior and quality control are closely related area of industrial safety practices and are intended to provide the trainees a broader perspective in safety engineering.
7. Trainee Recruitment including Diversity Efforts:  
Recruitment of trainees during this period remained fairly stable. Nine candidates applied for matriculation in the OSHE program, 8 were accepted and six enrolled during the reporting period. Two of these six enrolled on a full-time basis and four enrolled on a part-time basis. The part-time enrollees are practicing safety professionals in New York/ New Jersey metropolitan area. One of these new admits came with BS in engineering degree and the remaining had BS degrees with practical experience in health and safety field. Five of the six new admits are members of minority groups. Four trainees were females. One of the new trainees is an international student.

To attract trainees, NJIT held two graduate open houses and circulated program brochures to other local universities. This year in addition to the above, all NJIT graduating seniors were contacted personally via emails and were provided with the information on NIOSH scholarship and OSHE program descriptions. This resulted in good response. Three NJIT seniors are interested in starting the program in Spring 08.

## **E. Program Products**

Publications and Presentations of Program Faculty and Trainees:

1. Stephen Benstowe, a program trainee, presented “Occupational Health Problems of Professional Truck Drivers” at the NIOSH ERC Student/Resident Research Day held at NJIT on May 18,

- 2007.
2. Prakash Kothari and Gloria Martinez, program trainees, presented “Ergonomic Aspects of Personal Digital Assistant (PDA) and Laptop Use” at the NIOSH ERC Student/Resident Research Day held at NJIT on May 18, 2007.
  3. Sylvia Kamau, a program trainee presented “Ergonomic Analysis of Tasks in Plastic Extrusion” at the NIOSH ERC Student/Resident Research Day held at NJIT on May 18, 2007.
  4. Dr. A. K. Sengupta presented a seminar, “Industrial Ergonomics and Workstation Design” in the NY-NJ ERC seminar course at the NYU Graduate Program for Ergonomics and Biomechanics, on October 26, 2006.
  5. A paper submitted by Jason M Williams, a program trainee and Dr. A. K Sengupta, entitled “Effect of Glove Port Height on Shoulder and Back Stresses”, has been accepted for presentation in the conference and publication in the conference proceedings of the 38th Annual Conference of Association of Canadian Ergonomists, held in Toronto, Ontario, Canada, October 15-17, 2007.
  6. An abstract submitted by Dr. A. K. Sengupta, and three program trainees, Stacy Grabiner, Prakash Kothari, and Gloria Martinez, entitled “Ergonomic Aspects of Personal Digital Assistant (PDA) and Laptop Use”, has been accepted for presentation in the conference and publication in the Proceedings of the PREMUS 2007, Sixth International Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders, held in Boston, USA, August 27-30, 2007.

#### Conferences/Symposia Sponsored:

Dr. Sengupta organized and moderated “NOISH ERC Student/Resident Research Day” at the Campus Center of NJIT on May 18, 2006. It was a half-day conference. Eleven students/residents from Hunter College, NJIT, NYU, UMDNJ and Mount Sinai Medical School presented their research, with 30 attendees from the above schools and NJIT.

In addition the OSHE program co-sponsored the annual ERC scientific conference, “The Changing Workforce & Occupational Health Disparities,” held in Mount Sinai Medical Center on April 13, 2007. Dr. Sengupta served on the Conference Planning Committee.

#### Research Project Completed having Significant Trainee Involvement:

Jason Williams completed a research project on the effects of glove port height setting on the upper body stresses for glove-box work. A laboratory experiment was conducted with nine participants, where upper body stress in terms of posture, subjective discomfort and electromyography data from four upper body muscle groups were assessed. The study was approved by IRB. The result of the study has been presented and published in ACE 2007 conference in Toronto held on October 15-17, 2007

Another research project was conducted as a part of a term project in IE 665- Industrial Ergonomics class by three program trainees, Stacy Grabiner, Prakash Kothari, and Gloria Martinez. The research gathered information on ergonomic aspects of PDA and laptop computer use, using a survey instrument containing about 40 questions from 77 business executives and graduate students. A small scale laboratory experiment was also conducted to understand the EMG patterns of six hand and arm muscles when subjects used a PDA miniature keyboard for text messaging. This study has been presented and published in the PREMUS 2007 conference held in Boston, USA, August 27-30, 2007.

#### **F. Future Plans**

A major focus of this program will remain maintenance of a steady enrollment. A healthy enrollment is vital for scheduling regular classes and the smooth running of the program. As in

previous years, program brochures will be distributed this year to local industry, and mass emails will be sent to universities advertising the NIOSH scholarships and the OSHE program at NJIT. Other than these, program faculty and trainees attend the ASSE local chapter seminars and meetings, and NJASSE and ASSE annual conferences, which provide great opportunities for networking with local safety professionals and help in attracting trainees from local industry.

Another area of focus for the coming year is to improve the research output of the program. NIOSH trainees are required to take a Masters Thesis course as part of their program. This course provides them with the essential training in research in the safety science. We insist that the quality of a MS thesis is such that it can produce at least one publication in a national conference proceeding.

## Appendix A: OSHE Program Curriculum and Requirements

Details can be found in the NJIT's Official Web Site at  
(<http://catalog.njit.edu/graduate/programs/occupationsafety.php>)

### Required courses (18 credits)

- EM 633 Legal Aspects of Health and Safety (3 credits)
- IE 604 Advanced Engineering Statistics (3 credits)
- IE 614 Safety Engineering Methods (3 credits)
- IE 615 Industrial Hygiene and Occupational Health (3 credits)
- IE 665 Applied Industrial Ergonomics (3 credits)
- IE 685 Systems Safety (3 credits)

### Thesis (6 credits)

IE 701 Master's Thesis (6 credits) (Required for NIOSH trainees; optional for others)

### Elective courses (select 18 credits, or 12 credits if completing a master's thesis)

- EM 631 Legal Aspects in Environmental Engineering (3 credits)
- BME 671 Biomechanics of Human Structure and Motion (3 credits)
- EvSc 603 Hazardous Waste Operations and Emergency Response (3 credits)
- EvSc 614 Quantitative Environmental Risk Assessment (3 credits)
- EvSc 616 Toxicology for Engineers and Scientists (3 credits)
- HRM 601 Organizational Behavior (3 credits)
- IE 661 Man-Machine Systems (3 credits)
- IE 662 Cognitive Engineering (3 credits)
- IE 664 Advanced Ergonomics (3 credits)
- IE 669 Human Design Factors in Engineering (3 credits)
- IE 672 Industrial Quality Control (3 credits)
- IE 681 Interdisciplinary Seminar in Occupational Safety and Health (1 credit)
- IE 682 Industrial Safety and Health Evaluation (3 credits)
- IE 725 Independent Research (3 credits)
- IE 700 Master's Project (3 credits)

Following are two sample OSHE course curricula:

### **IE 665-101 – Applied Industrial Ergonomics (Fall 2006)**

#### **Instructor**

[Dr. Arijit K. Sengupta](mailto:sengupta@njit.edu), Email: [sengupta@njit.edu](mailto:sengupta@njit.edu), Office: GITC 2517, NJIT, Office Hours: Monday 12:30 - 2:30 Thursdays 1:00 - 2:30 pm. Other time by appointment

#### **Catalog Description**

Introduces the fundamentals and applications of industrial ergonomics for improving equipment, tool, workplace, and job design. Engineers, as well as safety and health professionals, will benefit from the course by understanding the design principles for human operators and current issues in industrial ergonomics, and a variety of evaluating methodologies for the design.

#### **Textbook**

Work Design: Industrial Ergonomics by Stephan A. Konz and Steven Johnson, sixth edition, **2004, ISBN: 1-890871-48-6**. Additionally lecture notes will be posted on the internet and are required reading for the course.

**Lectures** : Wednesdays (6:00 - 9:05 pm) at GITC 1204

## Course Outline

Tentative weekly schedule of lecture topics (Any change will be notified beforehand in the class)

1. Introduction, background and history of ergonomics
2. Anatomy, Biomechanics, and Work Physiology-1
3. Mechanism of muscle contraction and Work Physiology
4. Work related musculoskeletal disorders
  - Case study papers
  - Work related CTS, current concepts, 2003, by S. Kumar
5. Anthropometry and Criteria for work design
  - Anatomical movement terms
6. Review
7. **Midterm Exam**
8. Workstation Design
  - Experimental evaluation of office chairs
9. Manual Material Handling
  - Download lifting equation manual from NIOSH website
10. Hand tools
11. Controls and displays
12. Temporal ergonomics and climate
13. Managing and ergonomics program
14. Review
15. **Final Exam**

## Grade Distribution

Quizzes and class participation (15%)

Term project (25%) - This involves a report a class presentation on an ergonomics topic. [Click here to find the details.](#)

Midterm and Final Exam (30% each)

## [NJIT Honor code constitution](#)

### **IE 615 Industrial Hygiene and Occupational Health (3 credits)**

Objectives: An introduction to industrial hygiene is presented. Recognition, evaluation and control of human exposure to noise, heat, bio-hazards, chemicals, radiation and improper lighting are discussed. Government standards, field measurements, work practices, engineering designs and the effects of excessive exposure on worker health and productivity are addressed.

Instructor: William A. Biolsi

**Text:** (i) Fundamentals of industrial hygiene, 4th Ed., Barbara A. Plog (Ed.), National Safety Council, 1995.  
(ii) Recognition of health hazards in industry, 2nd Ed., William A. Burgess, NY: John Wiley & Sons, 1995

Course Schedule: IE 615 Industrial Hygiene and Occupational Health

	<b>TOPIC</b>	<b>READINGS</b>
1	<u>INTRODUCTION &amp; BACKGROUND</u> History of Industrial Hygiene; Occupational Exposure Limits, Legal Aspects of the Occupational Environment	Chaps. 1, 23, 24, 29, 30 Appendix B
2	Environmental & Occupational Toxicology; Epidemiologic Surveillance	Chap 6
3	<u>HAZARD RECOGNITION</u> Respiratory System; Particulates; Diseases of the Lungs	Chap 2, 7, 8
4	Industrial Dermatoses; The Skin; Temperature Extremes	Chap 3, 12
5	<u>PHYSICAL AGENTS</u> Noise, Vibration & Ultrasound; The Ear	Chap 4, 9
6	Non-Ionizing Radiation; The Eye; Ionizing Radiation	Chap 5, 10, 11
7	HUMAN ENVIRONMENT AT WORK Biomechanics; Ergonomics	Chap 13
8	<b>MIDTERM EXAM</b>	
9	<u>HAZARD EVALUATION</u> Methods of Evaluation; Air Sampling Instruments	Chap 15, 16
10	Direct-Reading Instruments; Analysis of Gases & Vapors; Sampling & Sizing Particulates; Biological Monitoring	Chap 17
11	<u>CONTROL OF OCCUPATIONAL HAZARDS</u> Methods of Control; Ventilation	Chap 19, 20
12	General & Local Ventilation	Chap 21
13	Personal Protective Equipment; Respiratory Protective Equipment	Chap 22
14	<u>PROGRAM MANAGEMENT</u> Surveys/Audits; Hazard Communication; Hazardous Waste Management; Lab Safety & Health	Chap 27, 28
15	Miscellaneous Topics; Review	
16	<b>FINAL EXAM</b>	

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<b>Grading:</b>	Midterm	30%;	Final exam	30%
	paper	30%;	Class work	10%

## **Appendix B: Faculty and Trainee Publications**

Jason Williams, “Effect of Glove Port Height on Upper Body Stress for Performing Laboratory Work”, MS thesis, New Jersey Institute of Technology, Newark, NJ, August 2006.

Dr. Sengupta has been appointed as a member of the editorial board of the Journal “Occupational Ergonomics” published by IOS Press, Netherlands.

### **III Program Progress Report**

#### **A. Program Title: Graduate Program of Ergonomics and Biomechanics (New York University)**

#### **B. Program Director: Margareta Nordin, Dr. Sci.**

#### **C. Program Description**

##### Goals and Objectives

The aim of the Graduate Program of Ergonomics and Biomechanics (ERBI), Graduate School of Arts and Sciences (GSAS) and School of Medicine (SOM), New York University Masters of Science (MS) degree is to train interested individuals in the theory, clinical and practical application of occupational musculoskeletal ergonomics and biomechanics. The primary objective of the MS program is to prepare graduate students for academic, public and professional careers in the fields involving the prevention of musculoskeletal disorders, injuries and disabilities that result from the interaction of individuals and environmental factors.

The immediate Objectives of the ERC ERBI Program during 2006-2007 were:

1. To improve marketing and dissemination strategies of the ERC and ERBI programs.
  - a. The ERBI faculty has worked closely with the ERC, NYU GSAS and SOM to develop and implement these strategies. The ERBI program has worked with the NYU Office of Career Development to create a more effective marketing strategy for the ERBI Masters program targeting NYU undergraduate students, mainly juniors and seniors, and specific outreach to minority students. The plan has been to apply e-marketing tools such as distributing emails via the office's various databases and listservers. Additional groups, including minorities, have been targeted through cooperative efforts with the New York University Career Development Office.
  - b. The ERBI program continues to work with different offices at NYU to utilize the resources available within NYU for recruiting students. ERBI representatives have attended and represented the ERBI program in Graduate Fairs and GSAS Open houses in 06-07. The ERBI faculty has reached out to other universities in the greater metropolitan area as well as abroad.
  - c. A new brochure is being developed for the NYU Master of Science Graduate Program of Ergonomics and Biomechanics and the new Advanced Certification Program in Ergonomics.
2. Development and implementation of a new educational program, Advanced Certification in Ergonomics. The ERBI program initiated an Ergonomic Certificate from ERBI, GSAS, NYU. The Ergonomic Certificate requires a total of 12 credits to be completed over the period of one year, and is intended for professionals in the field of occupational health and safety in the greater NY/NJ area.
3. Collaborative projects with other NY/NJ ERC member institutions. The ERBI faculty plan to generate one project, such as a literature review and/or data collection, within the next two years between an ERBI student and a student from another of the NY/NJ ERC member institutions, in order to promote a creative and collaborative environment between the ERC and ERBI for the initiation of multidisciplinary projects.

##### Responsible Conduct of Research Training:

All ERBI faculty and instructors have completed the IRB and HIPPA training, obtained certification provided by the NYU SOM Institutional Review Board, and are submitting research projects to the IRB on a regular basis. ERBI students have been exposed to the concept of research ethics in the course, Research Methods in Ergonomics and Biomechanics (G48.2123). in the Practicum Course (G48.2121). In the later Practicum Course (G48.2121), the students obtain further and more comprehensive understanding of the IRB and HIPPA rules and requirements for conducting research, including appropriate forms and submission procedures.

#### Faculty participation:

Drs. Nordin and Sheikhzadeh continued their leadership of the ERC ERBI Program during 2006-2007, and there were no changes in senior faculty and staff. However in Fall 06, Shira Schechter Weiner, ERBI PhD candidate, began training to take over for Angela Lis for the Master's program and student advisement. The shift of responsibility took place January 1, 2007. Ms. Weiner was approved by the ERC during this grant year and replaced Ms. Lis in the NYU ERC and NORA funding.

#### Curriculum:

The Program Curriculum and Course Outlines, presented in Appendix A, did not undergo major change in 2006-2007.

### **D. Program Activities and Accomplishments:**

#### Progress toward Goals and Objectives:

Four Master's students received ERC trainee funding including Vivek Pinto, Maneesha Kumar, Lisa Ternes, and Andrew Kraszewski. One student, Maneesha Kumar, received a research assistantship. Ms. Kumar, with this ERBI-ERC funded research assistance, participated as research coordinator in the research project entitled "Reliability and validity of a treatment outcome satisfaction questionnaire". She has been responsible for patient recruitment, data collection, patient follow-up, analysis and written reporting. Also Vivek Pinto assisted Dr. Sheikhzadeh in training two ERBI Masters students, Maneesha Kumar and Anne-Marie Bellivau, in use of the three-dimensional kinematic data collection and analysis system using electromagnetic motion analysis. The objective of this training was to have the students become proficient in performing kinematic analysis of the trunk and upper extremity based on a protocol recommended by the International Society of Biomechanics.

One PhD student, Marc Campo, successfully defended his dissertation and three PhD students, Shira Schechter Weiner, Jangwhon Yoon, Angela Lis, successfully completed their proposal defense. All students were prior recipients of the ERC Pilot Project Awards. In addition two minority students graduated in January 2007.

Also the ERBI program obtained approval for an Advanced Certification in Ergonomics – a 12-credit program approved by NYU Graduate Curriculum Committee in November 2006 and by the Department of Education of New York State in March 2007. Students who wish to pursue course work at NYU, but desire only to take a few courses for academic or professional development, may apply as certificate students. The certificate course work may be useful to those working in the field who are responsible for occupational health & safety and/or ergonomic program management. The certification covers the fundamentals of musculoskeletal and environmental ergonomics and includes independent credits for fieldwork. If a certificate student is accepted as a degree seeking student, those courses may be credited toward the degree requirements.

To strengthen its research training program, the New York University-Hospital for Joint Diseases allocated \$8,000.00 to the ERBI laboratory, which was supplemented by \$5,000.00 from the NYU ERC funds to purchase a 16-channel electromyography system for the ERBI laboratory.

The ERBI program has continued to develop research on "Ergonomics in Healthcare". During 2006-20, two projects have been initiated to promote application of ergonomics in healthcare:

- a. Collaboration with the Tisch Hospital, New York University Medical Center, which manages the OR activities. Dr. Sheikhzadeh, ERBI faculty, initiated a project entitled

“Participatory ergonomics for operating room nurses: Trade-specific versus specialty-specific risk factors and solutions”. Nurses are underserved in the area of ergonomic and biomechanics education and occupational health nurses have shown an increased interest in ergonomics. This project is extension of the ERC Pilot Research Project , awarded 2005, which investigated ergonomic risk factors in specialty hospital. The project was delayed due to staff changes and is resumed in Fall 2007.

- b. Manny Halpern, ERBI faculty, has been retained as consultant to Village Care New York in the effort to build a new Center for Rehabilitation and Nursing. As a mediator between the designer and the end user of the facility, the ERBI faculty facilitates the design process by helping to define the needs of the staff and clients based on ergonomic criteria and evidence, and translating them to design specifications. The project involves four activities: selection of devices for patient transfers, staff workstation design, accessibility and usability of entertainment / recreational devices in residents room, and the functionality of the design of storage areas. The project is expected provide better understanding of the role of ergonomics in the design of a health care facility

Dr. Ali Sheikhzadeh (ERBI faculty) and J. Yoon, ERBI Ph.D. candidate, and ERBI-NORA funded PhD student Vivek Pinto’s continued collaborative research activities with the Department of Orthopaedic Surgery, NYU-Hospital for Joint Diseases. The project was initiated originally in Fall 2005 to gain a better understanding of shoulder and scapula kinematics. The project has expanded to study 120 patients with Shoulder Impingement, Rotator Cuff Tear, and Shoulder Arthroplasty. This study will result in a comparative biomechanical profile of healthy controls and patients while performing activities of daily living. Two manuscripts have been prepared for publication based on data gathered from the earlier phase of this project (see below). V. Pinto, ERBI PhD student and J. Yoon, ERBI PhD candidate assisted with patient recruitment, data collection, and data processing.

As part of NYU’s interdisciplinary OSH efforts, Rudi Hiebert, ERBI instructor, worked collaboratively with Dr. Paul Landbergis, from Mount Sinai Department of Community and Preventive Medicine and other researchers, on a study entitled, “Extended work hours and musculoskeletal disorders among health care workers: a case control study.” Also collaborative healthcare studies have been initiated with Drs. Moline and Morland of Mount Sinai as a result of Ms. Weiner’s ERC-funded study. Additionally three ERBI MS Students, Vivek Pinto, Maneesha Kumar and Anne-Marie Belliveau, and instructor Rudi Hiebert ScM participated in the ERC’s OSH Historical Perspectives Tour of Northeast industrial sites in June 2007.

#### Trainee Honors, Awards and Scholarships:

Dr. Manny Halpern assisted the ERBI Masters students in participating in "The Ergonomics Student Design Competition." The competition is presented by the Institute of Industrial Engineers, sponsored by Auburn Engineers, Inc. and supported by the Applied Ergonomics Community. Two ERBI students, Vivek Pinto and Carlo De Castro, and a student from Pratt Institute participated, as a team, in this competition. The team was selected as one of four teams to participate in the final design competition at the Applied Ergonomics Conference on March 12-14, 2007, Dallas, TX. The team received honorable mention.

S. Schecter Weiner, ERBI PhD candidate, expanded an ERC Pilot Research Project, award in 2006, to Doctoral Research, entitled, “Factors influencing physician management of nonspecific low back pain.” She is now working collaboratively with Drs. Moline and Morland at Mt. Sinai.

#### Faculty Honors, Awards and Appointments:

As noted above in the section on Trainee Honors, Dr. Manny Halpern assisted the ERBI Masters students in participating in "The Ergonomics Student Design Competition." The team was

selected as one of four teams to participate in the final design competition at the Applied Ergonomics Conference on March 12-14, 2007, Dallas, TX and received honorable mention.

#### Trainee Theses and Dissertations:

Six trainees theses and dissertations were incorporated into published articles or manuscripts now under review (See Appendix B, Peer-Reviewed articles, No. 1-6) They are also described more fully in Section E. Program Products.

#### New Faculty Positions:

In January 2007, Shira Schechter Weiner, ERBI PhD candidate, took over activities in the Master's program and student advisement from Angela Lis, who left the program.

#### New Courses: None

#### Trainee Recruitment:

A marketing plan and effort for recruitment of students to the ERBI program is ongoing. Drs. Ali Sheikhzadeh has worked closely with New York University (Washington Square) and the School of Medicine for improved representation for ERBI on their websites. We initiated targeted multicultural student recruitment to the ERBI Program through mass email distribution in conjunction with the NYU Wasserman Center for Career Development. For Fall 2006, we received two minority student applications, of whom one student, M. Kumar, was offered admission, entered to the program, and received tuition award and a research assistantship.

### **E. Program Products**

Two presentations that resulted from ERC funding were made by Janwhon Yoon and Dr. Manny Halpern at "WorkLife 2007: Protecting and promoting worker health," a national symposium hosted by NIOSH of CDC, Bethesda, Maryland, September 2007 and at PREMUS (Prevention of Work-Related Musculoskeletal Disorders), Boston, Massachusetts, August 2007.

A presentation of collaborative efforts between ERBI and other ERC participants, "Extended work hours and musculoskeletal disorders among health care workers: a case control study," (authors: Hiebert R, Landsbergis P, Gurnitz K, Dropkin J, Adamu M) was accepted to PREMUS. Boston, Massachusetts, August 2007.

Dr. Ali Sheikhzadeh, and NORA funded student, Vivek Pinto, PhD student and PhD candidate, Jangwhon Yoon, prepared two manuscripts that resulted from the study of kinematic analysis of the shoulder and scapula during full range of motion and activities of daily living. The project was based on collaborative research with the Dept. of Orthopaedic Surgery, NYU-Hospital for Joint Diseases.

Dr. Ali Sheikhzadeh and Chatrali Gore, research assistance funded by ERBI-NORA in 2004, submitted the result of the ERC Pilot Research Project, awarded in 2004, as a manuscript to the Journal of Applied Ergonomics.

Dr. Marco Campello, ERBI faculty, prepared and presented, "The Protocol for work-related low back pain," at the Commission by the Center of Reference for Workers' Health through the Ministry of Health, Brazil, March 2007.

Dr. Campello lectured on the utilization of Functional Capacity Evaluation for the Multiple Sclerosis Society NYC Chapter, New York, New York, April 2007.

### **F. Future Plans**

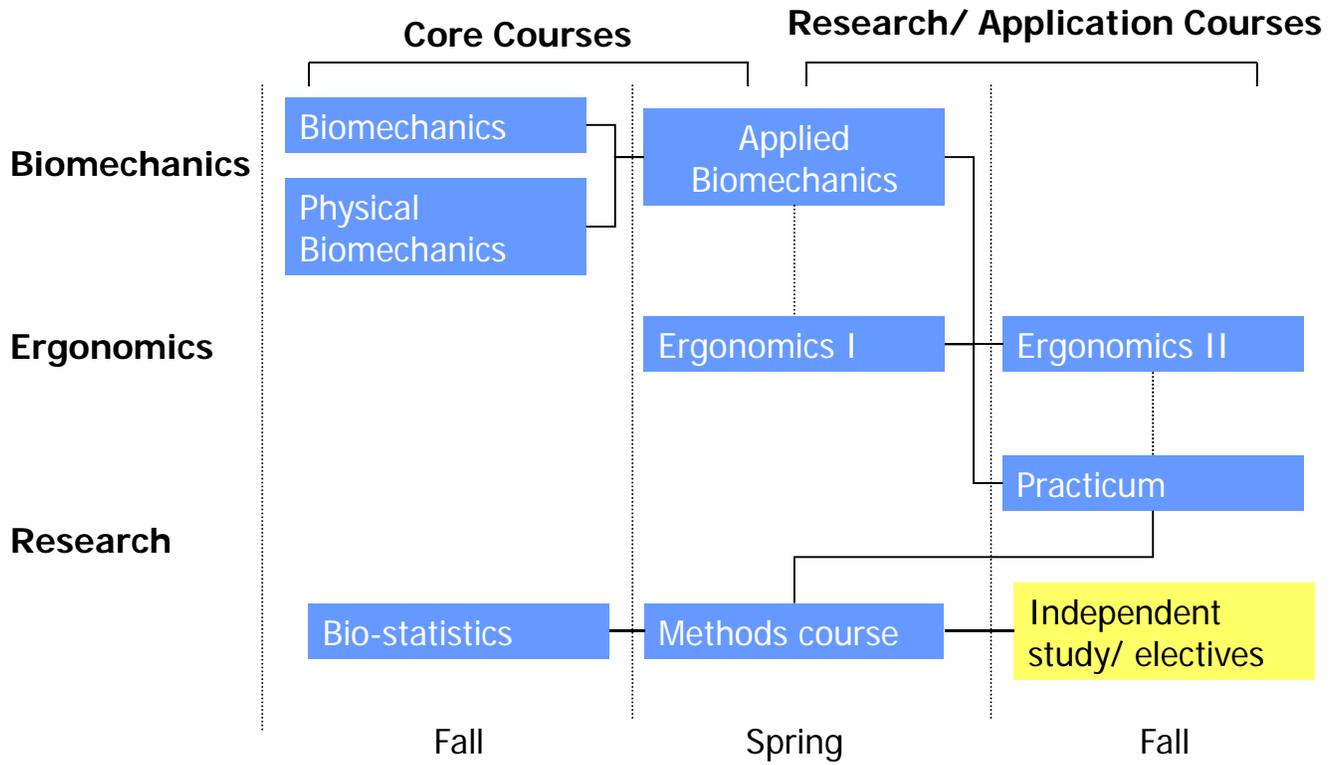
Marketing: The main effort in the year will be to continue marketing of ERBI program through redesign of website, brochures, marketing materials. In the coming year we intend to engage in targeted advertising to organizations the ERBI and OIOC has had contacts with in the past, as well as participants in courses our staff has given throughout the ERC community, such as the OSHA 2250 offered by UMDNJ within the NYNJ ERC.

Research Training: Investigate the possibilities of conducting research on the relationship between patient safety and employee safety. To do this we will seek the cooperation of a hospital and access to two separate reporting systems. This may be the topic of a student Pilot Project Program Grant for 2008-2009.

#### **IV. Report of Specific Improvements in OS&H Resulting from ERC Programs**

1. August 2006. Healthy Computing Design recommendations and a training session for the staff of two computer facilities run by Village Care of NY for senior citizens. New York, NY.
2. February 2007. Ergonomics Awareness for Teachers – Teacher in-service workshops for New Jersey Safe School Program, UMDNJ School of Public Health, Piscataway, NJ.
3. March 2007. Industrial Ergonomics – Workshop for students in the Program of Physical and Occupational Therapy. State University of New York Downstate, Brooklyn, NY.
4. Representatives of ERBI have participated in six community-based health promotion fairs. Literature and promotional materials were distributed to all event visitors and participants. One of the highlights events is our annual display at the Graduation Fair of the New York City District Council of Carpenters, Laborer Technical College, providing apprentices, journey laborers and their guest with safety and health information
5. Dr. Margareta Nordin served on the The Bone and Joint 2000-2010 Neck Pain Task Force as a member of the scientific secretariat, with Shira Weiner, PhD Candidate, serving as research assistant. The primary objective of the task force was a systematic literature review of neck pain to generate evidence-based clinical and research recommendations for managing neck pain and associated disorders including whiplash-associated disorders. Publication submitted.

**ERBI Full Time Student Program**  
**(Total of 36 credits for MS degree)**



**COURSE DESCRIPTIONS with  
PREREQUISITES and DETAILS for SELECTED COURSES**

Course	Credit /Term	Description
G48.2101 Biomechanics	4 cr. Fall	This course covers the basic concepts of mechanics, such as force and torque, and the analyses of “moving” systems with applications to human motion analyses mechanics.
G48.2111 Physical Biomechanics	4 cr. Fall	This course covers the laws of physics and basic concepts of biology, physiology and mechanics will be applied to explain the effect of applied forces and the biomechanical response of the tissues of the neuro-musculoskeletal system.
G48.2112 Applied Biomechanics in the Analysis of Human Performance	4 cr. Spring	The course covers the major processes and mechanisms underlying human motor performance and the pathomechanics of the most relevant occupational related Musculoskeletal Disorders (MSD). Biomechanical principles are systematically introduced to produce a meaningful conceptual framework and facilitate hypothetical-deductive reasoning.
G48.2131 Ergonomic Issues I: Physical factors in the workplace	4 cr. Spring	This course focuses on physical issues directly related to controlling musculoskeletal disorders. The second section enhances the background in industrial ergonomics by addressing the physical and organizational environment relevant to workplace design. The scope of the topics in both is specifically selected to focus on prevention of musculoskeletal problems.
G48.2132 Ergonomics Issues II: Environmental factors in the Workplace	4 cr. Fall	The course covers environmental and organizational influences in the workplace that are relevant to the development of musculoskeletal problems.
G48.2121 Practicum in Ergonomics and Biomechanics	4 cr. Fall	The course will focus on methods and instruments for data collection and analysis of musculoskeletal disorders (MSD). The course lectures and hands-on projects are designed to illustrate theoretical and practical issues with the use of various instruments.
G48.2123 Research Methods in Ergonomics and Biomechanics	4 cr. Spring	This course is designed to give graduate level students an overview of common study designs in scientific and medical research, and specific knowledge in the application of these research methods in to the fields of Ergonomics and Biomechanics. Also students will learn to critically evaluate scientific papers and learn how to draw valid conclusions.
G48.2303 Introduction to Biostatistics	4 cr. Fall	Introduction to probability and statistical methods utilized in the analysis and interpretation of experimental and epidemiological data. Statistical techniques associated with the normal, binomial, Poisson, t, F and chi-squared distributions plus an introduction to nonparametric methods.

## **Applied Biomechanics in the Analysis of Human Performance**

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<i>Course Number:</i>	G48.2112
<i>Prerequisites:</i>	Physical Biomechanics and Biomechanics
<i>Semester Offered:</i>	Spring
<i>Instructor:</i>	Marco Campello Ph.D., CIE
<i>Day and Time:</i>	Tuesdays, 5:30--8:15 p.m.
<i>Credits:</i>	4
<i>Course Description:</i>	<p>This course builds upon the Physical Biomechanics and Biomechanics courses. Its primary purpose is to explore the major processes and mechanisms underlying human motor performance and the pathomechanics of the most relevant occupational related Musculoskeletal Disorders (MSD). Biomechanical principles and their interaction with basic applied sciences are systematically introduced to produce a meaningful conceptual framework and facilitate hypothetical-deductive reasoning.</p> <p>Specific topics to be covered in the first part of the course include the review of physical biomechanics with increased emphasis on its interaction with other applied sciences such as neuroscience and energetics physiology. The second part of the course will focus on multi-segmental motion analysis and clinical biomechanics of selected case studies on occupational related MSD.</p>

## **Research Methods in Ergonomics and Biomechanics**

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<i>Course Number</i>	G48.2123
<i>Prerequisites:</i>	Biostatistics
<i>Semester Offered:</i>	Spring
<i>Instructor:</i>	Sherri Weiser, PhD
<i>Day and Time:</i>	Thursday, 5:30- 8:00 p.m
<i>Credits:</i>	4
<i>Course Description:</i>	<p>This course is designed to give graduate level students an overview of common study designs in scientific and medical research, and specific knowledge in the application of these research methods in to the fields of Ergonomics and Biomechanics. Also students will learn to critically evaluate scientific papers and learn how to draw valid conclusions.</p> <p>The first part of the course is an overview of the scientific method and various study designs that can be used to investigate musculoskeletal disorders (MSD). The second half focuses on specific topics relevant to research practice, such as issues in measurement, measurement instrument validation, statistical analysis, and ethical conduct of research. Illustrations of the applications of these methods are presented in the context of ergonomic and biomechanical approaches to the evaluation and control of musculoskeletal disorders.</p>

## **Appendix B. Faculty and Trainee Publications and Conference Abstracts**

### Peer-Reviewed Articles (Names in bold indicate ERBI Trainees)

Sheikhzadeh A, **Gore C**, Zuckerman JD, Nordin M: Operating Room Nurses' Perceptions of Ergonomic Risk Factors in Surgical Environment: A Pilot Study. *Applied Ergonomics*, (in press).

Brunner F, Sheikhzadeh A, Nordin M, **Jangwhon Y**, Frankel VH: Effect of Aging on Type II Muscle Fibers– A Systematic Review of the Literature. *The Journal of Aging and Physical Activity*, 15(3): 336-48, 2007.

**Pappas E**, Hagins M, Sheikhzadeh A, Nordin M, Rose D: The effect of gender and fatigue on the biomechanics of bilateral landings from a jump: peak values. *J. Sports Medicine*, 6(1): 77-87, 2007.

**Pappas E**, Hagins M, Sheikhzadeh A, Nordin M, Rose D: Biomechanical differences between unilateral and bilateral landings from a jump: Gender differences, *Clin J Sports Med*, 17(4):263-268, 2007.

**Campello MA**, Weiser SR, Nordin M, Hiebert R: Work retention and nonspecific low back pain. *Spine*. 31(16):1850-7, 2006.

**Lis, A., Black, K.M., Korn, H.**, Nordin, M.: Association between sitting and occupational LBP. Epub 2006 May 31. *Eur Spine J* 16(2):283-98, 2007.

Sheikhzadeh, A., Parnianpour, M., Nordin, M.: EMG activity and controllability during complex upright trunk exertion. *Clinical Biomechanics* (in press).

### Books/Book Chapters

Nordin, M., Andersson, G.B.J., Pope, M.J. (Editors): Musculoskeletal Disorders in the Workplace. Principles and Practice. Second Edition, Mosby Elsevier, Philadelphia, PA, USA, 2006.

Weiser, S. Psychosocial aspects of work-related Musculoskeletal disorders: Clinical implications. In Nordin, M., Andersson, G.B.J., Pope, M.J. (Editors): Musculoskeletal Disorders in the Workplace. Principles and Practice. Second Edition, Mosby Elsevier, Philadelphia, PA, USA, 2006, pp. 13-22.

Sheikhzadeh, A. Biomechanics of the hip and knee. In Nordin, M., Andersson, G.B.J., Pope, M.J. (Editors): Musculoskeletal Disorders in the Workplace. Principles and Practice. Second Edition, Mosby Elsevier, Philadelphia, PA, USA, 2006, pp. 273-288.

Nordin, M., Balague, F., Cedraschi, C. Lower Back: Treatment options. In Nordin, M., Andersson, G.B.J., Pope, M.J. (Editors): Musculoskeletal Disorders in the Workplace. Principles and Practice. Second Edition, Mosby Elsevier, Philadelphia, PA, USA, 2006, pp. 125-134.

Weiser, S., Campello, M., Nordin, M., Hiebert, R.: Restoring patients with nonspecific low back pain to gainful employment. In Rothman-Simeone The Spine edited by Herkowitz, H.N., Garfin, S.R., Eismont, F.J., Bell, G.R., and Balderston, R.J. Fifth Edition. Saunders Elsevier, Philadelphia, PA, USA 2006, pp. 1595-1606.

Hiebert, R., Weiser, S., Campello, M., Nordin, M.: Nonspecific Low Back Pain. In Environmental and Occupational Medicine edited by WH Rom, 4th edition. Lippincott-Raven Publishers, Philadelphia, PA, USA, 2007, pp. 924-936.

### Conference Abstracts (Name in bold indicates ERBI Trainee)

Hiebert R, Landsbergis P, Gurnitz K, Dropkin J, Adamu M. Extended work hours and musculoskeletal disorders among health care workers: a case control study PREMUS 2007. 27-30 August 2007, Boston MA.

Jangwoon Y. The influence of target size and weight on the trunk muscle recruitment in different lifting speeds.

PREMUS 2007. 27-30 August 2007, Boston, MA (Platform) and CDC NIOSH Worklife 2007 Protecting Workers Health. A National Symposium, September 10-11, 2007, Bethesda, MD (Poster).

Halpern M. Application of NIOSH Model Ergonomics Program in a specialty hospital. CDC NIOSH Worklife 2007 Protecting Workers Health. A National Symposium, September 10-11, 2007, Bethesda, MD (Poster).

### III. Progress Report: Center Administration/ Interdisciplinary Activities

#### A. Program Title: Center Administration/ Interdisciplinary Activities

#### B. Center Director: Jacqueline Moline, MD, MSc

Center Deputy Director: David Kotelchuck, PhD, MPH, CIH

#### C. Center Description

##### Number of Core Programs

UOSHERC is a consortium of five educational institutions in the NY/NJ metropolitan area offering ten programs in occupational health and safety training and research. The constituent programs are:

- Occupational Medicine and Pilot Program Research Program at Mount Sinai School of Medicine (New York City, NY);
- Occupational Medicine at the Universities of Medicine and Dentistry of New Jersey (UMDNJ)/Robert Wood Johnson Medical School (Piscataway, NJ);
- Industrial Hygiene and Hazardous Substance Academic Training at Hunter College School of Health Sciences (New York City, NY);
- Occupational Safety and Health Engineering at the New Jersey Institute of Technology (Newark, NJ);
- Continuing Education and Outreach and Hazardous Substance Training at UMDNJ/ NJ School of Public Health (Piscataway, NJ);
- NIOSH NORA Research Training Program at Mount Sinai School of Medicine (New York City, NY) and
- Occupational Ergonomics and Biomechanics Program at New York University (New York City, NY).

##### ERC Staff and Management

UOSHERC is administered by a core staff at Mount Sinai School of Medicine in conjunction with the ERC Management Committee. Jacqueline Moline, MD, is Director of UOSHERC, the NY/NJ ERC, as well as Director of the Pilot Project Research Program at Mt. Sinai. During this grant year (2006-2007), Dr. Debra Milek assumed Directorship of the Mount Sinai Occupational Medicine Residency program, replacing Dr. Moline. Dr. Michael Gochfeld continues as Director of the RWJ/UMDNJ Occupational Medicine Residency Program, and is now the longest serving OM Residency Director among all the NIOSH ERC's. Dr. David Kotelchuck, recently retired from his teaching post at Hunter College, continues to serve as UOSHERC Deputy Director. He remains an adjunct faculty member at Hunter and continues teaching the ERC Interdisciplinary plant visits course. Dr. Jack Caravanos, who has directed the Environmental and Occupational Health Sciences (EOHS) academic program at Hunter since 1997, directs the NIOSH ERC industrial hygiene program. During the current grant year (2006-2007) Dr. Mark Goldberg took over Directorship of the Hunter HSAT program, replacing Dr. Caravanos. Dr. Margareta Nordin continues her Directorship of the NYU Occupational Ergonomics and Biomechanics program, and Dr. Arijit Sengupta continues as program director of the NJIT Occupational Safety and Health Engineering program. Dr. Paul Landsbergis of the Mt. Sinai Medical School Department of Community and Preventive Medicine heads the NIOSH NORA Research Training Program. In another change of program directorship, Mitchel Rosen, MS (PhD expected) has taken over leadership of the ERC Continuing Education and Outreach program at UMDNJ from Dr. Audrey Gotsch, who is now Dean of the NJ School of Public Health.

In summary, UOSHERC has undergone significant leadership changes within the past two years,

reflecting a new generation of leadership and a new stability. Dr. Moline is Chairperson of the ERC Management Committee. Other members include Jack Caravanos, DrPH, CSP, CIH (Hunter - IH), Michael Gochfeld, MD, PhD (UMDNJ/ Robt. Wood Johnson Medical School - OM), Mark Goldberg, PhD, CIH (Hunter - HSAT), David Kotelchuck, PhD, CIH (Deputy. Dir.), Paul Landsbergis (Mt. Sinai - NORA Research), Debra Milek, MD, PhD (Mt. Sinai - OM), Margareta Nordin, Med.Dr.Sci. (NYU - Ergonomics & Biomechanics), Mitchel Rosen, MS (UMDNJ/NJ School of Public Health - CE/O & HST), Arijit Sengupta, Ph.D. (NJ Inst. Technology - OSHE).

In addition the ERC has an External Advisory Board (EAB) consisting of 18 members representing private industry, labor unions, government agencies, non-profit organizations and related academic institutions. The group meets annually and advises the Management Committee on a range of health and safety issues and concerns. The EAB met this year on July 18, 2007 at Mt. Sinai Medical School, and received with interest and commented on the report about the ERC's recently completed second annual Northeast OSH Historical Perspectives tour (see Interdisciplinary section below).

### Interdisciplinary Interaction within UOSHERC

UOSHERC continues to offer two interdisciplinary courses annually, as it has done since 1997, in which all UOSHERC schools actively participate. The first is a case-study-based "NIOSH ERC Interdisciplinary Seminar," which seeks to introduce students to the various OSH subspecialties and promote interdisciplinary, team-based approaches to solving OSH problems. This was offered in Fall 2007 at NYU and taught by Dr. Kimberly Morland of Mt. Sinai (App. C). The second is a site visit course offered during the Spring semester, involving walkthrough surveys of six different worksites in the metropolitan NY/NJ region. In Spring 2007 this course was taught by Drs. Kotelchuck, Gochfeld (UMDNJ) and Mirer (Hunter) (App. D). Site visits included the Pfizer pharmaceutical plant, UMDNJ University Hospital and the NY Times printing plant.

The annual UOSHERC Scientific Conference was held on April 13, 2007 on "The Changing Workforce and Occupational Health Disparities" (App. E). 72 registered persons heard the keynote speaker: Dr. Michael Silverstein of the Univ. of Washington. Also our annual Student Research Day was held on May 18, 2007 at NJIT, and students from all ERC schools presented (App. F) Finally the ERC conducted its second annual Northeast OSH Historical Perspectives tour on June 10-15, 2007. Eighteen students and nine faculty visited the Lackawanna Coal Mine, the Homestead steel mill in Pittsburgh, the River Rouge auto plant in Michigan, and the Niagara hydroelectric plant. Dr. Caravanos and Mitchel Rosen organized and led the tour (App. G).

★ (NOTE: Outreach activities included in the Cont. Educ./Outreach/HST program report.)

## **APPENDICES**

(Appendices A and B not applicable for this section of the report)

Appendix C. Syllabus ERC Seminar Course (Fall semesters)

Appendix D. Syllabus ERC Plant Visits Course (Spring semesters)

Appendix E. Program UOSHERC 28<sup>th</sup> Annual Scientific Conference:  
“Meeting the Challenges of our Aging Workforce”

Appendix F. Agenda: Annual UOSHERC Student Research Day (2007)

Appendix G. Itinerary UOSHERC Northeast OSH Historical Perspectives Tour (Summer Semesters)

## Appendix C. Syllabus ERC OSH Seminar Course

### **INTERDISCIPLINARY SEMINAR on OCCUPATIONAL SAFETY AND HEALTH**

(Fall 2007 semester)

The NY/NJ Education and Research Center (ERC), with support from the National Institute for Occupational Safety and Health (NIOSH), is pleased to offer a one-credit interdisciplinary occupational health and safety seminar course during the Fall 2006 semester. Faculty, students and interns from five schools in the New York/New Jersey metropolitan area will present and discuss case studies in occupational safety and health on Wednesday mornings from 9:30 am – 12:30 pm at the NYU Graduate Program for Ergonomics and Biomechanics, 63 Downing Street, NY, NY, near the intersection of Houston and Varick Sts. in the West Village (Subway:1 or 9, Houston St. station).

In this seminar students and interns in the various NY/NJ ERC programs will be able to participate in health and safety problem-solving as members of interdisciplinary teams of industrial hygienists, occupational physicians, ergonomists and occupational safety engineering specialists. Participating schools will be Mount Sinai Medical School, Hunter College/CUNY, the University of Medicine and Dentistry of New Jersey/Robert Wood Johnson Medical School, New Jersey Institute of Technology and the NYU Program in Occupational Ergonomics and Biomechanics. The course Director will be Dr. Kimberly Morland of Mount Sinai Medical School.

The first class will be held on Wednesday, September 12 and will continue for five Wednesdays until Wednesday, October 24. Students who are interested in the seminar or who have further questions should contact their program director, Dr. Kimberly Morland at [Kimberly.morland@mssm](mailto:Kimberly.morland@mssm) or Dr. David Kotelchuck, Hunter College and Deputy Director of the NY/NJ ERC, at [dkotelch@hunter.cuny.edu](mailto:dkotelch@hunter.cuny.edu).

<b>DATE</b>	<b>GUEST LECTURER</b>	<b>TOPIC</b>
Sept. 12	Kimberly Morland, PhD Mount Sinai	A Review of Occupational Health Safety and Methods
Sept. 19	Jack Caravanos, PhD Hunter College	International Environment and Occupational Health concerns with ULABs (used lead acid batteries) recycling.
Oct. 3	Steven Markowitz, MD, MPH Queens College	An Epidemiologic Investigation of Bladder Cancer in a Chemical Plant
Oct. 10	Jacqueline Moline, MD Mount Sinai	World Trade Center
Oct. 17	Paul Landsbergis, Ph.D. Mount Sinai	The Changing Nature of Work, Work Organizations, Stress and Health
Oct. 24	Student Teams	Interdisciplinary Presentations

Text: “Problem-Based Cases in Env. Epi.”, Markowitz and Kjellstrom (eds.), WHO (1998) and will be passed out during class on October 10. Requirements: Students are expected to participate in class discussion and a team presentation. Students may miss one of the guest lectures and must attend class on October 24th to receive a passing grade. Grades will be Pass/Fail, unless otherwise required.

## Appendix D. Syllabus ERC OSH SiteVisits Course

### NIOSH ERC Course: Site Visits and Industrial Processes

Faculty: Drs. David Kotelchuck, Michael Gochfeld and Franklin Mirer

*Required Course for ERC interns and students at Hunter College, UMDNJ, NJIT, NYU, Mt. Sinai*

#### Spring 2007 semester

Jan. 31	Course introduction and protocols for site walk-throughs. Prebriefing for Power Battery plant visit (at audiovisual Conferencing centers on individual campuses. All remaining debriefing sessions will be held at these campus centers.)
Feb 7	Power Battery Company (Paterson, NJ)
Feb.14	Debriefing discussion and preparation for Pfizer plant visit
Feb 21	Pfizer pharmaceutical plant (Brooklyn, NY)
Feb 28	Debriefing discussion and preparation for University Hospital site visit
Mar 7	UMDNJ University Hospital (Newark, NJ)
Mar 14	Debriefing discussion and preparation for NY Times site visit
Mar 21	NY Times printing plant (Edison, NJ)
Mar 28	Debriefing discussion for Ravenswood power plant
Apr 4	Keyspan Ravenswood power plant (Queens, NY)
Apr 11	No class. Students to attend ERC Scientific Conference.
Apr 12	ERC Student Research & Pilot Project Research talks (afternoon)
Apr 13	28 <sup>th</sup> annual ERC scientific conference: “The Changing Workforce and Occupational Health Disparities” Hatch Auditorium, Mt. Sinai Medical Center (all day)
Apr 18	WTC and Construction H&S site visit (Lower Manhattan, NY)
Apr 25	Final Examination for ERC students and interns (at your school sites)

Recommended Texts: *Recognition of Health Hazards in Industry* (2<sup>nd</sup> edn.) by W.A.Burgess, John Wiley and Sons (New York, 1995), and *Encyclopedia of Occupational Safety and Health* (4<sup>th</sup> edn.) by Jeanne Mager Stellman (ed.), ILO (Geneva, 1998)

Course Requirements: Attendance at the site visits is mandatory (One excused absence is allowed.) each student must turn in four site visit reports and pass the final examination.

Grades: Notebooks shall be kept of all site visits, which will be the basis of the written reports. Reports will be graded for completeness of identification of hazards and controls, the quality and appropriateness of health & safety recommendations, and the accuracy of the overall evaluation of the health & safety program at the site.

Written Site Visit Reports (4)	80% of course grade
Final Examination	20% of course grade

## Appendix E. UOSHERC Scientific Conference

### Agenda

The Changing Workforce and Occupational Health Disparities

April 13, 2007

Hatch Auditorium, Mount Sinai School of Medicine

New York, NY

- 8:30 - 9:10 Registration
- 9:10 - 9:15 Welcome
- Jacqueline Moline, MD, MSc - Mount Sinai, NYC
- 9:15 - 10:00 The Changing Workforce and Occupational Health Disparities
- Sherry Baron, MD, MPH – NIOSH
- 10:10 - 10:45 Meeting the Health and Safety Needs of Aging Workers
- Michael Silverstein, MD, MPH – Univ. of Washington, Seattle
- 10:45 - 11:00 BREAK
- 11:00 - 12:10 Immigrant Workers Health and Safety
- Steve Markowitz, MD, MPH, Queens College
  - Carmen Calderon, NYCOSH
  - Saru Jayaraman, Restaurant Opportunities Committee
- 12:10 - 1:30 LUNCH
- 1:30 - 2:00 Worker Health Disparities by Socioeconomic Status
- Paul Landsbergis, PhD, MPH – Mount Sinai, NYC
- 2:00 – 2:30 Initiatives for Lower Wage Women Workers
- Tammy Rivera or Ellie Spicer, District Council of Carpenters [waiting for call back]
  - Carol Joyner, 1199 Childcare Fund [will contact if you give the go-ahead]
- 2:30 – 2:45 BREAK
- 2:45 – 3:15 NIEHS Minority Worker Training Programs
- Sharon Beard, NIEHS, Research Triangle Park, NC
- 3:15 - 3:45 OSHA Initiatives to Improve the Health and Safety of Immigrant Workers
- Diana Cortez, OSHA Area Director, Tarrytown, NY
- 3:45 – 4:00 Closing Remarks/ Questions & Answers/ Evaluations
- Paul Landsbergis, PhD, MPH – Mount Sinai, NYC

## Appendix F. UOSHERC Student Research Day

NIOSH ERC Student/Resident Research Day  
Friday, May 18, 2007  
10:00 pm – 1:30pm  
Cullimore Lecture Hall-1  
New Jersey Institute of Technology  
Newark, NJ

Coffee, tea and breakfast will be served.

### AGENDA\*:

- 10:00 – 10:05 Welcome: Dr. Arijit Sengupta (NJIT)
- 10:05 – 10:15 Introduction to the NY/NJ NIOSH ERC and its  
Interdisciplinary Health and Safety Training Emphasis  
-- Dr. David Kotelchuck (Hunter College and ERC Deputy Director)
- 10:15 – 10:30 Measurement of Exhaled Nitrous Oxide and Pentane After Diesel Exhaust  
Inhalation  
-- Anthony Grippo, MD (UMDNJ)
- 10:30 – 10:45 Occupational Health Problems of Professional Truck Drivers  
-- Stephen Benstowe (NJIT)
- 10:45 – 11:00 Injuries and Illnesses Among the New York City Department of  
Environmental Protection Bureau of Water and Sewer Operations  
Workers, 2003-2006  
-- David Olton (Hunter College)
- 11:00 – 11:15 Factors Influencing Physician Management of Nonspecific Low Back  
Pain: A Pilot Investigation  
-- Shira Wiener (NYU)
- 11:15 – 11:30 Carpal Tunnel Syndrome and Acupuncture: Randomized Clinical Trial  
-- Hannah Kim, MD (Mount Sinai)
- 11:30 – 11:45 Break
- 11:45 – 12:00 The Influence of Target Size and Weight on Muscle Recruitment in  
Different Lifting Speeds -- Jangwhon.Yoon (NYU)
- 12:00 – 12:15 Ergonomic Aspects of Personal Digital Assistant (PDA) and Laptop Use  
-- Prakash Kothari and Gloria Martinez (NJIT)

## Appendix G. UOSHERC Northeast Historical Perspectives Course

### ERC Summer Tour Itinerary 2007

#### Agenda

- June 10 Lackawanna Coal Mine
- June 11 Rivers of Steel Tour (Homestead steel plant), Pittsburgh
- June 12 Ford River Rouge and GM Auto manufacturing plant tours
- June 13 Occupational Safety and Health in Canada, University of Toronto
- June 14 (morning) New York Power Authority hydroelectric plant, Niagara, NY  
(afternoon) Grain Elevator Tour, Erie Canal, Buffalo, NY
- June 15 Corning Glass Tour (Meet with Safety and Health Director)  
Corning Museum of Glass

#### Logistical information:

1. Please be at your departure location on time. Sunday, June 10:
  - a. 7:00 AM at Hunter College, 425 East 25th Street  
(Jack Caravanos 908-337-8818 cell#)
  - b. 7:30 AM at UMDNJ-SPH, 683 Hoes Lane West, Piscataway, NJ  
Park in Lot C if you are leaving your car  
(Mitchel Rosen 732-236-6816 cell#)
2. If you will be leaving from UMDNJ and leaving your car here, please email the make and model of your car and your license plate number.
3. Bring a passport or other acceptable form of identification for crossing into Canada and back to the US. Check the US State Department web site for more information ([travel.state.gov](http://travel.state.gov)). Anyone needing a visa to leave the US should have made those arrangements.
4. We are pleased that Dr. Moline, our ERC Director, will be on the beginning of the tour. She will join us through the steel tour, then return to NY. Also joining us will be our NIOSH Program Officer, John Talty. He will meet us in Detroit for the auto plant tours.
5. Wear comfortable clothes. Most places will require closed toe shoes and long pants.
6. Bring a camera.

#### Hotels (All have free wireless):

Pittsburgh, PA June 10  
Hampton Inn University Center  
3315 Hamlet Street  
Pittsburgh, Pennsylvania  
412-681-1000

Detroit, MI June 11  
Hampton Inn  
20061 Michigan Avenue  
Dearborn, Michigan  
313-436-9600

Toronto June 12  
Comfort Suites City Centre  
200 Dundas Street East

Toronto, ON, CA  
(416) 362-7700

Niagara Falls, NY June 13  
Comfort Inn The Pointe  
1 Prospect Pointe  
Niagara Falls, NY  
(716) 284-6835

Corning, NY June 14  
Comfort Inn  
66 W. Pulteney St.  
Corning, NY  
(607) 962-1515

Contact me if you have any questions.

Mitchel A. Rosen  
Director  
Office of Public Health Practice  
UMDNJ-School of Public Health  
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mrosen@umdnj.edu

### III. Program Progress Report

#### A. Program Title: Continuing Education/Outreach/HST (UMDNJ)

#### B. Program Director: Mitchel A. Rosen, MS, CHES

#### C. Program Description

NY/NJ ERC serves the continuing education needs of the occupational health and safety professionals of New York, New Jersey and Puerto Rico. The University of Medicine and Dentistry of New Jersey (UMDNJ), School of Public Health (SPH) continues to administer Continuing Education and Outreach activities for the NY/NJ ERC. In addition to the numerous courses offered by the NY/NJ ERC in Piscataway, New Jersey, partnerships established with the Nassau Community College (NCC), Garden City, New York and SUNY Ulster in Kingston, enable the ERC to offer additional open-enrollment industrial hygiene and occupational safety courses in New York. NCC is conveniently located for students residing the Long Island area and the SUNY Ulster campus is ideal for students residing in the Albany, New York Area. The NY/NJ ERC also started offering safety and health training at the New York City College of Technology, in Brooklyn, New York, for the convenience of NYC students. Additionally, courses are provided via distance education to locations throughout New York State. Finally the HST program is a scholarship program for governmental employees who wish to attend continuing education and outreach courses but need tuition assistance.

#### Objectives:

1. To provide continuing education programs to a minimum of 400 safety professionals, industrial hygienists, occupational health nurses, and occupational physicians.
2. To provide continuing education credits for each course offered through the ERC.
3. To utilize faculty from the ERC, as well as professionals from our target population, as instructors in the continuing education programs.
4. To conduct a needs assessment of the training needs of safety professionals, industrial hygienists, occupational health nurses, and occupational physicians.
5. To lead the Historical Perspectives on Occupational Health and Safety tour for the ERC graduate students.

#### D. Program Activities and Accomplishments

1. To provide continuing education programs to a minimum of 400 safety professionals, industrial hygienists, occupational health nurses, and occupational physicians.

During the program year 7/1/06 to 6/30/07, the NY/NJ ERC offered 245 continuing education courses, training 3,445 students (including the HST program).

Discipline	# of courses	# of students
Industrial Hygiene (IH)	35	526
Occupational Health Nursing (OHN)	7	212
Occupational Medicine (OM)	33	203
Occupational Safety (OS)	84	943
Hazardous Substance Training (HST)	86	1,561
TOTAL	245	3,445

In addition to the courses offered in Piscataway, NJ, open-enrollment courses were also offered in Garden City, NY, Brooklyn, NY, and Ulster, New York. A synchronous distance education course was offered in locations throughout New York, including Albany, Syracuse, Buffalo, Elmira, New York City, and Rochester.

2. To provide continuing education credits for each course offered through the ERC.

The ERC courses are approved for appropriate continuing credits in the disciplines required for participants. Most courses are approved by the American Board of Industrial Hygiene (ABIH) for Certification Maintenance Points for certified industrial hygienists and are recognized by the Board of Certified Safety Professionals for continuing education credits for certified safety professionals. Other courses have Continuing Medical Education (CME) or Nursing credits. Additionally, many courses are approved by the New Jersey Department of Health and Senior Services to meet the continuing education requirement for New Jersey registered environmental health specialists and licensed health officers. In the past year, an application was made to the National Society Professional Engineers for courses to meet their continuing education criteria.

3. To utilize faculty from the ERC, as well as professionals from our target population, as instructors in the continuing education programs.

The industrial and occupational hygiene faculty roster is extensive and includes those who have served as course directors, program faculty, technical advisors, and task force and planning committee members. Their ongoing services to the Center have been instrumental in the successful development and presentation of hundreds of courses and conferences. They are a central resource in the identification of timely course topics for members of their profession and demonstrate their commitment to the program. Some of these professionals are: David Kotelchuck, Ph.D., CIH (Hunter/Mount Sinai); Jack Caravanos, DrPH, CIH, CSP (Hunter); and Mark Goldberg, Ph.D., CIH (Hunter). Edward Bulava, CIH, a long time instructor and consultant became the president of the New Jersey Chapter of the Industrial Hygiene Association in 2005, is the immediate past president. Other instructors in the IH program include Douglas Pastore, MS, CIH (VP of Health and Safety, L'Oreal International) and Peter Crosby, MS, CIH. Douglas Pastore was instrumental in updating the *CIH Review* course materials and he serves as an adjunct professor at UMDNJ-SPH. Peter Crosby, an adjunct faculty of Hunter College, serves as the course director for the *Fundamental of Industrial Hygiene*.

Although the ERC does not have an OHN Academic Program, we aggressively work on meeting the CE needs of occupational nurses. The nurses on faculty and staff at the EOHSI Occupational Health Clinic, Susan Anastario, RN, BSN, COHN and Rosalind Julius, RN, have provided invaluable service to the program by providing instruction, curriculum updates and course development. Annette B. Haag, MS, RN, COHN, presented a three day review course for nurses preparing for the COHN licensing exam and Debbie DiBenedetto, BSN, MBA, RN, COHN, President, AAOHN, presented a two day Principles of Disability and Workers Compensation Case Management & Case Management Certification Review course. UMDNJ is working with Ms. DiBenedetto on more courses that will meet the training needs of occupational health nurses.

Members of the occupational medicine faculty of the UOSHERC have served as course directors, participated in task forces and planning committees, provided instruction in various courses and institutes, and have provided ongoing support to this Center. The following physicians have demonstrated long term commitment to the ERC: Jacqueline Moline, MD; Philip Landrigan, MD, MSc; Stephen Levin, MD; Michael Gochfeld, MD, PhD; Howard Kipen, MD, MPH; and Iris Udasin, MD. Members of the occupational medicine faculty continue to hold key leadership positions. For instance, Drs. Gochfeld and Kipen (UMDNJ) each served as president of the Occupational Medical Association of New Jersey.

Some of the individuals who have long been committed to continuing education and outreach in occupational safety are: Jack Caravanos, DrPH, CIH, CSP and Mark Goldberg, PhD, CIH. These individuals have been instrumental in identifying additional occupational safety program faculty such as Philip Taylor, MS (Port Authority NY/NJ); Douglas Pastore, MS, CIH, former

NJ Chapter President of ASSE; and Karen Smyth, MPH. In addition to owning and operating one of the leading site safety management companies in New York City, Ms. Smyth is an adjunct faculty at NYU in Construction Management. She is an active member of the NYC Chapter of ASSE.

4. To conduct a needs assessment of the training needs of safety professionals, industrial hygienists, occupational health nurses, and occupational physicians.

The NY/NJ ERC conducted one advisory board meeting for the industrial hygiene and occupational safety programs this grant year on October 10, 2006, at the New York City College of Technology, Brooklyn, New York. Among the items discussed at this meeting were identifying additional federal grants for training, offering additional training to the Spanish speaking workers (or Trainer Courses for Safety Professionals, who would then train the workers), developing a Scaffolding course to meet the need for the New York City Local 52, and identifying additional training to offer at the New York City Campus.

The needs assessments collected by the NIOSH-ERC booth (managed by the Cincinnati ERC) at the national conferences continue to serve as a valuable tool to enhance the CE program. Additionally, a post-course evaluation is distributed at every session of training. The student feedback is reviewed by the Center staff and shared with the instructors.

The Center continues to display the NY/NJ ERC CE booth at local industrial hygiene, safety, vocational education, and other conferences in New York and New Jersey. Although the Center's funding is limited for these efforts, having a presence at these events is vital to outreach. In addition to distributing course brochures, potential students are given the opportunity to sign up for the mail list and complete a needs assessment, similar to the national assessment. The information gathered at the local conferences, along with the information gathered from the national conferences; continue to serve as a vital resource for the Center.

5. To lead the Historical Perspectives on Occupational Health and Safety tour for the ERC.

The NY/NJ ERC sponsored its second "Historical Perspectives" tour this year. The program, lead by Mitchel Rosen, MS, CHES, the Program Director of CE and HST and Jack Caravanos, DrPH, Program Director of I.H., brought students to sites with historical significance in environmental and occupational health and safety. The sites included coal mining, steel manufacturing, automobile assembly, power generation, and glass manufacturing. Students were able to get first hand experience of the hazards workers faced while working in those dangerous locations. The students also visited the occupational safety and health program at the University of Toronto. They described differences between how occupational health is practiced in Canada versus the United States.

A goal of the tour was to provide a means to integrate the practice of occupational safety and health within the four academic disciplines represented by our Education and Research Center. Those disciplines include occupational medicine, industrial hygiene, occupational safety, and ergonomics. A total of 27 people participated on the tour, including 18 students and nine ERC faculty members. Students and faculty from all schools and programs within the ERC were represented. Additionally, John Talty, from NIOSH, met the tour in Detroit for the tour of the River Rouge and Michigan Truck Assembly plants.

The evaluation of the program was extremely positive. All 18 students agreed that the interaction with other students and faculty was very positive. All 18 students would recommend the trip to other ERC students. The most informative evaluation data included the response to

how students will utilize the information learned to improve their professional practice. The quotes below summarize the effectiveness of the tour:

“I am much more aware of industrial ergonomic problems and through this tour was able to gain knowledge about IH and occupational medicine that I do not through my program.”

“Being trained in interdisciplinary work and being exposed to these experts in specific areas will continue to help me look outside the box to find solutions to many complex problems.”

“Experiencing these working conditions and sites first hand will allow a much greater understanding of the work environment/stressors when evaluating patients.”

“I have seen the environments and conditions under which people in the industries we visited work. That is invaluable, as I will have to make decisions about health, fitness for duty, return to work, and disability retirement for people in some, if not all of these industries.”

“I thought that the practical experience with theory, will provide me with the knowledge to identify, evaluate, and correct EHS issues.”

## **E. Program Products**

Courses offered by NY/NJ ERC CE Program, July 1, 2006 to June 30, 2007

### **Occupational Safety:**

- Asbestos Control for Worker/Handler (and Refresher)
- Asbestos Operation & Maintenance (and Refresher)
- NJ Asbestos Safety Tech
- 10 Hr Construction
- Lead Worker
- Lead Inspector/Risk Assess Refresher
- 10 Hr General Industry
- Occupational Safety & Health Construction Industry
- Occupational Safety & Health General Industry
- Principles of Ergonomics Applied to Work-Related Musculoskeletal and Nerve Disorders
- Excavation, Trenching and Soil Mechanics
- Public Warehousing and Storage
- Machinery and Machine Safeguarding
- Fall Hazard Awareness for the Construction Industry
- Introduction to Safety and Health Management
- Introduction to Accident Investigation
- Safety for Small Business
- Recordkeeping Seminar

### **Industrial Hygiene:**

- Comprehensive Industrial Hygiene Review
- Guide to Industrial Hygiene
- Asbestos Inspector and Management Planner (and Refresher)
- Respiratory Standard
- Respiratory Protection
- Bloodborne Pathogens Exposure Control
- Health Hazard Awareness

- Annual Scientific Meeting

**Occupational Health Nursing:**

- Training and Certificate in Occupational Hearing
- Recertification in Occupational Hearing
- Spirometry
- Certified Occupational Health Nurses Review
- Case Management

**Occupational Medicine:**

- The Status of Ethiopian Occupational Health as Configured in a Global Context
- Survey of Current Lead Use, Handling, Hygiene, and Contaminant Controls Among New Jersey Industries
- A Real-World Study of Health Effects of Exposure to Diesel Exhaust
- MRSA: Developing and Evaluating a Prison Inmate Educational Video/Community Acquired; MRSA - A Novel Approach to Controlling It
- Health Effects of Ambient Air Pollution
- FDNY Responders to a Terrorist Attack: Consequences & Lessons Learned
- School Health and Safety
- The Long History of Emerging Occupational Diseases
- Does Air Pollution Trigger Ventricular Arrhythmias?
- The Health and Safety Consequences of Psychosocial Job Demand and Control
- Controlling Silica Exposures in Road Construction
- Tuberculosis Screening for Health Care Workers
- The Impact of the Vietnam War
- Studying of Neurotoxicants as Single Chemicals
- Mycologist looks at Katrina
- Mold Overview
- Ozone's Impact on Public Health
- Overview of the New York Workers' Compensation System
- Lung Cancer Screening
- Public Perception of the Avian Influenza
- Disability Rating Under The NJ Workers Compensation Statute: Evidence of Consistency
- The ACOEM 2006 Guideline Preventing Needless Work Disability
- Clinical Utility of Cardiopulmonary Exercise Testing
- Electrodiagnostic Testing in Occupational Medicine
- A Look at Techniques for Pesticide Exposure Assessment
- Expert or Hired Gun? The Role of the Occupational and Environmental Health Physician in the Courtroom
- Fetal Noise Exposure Limit
- A Workplace Walkthrough: A Physician/IH Perspective
- Workers' Compensation Law in New Jersey
- Exposures on Airplanes

- Ambient Air Pollution and the Risk of Acute Ischemic Stroke
- Survival Skills for Doing Workers' Compensation Medical Care
- Herbs and Nutraceuticals: What your patients are taking and what you need to know?

## **F. Future Plans**

The NY/NJ ERC will continue to offer the Comprehensive Industrial Hygiene Review, Fundamentals of Industrial Hygiene, construction safety, ergonomics, asbestos, lead, occupational hearing and spirometry training as part of the CE program. Their initial courses, as well as their update (refresher) training, continue to attract a large number of occupational health and safety practitioners to the Center.

The on-line student registration system currently used by the Center offers the students an opportunity to let the Center know of additional courses they like to see offered at the Center. Student input, through this registration system, has been an invaluable tool for new course development. The Center identified fall protection and electrical safety as additional course areas where training was needed for the coming year.

The Center will offer a competent-person level Fall Protection and Electrical Safety course in 2008. The fall protection course will be geared to safety and health managers, who are responsible for identifying the appropriate fall protection equipment for their employees. The Center will work with JJCruz, Inc, one of the site safety management companies at the new World Trade Center construction site, to design a lab for this course. It should also be noted that Philip Taylor, MS, CSP, CHST, one of the Center's adjunct instructor and full-time Site Safety Manager for the PANYNJ at the WTC construction site, will be working with the Center on this course.

The Center will also be offering a four-day electrical safety course in 2008. The National Electrical Code (NEC) was updated in 2007 and several new safety protocols have gone into effect for facilities that use hazardous materials and generate combustible dusts (effective 8/13/2007). The curriculum development for this course will be lead by John Malool, MS, Course Director for the HST Program.

The Center's Spirometry program successfully completed the reapplication process with NIOSH. Over the past five years, UMDNJ has offered two sessions of the three-day Spirometry course, per year on-site. At the time of this reporting, the Center has been contracted to offer three sessions of the Spirometry course off-site (Fall 2007). The Center is also exploring the possibility of offering open-enrollment Spirometry courses at Coordinated Health, in Bethpage, New York.

### **III. Progress Report (Hazardous Substances Academic Training - HSAT)**

#### **A. Program Title: Hazardous Substance Academic Training (Hunter)**

#### **B. Program Director: Mark Goldberg**

#### **C. Program Description**

##### Goals and Objectives:

The Hazardous Substances Academic Training (HSAT) program is a concentration within the EOHS track for students seeking the MS degree. (No support is requested for students in the MPH program.) For the overall goals and objectives of this industrial hygiene program, see the above IH Program report. The goals of the HSAT program remain:

- (1) To broadly develop interest in and understanding of the problems of hazard recognition, evaluation and control at hazardous waste sites and during emergency response to chemical spills and fires among most MS graduates and many MPH graduates, and
- (2) To graduate annually a smaller group of industrial hygiene professionals with the MS degree and advanced training including field experience in this specialty area.

##### Curriculum:

The EOHS curriculum (ABET Accredited IH Program) consists of 15 credits of Public Health core courses, 25 credits of specialized IH coursework (including EOHS 745 Hazardous Waste Management and EOHS 759 Industrial Site Visits) and 8 credits of EOHS electives for a total of 48 credits. All students must also complete an internship and prepare a capstone paper. In addition to the Industrial Site Visits course required of all IH students, HSAT students must take two other hazardous substances courses, including Hazardous Waste Management and a choice among Fire Safety, Indoor Air Quality and Biohazards and Emergency Response, for a total of 12 credits of HSAT-related courses.

We offered the following electives in 2006-07: Indoor Air Quality (Fall) and Biohazards and Emergency Response (Spring).

##### Faculty:

The EOHS has 5 full-time faculty; Associate Professor Jack Caravanos, Professor Susan Klitzman, Associate Professor Mark Goldberg, Professor Frank Mirer and Assistant Professor Jennifer Richmond-Bryant. Presently Professor Klitzman is on administrative reassignment. Three of the five faculty are Board Certified in Industrial Hygiene For details see IH Program report above.

#### **D. Program Activities and Accomplishments**

1. Progress Toward Goals and Objectives:
  - a. EOHS completed a 250+ page self-study in preparation for ABET reaccreditation
  - b. EOHS completed a student survey and assessed results
  - c. EOHS completed an alumni survey and assessed results
  - d. EOHS completed an employer survey and assessed results
  - e. EOHS held 2 meetings (October and March) with current students to assess effectiveness of program

## 2. Students:

The EOHS Program continues to maintain a healthy enrollment. For the Fall semester 2006, there were 57 students matriculated in the Program. Of these, 29 were MS students and 28 MPH students. For the current semester (Spring 07), there are 62 students enrolled, 30 of whom are MS students. For the Fall semester (2006), 2 students were selected for HSAT scholarships: Raymond Nieves and Joseph Schafer. In Spring 2007, 7 students were awarded scholarships: Jacki Camacho, Adam Farano, Honghong Luo, John Meehan, Dominique Niceforo, Ray Nieves and Joseph Schafer. Three HSAT trainees graduated in 2006-07: Robert Harrington, Nancy Katz and Selim Tlili.

## 3. Faculty Changes:

This academic year has seen some changes in the EOHS faculty:

- Dr. Mark Goldberg, who was Acting Director of the HSAT program when Dr. Caravanos was on sabbatical, is now the Director.
- Dr. Jack Caravanos returned from a very successful one-year sabbatical leave from Hunter College (9/05 – 8/06) He published several articles, began work on several more, and completed several projects with the New York City Department of Health and Mental Hygiene.
- This year EOHS was proud to add to its faculty Dr. Frank Mirer, as a Professor. Dr. Mirer had a long and brilliant career as Director of Health and Safety for the United Auto Workers of American trade union. He led the Department to become one of the outstanding organizations of its kind in the world. He has published extensively on his work, and is a member of many health and safety advisory boards. Dr. Mirer received his PhD in Toxicology from Harvard University, where he also received the MPH.

## F. Future Plans

Two important academic initiatives that began last year have been brought to fruition this year.

1. Under the leadership of Dr. Susan Klitzman, Director of the Urban Public Health Program and a faculty member in the EOHS Track, a proposal for a doctoral program (DrPH) was submitted to the City University of New York administration. This program has been approved and will begin its first classes in the Fall 2008 semester. The program is anchored at the CUNY graduate center and will have faculty from several CUNY colleges. UPH at Hunter College will be an important component of this new program.

2. Last year EOHS proposed to the college a dual degree option for our students whereby MS students could also obtain the MPH degree by completing 9 additional credits after completion of MS requirements. The MS/MPH dual degree will include all of the course work currently required for the MS as well as those courses required for the MPH that are not part of the MS curriculum. The dual degree will require the completion of 58 credits. The current MS requirement is 48 credits. Current accreditation of the degrees (the MS by ABET and the MPH by CEPH will continue). Although the proposal was approved by several faculty committees, it was returned to us by the CUNY administration for revising. It is currently being revised.

In addition to these initiatives, a new one has begun this academic year. The City University of New York has committed resources to the establishment of a School of Public Health at Hunter College. Dr. Klitzman, along with faculty from other CUNY campuses, is a lead member of the planning committee for this undertaken. A department of EOHS will be part of the new school.

Second Annual EOHS Bus Tour of Industrial Sites: The EOHS NIOSH-IH and HSAT students and faculty participated in 2<sup>nd</sup> Annual EOHS Industrial Site Tour in June 2007 – a 1,500 mile bus tour through NY, PA, OH, MI and Canada visiting 8 industrial sites / facilities with 18 ERC students and 9 program faculty from all the NIOSH funded programs.

## Appendices

### Appendix A: Program Curriculum

#### Industrial Hygiene / Hazardous Substance Academic Training\*

Semester	Course
Semester 1	PH 700: Biostatistics
Semester 1	PH 702: Environmental Health & Safety
Semester 1	EOHS 702: Occupational Health & Safety
Semester 1	EOHS 754: Toxicology
Semester 2	PH 701: Health Care Administration
Semester 2	PH 703: Epidemiology
Semester 2	EOHS 757: Industrial Hygiene
Semester 2	EOHS 762: Noise & Radiation
Semester 3	PH 710: Urban Health Promotion
Semester 3	EOHS 741: Industrial Hygiene Laboratory
Semester 3	EOHS 755: Industrial Ventilation
Semester 3	ELECTIVE or EOHS 745: Hazardous Waste Management (for HSAT students)
Semester 4	EOHS 759: Industrial Site Visits
Semester 4	EOHS 761: Capstone
Semester 4	ELECTIVE or EOHS 77086: Fire Safety and Emergency Response (for HSAT students)
Semester 4	ELECTIVE

\* All courses required except for those designated as ELECTIVE. HSAT students are required to take EOHS 745 and 770.86, and thus have only one elective course. Other IH students have three electives as indicated.

## Appendix B: Faculty and Trainee Publications

Weiss A, Caravanos J, Blaise M, Jaeger R; *Distribution of lead in urban roadway grit and its association with elevated steel structures*; Chemosphere, Vol 65: pp 1762-1771; December 2006

Caravanos J, Weiss A, Jaeger R; Long Term Exterior Dust Lead Loadings in New York City; Environmental Research, Vol 100(2): pp 159-164; February 2006

Caravanos J, Weiss A, Blaise M, Jaeger R; A Survey of Spatially Distributed Exterior Dust Lead Loadings in New York City; Environmental Research, Vol 100(2): pp 165-172; February 2006

Weiss A, Caravanos J, Jaeger R; Lead in Urban Roadway Grit: A Novel Source and it's Implication, The Toxicologist, (abstract) Society of Toxicology Conference, San Diego, CA, March 2006

M. Goldberg and N. Clark, "Controlling an Ancient Occupational Disease in a Modern Urban Setting: Assessing Silica Exposure during Infrastructure Rehabilitation in New York City." In Goldsmith and Sonnino (Eds.), *Rome and New York City: Comparative Urban Problems at the End of the 20<sup>th</sup> Century*. Casa Editrice Universita La Sapienza, Rome, 2006.

Klitzman S, Matte T and Kass D, "The Urban Physical Environment" in D. Vlahov, N. Freudenberg, S. Galea (Eds.), Urban Health: Cities and the Health of the Public, Nashville TN: Vanderbilt Univ. Press: 61-84, 2006.

Klitzman S, "Trends in lead exposure in New York City: Challenges and implications for public and environmental health policy and practice." in V. Goldsmith and E. Sonnino (Eds.), Rome and New York City Comparative Urban Problems at the End of the 20<sup>th</sup> Century, Rome: Casa Editrice Universita La Sapienza: 249-267, 2006.

Richmond-Bryant J, Eisner AD, Brixey LA, Wiener, R. (2006) Transport of small airborne particles within a room. *Indoor Air*. 16: 48-55.

Richmond-Bryant J, Eisner AD, Brixey LA, Wiener R. (2006) Short-term dispersion of indoor aerosols: Can it be assumed the room is well-mixed? *Building and Environment*. 41: 156-163.

Richmond-Bryant J, Eisner AD, Flynn MR. (2006) Considerations for modeling particle entrainment into the wake of a circular cylinder. *Aerosol Science & Technology*. 40: 42-51.

### **III. Program Report**

#### **A. Program Title: Pilot Projects Research Training Program (Mount Sinai)**

#### **B. Program Director: Jacqueline Moline, MD, MSc**

#### **C. Program Description**

##### Program Goals and Objectives:

The goals of the Pilot Project Research Training Program of the Universities Occupational Safety and Health Education and Research Center (UOSHERC) are to:

1. To stimulate and enhance training in occupational safety and health research by students and faculty in the ERC and TPG programs in NIOSH Region II, especially in the priority areas designated in the NIOSH NORA agenda.
2. To encourage new directions in occupational safety and health research by providing "start-up funds" to student and faculty investigators to initiate innovative occupational safety and research.
3. To stimulate investigators in departments throughout the institutions participating in the NIOSH Region II ERC and TPG programs, as well as at other regional institutions, to join in cooperative research with our faculty and students, thereby adding their expertise and talents to that of those already engaged in research in occupational safety and health.

The Pilot Project Training Grant Program continues to be a major asset to our ERC as a means of funding new research, and increasing the visibility of the ERC and TPG programs in this Region and in their parent institutions. We have targeted trainees and other students in an effort to foster future scientists in occupational safety and health. This Program also promotes interdisciplinary collaborations, both within this ERC as well as with the TPG in Region II. Through the Pilot Project Training Grant Program, we have been able to involve students and scientists in Puerto Rico, a component of Region II in participating in the ERC.

All pilot projects submitted must undergo scientific review following the NIH-style scoring format. Trainee-initiated projects are particularly encouraged. Efforts are made to ensure that new scientists and trainees apply for the program, and that reviewers are aware that the applicants are trainees. The pilot research grants program is open to all doctoral level students in the schools which participate in the NIOSH Region II Education and Research Center and Region II TPG. Junior faculty members or faculty members who have an interest in research in occupational safety and health are also eligible. In addition, the program is open to students and researchers at other regional institutions and other stakeholders who wish to undertake cooperative occupational safety and health research with faculty and/or students at Region II ERC and TPG institutions.

##### Responsible Conduct of Science:

For all pilot research proposals involving human subjects, investigators are required to obtain Institutional Review Board (IRB) approval from their institution, and demonstrate proof that they have training in the responsible conduct of research. Other research assurances, such as approval for animal studies, are required prior to the release of funding.

Faculty Participation:

This pilot research training program is directed by Jacqueline Moline, MD, MSc., Director of the ERC. She is responsible for overall administration and direction of the program. Dr. Moline works with the scientific review panel to assign projects to reviewers and to seek guidance for ensuring that projects fit into the goals of both our ERC and NIOSH with respect to NORA goals and r2p. We continue to collaborate with our region’s only TPG, the Industrial Hygiene Training Program of the University of Puerto Rico, whose Director, Dr. Jesus Gonzalez, is on the program’s scientific review panel.

Program curriculum:

The Pilot Project application and requirements are at <http://www.mssm.edu/cpm/pprpt.shtml>

**D. Program Activities and Products:**

For 2006-2007, we received a total of 10 pilot project applications. Five proposals were from doctoral students or residents, and two were from junior faculty who are recent graduates of the ERC. One proposal was from a recent ERC trainee who is in Puerto Rico, and two were from junior faculty in other departments at Mount Sinai who are collaborating on occupational medicine projects. Five awards were made totaling \$50,500. They are listed below:

Title	Institution
<b>Funded</b>	
Measurement of Exhaled Pentane in Asthmatics after Diesel Exhaust Inhalation	UMDNJ
Validating a mechanism for self-reporting of postural demands in home computer and electronic game use.	NYU- Occupational and Industrial Orthopaedic Center (OIOC)
Prognosis for neck and upper extremity musculoskeletal disorders in older office workers	Mount Sinai School of Medicine
Respiratory Disease in Construction Workers at the WTC Site	Mount Sinai School of Medicine
Mouse Models of Uranium-induced Autoimmunity	Mount Sinai School of Medicine
<b>Not Funded</b>	
The Influence of Size and Distance of Icon on Muscle recruitment during Computer Mouse Clicking	NYU- Occupational and Industrial Orthopaedic Center (OIOC)
Acupuncture as an Adjunct to Standard Conservative Treatment vs. Standard Treatment Alone in Rhinosinusitis in the World Trade Center Population: A Randomized Controlled Pilot Study	Mount Sinai School of Medicine
Participatory ergonomics for operating room nurses: Trade-specific versus specialty-specific factors risks and solutions	NYU- Occupational and Industrial Orthopaedic Center (OIOC)
Injury Rates by Occupation in the Puerto Rican Construction Industry: 2002-2004	Puerto Rico Department of Health
Implementation of a Uniform Rehabilitation Protocol in Clinical Setting	NYU- Occupational and Industrial Orthopaedic Center (OIOC)

NORA sectors covered by the pilot proposals funded this year, as indicated in the above Table, include Construction (Project 4), Services (Projects 2 and 3), Transportation (Project 1), Mining (Project 5). Also two of the projects (Projects 2 and 3) have the potential to impact on several sectors, since they relate to computer use, which is ubiquitous in the workplace.

All awardees present their work at the ERC Annual Scientific Conference, as they did at this year's conference, held at Mount Sinai on April 13, 2007. Abstracts of the pilot projects were distributed to all attendees of the Annual Scientific Day, as they are each year.

## **E. Program Products**

Of the grants funded in recent years, one project provided pilot information that was utilized in the successful grant application for the Mount Sinai World Trade Center Medical Monitoring Program (J. Szeinuk "Clinical and Socio-Economic Consequences of the WTC Disaster Among Exposed Patients Examined at the Mount Sinai Center for Occupational and Environmental Medicine"). This grant year (2006-2007) there were a total of seven publications arising out of recently funded pilot projects, with two other articles submitted for publication and now under review (Appendix B).

Also at NYU, S. Schechter Weiner, ERBI PhD candidate, expanded her ERC Pilot Research Project award from 2006 into her Doctoral Research topic, entitled, "Factors Influencing Physician Management of Nonspecific Low Back Pain."

## Appendices

### Appendix A. Not Applicable

### Appendix B. Pilot Projects Research Training Program Publications

(Recipients of the Pilot Project grant awards underlined)

A. Sheikhzadeh, C Gore, M. Nordin: Ergonomics risk factors among operating room nurses: A pilot study. The 28th Annual meeting of the International Society for the Study of the Lumbar Spine (ISSLS), Bergen, Norway, June 13-17, 2006.

Sheikhzadeh A, Gore C, Zuckerman JD, Nordin M: Operating Room Nurses' Perceptions of Ergonomic Risk Factors in Surgical Environment: A Pilot Study. Applied Ergonomics. (Submitted for review).

Sheikhzadeh A, Gore C, Zuckerman JD, Nordin M: Prevention of Work-related Musculoskeletal Disorders among Orthopedic Surgeons: A pilot study. Applied Ergonomics. (Submitted for review).

Hagins M, Lamberg EM. Natural breath control during lifting tasks: effect of load. Eur J Appl Physiol. 2006 Mar;96(4):453-8. Epub 2005 Dec 10.

Halpern M. Application of NIOSH Model Ergonomics Program in a Specialty Hospital (poster). WorkLife 2007, NIOSH Symposium: Protecting and Promoting Worker Health, Bethesda, MD, September 10-11, 2007

Campello MA, Weiser SR, Nordin M, Hiebert R. Work retention and nonspecific low back pain. Spine. 2006 Jul 15;31(16):1850-7.

Nonspecific triggers also provoke occupational asthma. Piligian G, Szeinuk J, Levin S, Moline J, Milek D, Afilaka A, Wilk-Rivard E. Am J Respir Crit Care Med. 2005 Aug 1;172(3):280-305.

Suarez-Martinez EB, Montealegre F, Sierra-Montes JM, Herrera RJ. Molecular identification of pathogenic house dust mites using 12S rRNA sequences. Electrophoresis. 2005 Aug;26(15):2927-34.

Transport of airborne particles within a room. Richmond-Bryant J, Eisner AD, Brixey LA, Wiener RW Indoor Air. 2006 Feb;16(1):48-55.

### III. Program Report

#### A. Program Title: National Occupational Research Agenda (NORA) ERC Program

#### B. Program Director: Paul A. Landsbergis, PhD, MPH

#### C. Program Description

##### Goals and Objectives:

- a. Provide the administrative and technical support within the ERC necessary to promote and conduct research in NORA priority areas.
- b. Coordinate interdisciplinary research
- c. Train graduate students whose theses address NORA priority areas.
- d. Provide support for ERC faculty who conduct research training to graduate students.
- e. Administer Continuing Education and Outreach Programs to apply NORA research findings
- f. Administer Research Training Pilot Project Programs that fund new investigators in NORA priority areas.

Research training and research is conducted in the following NORA priority areas:

Cancer Research Methods, Mixed Exposures, Special Populations at Risk, Surveillance Research Methods, Exposure Assessment Methods, Musculoskeletal Disorders, and Organization of Work

##### Responsible Conduct of Science Training:

All ERC and NORA supported students receive responsible conduct of science training and take on-line or IRB required training in human subjects protection.

##### Faculty Participation:

- a. Dr. Anne Golden, an occupational epidemiologist, assists Dr. Moline in the Pilot Project Program, providing epidemiological expertise in the selection process in conjunction with the Scientific Advisory Board.
- b. Dr. Paul Landsbergis supervises the NORA research assistant and oversees development of new research grant proposals and the expansion of existing studies in the areas of disaster response, ergonomics and work organization. Our primary target population is the health care industry, although studies of employees in other industries are also conducted. Efforts include:
  - Biopreparedness. Faculty at UMDNJ (Dr. Gochfeld) conduct research on the impact of preparedness training, and on evaluation of emergency room preparedness, particularly with respect to decontamination facilities.
  - Health Effects of Exposure to Respiratory Hazards and Acute Psychological Trauma Among World Trade Center Workers. ERC faculty members were leaders in the development of the major CDC-funded center for the clinical evaluation and long-term medical monitoring of World Trade Center (WTC) rescue, recovery and clean-up workers. Proposals are being developed for data analysis and research.
  - Ergonomic Risk Factors and Musculoskeletal Disorders. Faculty at NYU (Dr. Sheikhzadeh), NJIT (Dr. Sengupta), Mt. Sinai (Dr. Landsbergis) and their students are conducting studies on ergonomics, biomechanics and musculoskeletal disorders, primarily among health care workers.
  - Health Risks of Stressful Work Organization. Dr. Landsbergis is currently conducting studies on the health impacts of work stress. These include development and implementation of innovative research methodologies, such as ambulatory monitoring to assess blood pressure

elevation or heart rate variability as biological markers of work stress, and examining patterns and trends in medical insurance claims for occupational disease surveillance.

Curricula:

The ERC NORA Program provides support for:

- a. Interdisciplinary Occupational Health and Safety Seminar, emphasizing the role of epidemiology in all facets of occupational safety and health, and attended by students throughout the ERC is taught every fall. Course Director: Dr. Kimberly Morland, Mt. Sinai
- b. Videoconferencing of the Interdisciplinary Environmental and Occupational Site Visit and Industrial Processes Course, held every spring, conducted through the Continuing Education facilities of UMDNJ. Course Directors: Drs. Frank Mirer and David Kotelchuck, Hunter College and Dr. Michael Gochfeld, UMDNJ/RWJ Medical School.
- c. Faculty, who develop and teach graduate research training courses at the five institutions belonging to the ERC.

**D. Program Activities and Accomplishments**

1. Progress toward Goals and Objectives:

a. Provide administrative and technical support within the ERC necessary to promote and conduct research in NORA priority areas:

Dr. Landsbergis developed and updates a roster of all NORA-related ERC faculty, students and staff, research projects, and graduate research methods courses.

b. Coordinate Interdisciplinary Research:

*Creosote Research Program* (Jacqueline Moline, MD, Anne Golden, PhD, Kimberly Moreland, PhD). The cancer incidence study data collection and data analysis has been completed. There is an increased incidence of skin cancer among dockbuilders with both sun exposure and creosote exposure. The Intervention aspect of this Program has been funded by NIOSH, and will be completed in 2007.

*Diesel exhaust* poses a potential health hazard to workers who drive, maintain, and repair diesel vehicles, and to the general public. UMDNJ residents (including Dr. Grippo) participated in two research projects: "Responses to Fresh Aerosols in Susceptible Subjects" (Kipen PI) and "The Effects of Diesel Exhaust and Stress on the Acute Phase Response and Symptoms in the Chemically Intolerant" (Fiedler PI). Residents provided assistance with medical clearance for subject participation, involving reviews of medical history and physical exams, and monitoring and coverage of controlled exposure sessions and procedures such as induced sputum to ensure subject safety. The "Stress" study reached its goal of 100 subjects in June 2007. As an outgrowth of this NORA experience, Dr. Grippo (resident) and Dr. Laumbach developed a sub-project to examine cell metabolic and lipid peroxidation in persons exposed to diesel exhaust. This project received ERC pilot funding (Dec 2006).

*Biomechanics and Ergonomics*. Dr. Sheikhzadeh, ERBI faculty, ERBI Ph.D. candidate, J. Yoon, and ERBI-NORA funded student, Vivek Pinto, continued collaborative research activities with the department of Orthopaedic Surgery, NYU-Hospital for Joint Diseases. The

project was initiated originally in Fall 2005 to gain a better understanding of shoulder and scapula kinematics. The project has expanded to include the study of 120 patients with Shoulder Impingement, Rotator Cuff Tear, and Shoulder Arthroplasty. The results of this study will reveal the comparative biomechanical profile of healthy subjects and patients during activities of daily living. Two manuscripts have been prepared for publication based on data gathered from the earlier phase of this project. V. Pinto and J. Yoon assisted with patient recruitment, data collection, and data processing.

Vivek Pinto assisted Dr. Sheikhzadeh in training two EBRI Masters students, Maneesha Kumar and Anne-Marie Belliveau, in use of the three-dimensional kinematic data collection and analysis system using electromagnetic motion analysis. The objective of this training was to have the students become proficient in performing kinematic analysis of the trunk and upper extremity based on a protocol recommended by the International Society of Biomechanics.

*Ergonomics.* New Jersey Institute of Technology supported Jason Williams, Prakash Kothari and Silvia Kamau from NORA funds. Mr. Williams completed his Masters Thesis, "Effect of Glove Port Height on Upper Body Stress for Performing Laboratory Work". Currently he is preparing a paper based on his thesis, which he plans to present at the Canadian Ergonomics Society Conference, Toronto, October 14-17, 2007. Mr. Kothari conducted a survey on muscle fatigue and musculoskeletal disorder due to typing in personal digital assistants (PDA). Based on his pilot study, an abstract "Ergonomics Aspects of Personal Digital Assistants (PDA) and Laptop Use" was accepted at PREMUS 07, the Sixth International Scientific Conference on Prevention of Work-related Musculoskeletal Disorders, Boston, August 27-30, 2007. Ms. Kamau was supported for maintaining the Safety and Ergonomics Laboratory. Additionally, she took part in a case study project at a local industry, Saint Gobain Performance Plastics in Wayne, New Jersey. The case study involved ergonomic analysis for set up operator activities in the die unit of a plastic extrusion machine.

*Work Organization, Ergonomics and Health.* Dr. Paul Landsbergis (Mt. Sinai) and Rudi Hiebert (NYU) analyzed a data set of Dr. Landsbergis' on ergonomics and musculoskeletal disorders among hospital workers. Mr. Hiebert presented this analysis as a poster at the PREMUS 07 conference. Dr. Landsbergis and colleagues presented the results of analyses of job stress and ambulatory blood pressure among health care workers at conferences in Brazil, Toronto, and Los Angeles. Dr. Landsbergis was co-author of a major review of job stress interventions published in the International Journal of Occupational and Environmental Health (Appendix D).

In 2006, Mt. Sinai and NYU jointly prepared a proposal to the Associated Press (AP) for an ergonomic study of AP photographers (Landsbergis, Mt. Sinai, PI; Gillespie, Mt. Sinai, co-I; Halpern, NYU, co-I). Funding decisions will be announced soon. Dr. Landsbergis, Dr. Moline and Dr. Robin Gillespie (Mt. Sinai) received a contract from the New York City Uniformed Sanitationmen's Association to conduct a study of ergonomics, work organization and the health of sanitation workers. Finally, Dr. Landsbergis is preparing new research proposals, which can provide research training opportunities for ERC graduate students: 1) as PI, an R01 proposal to NIOSH on work organization and worker health is being revised for resubmission; 2) as Co-Investigator, proposals on: work stress and breast cancer among

health care workers; work organization and atherosclerosis; occupational health among New York City transit workers; and ergonomics and low back pain among locomotive engineers.

c. Train graduate students whose theses address NORA priority areas:

Dr. Morland of Mt. Sinai was Course Director for the Interdisciplinary Occupational Health and Safety seminar in the Fall of 2006. The 6-session course provided students with examples of research projects aimed at assessing the health and safety of workers, emphasized epidemiologic methods for exposure assessment and monitoring health outcomes, and included presentations by Drs. Caravanos, Markowitz, Kotelchuck and Landsbergis. 7 students from ERC member institutions were enrolled.

Drs. Mirer and Kotelchuck of Hunter College and Gochfeld of UMDNJ were Course Directors for the Occupational Site Visits course, conducted February-April 2007. The ERC Continuing Education/Outreach Program, using NORA funds, broadcast the course from Hunter College. It was viewed live from 3 remote locations (UMDNJ, Piscataway, NJ, Mount Sinai, New York, NY, and NJIT, Newark, NJ). Students present at all locations had the ability to view and interact with the presenter(s).

Student memberships to the American Public Health Association (@ \$50/year) were provided to 8 ERC students or trainees, to encourage their participation in this key professional organization.

d. Provide support for ERC faculty who conduct graduate research training:

Hunter College has assigned Prof. Jennifer Richmond-Bryant as internship coordinator replacing Prof. Susan Klitzman. Prof. Richmond is working with MS and MPH students to carry out their research and capstone projects on NORA-related subjects. Partial scholarship support (through NORA) continues to be provided for David Olton and Muneshwar Jagdharry. In addition, the following research methods courses were taught during 2006-07:

- Introduction to Biostatistics MPH300 (Mt. Sinai, Dr. Godbold)
- Introduction to Qualitative Research Methods MPH305 (Mt. Sinai, Dr. Zarcadoolas)
- Multivariable Methods MPH311 (Mt. Sinai, Dr. Doucette)
- Research Methods MPH320 (Mt. Sinai, Dr. Brengle)
- Introduction to Epidemiology MPH400 (Mt. Sinai, Dr. Factor)
- Principles and Methods in Epidemiology PHCO 0502 (UMDNJ, Dr. Marcella)
- Introduction to Biostatistics PHCO 0504 (UMDNJ, Dr. Ohmann)
- Epidemiology Research Methods EPID 0651J (UMDNJ, Drs. Rich/Wartenberg)
- Environmental and Occupational Epidemiology ENOH 0652 (UMDNJ, Dr. Osinubi)
- Principles of Biostatistics and Epidemiology I PH700 (Hunter, Dr. Yeh)
- Principles of Biostatistics and Epidemiology II PH703.01 and 703.02 (Hunter, Dr. Klitzman)
- Advanced Engineering Statistics IE604 (NJIT, Dr. Bengu)
- Research Methods in Ergonomics and Biomechanics G48.2123 (NYU, Drs. Hiebert/Weiser)

e. Administer Continuing Education and Outreach Programs to apply NORA research findings:

Distance learning was provided to host the Environmental and Occupational Site Visit and Industrial Processes Course from February-April 2007. This course is broadcast from Hunter College and viewed live from three remote locations (UMDNJ, Piscataway, NJ, Mount Sinai, New York, NY, and NJIT, Newark, NJ). The course is given over a 2-hour period twice monthly. Students present at any location have the ability to view and interact with the presenter(s).

The CE Program conducted an interactive video (VTEL) seminar on January 25, 2007 that connected 7 sites in New York and New Jersey. The sites included Albany, Syracuse, Buffalo, Elmira, New York City, and Rochester in New York and Piscataway, NJ. The seminar was titled, "Overview of the New York Workers' Compensation System". A total of 46 people participated in the seminar. David Austin of the Bureau of Health Management in Albany, New York presented. Participants learned how to recognize the proper way to file reports and request authorization, and understand the disputed medical bill process. David Austin presented from the Albany, NY location. The other six locations heard David Austin speak as the power point slides were streamed on their video screens. After the 1-hour presentation was complete, David Austin led an interactive question and answer period that the participating sites took full advantage of. General CEUs and CME credits were available for participants.

To reach a broader audience, the ERC has developed and produced on-line courses that contain power point slides, streaming video and audio. This content is available to health and safety professionals, as well as the general public, and is distributed via web-browser, RSS (really simple syndication) feeds, and through the use of Apple iTunes application. All content is cross-platform and web-browser compatible by utilizing Adobe Flash and Apple Quicktime software. In 2007, the ERC completed the following on-line materials: 1) 28th Annual ERC Scientific Meeting: The Changing Workplace and Occupational Health Disparities; 2) Safetycast (enhanced podcasts presented in a radio-style format): Overview of PPE; Respiratory Protection; Hearing Protection; Eye Protection; PPE Regulations and Wrap-UP; Overview and History of Lead; Childhood Lead Poisoning; Lead Exposure in the Construction Industry.

A new Learning Management System (LMS) is being implemented at UMDNJ, and staff from the NORA-CEO program are taking part in the development and launch. The new system, Moodle, will be replacing the current system, Blackboard (Bb) / WebCT. Once completed, the ERC will be able to integrate these online materials with graded quizzes to establish a secure platform for distributing completion certificates and credits based on time and performance.

The ERC, through UMDNJ, is also participating in the development of an iTunes U channel on Apple's iTunes server. The server provides hosting space for content (podcasts, enhanced podcasts & video podcasts) and both open and secure (password protected) accessible environments. This is a free service offered by Apple, Inc. Ideally, this multi-faceted approach to distributing pertinent health and safety information will reach the largest majority of interested parties by allowing this information to be viewed by: Streaming through a web-browser; Downloaded and saved to a computer hard-drive; cell-phone; mp3 (ie., iPod) player; Apple iTunes; On a distributed CD.

f. Administer Research Training Pilot Project Program that funds new investigators in NORA priority areas:

Dr. Anne Golden, an occupational epidemiologist, continued to assist Dr. Moline in the Pilot Project Program, providing epidemiological expertise in the selection process.

2. Trainee Honors, Awards, Scholarships:  
None
3. Trainee theses and dissertations  
New Jersey Institute of Technology NORA-funded student Jason Williams completed his MS thesis, "Effect of glove port height on upper body stresses for performing laboratory work".
4. Faculty honors, awards, appointments  
None
5. New faculty positions  
None
6. New research methods courses  
None. Extensive research methods courses already exist.
7. Trainee recruitment including diversity efforts  
None

#### **E. Program Products**

1. Summary of Publications and Presentations of Program Faculty and Trainees (Appendix D)
2. Conferences/Symposia Sponsored: Annual ERC Region II conference (April 2007)
3. CE Courses Presented: NY State Workers' Compensation
4. Successful R2P Projects: None
5. Research Projects Completed having Significant Trainee Involvement:  
Jason Williams, NJIT. Based on his thesis, a conference paper entitled "Effect of glove port height on shoulder and back stresses" was accepted for publication in the proceedings of the 38th Annual Conference of Association of Canadian Ergonomists, Toronto, Ontario, Canada, October 15-17, 2007.  
  
Prakash Kothari, Gloria Mertinez and Sylvia Kamau, NJIT. A survey of 72 PDA and laptop users and a laboratory experiment measuring muscle activities during miniature keyboard operation were conducted. The abstract was published in the Proceedings of the PREMUS 07 conference.
6. Unique Training Courses Presented:  
Interdisciplinary Occupational Health and Safety Seminar (Fall)

Interdisciplinary Occupational Site Visits course (Spring)  
Northeast Occupational Safety and Health Historical Perspectives course (Summer)

**F. Future Plans (for July 1, 2007-June 30, 2008)**

- Dr. Morland will continue to be the Course Director for the ERC Interdisciplinary Seminar (fall 2007)
- UMDNJ will videoconference the Interdisciplinary Site Visit Course in spring 2008, and additional programs will be offered through the interactive video (VTEL) system.
- Dr. Golden will continue to assist Dr. Moline in the Pilot Project Program, providing epidemiological expertise in the selection process in conjunction with the Scientific Advisory Board.
- Dr. Landsbergis will continue to oversee development of new studies and expansion of existing studies in the areas of disaster response, ergonomics and work organization.
- Dr. Landsbergis will continue to work cooperatively with Dr. Hiebert at NYU to conduct analysis of data on musculoskeletal disorders among hospital workers and to obtain funding for further work.
- Laura Rothenberg, MS, will continue as NORA program research assistant, for 30% FTE.
- Dr. Sengupta of NJIT purchased a new biomechanical modeling software (“Anybody”) to be used in future NORA related research. Ms. Prabhjot Saini, a biomedical engineering student, installed and learned to program the software in the summer of 2006. The software employs state of the art technology to determine the internal stresses on human body tissues that arise out of external loading.