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

ANNUAL REPORT

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EXECUTIVE SUMMARY

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) 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 and Pilot Project 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 NJ Inst. of Technology (Newark, NJ);
- Continuing Education and Outreach and Hazardous Substance Training at UMDNJ/Robert Wood Johnson Medical School (Piscataway, NJ); and the
- Occupational Ergonomics and Biomechanics Program at New York University (NY, NY).

Changes: Earlier this year, Dr. Philip J. Landrigan, Ethel H. Wise Professor of Community Medicine and Chairperson of the Department of Community and Preventive Medicine at the Mount Sinai School of Medicine, stepped down after 20 years as UOSHERC Center Director. The ERC Management Committee elected Dr. Jacqueline Moline, Director of the Mount Sinai Occupational Medicine Residency Program, to replace him. Dr. David Kotelchuck, now retired from Hunter College, continues to serves as Deputy Director. The composition of the ERC Management Committee has changed this past year, with the addition of three new, younger program directors in Industrial Hygiene (Caravanos), Continuing Education and Outreach (Rosen) and HSAT (Goldberg).

Achievements: 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 and with the help of NIOSH NORA funds. In addition, to enhance student interdisciplinary interactions, UOSHERC regularly holds an annual Scientific Conference. During this current grant year UOSHERC held its 27th annual scientific conference April 7, 2006 on the topic "Nanoparticles: Health and Technology". Also UOSHERC held its annual student research day on May 3, 2006 again at NJIT.

Perhaps the highlight of this grant year was the highly successful and our first ERC Interdisciplinary Northeast OSH Tour: During the week of June 4-8, 2006, under the leadership of program directors Jack Caravanos (IH) and Mitchel Rosen (CEO), twelve ERC students and interns and seven ERC faculty traveled across the Northeastern U.S. and Canada to visit industrial sites of current or historical health and safety interest, including Corning Glass Works in Corning, NY; Love Canal near Niagara Falls, NY; Thetford Asbestos Mines in Quebec; and Boott Cotton Mills in Lowell, Mass. Students from every ERC academic program, accompanied by ERC faculty from every academic program, participated. A book entitled "Historical Perspectives" records the tour itinerary, the names of the participants and pictures of the participants inspecting the various worksites. Plans are being made to offer a similar ERC tour next Summer.

III. Program Progress Reports

A. Program Title: Industrial Hygiene (Hunter College)

B. Program Director: Jack Caravanos, DrPH, CIH, CSP

C. Program Description:

1. Goals and Objectives

The aim of the program is to train practicing industrial hygienists and environmentalists, while providing exposure to the broader fields of occupational and environmental health and safety for all students. Also Hunter College, as part of the diverse, multicultural City University of New York, plays a leadership role nationally in training persons of color, especially Black, Hispanic and Asian-American students, as professional industrial hygienists. During the past years, the Hunter program has continued to make progress toward these goals, increasing its minority enrollment, especially among Latino and Asian American students. Graduates of the program, many of whom remain in the New York City metropolitan area, form a rich, regional network of federal, state and local employees, as well as private-sector employees, involved with protecting workers' health and safety.

As part of the newly created Urban Public Health program at Hunter, the EOHS track offers two degrees in environmental and occupational health and safety: the MS degree, with its emphasis on industrial hygiene, and a new MPH degree, emphasizing urban environmental and occupational health and safety studies. The MPH degree for the Hunter EOHS track was established in 1999, and accredited by the Council for Education in Public Health (CEPH) in 2000. It was re-accredited after review in 2003 for seven years. Also Hunter MS program in industrial hygiene was accredited by ABET (The Accreditation Board for Engineering and Technology) for six years in 2001. NIOSH ERC support is sought primarily to support students in the ABET-accredited MS-degree program, but some funds are requested to support MPH students who are interested in professional careers in industrial hygiene

2. Responsible Conduct of Science Training

Hunter IH students receive formal training on ethical issues in science, with special attention to the AIHA Code of Ethics, during both their introductory OSH and IH courses. They receive training on proper citation and use of information from other scientific studies, and what constitutes plagiarism in the use of these materials. These are reinforced during their field and thesis internship courses, where they are also instructed on use of human subjects in scientific studies, IRB procedures and DHHS training courses on this subject.

3. Faculty Participation

During Academic Year 2005-2006, the core Hunter IH faculty consisted of five faculty members:
Dr. Jack Caravanos (Director – on sabbatical), Dr. Mark Goldberg (Acting IH Director), Susan Klitzman, David Kotelchuck, Jennifer Richmond-Bryant and Michael Bonchonsky (one-year substitute appointment to replace Dr. Caravanos). During this year, the program director, Dr. Jack Caravanos, was on academic sabbatical, and the program was supervised by Dr. Mark Goldberg, PhD, CIH. To replace the academic duties of Dr. Caravanos, the Dean approved the one-year substitute assistant professor appointment of Michael Bonchonsky. Mr. Bonchonsky is a hazardous materials specialist with an extensive history of teaching for EOHS. Dr. David Kotelchuck, formerly director of EOHS and presently Associate Director of the NY/NJ ERC, announced his retirement and a search for a new faculty member was initiated. Dr. Susan Klitzman, director of the Urban Public Health Program, of which EOHS is formally housed, was promoted to Full Professor. Finally EOHS was assigned a new line under a special CUNY Cluster Hire Program to stimulate more research in the area of Environmental Sciences / Air Resources also started in Fall 2005. Dr. Jennifer Richmond-Bryant, a recent graduate of University of North Carolina was offered the position and accepted.

Adjunct IH faculty to teach specialized IH and OHS courses in 2005-2006 consisted of four experienced professionals, namely Benjamin Alter, an experienced environmental consultant; Howard Bader and John Tiffany, who taught in both the Indoor Air Quality course and the Industrial Ventilation course, and Philip Taylor, who taught the Industrial Safety and Emergency Response course.

4. Curriculum

The Environmental and Occupational Health Sciences (EOHS) track within the Urban Public Health (UPH) program offers MS and MPH degrees. Both require 48 credits of graduate course work, which students usually complete in 2-3 years. All MS students (ABET curriculum) are now required to successfully complete a comprehensive examination (students who wrote theses were exempt in the past), and an approved field internship of at least 210 hours. The MS degree has no thesis requirement, but students are required to undertake a research project of two to six credits as part of their course of studies. The MPH degree also has no thesis requirement, but all MPH students are required to complete a 210-hour field internship and to complete a capstone project. MS and MPH students who achieve a grade-point-average of 3.7 or greater may elect to complete a research thesis, which satisfies the MS research project requirement, and becomes the capstone project for the MPH students. All MS students must take and pass a comprehensive final examination; no final examination is required for MPH students.

In the ABET curriculum, which took effect September 2001 (Appendix A), EOHS 755 Industrial Ventilation, EOHS 762 Noise and Radiation, and EOHS 759 Industrial Processes and Site Visits are now required courses for all MS-degree students. In addition, since the EOHS track is part of the Urban Public Health Program, students are now required to take two courses (3 credits each), which are part of the Urban Public Health Core – PH 701 Health Administration and either PH710 Health Promotion or PH740 Public Health Policy. These will give all EOHS MS students at least a basic introduction to urban public health issues. In total, 40 of the 48 credits needed for the EOHS-MS degree are now required. This past year the EOHS elective courses were: Indoor Air Quality (Fall), Hazardous Waste Management (Spring, required for all HSAT fellows), and Biohazards and Emergency Response (Spring). In the summer of 2006 we offered Industrial Safety.

The MPH curriculum is similar to the MS curriculum in its urban public health core, but differs from it significantly in its EOHS Core. In the EOHS Core, the MPH curriculum has two identical didactic courses in EOHS 702 Occupational Health and Safety and EOHS 754 Toxicology, and one instrumentation course (EOHS 747) rather than the 4-credit E/IH Lab (EOHS 741). However MPH students may substitute EOHS 741 for EOHS 747 to fulfill their MPH requirements. In addition the MPH EOHS core curriculum includes two environmental courses: EOHS 705 Environmental Chemistry and EOHS 765 Environmental Audits and Remediation. The MPH curriculum is designed so that a student who wishes to become an industrial hygienist may take the full ABET-approved MS curriculum while in the MPH program and graduate with 49 total credits.

D. Program Activities and Accomplishments

1. Trainee Recruitment including Diversity Efforts

Recruitment of trainees during this period remained fairly stable. Eighteen candidates applied for matriculation in the IH (and HSAT) program, of whom 14 were admitted and 12 were enrolled. Of these twelve, 8 (or 66%) are members of minority groups. 5 of the twelve (42 percent) are female.

2. Progress Toward Goals and Objectives

A total of 21 students were enrolled in the program during 2005-2006. Of these 18 were in the IH program and 3 were in the HSAT program. Of the 18 IH students, 8 were fulltime and 10 were part-time. Six of the 8 fulltime students were supported by NIOSH, and 4 of the 10 part-time students. Also 17 other students took IH courses during the year.

The following 10 (6FT and 4PT) students received NIOSH Industrial Hygiene funding during the 2005-2006 academic year. Note: students list with an asterisk (*) were carry-overs from the previous grant year.

NIOSH FUNDED IH STUDENTS	STATUS
Bangura, Mohamed *	Full Time (12 cr)
Harrington, Robert *	Part Time (6 cr)
Kang, Jeehee	Full Time (12 cr)
Kureekattil, Raichal	Part Time (6 cr)
Levy, Amanda	Part Time (6 cr)
Pockels, William	Part Time (6 cr)
Roman, Amy	Full Time (12 cr)
Roth, Michael *	Full Time (12 cr)
Stines, Sabrina	Full Time (12 cr)
Zock, Matthew	Full Time (12 cr)

3. Trainee and Faculty Honors

Professor Jack Caravanos was awarded the President's Award for Excellence in Teaching (Hunter College award) in May 2006.

William Pockels, NIOSH funded student and president of the AIHA student chapter, received an American Industrial Hygiene Foundation Student Scholarship Award at the May 2006 AIHCE Conference in Chicago, IL

4. New Courses

No new courses were initiated.

5. Measures of Effectiveness

Goals	**Measures of Effectiveness**	**Status** (2005-06)
Teaching	Avg. of Teaching Evaluation for EOHS faculty will exceed 3.5***** annually	Achieved annually from 2002-06
Research (1)	1. At least 75% of EOHS FT faculty conduct funded research in 2005-10	Achieved in 2005-06 (100%.)
Research (2)	2. At least 50% of EOHS FT faculty publish or have articles accepted for publication in peer-reviewed journals During 2005-10.	Achieved in 2005-06 (75%. Four of five published such research in 02-04 or had article accepted
Service	Each FT EOHS faculty member will participate in one profl. activity outside UPH program during 2005-10.	Achieved in 2005-06 (100%)
Pgm. Certification	IH degree programs will remain certified by ABET & CEPH	MS degree program certified until 2007; MPH until 2010.
Graduates (1)	1. Annual Nr.MS graduates will exceed 8. 2. Annual Nr. MPH graduates will exceed 8.	1.Achieved for MS degree pgm.during 2005-06 2. Achieved in MPH in 2005-06
Graduates (2)	2. At least 75% MS and MPH grads in program during 2005-10 employed professionally in occ. and/or env. field.	Achieved during 2005-06 (>80% profl'y. employed in 2005-06

E. Program Products

1. Student and Faculty Publications and Presentations during this reporting period:

Even with faculty busy with academic duties, Professor's Caravanos, Klitzman, Kotelchuck and Richmond-Bryant were able to continue publishing scholarly papers in 2005-2006. (Appendix C)

2. Conferences/Symposia Sponsored

Dr. Kotelchuck organized and moderated "NOISH ERC Student/Resident Research Day" at the Campus Center of NJIT on May 3rd, 2006. Five 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 Hunter IH program co-sponsored the annual ERC scientific conference on Nanotechnology, held on April 7, 2006, and Drs. Goldberg and Kotelchuck served on the Conference Planning Committee.

F. Future Plans

Dr. Klitzman was especially busy during this academic year solidifying the details of the first CUNY DrPH program, to be housed at Hunter College. After several years of assessment, planning and development, the UPH program submitted a letter of intent (new curriculum program). Planning for the new doctoral program, which has an EOHS track imbedded, continued to the next academic year and its approval seems promising.

First Annual EOHS Bus Tour of Industrial Sites: As previously describe, the EOHS NIOSH-IH program was instrumental in initiating and implementing the first annual EOHS bus tour of industrial sites. The program enrolled 4 NIOSH funded students and two EOHS faculty members.

Students	Faculty
Nancy Katz	Jack Caravanos
Muneshwar Jagdharry	David Kotelchuck
David Olton	
Sabrina Stines	

A second trip during the Summer of 2007 is planned.

III. Program Progress Reports

A. Program Title: Occupational and Environmental Medicine Residency Program at Mount Sinai School of Medicine

B. Program Director: Jacqueline Moline, MD, MSc
Deputy Director: Debra Milek, MD, PhD, MPH

C. Program Description:

1. Goals and Objectives

The goal of the occupational and environmental medicine training program of the Department of Community and Preventive Medicine of the Mount Sinai School of Medicine within the Universities Occupational Safety and Health Education and Research Center (UOSHERC) 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 can lead to a Master of Public Health degree, (2) extensive clinical training in occupational medicine, (3) field placement in diverse occupational settings and (4) research training.

2. 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/ and also at www.cancer.gov prior to participation in research activities.

3. Faculty participation

Jacqueline Moline, M.D., M.Sc., Director of the NY/NJ ERC, was Director of the Occupational Medicine Residency Program in 2005-2006 as well as the Pilot Project Research Program. Debra Milek, MD, PhD, MPH, was Deputy Director of the Residency Program during 2005-2006, and became Director of this program after July 1, 2006. Dr. Milek is assisted in the administration of the residency program by a Residency Steering Committee. This committee consists of Divisional faculty who are key teachers in the residency program. These faculty members are consulted on a frequent basis on matters regarding policies, evaluation, supervision, and day-to-day operation of the residency program. Core faculty on the Steering Committee include Drs. Moline MD, Philip Landrigan MD (former Director of the NY/NJ ERC), Michael Crane MD, Elizabeth Garland MD, Mary Bussell PhD, John Doucette PhD, James Godbold PhD, Robin Herbert MD, Stephen Levin MD, and Jaime Szeinuk MD.

Support faculty include clinicians: Aboaba Afilaka, MD, MSc, George Piligian, M.D., Britt Hatfield M.D., MPH, Rafael de la Hoz, M.D., Elizabeth Wilk-Rivard, M.D., M.P.H., Laura Bienenfeld, M.D., M.P.H. Neil Schachter, M.D; epidemiologists Paul Landsbergis, Ph.D., Kimberly Morland, Ph.D., Susan Teitelbaum, Ph.D, David Savitz, Ph.D. and Jonine Bernstein, Ph.D..; industrial hygienists Alice Freund, M.S., C.I.H, and Norman Zuckerman, MS, CIH; and ergonomist Jonathan Dropkin, M.S. The faculty in the area of laboratory sciences in environmental health serves primarily as research consultants and potential mentors in research projects depending in the interests of the residents. Luz Claudio, Ph.D., Mary Wolff. Ph.D. and Andrew Todd, Ph.D., are laboratory scientists in neurobiology, analytic chemistry and biophysics, respectively.

4. Program curriculum

A typical weekly OEM resident schedule is as follows:

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

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.

D. Program Activities and Accomplishments

1. Progress toward goals and objectives

The Division of Environmental and Occupational Medicine at Mount Sinai School of Medicine in the Department of Community and Preventive Medicine has trained physicians in occupational medicine in its full-time two-year Occupational and Environmental Medicine (OEM) Residency Program since 1973 and has received support from NIOSH since 1978.

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. Upon completion of the residency program, virtually all of our graduates practice occupational medicine in academic, corporate or clinical locations. One graduate is an Occupational Medicine consultant for a company he had rotated through as a resident. Another graduated resident, based in the Surgical Pathology Department at Mt. Sinai, continues to participate in our departmental activities and provides occupationally related research opportunities for our residents.

Most graduates take the board examination within one to two years of completing the program, and all recent trainees have passed the board on the first attempt, with impressively high scores.

2. Resident and faculty honors and awards

Upon his retirement as Director of the NY/NJ ERC this past year, the Management Committee of the NY/NJ ERC awarded Dr. Philip Landrigan a plaque of appreciation for his 20 years of devoted work from 1985-2005 as ERC Director. Dr. Jacqueline Moline, Director of the Mount Sinai Occupational Residency Program, was elected in November 2005 to replace him.

3. Resident theses and dissertations

Winston Kwa: "Creosote Study: Study of Transit Workers at the Linden Facility" A cross-sectional study examining the extent of creosote exposure among transit workers at the Linden Facility plant. Results showed that air levels of creosote were well below the OSHA and NIOSH exposure limits but all of the workers had detectable levels of the urinary metabolite 1-OHP. He is also currently in the process of completing and writing up a study done on dockbuilders to examine their exposure to creosote and effects of intervention efforts.

Hale Yarmohammadi: "Laryngoscopic Findings in WTC Workers". This study examined the persistent irritant-related findings in rescue and recovery workers at the WTC disaster site.

4. New faculty appointments

Michael Crane, MD, MPH, is an assistant professor of Community and Preventive Medicine at Mount Sinai School of Medicine. He is board certified in Internal Medicine and Occupational Medicine. Dr. Crane's activities at Mount Sinai include precepting residents at the Selikoff Center for Occupational and Environmental Medicine, instructing occupational medicine residents, and serving as chair of the Occupational Medicine Residency Advisory Committee. He is also currently the Co-Principal Investigator of the World Trade Center Medical Monitoring and Treatment Program at Mount Sinai. Previously, Dr. Crane worked at Con Edison, supervising residents during their mandatory rotations there.

Britt H. Hatfield, M.D., M.P.H. joined the Mount Sinai School of Medicine faculty after he completed the Occupational and Environmental Medicine Residency at Harvard University. Dr. Hatfield is certified by the American Board of Preventive Medicine as a specialist in Occupational Medicine. Dr. Hatfield teaches and supervises residents in the Irving J. Selikoff Center for Occupational and Environmental Medicine. Further, he treats patients in the World Trade Center Health Effects Treatment Program. He has also served as a United States Navy physician with the 2nd Marine Expeditionary Force.

Norman Zuckerman, Industrial Hygienist, MS, CIH currently works as an Industrial Hygienist for the Mount Sinai Center for Occupational and Environmental Medicine in the Department of Community and Preventive Medicine at the Mount Sinai School of Medicine. He is responsible for providing industrial hygiene related technical support for the medical staff. During the past year, he has taken a more active role with the residents in case presentations and worksite visits.

5. New Courses

In June 2006 the NY/NJ ERC initiated its first Northeast Occupational Safety and Health Tour, organized and led by Dr. Jack Caravanos, IH Program Director at Hunter College, and Mitchel Rosen, Director of the ERC Continuing Education and Outreach Program at the NJ School of Public Health.

For one week, twelve ERC students and interns and seven ERC faculty traveled across the Northeastern U.S. and Canada to visit industrial sites of current or historical health and safety interest. Among these were Corning Glass Works in Corning, NY; Love Canal near Niagara Falls, NY; McGill University in Montreal; Thetford Asbestos Mines in Quebec; and Boott Cotton Mills in Lowell, Mass. Students and faculty from every ERC academic program were represented. Participants from the Mount Sinai

Occupational Medicine Residency Program were faculty member Dr. Afilaka and residents Winston Kwa and Hale Yarmohammadi. A similar tour is planned for Summer 2007 (see below).

In addition, new elective courses are regularly added to the MPH curriculum. In 2005-2006 the following were added: Introduction to Qualitative Research Methods, Introduction to Global Health, Introduction to Medical Anthropology, What's Sex Got To Do With It? Teen Pregnancy, Prevention & Intervention, Refugee Health, Heath Politics & Policy, Zoonoses: An Emerging Public Health Issue and Global Health Conference.

6. Measures of Effectiveness See Table 1 below (page 12)

7. Trainee recruitment efforts

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.

Program Products

1. Trainee publications and presentations

Resident publication: Yarmohammadi H., Estrella L., Doucette J. and Cunningham-Rundles C. Recognizing Primary Immune Deficiency in Clinical Practice. Clinical and Vaccine Immunology. March 2006 (13) 3 p329-332.

Resident presentations:

Dr. Yarmohammadi presented a poster at the ACOEM Conference in May 2006 entitled: Laryngoscopic Findings in WTC Workers: Preliminary findings of the WTC database of the ENT evaluations performed on rescue and recovery workers. Dr. Yarmohammadi also presented talks on confined spaces for the Topics in Safety and Ergonomics class, a summary talk on molds and their health effects to faculty, interns and students in the Northeast OSH Tour, as well as a talk on anaphylaxis to this group as well. Dr. Winston Kwa also presented a lecture on gas leaks in the petroleum industry for the Topics in Safety and Ergonomics class.

2. Faculty publications and presentations

Faculty publications: See Appendix C.

Faculty presentations: The Mount Sinai Occupational and Environmental Medicine Residency Program continues to be active in continuing education and outreach. Clinical faculty 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, 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. Our physicians also participate in the Fogarty International Program, providing outreach on occupational medicine topics.

3. Conferences/symposia sponsored

In April 2006 this ERC held its 27th annual scientific symposium on "Nanoparticles: Health and Technology" in Hatch Auditorium at the Mount Sinai Medical Center. In addition, the Occupational and Environmental Medicine Program sponsored 23 special symposia and press briefings on the World

Trade Center health effects among rescue and recovery workers, ten of them in English, seven in Spanish and six in Polish. (Appendix D).

4. Research projects having significant trainee involvement:
All residents of the Occupational Medicine Residency Program participate as part of their clinical training in the World Trade Center occupational medicine clinic, a unique research and training experience.

E. Future Plans (Include in summary form plans for the next budget period.)
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 and prevention, heavy metals, and asbestos including an expansion of mesothelioma research. 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. In the future, we also hope to offer a practicum experience with OSHA or 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. We are also planning to add a monthly seminar series of invited guests with diverse careers in a variety of areas of Occupational & Environmental Medicine 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. Finally the very successful ERC-supported Northeast OSH Tour will be repeated with the expectation of even greater participation in the coming years.

We have received feedback from recent graduates employed in the field recommending more intensive training in acute orthopedic injury treatment and injection techniques. We expect to address this need by collaborating with our Orthopedic and Physical Medicine and Rehab departments. Although the residents currently see some WTC patients in the Occupational Medicine clinic, a future rotation in our World Trade Center treatment program is 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. One of our residents is a former ophthalmologist, which affords us the opportunity to use his expertise to teach his resident colleagues some of the basics of evaluation and treatment of occupational eye injuries.

G. Report on Specific Improvements in OS&H Resulting from ERC Programs
The OEM faculty at MSSM has been instrumental in developing and maintaining 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, with Dr. Yarmohammadi's expertise in Allergy has been particularly valuable in our WTC patients.

Table 1. Occupational Medicine: Mount Sinai School of Medicine

Measures of Effectiveness	Minimum	Target	2005-2006
Nr of qualified applicants	4	6+	8
% of Residents completing program	NMV	100%	100%
Avg. Nr formal present-ations by residents	1	2/year	1.5
Avg. Nr abstracts submitted by residents	1	2/year	1
Nr faculty publications per year*		10/year	94
% Certified in Occ. Medicine**	50%	100%	100%
% Practicing Occ. Medicine	NMV	75%	100%

III. Program Progress Report

A. Training Program: Occupational Medicine at UMDNJ-Robert Wood Johnson Medical School

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

C. Program Description:

1. Goals and Objectives

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 (all current residents). The academic and practicum components are now integrated. Residents enroll in the UMDNJ-School of Public Health MPH program.

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

The objectives of the Residency are:

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 fieldwork 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.

2. Responsible conduct of science training: The University of Medicine and Dentistry of New Jersey requires all faculty, clinical staff, and residents to complete a web-based course on responsible conduct of science. All persons must complete this training and receive an on-line certificate. The

coordinator retains a hard copy of this certificate. This web-based course is supplemented by lecture content when faculty describes the design and implementation of their research projects.

3. Faculty participation

Michael Gochfeld, MD, PhD has been Residency Director of this program since its inception, and is currently the longest serving ERC Residency Director in the U.S. Other core faculty are:
Nancy Fiedler, PhD.; Howard Kipen, MD, MPH, Division Director of Occupational Medicine; Robert Laumbach, MD, MPH; Omowunmi Osinubi, MD, MSc: Associate Residency Director;
and Iris Udasin, MD. Director of Employee Health. Many other clinical faculty participate in the program.

Dr. Osinubi, Associate Director, has a background in anesthesiology and pain management. She is a valuable preceptor on musculo-skeletal and ergonomic cases. She has a current research interest in smoking cessation.

Dr. Kipen, Division Director, has had strong research interests in asbestos, unexplained symptoms, and is currently researching cardiovascular responsiveness to inhaled agents. He is board certified in internal and occupational medicine.

Robert Laumbach, MD, MPH, trained in industrial hygiene prior to medical school. He is board certified in Family Medicine and Occupational Medicine. His current research interest is on respiratory system responsiveness to inhaled agents.

Iris Udasin, MD, is board certified in internal medicine and occupational medicine. She has a major interest in medical monitoring of hazardous waste workers and WTC responders. All of the above physicians readily precept residents in referral clinic.

Nancy Fiedler, PhD, is a clinical psychologist with special interests in neurobehavioral toxicology and is currently investigating the interaction of stress with toxic exposures. She also precepts residents on the psychosocial aspects of their cases.

Dr. Joseph Romano, recently retired medical director of AT&T, has offered to meet with the residents on a regular basis to teach management skills. He is now a regular participant in weekly case management conferences, as well as chairing the OMRAC.

Dr. Gary Udasin, Medical Director of Schering Plough has been a steadfast supporter of the residency by providing practicum rotations at the pharmaceutical giant. Former residents, Howard Lu and Michael Suls also serve as preceptors for the residents during practicum rotations at Princeton Medical Center.

4. Program curriculum

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 is spread more or less equally over the two years. Residents obtain the MPH degree taking 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. It also facilitates other learning experiences and contact with attendings since we no longer have residents away from EOHSI for weeks at a time.

The MPH curriculum (45 semester credits) includes five core courses (Biostatistics, Epidemiology, Environmental Health, Health Administration, Health Education/Behavioral Science). The following track courses are required: Principles of Occupational Health, Occupational Health Practices, Toxicology, Industrial Hygiene, and Risk Assessment. All trainees are required to participate in a one-credit multi-university seminar course in which they work with trainees from the other ERC institutions. They also participate in a multi-university industrial site visits course. Finally they are required to complete fieldwork research. The program has a required weekly lecture series as well as

journal clubs and seminars. In addition the residents complete a minimum of four months of outside practicum rotations in a variety of sites including pharmaceutical firms and industrial medicine clinics.

Program Activities and Accomplishments

Over the past 20 years the program has had 37 graduates, thirty of whom practice full-time in the field of occupational - environmental medicine. Two others are full-time preventive medicine practitioners.

The program continues to recruit excellent residents who 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. Recent graduates have received academic awards from the School of Public Health, for the highest grade point average of all MPH candidates.

Among faculty honors, the Director, Dr. Gochfeld, was honored by ACOEM in 2006 with its Health Achievement Award. No new courses were introduced in 2005-2006. 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.

F. Program Products

Faculty continue to be productive in various research areas (see Appendix C). Research has focused on heavy metal toxicity, exposure assessment, diesel exhaust, cardiovascular effects of contaminants, and radiation. Drs. Gochfeld and Fiedler organized and participated in a conference on Protecting the Responders, sponsored by the New Jersey Center for Public Health Preparedness. Dr. Udasin continues to play a lead role in providing surveillance to World Trade Center responders. We completed a study of the physical and toxic hazards facing harbor workers, with recent graduate Julie Caruth MD, MPH as the principal investigator. “Seaport Accident Prevention in a Developing Country” Caruth

Dr. Damir Mazlagic led a project to investigate neurotoxic effects attributable to mold exposure in office buildings. “Skin-Test Reactivity to Allergens and Neuropsychological effects Attributed to Indoor Mold Exposure: Pilot Study” Mazlagic

G. Unique training courses presented.

Although preparedness for disasters and terrorism is hardly new, it has become a significant part of the occupational physician’s responsibility in major organizations since the 9/11 and Anthrax events of 2001. Accordingly we have incorporated preparedness training into our curriculum, and several residents have planned fieldwork dealing with various aspects of preparedness. Angela Gupta, MD, MPH conducted a needs assessment of emergency room physicians. Anthony Grippo, MD began a NORA-funded study of actual emergency room preparedness in central New Jersey in the wake of the TOPOFF-3 exercise, and this project is being continued by current resident Michelle Robertson, MD. This work has been coordinated with the New Jersey Center for Public Health Preparedness, and is been developed into a half-day workshop for the Medical Society of New Jersey (May 6, 2006), and a two-day workshop for the American College of Occupational and Environmental Medicine State-of-the-Art Conference (Oct 20-22, 2006) in New York.

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 interests of the faculty range from pulmonary disease to biomarker epidemiology.

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

The residents play an active role in the EOHSI Clinical Center, among which activities is 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 EOHSI 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. Residents play an important role in the medical encounters.

Our major contributions continue to be the placement of graduates in key occupational medicine positions:

Angela Gupta MD, MPH became the Associate Director of Occupational Medicine for Rutgers University, one of New Jersey's largest employers. She has assumed responsibility for reviewing protocols for compliance with new standards, for preparedness for emerging infectious diseases and terrorism, and for writing standard protocols and standing orders.

Damir Mazlagic, MD, MPH has become the director of occupational medicine for Berkshire Medical Center in northwestern Massachusetts. He will be responsible for expanding the client-base of the occupational medicine program and for developing and implementing prevention programs for the mainly small employers in this underserved rural region of New England.

Occupational Medicine: UMDNJ/Robt. Wood Johnson

Measures of Effectiveness	Minimum	Target	2005-2006
Nr of qualified applicants	4	6+	7
% of Residents completing program	NMV	100%	100%
Avg. Nr formal presentations by residents	1	2/year	1
Avg. Nr abstracts submitted by residents	1	2/year	1.5
Nr faculty publications per year*		10/year	28
% Certified in Occ. Medicine**	50%	100%	100%
% Practicing Occ. Medicine	NMV	75%	100%

III. Program Progress Report

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

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

C. Program Description:

Goals and objectives

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 to train degreed engineers in the specialty of occupational safety and health. The focus of the program is: (1) To train engineering and safety professionals, at the graduate level to identify, predict and resolve occupational safety and health issues through engineering design, (2) To advance knowledge of safety and ergonomics through faculty and student research, (3) To provide outreach services to 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.

Curriculum

The educational program resides under the auspices of the Department of Industrial and Manufacturing Engineering (IME) of NJIT. The degree is fully approved by the New Jersey 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 in general is only 'strongly recommended' in most of the other graduate program of study at the Institute. The 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, which are individually addressed. 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 below.

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:

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

Elective courses (Select 18 credits)

(Select 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)
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 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)

Training Candidates

Admission requirements include a bachelor's degree in engineering from an ABET accredited school with an acceptable grade point average (2.80/4.00 or higher). Students holding a BS in safety related field may be conditionally admitted into the program. However, depending upon their background, they must complete additional bridge courses, which may include undergraduate courses with grades of B or better in order to matriculate.

Responsible conduct of science training

New Jersey Institute of Technology is an institution dedicated to the pursuit of knowledge through teaching and research. The university expects that its graduates will assume positions of leadership within their professions and communities. Within this context, the university strives to develop and maintain a high level of ethics and honesty among all members of its community. Imperative to this goal is the commitment to truth and academic integrity. The NJIT Academic Honor Code confirms this commitment. This 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, beginning with acceptance to the university. Letters informing students of their admission to the university, or of their permission to enroll in one or more classes, refer to the Academic Honor Code and include the Honor Code Agreement.

Additionally, 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 NJIT’s Institutional Review Board clearance and all research personnel must be certified by Office for Human Research Protections which requires them to study and take an online test to be certified.

Faculty Participation

Dr. Arijit K. Sengupta, the Program Director, is an Associate Professor in the Department of Engineering Technology and has a joint appointment at the Industrial and Manufacturing Engineering Department (IME) at NJIT. Dr. Sengupta has earned his doctoral degree from the Department of Industrial Engineering (IE) 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 towards 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 supervising and teaching courses. He teaches several core and elective courses for this program (IE 664, IE 665, IE725, IE 681 and IE682).

Dr. George Olsen serves as the Associate Program 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 serving as Associate Program Director. He supervises student research projects and theses, and teaches two required courses the safety engineering (IE614) and systems safety (IE 685). Both of these core faculty members 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.

Other than the two-core program faculty, several other NJIT faculties contribute in 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 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 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

D. Program Activities and Accomplishments

Admission statistics

Recruitment of trainees during this period remained fairly stable, 22 candidates applied, 12 candidates were admitted and seven trainees were enrolled. Three trainees enrolled as full time and four on part-time basis. Part-time candidates were practicing safety professionals in New York, New Jersey region. Four of these newly admits came with BS in engineering degree and the remaining had BS degree with practical experience in health and safety field. Six of the newly admits belonged to minority group and one of them being female. Two of the new trainees were international graduate students.

Enrollment and graduation

Number of trainees enrolled in the program during the reporting period totaled 18, with enrolment during Fall 05 and Spring 06 being 14 in each semester. Eleven trainee with BS in engineering degree comprised 61 percent of the total 18, and two of them had a previous MS degree in Engineering. Out of the total 18 trainees 9 were full time. In terms of diversity of the trainees and minority enrollment, this program faired quite well. Sixty one percent of the total enrollment came from minority group, and five (28%) trainees were female.

Two trainees graduated from this program during the reporting period. Both of them were NIOSH trainees. Details of their training can be found in Appendix E. Two trainees left the program after spring 2005 semester without completing it. One of them, an international student from India, entered the program in fall 05 but left to attend MS Safety Engineering Program at Rochester University, NY. A better financial assistance package most likely motivated him to transfer. The other trainee switched to Engineering Management program.

NIOSH trainees

Among the program trainees six trainees received NIOSH scholarship. Tamara McNair and Ryan Brown completed their program during this period and both of them are now employed in the Safety Engineering field in the local industry. Tamara's thesis title was "An ergonomic job analysis of a work process within in a glovebox". Ryan's thesis was on "Do industrial back support belts reduce stress in asymmetric lifting?" Details of their graduation can be found in Appendix E. Mary Monrinville, Jason Williams and Stephen Benstowe have completed their course work and are now working on their MS

thesis. Amal Shah was the newest NIOSH trainee. He entered the program in spring 2006. His BS degree is in Biomedical Engineering from NJIT and currently he is pursuing his course work.

Trainee and Faculty honors

Steven Benstowe was nominated and received 2005 Industrial Hygiene Scholarship offered by the American Industrial Hygiene Association, New Jersey Section. Dr. Sengupta was invited as a keynote speaker at the Humanizing Work and Work Environment, HWWE 2005 Conference, organized by the Indian Society of Ergonomics at the Indian Institute of Technology at Guwahati, Assam, India. His keynote address was on "Do industrial back belts reduce back injury risk in manual material handling?" on December 11, 2005.

New courses

Two courses, BME 671 – Biomechanics of Human Structure and Motion, and EM 631 - Legal Aspects in Environmental Engineering offered by the Biomedical Engineering and Engineering Management programs at NJIT, respectively, were included as elective courses for this program.

Program Products

Followings are the list of publications and presentation during this reporting period.

1. "Do industrial back belts reduce back injury risk?" by A.K. Sengupta (Program Director) and R. J. Brown (trainee), published in the conference proceedings CD rom of HWWE 2005, Humanizing Work and Work Environment, 10-12 December 2005, at the Indian Institute of Technology, Guwahati, Assam, India.
2. Jason Williams (trainee), presented his research "Effect of Glove Port Height on Shoulder Stress for Performing Laboratory Work" on NOISH ERC Student/Resident Research Day" at NJIT Campus Center, Newark, NJ, 05/03/2005
3. 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.

In addition to above, two trainees completed their MS thesis as previously described.

Dr. Sengupta organized and moderated "NOISH ERC Student/Resident Research Day" at the Campus Center of NJIT on May 3rd, 2006. Five 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.

Consistent with OHSE program goal the measures of effectiveness presented in the able below were identified in the proposal for the period 2003-05. The scores are shown for the present funding period.

Objective measure of effectiveness and outcomes of the program

Measures of effectiveness	Minimum	Target	2005-06	Intervention
Fall 05 Enrollment: Full Time Part time	3 10	5 15	7 7	More advertisement, industry contacts.
% students with Eng. BS degree	60%	70%	61%	Advertise in engineering schools
Average years to graduate.	3 (max)	2	3.3* years	Monitor
Mean instructor evaluation scores	3.0	3.5	?	
% of graduates secure	75%	100%	100%	Satisfactory

employment in OSHE related field within 6 months of graduation				
Yearly output of Core faculty: Presentations/seminars Publications in Journal & conference Grant proposal submitted	 2 1 1	 3 2 2	 2 1 1	Satisfactory

* One graduate took leave of absence for one year.

Future Plans

The main focus of this program will remain maintenance of a steady enrolment. 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 other universities advertising the NIOSH scholarship and the OSHE program at NJIT. Other than these, program faculty and trainees regularly attend the ASSE local chapter seminars and meetings, which provide a great opportunity for networking with the local safety professionals and helps 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.

III. Program Progress Reports

A. Program Title: Occupational Musculoskeletal Ergonomics and Biomechanics (NYU)

B. Program Director: Margareta Nordin, Dr. Med. Sci.
Associate Director: Ali Sheikhzadeh, PhD, CIE

C. Program Description:

1. Goals and Objectives:

The aim of the Graduate Program of Ergonomics and Biomechanics (ERBI), Graduate School of Arts and Science (GSAS) and School of Medicine (SOM), New York University is to train graduate students in the theory and application of occupational musculoskeletal ergonomics and biomechanics. The ERBI program has both doctoral and masters programs. Only the masters program is supported by NY/NJ-NIOSH ERC funding. The primary objective of the Masters of Science (MS) program is to prepare the students for *academic* and *professional careers* related to the *prevention of musculoskeletal disorders, injuries and disabilities* that result from the interaction of individual and environmental factors.

The immediate goals of the ERBI program within the ERC during the academic year 2005-2006 were:

- To improve marketing and dissemination strategies for the ERC and the ERBI programs and to work with the ERC, NYU GSAS and SOM to develop and implement these strategies.
- To attract and recruit more minority students into the ERBI masters program in accordance with NIOSH recommendations over the next five years.
- To promote a creative and collaborative environment between ERBI and the other programs within the ERC through the initiation of multidisciplinary projects between faculty and graduate students. Within the next three years one project will be initiated between the ERBI program and ERC students.
- To create a portable Ergonomics and Biomechanics Laboratory where technical expertise and research equipment can be accessible to ERBI and other ERC faculty and students.

2. Responsible Conduct of Science:

All ERBI faculty have completed IRB and HIPPA training and obtained certification provided by the NYUSOM Institutional Review Board, and are submitting research projects to the NYUSOM IRB on a regular basis. ERBI adheres to all NYUSOM rules on conducting research.

ERBI students are exposed to the concept of research ethics in the required "Research Methods in Ergonomics and Biomechanics" (G48.2123) course. There the students obtain a more comprehensive understanding of the NYUSOM IRB and HIPPA rules and requirements for conducting research. In addition in the "Practicum" course (G48.2121) they get experience in filling out the appropriate forms and going through grant submission procedures. ERBI Ph.D. students are also required to take a non-credit course, "Scientific Integrity and the Responsible Conduct of Research (G16, 2000)", mandated by the NIH and required for all first year Ph.D. students at NYUSOM.

All ERBI or non-ERBI students recruited as Research Assistants for ERC Pilot Research Projects and/or NORA funding are required to have the NYU Hospital for Joint Diseases' orientation that includes HIPPA training.

3. Faculty Participation

The ERBI program has five core faculty members (Drs. Campello, Halpern, Nordin, Sheikhzadeh and Weiser) and four active adjunct faculty members (Drs. Goldsheyder, Hiebert, Lis and Trainor). The faculty is multidisciplinary, representing biomechanics, engineering, epidemiology, ergonomics, industrial hygiene, medical science, physical therapy and psychology. Six of the faculty members are certified ergonomists, and three are licensed clinicians. Faculty meetings occur about once a month from August to May. The complete list of faculty and their research interests are listed in Appendix D.

4. Curriculum

The 36-credit ERBI Master of Science (MS) degree can be completed in three semesters of full-time study or six semesters of part-time study. The program provides graduate training in musculoskeletal ergonomics and occupational biomechanics, with an emphasis on the prevention and rehabilitation of work-related injuries and disabilities. All MS students are required to take 7 core courses (28 credits), which provide a solid foundation in musculoskeletal ergonomics and occupational biomechanics. In addition to preparing students to enter the workforce as highly trained ergonomists and biomechanicians, the MS program also trains students in basic and applied research concepts including study design. To support this objective, a basic biostatistics course (4 credits), a methodology course (4 credits), and a practicum course (4 credits) are required. The Practicum and the Independent Study courses include the utilization of instrumentation in the biomechanics/ergonomics laboratory and other facilities within NYU HJD, clinical research through the OIOC clinic, epidemiology studies and/or mathematical modeling. The ERC will enable ERBI masters students to join with students of other programs participating in the NY/NJERC, facilitating an interdisciplinary learning experience that will make them stronger practitioners in the workforce.

A. Program Activities and Accomplishments

1. Progress Toward Goals & Objectives**:**

Goal and objectives: Marketing and dissemination

The ERBI program worked closely with the New York University Admission Office to ensure active representation of the ERBI program in Graduate Fairs and the GSAS open houses in 2005 and continues to do so in 2006. The program was presented in 10 events, 5 of which were minority related. The ERBI program received 3 minority student applications for Fall 2005. Three students were accepted and enrolled in the program.

ERBI faculty collaborated with the Director of Graduate Enrollment Services and Office of Faculty Communications at NYU to produce better marketing brochures and information. This information was used to update the ERBI program profile on professional websites such as the Directory of Human Factors and the Ergonomics Society.

Goals and objectives: Interdisciplinary activities within the NY/NJ ERC during Academic Year 05-06

a) Dr. Halpern collaborated with the ERC on three courses sponsored by UMDNJ Continuing Education in February, March, and June 2006 (see CE courses below.). .

b) ERBI faculty and students continue to apply for the ERC Pilot Research Award. In October 2005, ERBI faculty and Ph.D. students submitted three proposals, of which two were awarded in December 2005.

c) ERBI faculty participated in the ERC 27th Annual Scientific Meeting on April 2006 and presented two posters.

d) Four ERBI MS students participated in the ERC interdisciplinary seminar in Fall 2005 and the interdisciplinary site visit course in Spring 2006.

e) ERBI faculty member, Dr. Halpern, and ERBI Masters student, Vivek Pinto, participated in the first ERC Northeast Summer Tour in June 2006.

Dr. Landsbergis (MSSM) and Mr. Hiebert, ERBI faculty, plan to analyze existing data collected from a cohort of hospital workers in an NIH-sponsored research project. The analysis will evaluate the relationship between overtime work and changes in risk for musculoskeletal disorders. In addition Drs. Halpern (ERBI) and Landsbergis (MSSM) submitted a joint proposal entitled “Ergonomic Work Assessment of Still Photographers and Video Camera Operators at Associated Press.” The proposal will assess the relationship between the health of the photographers and their work, with special emphasis on musculoskeletal disorders.

Goals and objectives: Creating a portable ergonomics laboratory

The ERBI faculty has renewed and updated the ERBI laboratory equipment to enhance student and faculty research, and learning and teaching capabilities. During Fall 2005, the following research tools were purchased for the ERBI laboratory:

- Two new notebook computers for data collection and processing.
- A Polhemus Liberty Magnetic Tracker with four sensors for capturing 3-dimensional movement.
- The MotionMonitor Software, a 3-D motion capture system designed to synchronously collect data and permit immediate playback from various hardware, such as magnetic and optical kinematics trackers, EMG, force plates, video, event markers and other analog devices.

2. Trainee honors, awards, scholarships**:**

In Spring 2006, the ERBI program received an award from the Oxford Research Institute to enhance ERBI student training and education in research. The ERBI faculty decided to use the award and a portion of the ERC equipment budget to purchase a new Analog/Digital Data Acquisition (A/D) card. The new card is currently used in one Ph.D. Doctoral Research, an ongoing research project, one ERC Pilot Research Project and for MS education in the Practicum course.

3. Faculty honors, awards, appointments:

Dr. Nordin was appointed as a scientific reviewer for the National Institutes of Health for 4 years in June 2006.

4. Trainee theses and dissertations**:**

In Fall 2005, Dr. Robin Gillespie defended her Doctoral Thesis entitled "Children/adolescents, computers and musculoskeletal problems". She fulfilled all requirements of the NYU GSAS Doctoral Degree and graduated May 2006.

In Spring 2006 ERBI Ph.D. candidate, Marc Campo, PT, MS, defended his Doctoral Thesis proposal entitled "Musculoskeletal disorders and psychosocial stress among physical therapists". Mr. Campo is expected to defend his Doctoral Thesis during 06-07.

5. New faculty positions**:**

In Fall 2005, Dr. Marco Campello was appointed as Assistant Clinical Professor, Department of Orthopaedic Surgery, SOM, NYU and joined the ERBI faculty. Dr. Campello will teach (G48.2112) Applied Biomechanics in the Analysis of Human Performance and he will supervise individual MS research and clinical projects.

Beginning Fall 2006, Shira Schecter Weiner, MA, PT, CIE, will substitute for Angela Lis as coordinator of ERBI MS student related activities. Under the supervision of Drs. Nordin and Sheikhzadeh, Ms Weiner will be responsible for advising and communicating with ERBI MS students.

6. Trainee Recruitment & Diversity Efforts**:** See "D.1 Marketing and dissemination" (above) for efforts by NYU to promote minority enrollment in ERBI and elsewhere in the graduate programs at NYU. Also the ERBI Program was represented at The Annual Biomedical Research Conference for Minority Students (ABRCMS), a national conference designed to encourage students to pursue advanced training in the biomedical sciences or behavioral sciences, including mathematics and provide faculty mentors and advisors with resources for facilitating student success. In May 2006, the ERBI Faculty communicated with Long Island University, a largely minority university in Brooklyn, NY , to promote the ERBI program and participated in one recruitment fair for students. These efforts were successful in helping NYU get two applications for admission from minority students last year, resulting in one new minority student in the program.

7. Measures of Effectiveness

During 2005-2006, the ERBI program met all of its Measures of Effectiveness. The program selected 5 applicants for Fall '05, recruited one minority student, was recertified by Oxford, and its faculty had 21 publications this past year. Also the faculty met the goal of achieving teaching evaluation scores over 3.5 in 8 out of 9 ERBI courses. For details see Appendix F.

B. Program Products

1. Publications and presentations of program faculty and trainees

This year ERBI faculty published one book "Musculoskeletal Disorders in the Work Place. Principles and Practice", editors M. Nordin, GBJ Andersson and M. Pope, 9 book chapters, and 11 original manuscripts accepted for publication in a peer reviewed journals. (Appendix C)

One ERBI MS student, one ERBI MS alumnus (check) and two faculty collaborated on a systematic review entitled "Association between sitting and occupational low back pain", published in The European Spine Journal, Spring 2006. Two ERBI Doctoral Dissertations were published in Spring 2006: Campello et al "Work retention and nonspecific low back pain" Spine 2006 and Hagins et al " The effects of breath control on maximum force and IAP during maximum isometric lifting task" Clinical Biomechanics 2006. .

The results of the ERC Pilot study "Ergonomic Risk Factors among Operating Room Nurses: A Pilot Study" was submitted by Dr. Sheikhzadeh et al to the International Society for the Study of the Lumbar Spine (ISSLS) annual meeting and was accepted as a poster presentation for the meeting in Bergen Norway, June 2006. In June 2006 Dr. Sheikhzadeh et al submitted results of two ERC pilot research projects to the Journal of Applied Ergonomics. These papers are still in review.

1. CE courses presented**:**

Dr. Halpern worked with the UMDNJ- School of Public Health to serve as instructor for three ERC-initiated Training courses:

1. February 28, 2006: Ergonomics. UMDNJ-School of Public Health, CIH Review. (2 hours.)
2. March 24, 2006: School Ergonomics. UMDNJ-School of Public Health / NJ Center for School and Community Health Education, "Safe Schools" outreach program for vocational educators. (Two 2.5-hour sessions.)
3. June 14-16, 2006: OSHA 2250 Principles of Ergonomics Applied to Work-Related Musculoskeletal and Nerve Disorders. UMDNJ-School of Public Health / Region II: Atlantic OSHA Training Center.

2. Successful R2P Projects**:**

In 2006 the US Navy requested a clinical training course to establish a rehabilitation program for patients with non-specific low back pain with the goal of returning them to active duty within the NAVY. The program is a multidisciplinary program to prevent work related disability and was developed with prior CDC/NIOSH funding. The training course took place in September 2006 at the Naval Hospital Center, Portsmouth, VA. Follow-up is currently in progress.

3.Research projects completed having significant trainee involvement**:**

Dr. Sheikhzadeh initiated two research projects with the Department of Orthopaedic Surgery, NYU Hospital for Joint Diseases, which had significant ERC trainee involvement. In response to request from the chairman and an attending shoulder surgeon, a pilot project was initiated on the kinematic analysis of the shoulder and scapula during daily living activities and full range of motion. Two ERBI-NORA funded students, Elizabet Kardos and Vivek Pinto, participated in literature review, study design and execution, and the pilot project report during AY 05-06. The project has been expanded to study 120 patients with Shoulder Impingement, Rotator Cuff Tear, and Shoulder Arthroplasty. ERBI Ph.D candidate, J. Yoon, and ERBI-NORA funded students plan to collect data for this study during AY 2006-2007.

Since 2001, Dr. Sheikhzadeh has been involved in a series of studies to determine when patients recover the ability to safely operate the brakes of an automobile following lower extremity trauma or surgery. In 2006, Dr. Sheikhzadeh and ERC ERBI student Vivek Pinto developed several driving scenarios to compare the driving performance of healthy subjects and patients with upper extremity trauma. Driving scenarios include driving with one-handed and two-handed control of the steering wheel while driving in straight and curved pathways, and turning at street intersections.

4. Unique training courses

The ERBI program has been involved in 15 training activities during the academic year of 2005-06.(Appendix E).

C.Future Plans

New program- Certification in Ergonomics

The ERBI program will initiate an Ergonomic Certificate from ERBI, GSAS, NYU. The Ergonomic Certificate will require a total of 10 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. The certification curriculum will be submitted to the GSAS, NYU Curriculum Committee for approval in November 2006.

Collaborative projects with other NY NJ ERC member institutions

The ERBI faculty intends to generate one project, such as a literature review or data collection, within the next two-year between an ERBI student and a student from one of the other NY/NJ ERC member institutions.

Ergonomics and Healthcare

The ERBI program will continue to develop research on "Ergonomics and Healthcare". The current projects are ergonomics for surgeons and surgical nurses and a new project on ergonomics and senior nursing homes. These projects started with ERC funded pilot studies. The projects are now established and partially funded from various community sources. All these projects have involved ERC students and will continue to do so.

Initiate Collaboration with NYU Department of Nursing

The ERBI faculty is planning to initiate collaboration with the Department of Nursing, School of Education, NYU. Nurses are underserved in the area of ergonomic and biomechanics education and occupational health nurses have shown an increased interest in ergonomics. Preliminary and informal discussions have been held with the Department of Nursing, NYU in the summer of 2006, and will continue during AY 2006-2007.

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

The ERBI program graduated 7 Masters of Science students AY 2005- 2006. Three students were immediately recruited for company positions related to or in safety and health services, 2 students used the MS degree for advancement in a clinical career, and two students opted to continue on to doctoral studies. We believe the ERBI faculty and OIOC staff are leaders in research on work-related rehabilitation for individuals with musculoskeletal disorders. We currently experience a return to work rate of over 90% for clinic patients with musculoskeletal disorders. We have also established the only functional capacity evaluation service in the greater New York area that allows the evaluation of the physical capacities of injured workers as an aid to appropriate job placement.
ERBI/OIOC research focused on knowledge exchange projects in AY 2005-2006. The OIOC clinical Return to Work Program was disseminated to the US Navy. We continued to promote work place safety in the healthcare industry through the development of ergonomic projects.

III. Program Progress Reports

A. Program Title: Center Administration

B. Program (ERC) Director: Jacqueline Moline, MD, MSc
ERC Deputy Director: David Kotelchuck, PhD, MPH, CIH

C. Program Description:

A. Number of Core Programs

UOSHERC made an important addition to its educational and research training offerings this grant year with the elevation of the NYU program in Occupational Ergonomics and Biomechanics to full core program status within this ERC. The NYU program was elected to membership by the ERC Management Committee in Summer 2002 and gained core status as a result of the successful ERC competitive renewal proposal. Thus this ERC is now a consortium of five educational institutions offering ten programs in occupational health and safety training, as well as a Pilot Project Research program at the Mount Sinai School of Medicine. The 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);
- Pilot Project Research Program at Mount Sinai School of Medicine (New York City, NY)
- 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).

B. ERC Staff and Management

UOSHERC continues to be administered by a core staff at Mount Sinai School of Medicine in conjunction with the ERC Management Committee. This past year has seen a major turnover in leadership of this ERC and its component programs – an important process of renewal in what has been for the past few decades an unusually stable ERC leadership. First and foremost, Jacqueline Moline, MD, Director of the Mount Sinai Occupational Medicine Residency and Pilot Project Research programs, was elected by the ERC Management Committee to be Director of UOSHERC, the NY/NJ ERC, to replace Philip Landrigan, MD, who retired as Director of this ERC after 21 years. She maintained all three of her positions throughout this grant year 2005-2006, although she gave up the Residency Directorship as of July 1, 2006 (i.e., after the current grant year) to her colleague Dr. Debra Milek. Dr. David Kotelchuck, PhD, CIH, remains ERC Deputy Director. This year as of Feb. 1, 2006 he retired from the Hunter IH faculty, but remains an adjunct faculty member there and Director of the Center for Occupational and Environmental Health at Hunter College. He will continue to teach the ERC Interdisciplinary plant visits course, as he has for the past decade. Dr. Jack Caravanos, who has directed the academic EOHS program at Hunter since 1997 and overseen the program's accreditation both by ABET and CEPH, has taken over direction of the NIOSH ERC industrial hygiene program from Dr. Kotelchuck. In turn Dr. Mark Goldberg of Hunter College has replaced Dr. Caravanos as Director of the Hunter HSAT program. In another change of program directorship, Mitchel Rosen, MS (PhD

expected) has taken over directorship 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. Dr. Paul Landsbergis of the Community Medicine Department at Mount Sinai School of Medicine, and an experienced occupational health and safety researcher, is Director of the NORA Research program. Ms. Jane Gruen remains business manager at the Division of Environmental and Occupational Medicine of Mount Sinai.

These program leadership changes reflect a positive renewal for the ERC Management Committee, which has been quite stable for almost two decades. Dr. Moline is now Chairperson of the Management Committee. Other members include Jack Caravanos, DrPH, CSP, CIH (Hunter College School of Health Sciences), Michael Gochfeld, M.D, PhD. (UMDNJ/Robert Wood Johnson Medical School), Margareta Nordin, Med.Dr.Sci. (NYU), Arijit Sengupta, Ph.D. (New Jersey Institute of Technology), Paul Landsbergis, Ph.D. (Mount Sinai School of Medicine), Mitchel Rosen, MS (UMDNJ/NJ School of Public Health), Mark Goldberg, Ph.D., CIH (Hunter College School of Health Sciences), David Kotelchuck, Ph.D, CIH (Hunter College School of Health Sciences – ret.),

In addition the ERC has an External Advisory Board (EAB) consisting of 21 members representing private industry, labor unions, government agencies, non-profit organizations and related academic institutions. The EAB meets annually or biannually and advises the Management Committee on a range of health and safety issues and concerns. In the spirit of renewal and of new leadership of the ERC, in September 2006 Dr. Moline has sent a letter of invitation to a number of new persons to join the EAB (names suggested by the ERC Management Committee), and is sending a letter of thanks to several current Board members who are retiring from the Board after many years of valued service. Thus the Board is in the process of being replenished and to some extent rejuvenated. This new Board will meet next in February 2007.

C. Interdisciplinary Interaction within UOSHERC

1. Interdisciplinary Courses: UOSHERC continues to offer two interdisciplinary courses annually, as it has done since 1997. Students and faculty from all UOSHERC institutions have actively participated in both.

- The first is a case-study-based "NIOSH ERC Interdisciplinary Seminar," which seeks to introduce students to the various health and safety subspecialties and to promote interdisciplinary, team-based approaches to solving health and safety problems. This was offered in the Fall term of 2005 (and currently in Fall 2006), and taught by Dr. Kimberly Morland of the Mount Sinai School of Medicine. Not only is the student body of this seminar interdisciplinary within this ERC, but the faculty as well. For example four of the five seminars in Fall 2006 are being conducted by ERC faculty members from three different ERC programs (Hunter, NJIT, Mt. Sinai), and the last one by an occupational physician and epidemiologist from Queens College (CUNY). (Appendix A)
- The second is a site visit course offered during the Spring semester, involving walkthrough surveys of seven different worksites in the metropolitan NY/NJ region. This was taught jointly during the Spring 2006 semester by Drs. Kotelchuck (Hunter), Gochfeld (UMDNJ) and Richmond-Bryant (Hunter). Site Visits were conducted at the Pfizer pharmaceutical plant in Brooklyn; Power Battery plant in Paterson, NJ; the NY Times printing plant in Edison, NJ; UMDNJ Hospital in Newark, NJ; Hunter College IAQ inspection, and a construction safety tour of various sites in the WTC area. Students from all ERC academic programs attended, and the teaching team was interdisciplinary as well. (Appendix B)

2. Annual Scientific Conference: The 27th annual UOSHERC Scientific Conference was conducted this year on Friday, April 7, 2006. The topic was "Nanoparticles: Health and Technology," and the keynote speaker was Dr. John Howard, Director of NIOSH. Over 70 health and safety students and professionals attended the conference, which was held in Hatch Auditorium at the Mt. Sinai Medical

Center. Based on participant evaluations and ERC faculty response, this was considered by many present to be one of the best such ERC scientific conference in recent years, focusing as it did on health and safety issues for people researching and working a relatively new, promising arena of modern technology. Other featured speakers included Dr. Howard Kipen, Professor of Occupational and Environmental Medicine at UMDNJ, on "Combustion, Nanoparticles and Cardiovascular Toxicity" and Dr. Michael Holman, Analyst at Lux Research on "Nanotechnology Commercialization and Impacts for Occupational Health", as well as Drs. Bruce Lippy (The Lippy Group), Dr. Robert Mercer (NIOSH) and Dr. Maire Heikkinen (NYU). The conference concluded with a talk on public perception of nanotechnology and its impacts on hazard communication by Dr. William Hallman of Rutgers University. (www.njnyerc.org)

3. ERC Student and Intern Research Day: In another effort to promote interdisciplinary interactions among our students, UOSHERC holds an annual student research day. This year's research day conference was held on May 3, 2006, again at NJIT, our host for the past five years. After a welcome from Dr. Sengupta, Director of the NJIT Program, Dr. David Kotelchuck presented an introduction to the NIOSH ERC and its interdisciplinary training goals. Five student and intern presenters from three ERC programs (Mt. Sinai, UMDNJ and NJIT) followed, a slightly smaller number than in recent years. Sixteen students, interns and faculty attended, and all student evaluations rated the conference presentations as "Very Interesting" (Avg. Score 3.0 out of 3.0).

4. ERC Interdisciplinary Northeast OSH Tour: This summer from June 4-8, 2006, under the leadership of Dr. Jack Caravanos (Hunter IH) and Mitchel Rosen (UMDNJ CEO), this ERC conducted its first ever Northeast Occupational Safety and Health Tour with support from its NIOSH ERC grant. During this week in June, twelve ERC students and interns and seven ERC faculty traveled across the Northeastern U.S. and Canada to visit industrial sites of current or historical health and safety interest. Among these were Corning Glass Works in Corning, NY; Love Canal near Niagara Falls, NY; McGill University in Montreal; Thetford Asbestos Mines in Quebec; and Boott Cotton Mills in Lowell, Mass. Students from every ERC academic program, accompanied by ERC faculty from every academic program, participated. The tour was a resounding success. Thus one student was led to say: "I am joining the others in expressing the deepest appreciation for the hard work in putting together this wonderful trip. It has definitely changed my horizons." A book entitled "Historical Perspectives" records the itinerary of the tour, the names of the participants, and pictures of the students and faculty inspecting the various worksites.

As a result of the success of the 2006 tour, ERC Directors Caravanos and Rosen plan to conduct a second tour in Summer 2007. The itinerary of this tour will differ from that of Summer '06 in that it will proceed further south and west of the Northeast tour, with somewhat less time in Canada. Specifically plans for the tour currently include visits to coal mines in Pennsylvania, Gauley Bridge in West Virginia, the Ford River Rouge plant in Dearborn, MI, then on to Toronto, the Niagara Fall power plant, Love Canal and the Corning Glass Works. Already several students and interns who attended the 2006 Northeastern tour have asked to be able to attend the 2007 tour as well. These persons will be accommodated if space permits after all first-time participants are registered. The fact that many seek a second trip evidences the students' enthusiasm for this program. It is also hoped that this effort by the NY/NJ ERC, a first for any ERC to the best of our knowledge, will be establish to a model which other ERCs can replicate.

III. Program Progress Reports

A. Program Title: Continuing Education, Hazardous Substances Training and Outreach (UMDNJ) (COMBINED REPORT)

B. Program Directors: Audrey R. Gotsch, DrPH, CHES (07-01-05 to 12-31-05) and Mitchel A. Rosen, MS, CHES (01-01-06 to 06-30-06)

C. Program Description:

A. Continuing Education Report

2.a. Continuing Education Progress Report and Future Plans for Each Program Area

NY/NJ ERC serves the continuing education needs of the occupational health and safety professionals in New York, New Jersey, and Puerto Rico by providing CE/O training and serving as an educational resource for industry, federal, state, and local governments.

Mitchel Rosen, MS, CHES, became the Program Director of the CE program on January 1, 2006. Audrey Gotsch, DrPH, CHES, who was the CE Director since the inception of this ERC, continues to serve as an advisor to the program, and as Dean of the School of Public Health provide support for the educational activities of the Center. 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.

The NY/NJ ERC sponsored its first "Historical Perspectives" tour this year. The program, lead by Mitchel Rosen, MS, CHES, the CE and HST Program Director and Jack Caravanos, DrPH, IH Program Director, brought students to sites with historical significance in environmental and occupational health and safety. The sites were Love Canal, a working asbestos mine and mill in Thetford Mines, Quebec, and the Boott Cotton Mill Museum in Lowell, MA. Students were able to get first hand experience of the hazards workers faced while working in those dangerous locations. The students also visited McGill University in Montreal to meet with occupational medicine and safety faculty. They described differences between how occupational medicine 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 18 people participated on the tour, including six ERC faculty members, representing each of the schools and disciplines within the ERC.

The evaluation of the program was extremely positive. All 12 students agreed that the interaction with other students and faculty was very positive. All 12 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 three quotes below summarize the effectiveness of the tour:

"When I signed up for this program, I did not know I would get exposure to IH as well as occ. med. I did not know of these disciplines before this year and being exposed to these problems and methods of solutions will add to a well-rounded education."
Ergonomics/Biomechanics Student

"I will be using it in daily patient care and I now have a more practical view than before in regards to work place exposures."
Occupational Medicine Resident

"The opportunity to interact with individuals from other disciplines was the most important aspect of this trip. I will definitely use the contacts that I have made with these people in my future professional endeavors. In, addition, the chance to actually see these historic sites was a once in a lifetime opportunity for me. I will never think about asbestos or cotton the same way again; forever, I will see faces connected with these materials and remember the struggles and sacrifices associated with each. And when I provide healthcare for employees, I will always remember to ask about their job responsibilities and hazards."
Occupational Medicine Resident

In addition to the numerous courses offered by the NY/NJ ERC in Piscataway, New Jersey, UMDNJ offered eight open-enrollment safety courses through a partnership with the Nassau Community College (NCC), in Garden City, New York and SUNY Ulster in Kingston, New York. Based on the success of the last year's offerings, UMDNJ will continue to offer open-enrollment courses at these colleges in New York, next year.

The NCC campus is ideal for Long Island Area students and the Kingston campus is ideal for students who live in Mid-New York State. Additionally, for the convenience of the students in the New York City area, UMDNJ will offer training in collaboration with the New York City College of Technology, located in Brooklyn, New York, starting from January 2007.

Formal needs assessments conducted by UMDNJ have shown that safety, IH, and OHN courses, related to asbestos, lead, construction, indoor air quality, ergonomics, hearing, and spirometry, continue to have the greatest need in New York and New Jersey. Based on these results, UMDNJ will continue to offer courses, related to these disciplines, as open-enrollment training.

The NY/NJ ERC will continue to actively market the CE programs by posting course information on the shared ERC website, maintained by the Minnesota ERC; participate in regional and national expos; send by first-class mail the 2007 course catalogs; and maintain and update course listing on the UMDNJ Office of Public Health Practice (OPHP) website.

The OPHP website and the student data management systems are now integrated so that the students can view their training records in real-time and register for courses on-line. This system also allows CE to collect information on what areas of training students would like to see CE offer in the future. It also alerts students to pre-requisite requirements for specific courses, and view their enrollment status. In general, the students are very satisfied with the services provided by the new OPHP on-line registration system.

2.a.1 Faculty Reputation/Strength
Industrial/Occupational Hygiene

The industrial and occupational hygiene faculty roster is extensive and includes those who have served as course directors, program faculty, technical advisors, 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 and Mount Sinai); Jack Caravanos, DrPH, CIH, CSP (Hunter and UMDNJ); 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. Other instructors in the IH program include Douglas Pastore, MS, CIH (Director 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*.
Future Plans: Based on course needs, the NY/NJ ERC will recruit additional IH faculty as needed to conduct additional courses.

2.a.2 Occupational Health Nursing
Although the ERC does not have an OHN Academic Program, UMDNJ is aggressively working 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 and curriculum update 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. Ellen Kelly, MS, CCC-A, continues to offer the 3-day CAOHC Certified Hearing Course and the one-day refresher for CAOHC certification courses at UMDNJ.
Future Plans: With the addition of the NYU Graduate Program of Ergonomics and Biomechanics to the ERC in 2005, the Center is considering adding additional courses on work-related lower back pain courses for nurses. New faculty to the program from NYU includes Manny Halpern, PhD and Margareta Nordin, DrSci (Ergonomists). The EOHSI clinic also recruited Carol Perret, MSN, COHN, to the clinic staff. She will be a member of the advisory board and steering committee for new course development.

2.a.3. Occupational Medicine: 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, Iris Udasin, MD, and George Rhoads, MD, MPH. Members of the occupational medicine faculty continue to hold key leadership positions. For instance, both Dr. Michael Gochfeld (UMDNJ) and Dr. Howard Kipen (UMDNJ) served as president, of the Occupational Medical Association of New Jersey.
Future Plans: The CE and Occupational Medicine program of UMDNJ-RWJMS and Mt. Sinai are attempting to identify additional occupational medicine physicians needed to enhance the continuing education program. In the past year, we have identified occupational medicine physicians in Buffalo, Albany, and Syracuse so that live video-teleconferences (VTEL) can be held for reaching physicians in upstate New York.

2.a.4. Occupational Safety:
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) and Douglas Pastore, MS, CIH, a former NJ Chapter President of the ASSE.

Based on the increased demand for occupational safety courses in New York, additional instructors were recruited to conduct training. Since there are a large number of New York City Local Laws related to occupational safety, it is important to have instructors, with NYC experience, present these courses. Based on these criteria, the CE program recruited Karen Smyth, MPH and John Antonopoulos, MSME, PE, CSP to conduct additional occupational safety courses in New York. Ms. Smyth is the owner of a leading site safety management company in New York City and adjunct faculty of NYU, School of Construction Management. She is also an active member of the New York City Chapter of the

American Society of Safety Engineers (ASSE). Mr. Antonopoulos is faculty emeritus at CUNY and a consultant to the MTA- New York City Transit. He has over 35 years of design, management, and training experience in New York City.

The NY/NJ ERC was saddened by the loss of Raymond Manganelli, PhD (professor emeritus, Cook College) in September 2005. Dr. Manganelli was instrumental in establishing and presenting many of the safety courses at the Center.

Future Plans: The NY/NJ ERC will recruit additional instructors as needed to facilitate the safety program.

2.a.ii Courses Offered by Specialty Area

Annual Statistical Report, Table 12 and 12a present figures for this reporting period. The Statistical Report indicates that 216 courses have been held during this period and that 3391 students have received training in the program areas and related disciplinary fields.

2.a.ii.1 Industrial/Occupational Hygiene: As indicated by the Annual Statistical Report, industrial hygiene courses offered by the NY/NJ ERC are extensive. The goal of the CE program, with regard to IH training, is to provide the IH practitioners with the necessary tools to recognize, evaluate, and control exposure to toxic substances in the workplace. Among the most requested courses for the CE program include *Blood-borne Pathogens Control, Asbestos Safety Technician, Asbestos Inspector, Asbestos Management Planner,* and *Lead Inspector and Risk Assessor.* The NY/NJ ERC also developed and offered a four-day *Health & Safety for Oil & Gas Operations* as part of the IH program this year.

On April 7, 2006, the NY/NJ ERC conducted its 27th Annual Scientific meeting at Mt. Sinai. The topic for this year's meeting was *Nanoparticles: Health, Science & Technology*. The field of nanotechnology is advancing rapidly and will likely revolutionize the global industry. The key-note address was given by Dr. John Howard, the Director of NIOSH. Presentations were given by leading physicians, industrial hygienists, and toxicologists in this field. A total of 71 students attended this meeting. Overall, the meeting received excellent feedback from the attendees on the program's evaluation form. Attendee comments included that the speakers demonstrated current knowledge of the topic and were effective presenters. The students also mentioned that they received a better understanding of economic, workplace, and toxicological significance of exposure to nanoparticles.

Future Plans: The NY/NJ ERC will continue to use on-going needs assessment to enhance the IH program.

2.a.ii.2 Occupational Health Nursing: CE offered several sessions of the *Spirometry*, *Occupational Hearing Conservation,* and the *Hearing Refresher* course this year. Also, for the fifth consecutive year, UMDNJ offered the *Occupational Health and Safety Principles* (COHN) *and* the *Nursing Certification Review and Case Management Review* (CM). These licensing exam preparation courses continue to be well received. In addition to students from New York and New Jersey, nurses from Florida, Delaware, and Maryland attended the COHN and CM review this year.

Future Plans: The NY/NJ ERC will continue to offer the 3-day Spirometry and Occupational Hearing Conservation and the one-day hearing refresher as part of the CE program. Due to the continued success of the COHN and CM review courses at UMDNJ, they will again be offered in March 2007. Also, results from of our on-going needs assessment have shown a need for a Spirometry update course. UMDNJ will offer a one-day *Spirometry Update* course, by open enrollment in 2007.

2.a.ii.3 Occupational Medicine: The *Occupational Medicine Seminar Series,* which was developed as a course in 1997, continues to attract members of the outside medical community. CME, Category I, CEU, and CM credits have been awarded for this series and registration and evaluations have been implemented. They are now publicized and open to community physicians. The Center also offered

Workplace Psychopharmacology, on September 19. This course was offered in real-time over the VTEL system. A total of 24 seminars were offered for physicians this year.
Future Plans: Due to the overwhelming success of the September 19 VTEL program, NY/NJ ERC will provide additional programs for physicians by distance education.

2.a.ii.4 Occupational Safety: Numerous occupational safety courses were offered by CE this year in New York and New Jersey. The majority of them were related to asbestos and general safety compliance. CE also offered four sessions of the competent person level excavation course, *Excavation, Trenching, and Soil Mechanics* this year, in New Jersey. Region II leads the nation in trench collapses and excavation fatalities. The law requires that a designated person, trained to the competent person level, be at the site every time an excavation site is active.
Future Plans: The Center will continue to offer safety courses in asbestos, lead, excavation, and construction safety through this program. CE will also offer a *10hr OSHA Construction Safety* course in New York City, in Spanish, in collaboration with the Region II: USDOL-OSHA.

2.a.iii. Needs Assessment: The NY/NJ ERC conducted two advisory board meetings for the industrial hygiene and occupational safety programs this year. The first was hosted by the NYU Graduate Program of Ergonomics and Biomechanics. Among the items discussed at this meeting were identifying additional federal grants for training, developing an ergonomics course for dentists, and expanding on the student base in New York. The second advisory board meeting was held at UMDNJ. The items discussed at this meeting included offering additional train-the-trainer courses on health and safety. There are numerous Hispanic workers who do not receive adequate training to do their job. Since the majority of these workers do not speak English, it's vital that the Center reach out to health and safety professionals in this community and give them the necessary trainer courses to meet this need. The post-course evaluations continue to serve as a valuable source of information to the Center. This data is collected electronically and additional courses are offered and presentations are enhanced based on the student input.
Future Plans: CE will conduct two task force meetings in the coming year. The members of the NY/NJ ERC Task Force are public and private sector employees, whose contributions have tremendously enhanced our program. The student post-course evaluations and the needs assessments collected by the NIOSH-ERC booth at the national conferences continue to serve as a valuable tool in enhancing the program.

Additionally, the new on-line registration system allows UMDNJ to collect information regarding areas of interest by students who register on-line for training as well as visitors to the site. Questions currently asked of the respondents include, topic areas of interest, location for training, current job responsibilities, and level of education. A large number of respondents have participated in the on-line survey. UMDNJ will present a summary of this data at an upcoming task force meeting and identify ways to use this information to enhance the training.

Measures of Effectiveness:

1. Offer 120 CE courses (OM, IH, OS, and OHN).
A total of 125 courses were offered by CE in 2005-2006 (year 1 of 5).

2. Offer defensive driving training to CE staff that travel to off-site locations to conduct training.
Several employees received "Defensive Driving" training offered by UMDNJ- Logistical Services. Additional CE staff will receive this training next year.

3. Conduct Task Force Meeting.
Two formal Task Force meetings were conducted by UMDNJ this year for the CE program.

4. Offer ten CE courses off-site in the greater New Jersey and New York area.
Over twenty courses were offered off-site by the CE program.

B. Hazardous Substances Training Report

3. Hazardous Substance Training
a. Program
i. Needs Assessment
UMDNJ continues to assess the needs of public agencies in New Jersey and New York. The formal needs assessment procedures were outlined in the previous applications, and are still valid. Over the past year, UMDNJ has conducted informal needs assessment, calling agencies that have been granted scholarships to attend the training courses. The need is still high for most agencies as funding levels have not increased, and training budgets are low or non-existent. Without scholarships, many public agencies would not be able to attend training.

These state and local inspectors are enrolled in open enrollment, 40-hour Initial, 8-hour Supervisor, and 8-hour Annual Refresher training, co-funded by the HST and NIEHS- Worker Education and Training Program (WETP) offered at UMDNJ.

UMDNJ also offered five sessions of the 8-hour Annual Refresher for state and local compliance personnel, provided solely with NIOSH HST funds. These students were responsible for conducting compliance inspection; permit review, and enforcement under the state air, water, solid waste, and RCRA programs. In order to reduce their travel costs, UMDNJ instructors traveled to their facilities to present these trainings. A total of 119 state personnel were trained by UMDNJ through the HST program in 2006.

The Division of Site Investigation of the New York City Department of Design and Construction (NYCDDC) contacted UMDNJ to develop and offer an advanced course conducting an environmental site assessment. The NYCDDC inspectors had varying years of field experience and all of them had a current 8-hour Annual Refresher certificate, prior to attending the training. The goal of the NYCDDC, in providing this training to their inspectors, were to give them detailed knowledge of how to conduct Phase I and II Environmental Site Assessment, sampling methodologies, and site reconnaissance.

Dr. Jack Caravanos, the NY/NJ ERC IH Program Director and Mr. Benjamin Alter, NY/NJ ERC HSAT instructor, developed a 24-hour course titled “Phase I and II Environmental Site Assessment” for these inspectors. This course was offered once in June 2006, at the NYCDDC corporate office in Long Island City, New York, and fourteen inspectors attended this session.

In addition to providing these inspectors with a thorough review of how to conduct a Phase I and II Assessment, Mr. Alter lead the class on a field trip of a bus depot, currently undergoing environmental restoration in Queens, New York. The field trip gave these instructors the opportunity to demonstrate how to evaluate contractor logs, permits, New York City Local Laws related to site safety, and other issues encountered during environmental site assessment. In general, this course was well received by these inspectors.

ii Program Plan/Leadership
Our needs assessments have shown that funding is not available for many state and local officials to receive hazardous materials training. The HST program for the coming year will continue to provide full scholarships for public sector professionals in the hazardous waste industry. The NIOSH HST provides scholarships for 24 public sector employees to attend a one-day course (either the 8-hour

Hazardous Materials Annual Refresher or 8-hour Hazardous Materials Supervisor), and 9 public sector employees to attend the 40-hour initial Hazardous Materials course. Since the need for the 8-hour Annual Refresher far exceeds the available scholarships, the additional inspectors are allowed to take the course at no-charge, at open-enrollment trainings at UMDNJ.

Mitchel Rosen, MS, CHES, became the director of the HST program on January 1, 2006. Audrey R. Gotsch, DrPH, CHES, the Center Director since the inception of the ERC program, continues to serve on an advisory role to the HST program. In addition to being the Program Director for the CE/O program, Mr. Rosen also serves as the Director of the UMDNJ- School of Public Health, Office of Public Health Practice. The HST program is administered through this office. Mr. Rosen also serves as the president-elect of the NJ Public Health Association. **Koshy Koshy, PhD,** serves as the Program Manager for the HST Program. In addition to coordinating the HST activities of the Center, he also serves as an instructor for the program. He provides instruction for the 8-hour Annual Refresher and sections of the 40-hour initial training. **John M. Malool, MS** continues to be the course director. Mr. Malool has extensive experience in conducting hazardous materials training courses, and continually receives outstanding reviews by students. He currently holds the position of Marine Safety and Marine Environmental Protection Officer for the United States Coast Guard Auxiliary, First Southern Region 10th Division.

iii. Faculty Reputation/Strength

In addition to Mr. Malool, other key faculty for the project include professionals from governmental agencies, private industry and academia. Instructors are selected based upon their knowledge, practical experience, and ability to teach adult populations. Many faculty members have been part of the hazardous materials training program at UMDNJ since 1988. Key faculty members include the following experts.

Susan Anastario, BSN, RN, COHN, is a clinical instructor at UMDNJ-RWJMS.

Jack Caravanos, DrPH, CIH, CSP, serves as the Director of the Environmental and Occupational Health Sciences Program at Hunter College, School of Health Sciences, NYC, and as an adjunct assistant professor at UMDNJ-School of Public Health. Dr. Caravanos has worked extensively in both public and private sectors on the recognition and evaluation of occupational and environmental hazards.

Robert Gregory is the Fire Marshal at Princeton University, Princeton, New Jersey. Mr. Gregory is also a Lead Part-Time Fire Instructor for the Middlesex County Fire Academy.

Myles O'Malley, MA is the Director of CLPER (Childhood Lead Poisoning Emergency Response), Maplewood, NJ, a non-profit agency, dedicated to volunteer-based model program for the application of temporary, lead-based paint hazard controls interim controls to the residences of lead-poisoned children as soon as possible after medical diagnosis. Mr. O'Malley also has over 25 years of experience in asbestos, lead, and hazardous waste health and safety training.

Mary Nikola, EdD, is the Director of Leadership and Organization Development Rutgers Cooperative Extension, Cook College, Rutgers University. Dr. Nikola has extensive experience providing management and leadership training to adults. Previously, she was Director of Training and Development for Rutgers University.

Michael S. Zachowski, MS, is Vice President of Astrix, a software technology company specializing in computer software for the environmental industry. He was formerly a Director with OHM Remediation Services Corp. (OHM) a leading nationwide firm that provides site assessment and remediation activities on a planned and emergency basis. Previously, Mr. Zachowski served as Chief, Bureau of

Emergency Response, New Jersey Department of Environmental Protection.

iv. Coordination with Agencies

UMDNJ works extensively with public agencies to provide the training program. The New Jersey Department of Health and Senior Services (NJDHHS) is an essential partner for developing the Annual Refresher course. Each year, UMDNJ uses a Superfund site from New Jersey as a case study in the course. The NJDHHS conducts the Public Health Assessments in New Jersey, as part of a cooperative agreement with the Agency for Toxic Substances Disease Registry (ATSDR). The information provided by the NJDHHS includes slides of the site, as well as site descriptions, sampling plans and results, and other information to be distributed in the training course. Local and State departments of health and environment are used to assess the need for the courses. Several key departments include the New Jersey Departments of Environmental Protection and Transportation, New Jersey Highway Authority, Townships of South Brunswick and Freehold, Counties of Monmouth (NJ), Westchester (NY), and the New York City School Construction Association. Additionally, UMDNJ has forged a relationship with several of the OSHA area offices.

v. Courses offered during project period

UMDNJ offered the 40-hour Initial, 8-hour Annual Refresher, 8-hour Supervisor, 8-hour Incident Command Training, and the 24-hour Phase I and II Environmental Site Assessment course, as part of the HST program, in the past year.

Between July 1, 2005 and June 30, 2006, UMDNJ offered 37 8-hour Annual Refresher courses, training 555 students, eight 40-hour Initial courses training 78 students, and one 8-hour Supervisor course, training eight students through the co-funded by the HST and NIEHS programs. A total of 31 8-hour Annual Refresher and seven 40-hour Initial scholarships were provided for state and local personnel, who attended the co-funded training at UMDNJ.

Also, two sessions of the 8-hour Incident Command Training, training 39 students; five sessions of the 8-hour Annual Refresher, training 119 students; and one session of the 24-hour Phase I and II ESA course training 14 students were offered through the HST program.

Course Name	# offered	Trainees
24-hr Phase I and II ESA	1	14
8-hour Annual Refresher	5	119
8-hour IC Training	2	39
*40-hour Initial	8	59
*8-hour Annual Refresher	37	555
*8-hour Supervisor	1	8
TOTAL	53	794

* co-funded

Several sessions of the co-sponsored 8-hour Annual Refresher were held off-site; among these were one session in Tarrytown, New York for IBM, two in Elizabeth, New Jersey, for the American Water Company, and two sessions in Picatinny, New Jersey for Picatinny Arsenal.

vi. Program Evaluation

Trainees use a registration form to provide demographics, including gender, ethnicity, language, education, and occupational data (employment status, field of expertise, years in field, primary job duty, and work setting). They also indicate how they heard about the course, if they are a union member and if they are enrolled in medical surveillance. For relevant courses, training effectiveness is assessed through exams, which require 80% mastery on written and/or demonstrated items. Unless physically

restricted, trainees in relevant courses must demonstrate flawless mock decontamination and equipment handling recorded on a skills inventory form. Course evaluation forms request ratings on various program features (instructors, materials, facilities, activities, and equipment). One objective is to ensure that public sector employees receive training appropriate to their positions and that State and federal worker training is thorough. Course evaluations therefore include a section regarding the pertinence of training, any needed modifications and whether worker rights information was adequate.

Data is collected on electronically scannable forms. Once entered, frequencies summarize training numbers, demographics and trainee origin, indicating possible training needs and whether outreach is effective. Measure of central tendency compare pre- and post-tests and summarize course ratings. Explorative data analyses are also performed. For example, pre- and post-tests may be analyzed to assess the effects of education on test outcome, and education data for individuals and groups may be analyzed to determine the effects of class composition overall. Significant outcomes indicating a need for program modification are reported to course directors.

Students complete an evaluation form at the conclusion of the course. Evaluations rate the instructors, training facilities, hands-on exercises, whether the training met the objectives, and the level of instruction. Course instructors continue to receive positive reviews.

Over 90% of trainees indicated that the objectives of the training program were completely met. Additionally, 96% of the trainees indicated the level of instruction was appropriate.

vii. Plan for Coming Year

UMDNJ will continue to offer the 40-hour Initial, 8-hour Annual Refresher, and 8-hour Supervisor courses on-site. Scholarships will be provided to state and local governmental employees to attend these courses, upon request. UMDNJ will offer the 8-hour Incident Command course as needed. For the convenience of the state and local offices, UMDNJ will provide the 8-hour Annual Refresher courses on-site, at state offices, upon request.

UMDNJ will continue to look for opportunities to provide HST training throughout New York and New Jersey. Due to budgetary and travel restrictions, bringing these courses to the client's location has become essential to the program.

UMDNJ continues to offer the 8-hour Awareness, 16-hour Operations, and 24-hour Technician level training, as per 29CFR1910.120(q). These courses are essential for state and local governmental employees, with varying levels of responsibilities at hazardous waste sites. The emergency responder training is supported through the NIEHS-Worker Education and Training Program, however, part of the support necessary to support the Center's infrastructure is met with HST funding.

UMDNJ will continue to offer the 8-hour Transportation and Confined Space (8hour, 16hour, and 24hour) training, as part of the hazardous materials program.

b. Complete Statistical Report in Table 12

Measures of Effectiveness

1. Offer 30 sessions of the 8-hour Annual Refresher Training
Forty-two (42) 8-hour Annual Refreshers were offered by UMDNJ this year.

2. Conduct one Task Force Meeting for HST.

A task force meeting was conducted on April 25, 2006, at UMDNJ.

3. Offer five sessions 8-hour Annual Refresher off-site.

A total of ten sessions of the 8-hour Annual Refresher training were offered off-site this year.

C. Outreach Report

Outreach Progress Report

The occupational medicine, nursing, industrial hygiene, and safety divisions of the New York/New Jersey ERC continues to serve as a resource for occupational and environmental safety to the professional and worker communities of Region II. Over the past year, faculty and staff of all four disciplines, medicine, safety, industrial hygiene, occupational safety, ergonomics, and CE have provided presentations and serve on an advisory role for multiple activities. Although the NY/NJ ERC no longer has an occupational nursing program, supported by NIOSH, the occupational health nurses of the Environmental and Occupational Health Sciences Institute (EOHSI) continue to facilitate the educational needs of Region II.

Occupational Medicine

The physicians of the ERC's occupational medicine program are asked to provide a variety of community outreach presentations during the year; included are formal presentations, consultations, and interviews with the media. Since the terrorist events of 9/11, the proximately of the Mt. Sinai Center has required the physicians of the occupational medicine program to respond to numerous news interviews and provide seminars to local agencies and community groups on the long term affects of the dust exposure. Through the Mt. Sinai Medical Center, the occupational physicians have examined over 12,000 workers and volunteers who may have been exposed to soot, dust, and smoke. Dr. Jacqueline Moline, the NY/NJ ERC Director, has provided interviews for local and national newspapers, radio, and news organizations on World Trade Center (WTC) follow-up activities. Included among these were radio interviews with *WCBS,* television interviews with World News Tonight on *ABC, CNN American Morning*, and WPIX *Local Channel 11* News. Robin Herbert, MD, of Mount Sinai also provided numerous television, radio, and newspaper interviews related to the WTC aftermath. Among these were interviews given to the *Washington Times* on the effect from the WTC trauma on the fetus of woman involved in the event, an interview by the *Associated Press* on the health effects of rescue works at the WTC and its aftermath, an interview by *WPIX Local Channel 11* related to systemic effects of WTC workers and expiration of the deadline to file workman's compensation claims, and *60 Minutes* (CBS) on the 5th anniversary of 9/11. Steven Levin, MD, the Co-Director of the World Trade Center Medical Monitoring Program at Mt. Sinai also provided interviews to newspapers and radio on the long-term effects to workers from the WTC. The Mount Sinai School of Medicine will share a $20 million grant (awarded to 60 nonprofit agencies) from the American Red Cross. The objective for this program is to provide community mental assistance for 9/11 recovery.

The physicians of the EOHSI Occupational Medicine program provided numerous presentations at local and national events, over the year. Among them, Michael Gochfeld, MD, PhD, presented a session on "Inhalation Exposures to Radiation" at the NJ/NY Center for Public Health Preparedness Center; "Health Effects of Chromium" at the NJDEP; a session on mold exposure during flood repair at the Bell South Health and Safety Risk Managers Meeting; and several presentations on heavy metal and PCB exposure from food, water, and contaminated soils. Among the presentations that Howard Kipen, MD, MPH, provided included "Particle Exposure and Cardiopulmonary Disease Gene-Environment Interactions" for ACOEM, SOTAC, in Chicago, IL and at the International Toxicology of Nanomaterials: Biomedical Aspects, in Miami, Florida. Dr. Kipen also presented his work on myocardial infarctions from air pollution exposure at several conferences, nationally. Iris Udasin, MD, was interviewed numerous times by local (NY and NJ) radio and newspapers on her work with

responders exposed to WTC dust. She also provided a presentation at the NJ Police Benevolent Association in Atlantic City, New Jersey titled "Health Effects of Chromium" and the NJ Fire Fighters Benevolent Association titled "Blue Ocean Workshop on Sustainability". Omowunmi Osinubi, MD, provided a presentation on the "Health Effects of Environmental Tobacco Smoke and Other Fine Particulate Matter-Public Health Policy Considerations" at the NJ American Hygiene Association in Edison, New Jersey and a presentation on the "Relationship Between Work Organizational Factors, Physical Symptoms and Psychological Distress Two Years After the World Trade Center Terrorist Attacks" at the 2006 NORA Symposium in Washington, D.C. Nancy Fiedler, PhD, provided several presentations on neurobehavioral testing.

Industrial Hygiene

Jack Caravanos, DrPH, CIH, CSP, the IH Program Director, has provided expertise for numerous community and international development projects. Among these were several presentations for the Brooklyn-Queens Aquifer Citizen Advisory Board. The goal of this organization is to assist the NYCDEP disseminate surface and aquifer clean-up information to the community. Dr. Caravanos also worked with the Blacksmith Institute, an international organization, mainly funded by the World Bank and Asian Developmental Bank. The goal of this group is to identify international hazardous waste sites for remediation and support their clean-up. Dr. Caravanos participates in their monthly conference calls and he provides assistance in identifying sites for further assessment. Under the service of the Blacksmith Institute, Dr. Caravanos visited 20 sites (five cities), identified for clean-up in India, and a lead battery recycling facility in Aaina, Dominican Republic. Dr. Caravanos continues to serve as a subject matter expert for the New York City for childhood lead screening, in conjunction with the local health department. Dr. Caravanos provided the key-note address at the Metropolitan AIHA student Chapter held on November 9, 2005, at Hunter College. He focused his presentation on his work through the Blacksmith Institute in India. Dr. Caravanos also published four papers, in peer-review journals, this year. The main focus of these papers was residential lead contamination and other contaminant exposure to New York City residents and prevention.

Occupational Safety

The faculty and staff of the NYU Occupational and Industrial Orthopaedic Center (OIOC), New Jersey Institute of Technology, and UMDNJ have met the outreach needs of Region II by providing presentations, assisting in educational development, and providing consultation. NYU facilitated a break-out session at the Google NYC Health Fair 2006 on healthy computing, they provided a presentation at the United Nations on creating a healthy workplace, and lead a session on Return-to-Work Accommodations after an ergonomics injury at the 2006 Easter Ergonomics Conference and Exposition in New York City. Dr. Halpern of NYU also provides consultation to Google NYC by providing a bi-monthly assessment of individual Google employee workstations.

Dr. VanHouten of NJIT is working with the local Korean Business Owners Association in Newark, New Jersey. Due to numerous injuries from the lack of machine guarding and other safety issues at dry cleaning facilities, numerous Korean speaking workers are injured annually. NJIT is working on providing Korean language materials and facilitating presentation to these workers on safe work practices.

The Resource Center of UMDNJ continued to realize great successes through its curriculum development, implementation and evaluation initiatives that incorporate teacher professional development (teacher training workshops). These collaborative projects are allowing for enhanced environmental health education on the state and national levels. Mr. Rosen, the CE Director, facilitated four awareness programs for high school students on occupational safety and health hazards that they may face at the work-site. The sessions he facilitated reached 450 students and 50 teachers. UMDNJ is also very active with the Northern New Jersey Safety and Health Council (NNJSHC). UMDNJ hosted

the NNJSHC Spring Annual meeting on-campus, in Piscataway, New Jersey on March 1, 2006. The theme of this year's spring meeting was excavation safety. John Malool, MS, gave the key-note address on excavation and shoring safety. UMDNJ also participates in the New Jersey State Safety Congress and Expo. Over 3,000 safety professionals from New York and New Jersey attend.

III. Program Progress Reports

A. Program Title: Hazardous Substances Academic Training (Hunter)

B. Program Director: Mark Goldberg, PhD, CIH

C. Program Description:

1. 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.) 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.

To achieve the advanced-training goal (Goal 2), the following specific objectives will be accomplished as part of the HSAT program:

a. Each participating student will complete a 40-hour Site Investigators course.

b. Each participating student will complete 16 hours of advanced HSAT courses, including mandatory courses in Hazardous Waste Management (EOHS 745), Industrial Processes and Plant Visits (EOHS 759), and Environmental and Industrial Hygiene Laboratory (EOHS 741). The remaining 16 hours will be chosen from among hazardous substance-specific elective courses.

c. Each participating student will complete a field internship of at least 210 hours providing experience with hazardous waste and/or emergency response operations, and will make a presentation on it to EOHS faculty and students.

d. Each participating student will be encouraged to take the examination for CHMM (Certified Hazardous Materials Manager) certification.

2. Responsible Conduct of Science Training

Hunter IH and HSAT students receive formal training on ethical issues in science, with special attention to the AIHA Code of Ethics, during both their introductory OSH and IH courses. They receive training on proper citation and use of information from other scientific studies, and what constitutes plagiarism in the use of these materials. These are reinforced during their field and thesis internship courses, where they are also instructed on use of human subjects in scientific studies, IRB procedures and DHHS training courses on this subject.

3. Faculty Participation

During Academic Year 2005-2006, the core Hunter IH faculty consisted of five faculty members: Dr. Jack Caravanos (IH Director – on sabbatical), Dr. Mark Goldberg (HSAT Director and Acting IH Director), Susan Klitzman, David Kotelchuck, Jennifer Richmond-Bryant and Michael Bonchonsky (one-year substitute appointment to replace Dr. Caravanos).

- Dr. Jack Caravanos was on sabbatical leave from Hunter College for one year (9/05 – 8/06) During this time he pursued a research agenda, working on several projects with the New York City Department of Health and Mental Hygiene.
- During this year, Dr. Mark Goldberg assumed the position of Director of the HSAT program, as well as that of Track Coordinator of EOHS.
- Dr. David Kotelchuck retired from Hunter College on 2/1/06. He continues to have ties to the program in his position as Director of the Hunter College Center for Occupational and Environmental Health, and in his role as Deputy Director for the NY-NJ ERC. He also teaches as an adjunct Professor

in the EOHS track. Currently the Program is conducting a search for another full-time, tenure-track faculty person to replace him.

- This year EOHS added a new full-time, tenure-track Assistant Professor, Dr. Jennifer Richmond-Byrant. She received her MS in Industrial Hygiene from the University of Michigan and her PhD in Environmental Sciences and Engineering from the University of North Carolina. Her research interests include indoor air quality and the relationship between community air pollution and the indoor environment.
- EOHS also hired a substitute Assistant Professor, Michael Bonchonsky, to replace Dr. Caravanos for the Academic Year 2005-2006. Mr. Bonchonsky has an MS in Environmental Science and a degree in law (JD). For many years he was an officer in the Region II EPA, and later was a hazardous waste specialist with a private consulting firm. He has taught as an adjunct in our program for many years. His specialties include hazardous waste management and environmental law.

4. Curriculum

The HSAT program is a concentration within the MS-degree program. As noted above, three courses (EOHS 745 Hazardous Waste Management, EOHS 759 Industrial Processes and Plant Visits and EOHS 741 Env.&IH Lab) are required for all students in the HSAT program, for a total of 10 credits. Another three credits for 210 hours of HSAT-related field research is required. The remaining 6 credits of coursework are to be chosen from among Environmental Investigations and Remediation, Indoor Air Quality, Biohazards and Emergency Response, and Industrial Safety and Emergency Response. This curriculum and selected course outlines are summarized in Appendix A.

D. Program Activities and Accomplishments

1. Trainee Recruitment including Diversity Efforts

Recruitment of trainees during this period remained fairly stable. Eighteen candidates applied for matriculation in the IH (and HSAT) program, of whom 14 were admitted and 12 were enrolled. Of these twelve, 8 (or 66%) are members of minority groups. 5 of the twelve (42 percent) are female.

2. Progress toward Goals and Objectives

A total of 21 students were enrolled in the program during 2005-2006. Of these 18 were in the IH program and 3 were in the HSAT program. Of the HSAT students, three were selected for HSAT scholarships: Ayetiwa Kayode, Nancy Katz and Michael Schmeltz. Ms. Katz is a second year student and the other two are first year students. All are academically strong.

3. Faculty Honors

Professor Jack Caravanos was awarded the President's Award for Excellence in Teaching (Hunter College award) in May 2006.

4. New Courses

No new courses were initiated.

5. Measures of Effectiveness

In the Table below are a series of measures of effectiveness of the Hazardous Substances Academic program, a concentration within the Hunter Industrial Hygiene program (MS degree).

Goals	**Measures of Effectiveness**	**Status** (as of 6/06)
Teaching	Avg. of Student Teaching Evaluations for EOHS faculty exceeds 3.5*****	Achieved annually from 2002-06
Research (1)	1. At least 75% of EOHS FT faculty conducted funded research in 2005-06	Achieved in 2005-06 (100%.)
Research (2)	2. At least 50% of EOHS FT faculty	Achieved in 2005-06

	published or had articles accepted for publication in peer-reviewed journals during 2005-06	(75%. Four of five published such research in 05-06 or had article accepted
Service	Each FT EOHS faculty member will participate in one profl. activity outside UPH program.	Achieved (100%)
Pgm. Certification	IH program will remain certified by ABET and CEPH	MS degree program certified until 2007; MPH until 2010
Graduates (1)	1. Annual Number of MS graduates in HSAT program shall be 3 or more.	Not Achieved (2 HSAT grads last yr.App.B)
Graduates (2)	2. At least 75% MS grads in HSAT pgm. during past yr. employed in occ. and/or env. field.	Not Achieved (1/2 = 50% so employed. App. C)

***** On Question 16 of Student Course Evaluation Form: Score of 3.0 = Teacher is "Above Average"; 4.0 = "Excellent"; and 5.0 = "One of the Most Outstanding"

E. Program Products

1. Student and Faculty Publications and Presentations during this reporting period:

Even with faculty busy with academic duties, Professor's Caravanos, Klitzman, Kotelchuck and Richmond-Bryant were able to continue publishing scholarly papers in 2005-2006. (Appendix C)

2. Conferences/Symposia Sponsored

Dr. Kotelchuck organized and moderated "NOISH ERC Student/Resident Research Day" at the Campus Center of NJIT on May 3rd, 2006. Five 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 Hunter IH program co-sponsored the annual ERC scientific conference on Nanotechnology, held on April 7, 2006, and Drs. Goldberg and Kotelchuck served on the Conference Planning Committee.

F. Future Plans

Dr. Klitzman was especially busy during this academic year solidifying the details of the first CUNY DrPH program, to be housed at Hunter College. After several years of assessment, planning and development, the UPH program submitted a letter of intent (new curriculum program). Planning for the new doctoral program, which has an EOHS track imbedded, continued to the next academic year and its approval seems promising.

First Annual EOHS Bus Tour of Industrial Sites: As previously described, the EOHS NIOSH-IH program was instrumental in initiating and implementing the first annual EOHS bus tour of industrial and hazardous waste sites. The Hunter program enrolled 4 NIOSH funded students, however none of these was an HSAT student. Also two Hunter faculty members participated: Dr. Jack Caravanos helped conceive and led the tour, and also Dr. Kotelchuck participated. A second trip during the Summer of 2007 is planned, and it is hoped some of the HSAT students will be able to participate.

III. Program Progress Reports

A. Program Title: Pilot Projects Research Training Program (Mount Sinai)
B. Program Director: Jacqueline Moline, MD, MSc
C. Program Description:

Program curriculum: The Pilot Project application and requirements can be viewed at http://www.mssm.edu/cpm/pprpt.shtml

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 efforts 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 undergo scientific review following the NIH-style scoring format. Trainee initiated projects are particularly encouraged, and 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 are changing their focus of interest are also eligible. In addition, the program will be open to students and researchers at other regional institutions and to 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 the approval the animal studies, are required prior to the release of funding.

2. Faculty Participation

This research training program is directed by Jacqueline Moline, MD, MSc, a full-time faculty member and current Director of the ERC as well as the Occupational Medicine Residency Program at the Mount Sinai School of Medicine. She is responsible for overall administration and direction of the pilot research training program. Dr. Moline works with the scientific review panel to assign projects to reviewers and to seek guidance for ensuring that projects are fitting in the goals of both our ERC and NIOSH with respect to NORA goals and r2p. We continue to collaborate with our region's TPG, the Industrial Hygiene Training Program of the University of Puerto Rico, whose Director, Dr. Jesus Gonzalez is on the scientific review panel.

Program Activities and Products:

For 2005-2006, we received a total of 8 pilot project applications. Four proposals were from doctoral students or residents, and two were from junior faculty. Six awards were made totaling $52,923. They are listed below.

2005 Pilot Projects Funded

Title	PI	Institution	Amount
An evaluation of a workplace self-hypnosis intervention on blood pressure	Jenny Walker, MD, MPH, MSW Hannah Kim, MD Trainee	Mount Sinai School of Medicine	$10,000
Internal consistency and criterion validity of an Outcomes Satisfaction Questionnaire for Low Back Pain Patients	Sherri Weiser, PhD Research Assistant Professor Angela Lis, MA, PT Trainee	Occupational and Industrial Orthopaedic Center (OIOC)	$8,000
Factors influencing physician management of non-specific low back pain: A Pilot Investigation	Shira Schecter Weiner, MA, PT, CIE Trainee Sherri Weiser, PhD	Occupational and Industrial Orthopaedic Center (OIOC)	$6,050
The influence of target size and travel distance on movement, speed and muscle recruitment during lifting and placing a sub-maximal load	Jangwhom Yoon, MA, PT Trainee Dr. Ali Sheikhzadeh, PhD, CIE	Occupational and Industrial Orthopaedic Center (OIOC)	$7,200
A computational investigation of mixing and air exchange within negative pressure patient isolation rooms	Jennifer Richmond-Bryant, PhD	Hunter College Urban Public Health Program	$9,850
Acute cardiovascular responses to diesel exhaust air pollution in non-smokers, passive smokers and active smokers: A controlled human exposure study	Omowunmi Osinubi, MD, MSc, FRCA	UMDNJ - School of Public Health	$12,000

2005 Pilot Projects not funded

PI	Title	Institution	Amount
Jaime Szeinuk, MD Saul Maayani, PhD George Piligian, MD	Effects of supplemental oral magnesium on blood lead levels	Mount Sinai School of Medicine	Not Approved
XPD polymorphisms and risk for the development of Non-Melanoma skin cancer in Puerto Rican Construction workers: A case control pilot study	Edu B. Suarez, PhD Jaime Matta, PhD (Advisor)	Ponce School of Medicine	Not Approved

All 2004-2005 awardees presented their work at the ERC Annual Scientific Day, held in April each year. Abstracts of the pilot projects are distributed to all attendees of the Annual Scientific Day.

Of the grants funded, one project provided pilot information that was utilized in the successful grant application for the Mount Sinai World Trade Center Medical Monitoring Program. There were a total of four publications and six presentations arising out of recent pilot projects.

NORA topics included in this year's award include: musculoskeletal disorders, low back disorders, organization of work, indoor environment/control technologies and personal protective equipment, surveillance research/mixed exposures.

III. Program Progress Reports

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

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

C. Program Description:

1. The goals and objectives of the ERC NORA program are to:

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

2. 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.

3. 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 several 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. While a substantial amount of data on exposures and health effects in the cohort of 14,000 WTC workers has been collected, limited resources are available for data analysis and research.
- Ergonomic Risk Factors and Musculoskeletal Disorders. Faculty at NYU (Dr. Sheikhzadeh), NJIT (Dr. Sengupta) and Mt. Sinai and their students are conducting studies on ergonomics, biomechanics and risk of 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.

4. 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 Director: Dr. Jack Caravanos, Hunter College.
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

Mount Sinai hired Laura Rothenberg, MS, a graduate of the Hunter College Environmental and Occupational Health and Safety program to be the NORA program research assistant at 30% FTE. In addition, Dr. Landsbergis developed and circulated 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 Morland, PhD). The cancer incidence study data collection and preliminary data analysis was completed. There is an increased incidence of skin cancer among dockbuilders with both sun exposure and creosote exposure. The Creosote Intervention Project has received additional funding to recruit an additional ten subjects, and these data will be merged with those already collected. Once completed, a final report will be generated. We anticipate completion of the project by October 2007.

Public Health Preparedness (Michael Gochfeld, MD (faculty), Anthony Grippo MD (resident)). UMDNJ conducts training programs on public health preparedness, particularly biopreparedness. Training brings heightened awareness, enhances response effectiveness and builds confidence, but also drains resources and strains other systems. Current research focuses on the impact of preparedness training on trainees, with followup evaluation planned for case studies. The second phase of the project, begun in 2005-2006, involves evaluation of emergency room preparedness, particularly with respect to decontamination facilities. A survey of 12 emergency facilities in northern and central New Jersey is underway to ascertain whether specialized decontamination structures exist, to identify protocols and criteria for decontamination, and to determine whether facilities have been used in emergencies or tested in drills. Preliminary results from phase I will be presented by Dr. Gochfeld at the State-of-the-Art Conference (SOTAC) of the American College of Occupational and Environmental Medicine (ACOEM), “Dealing With Disasters: Readiness, Response and Rebuilding”, New York City, October 20-22, 2006.

Diesel Exhaust and Stress. 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. No results are available to report at this time.

Shoulder and Scapula Kinematics. Dr. Sheikhzadeh initiated two research projects with the Dept. of Orthopaedic Surgery, NYU-Hospital for Joint Diseases, which had significant trainee involvement. In response to a request from the attending shoulder surgeon, a pilot project was initiated to provide detailed kinematic analysis of the shoulder and scapula during daily living activities and full range of motion. Two NORA funded students, Elizabet Kardos and Vivek Pinto, participated in literature reviews, study design and execution, and the pilot project report during 05-06. The project has been expanded to study 120 patients with Shoulder Impingement, Rotator Cuff Tear and Shoulder Arthroplasty.

Work Organization, Ergonomics and Health (Paul Landsbergis, PhD). Dr. Landsbergis shared a data set he recently collected on ergonomics and musculoskeletal disorders among hospital workers. Three ERC members expressed interest in analyzing this data set as a way of providing research training for their graduate students. Dr. Rudi Hiebert of NYU began analysis of this data set in consultation with Dr. Landsbergis. Dr. Landsbergis and colleagues also presented the results of recent analyses of job stress and ambulatory blood pressure among health care workers at three conferences in the U.S. and one in Italy (see Appendix D). Finally, Dr. Landsbergis has been preparing new research proposals, which can provide research training opportunities for ERC graduate students. In 2005, as PI, he submitted an R01 proposal to NIOSH on work organization and worker health. The proposal was scored, but not funded, and is being revised for resubmission. In addition, he is a Co-Investigator on additional proposals: work stress and breast cancer among health care workers; 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 2005. 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, Sengupta and Landsbergis. Seven students from the ERC member institutions enrolled in the course.

Dr. Caravanos of Hunter College was Course Director for the Environmental and Occupational Site Visit and Industrial Processes Course, conducted February-April 2006. 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).

Dr. Golden assisted Mt. Sinai resident Winston Kwa, MD on data analysis and report generation for the Transit Workers Union Creosote Project. NORA funded Hunter College students David Olton and Jagdharry Muneshwar are beginning their capstone projects so their theses have not been completed

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

Hunter College hired an adjunct assistant professor (Michael Bonchonsky, JD, MS) for Fall 2005 and Spring and Summer 2006) to assist Dr. Susan Klitzman, EOHS Internship Coordinator, in working with MS and MPH students to carry out their research and capstone projects on NORA-related subjects. Partial scholarship support (through NORA) was provided to Hunter students David Olton and Muneshwar Jagdharry. In addition, the following research methods courses were taught during 2005-06:

Introduction to Epidemiology P400 (Mt. Sinai, Dr. Moreland)
Research Methods P020 (Mt. Sinai, Dr. Bussell)
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 (CE) 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 2006. This course is broadcast from Hunter College and viewed live from 3 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 also conducted an interactive video (VTEL) seminar on September 19, 2005, led by Jeffrey P. Kahn, MD, and titled "Workplace Psychopharmacology". Twenty six physicians were present at Mount Sinai and an additional 18 physicians participated from 4 remote locations, including Piscataway, NJ, Buffalo, NY, Syracuse, NY and Rochester, NY.

To reach a broader audience, the ERC is in the process of developing an on-line, on-demand course that would be open to the public. This course contains power point slides, streaming video, audio, and a graded quiz. Upon completion of the quiz, the participants will receive a course completion certificate and CE credits. The use of Anystreams Apreso Classroom software and hardware enables the NYNJ-ERC to more easily inform, educate and track student learning and access to our programs. The system also enables the center to quickly share information given in lecture format utilizing Adobe's Flash technology; converting all elements on the desktop screen to Shockwave Flash and any video elements to Flash Video. Both of these formats are the best and most widely compatible currently available to all major platforms (Windows, Macintosh, Linux) and all major web browsers.

Anystream Apreso Classroom is a SCORM compliant system, meaning it will flawlessly interface with any major Learning Management System (LMS). Our center has WebCT available, but BlackBoard and others are also compatible. The use of an LMS enables our center to offer on-line courses with secure on-line testing to ensure users meet the intended goals and objectives in learning materials and comprehension before a certificate is generated. The system also keeps a record of every user for tracking and demographic purposes.

Finally, the ERC conducted an Environmental and Occupational Site Visit tour in June 2006. The CE program utilized NORA funds to document the tour and is creating a learning module that introduces workplace safety and health issues to a broader audience and helps to enhance enrollment in our graduate and continuing education programs.

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 Ryan Brown completed his MS thesis, “Do industrial back support belts reduce stress in asymmetric lifting?” NJIT student Jason Williams is working on a MS thesis that evaluates the effect of height of the glove box arm ports on the efficiency of task performance and physiological costs of work for the glove box users.

4. Faculty honors, awards, appointments

Dr. Caravanos was awarded the Hunter College “President’s Award for Excellence in Teaching”

5. New faculty positions

Hunter College was the recipient of a new faculty line for expanding expertise in urban air resources. A comprehensive search was conducted and Dr. Jennifer Richmond-Bryant was selected. Dr. Richmond-Bryant is a recent graduate of the University of North Carolina–Chapel Hill and has done extensive indoor and outdoor air modeling work for the US Environmental Protection Agency. She will be teaching various courses including Industrial Ventilation and Physical Hazard Assessment (Noise and Radiation).

6. New research methods courses

None. Extensive research methods courses already exist.

7. Trainee recruitment including diversity efforts

The Hunter College EOHS advisory board produced an extensive recruitment plan in May 2006 and EOHS faculty met to discuss implementation. Faculty continue to visit local colleges, universities and professional associations to discuss opportunities in Environmental and Occupational Health Sciences.

E. Program Products

1. Summary of publications and presentations of program faculty and trainees
Appendix D lists publications by Drs. Caravanos and Klitzman and two of their trainees, a report by Drs. Golden and Moline and one of their trainees, and conference presentations by Dr. Landsbergis.
2. Conferences/symposia sponsored: Annual ERC Region II conference (April 2006)
3. CE courses presented: Workplace Psychopharmacology
4. Successful R2P projects: None
5. Research projects completed having significant trainee involvement
Industrial Back Belts, Ryan Brown, NJIT
In addition, the following ongoing projects had significant trainee involvement in 2005-06:
Evaluation of Emergency Room Biopreparedness, Diesel Exhaust and Stress, Anthony Grippo, UMDNJ.
Shoulder and Scapula Kinematics, Elizabeth Kardos and Vivek Pinto, NYU
Height of Glove Box Arm Ports, Jason Williams, NJIT
6. Unique training courses presented
Interdisciplinary Occupational Health and Safety Seminar (Fall)
Interdisciplinary Environmental and Occupational Site Visit and Industrial Processes Course (Spring)

F. Future Plans (for July 1, 2006-June 30, 2007)

- Dr. Morland will continue to be the Course Director for the ERC Interdisciplinary Seminar (fall 2006)
- UMDNJ will videoconference the Interdisciplinary Site Visit Course in spring 2007, 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.
- In 2007, there will be an additional ½ day at the Annual ERC Conference for the purpose of NORA faculty and student research presentations.
- NYU-ERBI PhD candidate, J. Yoon, and ERBI-NORA funded students are expected to collect data for the study of "Shoulder and Scapula Kinematics" during 06-07.
- 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.
- Preparation of new research proposals:
  - On July 28, 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)
  - On October 31, 2006, Mt. Sinai will submit an R01 proposal to NIOSH for a study on work organization and worker health, focused on the health care industry (Landsbergis, Mt. Sinai, PI)
  - Mt. Sinai will prepare a proposal to NIOSH to evaluate the impact of the New York City ergonomic standard (Landsbergis, Mt. Sinai, PI; Cone, Gillespie, Mt. Sinai, co-I)

- Mt. Sinai will prepare a proposal to study the health effects of exposure to respiratory hazards and psychological trauma among World Trade Center workers (Moline, Mt. Sinai, PI; Herbert, Stellman, Mt. Sinai, co-I).

APPENDICES

1. Hunter – Industrial Hygiene
Appendix A, B and C

2. Mount Sinai - Occupational Medicine Residency Program
Appendix A, B, C and D

3. UMDNJ – Occupational Medicine
Appendix B and C

4. NJIT – Occupational Safety and Health
Appendix B

5. NYU – Ergonomics and Biomechanics
Appendix B, C, D, E, F

6. Mount Sinai – Center Admin
Appendix A and B

7. UMDNJ – Continuing Education/Outreach
Appendix B

8. Hunter – Hazardous Substances Academic Training
Appendix A, B and C

9. Mount Sinai – Pilot Project Program
Appendix A

10. Mount Sinai – NORA
Appendix C

1. Hunter – Industrial Hygiene

Appendix A: Curriculum and selected course outlines

Master of Science EOHS*	**Master of Public Health EOHS***
(ABET accreditation)	(CEPH accreditation)
Admission Requirements	**Admission Requirements**
Minimum B minus overall and B in major (ie science)	18 cr college level science
GRE - acceptable score	Minimum B- overall and B in major (ie science)
TOEFL Exam	Graduate Record Exam (GRE)
40 credits of science & math	TOEFL Exam
	1 year experience in public health or related field
Required MS (urban) Core 15 credits	**Required MPH (urban) Core 18 credits**
PH 700 Biostatistics	PH 700-Biostatistics
PH 701 Health Administration	PH 701-Health Administration
PH 702 Env Health & Safety	PH 702 Env Health & Safety
PH 703 Epidemiology	PH 703-Epidemiology
PH 710 or PH 740 (Hlth Promtn or Public Hlth Policy)	PH 710-Health Promotion
	PH 740-Publc Hlth Policy
Required MS EOHS Core 25 credits	**Required MPH EOHS Core 18 credits**
EOHS 702 Occupational Health & Safety	EOHS 702 Occu. Health & Safety
EOHS 741 Environmental / Ind. Hygiene Lab (4 cr.)	EOHS 705 Environmental Chemistry
EOHS 754 Env. & Occup. Toxicology	EOHS 754 Env. & Occup. Toxicology
EOHS 755 Industrial Ventilation	EOHS 747 Hzd Evaluation & Instrumentation
EOHS 757 Industrial Hygiene	EOHS 760 EOHS Internship / Capstone
EOHS 759 Industrial Processes and Site Visits	EOHS 765 Env Audits and Remediation
EOHS 760 Supervised Fieldwork (IH Project)	
EOHS 762 Noise and Radiation Hazards and Controls	
Electives 8 credits	**Electives 12 credits**
Comprehensive Exam --	
TOTAL CREDITS - 48 credits	**TOTAL CREDITS - 48 credits**

All required courses are offered at least annually, and most required public health courses (PH designation) are offered every semester.

PRINCIPLES OF INDUSTRIAL HYGIENE

EOHS 757

Spring Semester, 2006 — Wed. 6:05 - 7:50
Prof. Mark Goldberg — Tel: 481-7555
Office: 1016
Office Hours: Wed. 4-5:45 — email: agoldber@hunter.cuny.edu

Texts

Jack Caravanos, Quantitative Industrial Hygiene: A Formula Workbook, ACGIH.

Barbara A. Plog, ed., Fundamentals of Industrial Hygiene, 5th edition, National Safety Council

COURSE OUTLINE

Session	Date	Topic
1	2/1	Introduction and Review. Definitions/History. Role of the Industrial Hygienist. Occupational Health Standards and Regulations. Hazard Recognition. ACGIH TLV's/BEI's. NSC, pp.135-144; Chap. 28; Appendix B pp. 919-932, 967-970.
2	2/8	Exposure Assessment I: Measurements. Introduction. Sampling Gases and Vapors: General Principles. Air Sampling Instruments: Calibration; NSC, Part 4 (Chaps. 15, 16, 17). QIH, Sec. 1: 6,8,11,13,16,17,26.
3	2/15	Air Sampling Instruments, cont. Aerosols: Properties and Behavior; Filtration; Size Selective Sampling; Inertial and Gravitational Collectors.
4	2/22	Direct Reading Instruments/Real Time Monitoring: Principles and Applications QIH, Sec. 2: 1-8, 13, 15, 20-25. Title of article due
5	3/1	Exposure Assessment II: Rationale and Strategies Compliance vs. Epidemiology. Sampling Strategies. Statistical Considerations. NSC, Ch. 15; Handouts QIH, sec. 7: 3, 5, 9, 10, 13, 14, 15 *Summary of Introduction and Sampling Methods (2)*
6	3/8	Exposure Assessment II, cont. *Assignment to be handed out*
7	3/15	Exposure Assessment, Calculations, Review *Summary of statistical methods (1)*
8	3/22	Test 1
9	3/29	Test 1 Review Other Tools for Assessment of the Work Place Environment. Walkthrough Surveys. Handouts. *Summary of results (2)*
10	4/5	Control of Chemical Hazards: Introduction. NSC, Ch. 18 Toxic Use Reduction (Hand out)
	4/12, 19	Spring Recess
11	4/26	Personal Protective Equipment. NSC, Ch. 22 Respiratory Protection, NSC Chap 12. *Summary of controls recommended (1)*
12	5/3	Respiratory Protection, cont. Reading the OSHA Respirator Standard, 1910.134. Summary of Discussion (2)
13	5/10	Physical Hazards in the Workplace: Hazard Recognition, Chemical vs. Physical hazards. Heat Stress: Physiology of Heat Stress;

		Calculations: QIH, Sec. 6, #1-9. *Assessment of article (2)*
14	5/17	Review.
15	5/24	Test 2

Educational Objectives:

This course should enable the student to:

1. Understand and apply the basic principles of industrial hygiene, including those underlying the recognition, evaluation and control of chemical and physical hazards found in occupational environments.
2. Describe the principles, calibration and operation of the basic instrumentation employed for sampling the work environment for airborne contaminants, including instruments designed to collect integrated and short-term samples, direct reading instruments, and real-time monitoring devices.
3. Select the appropriate parameters, including sampling media, for sample collection, based on standard (NIOSH, OSHA) methods.
4. Perform industrial hygiene calculations necessary for quantification of variable effecting the work environment.
5. Describe the various approaches to designing sampling strategies, including compliance, epidemiological studies, and sampling campaigns, and be able to design a simple sampling strategy based upon statistical considerations.
6. Describe the hierarchy of controls and apply it to specific occupational environments, including recent developments in toxic use reduction.
7. Understand the basic principles and measuring techniques involved in assessment of local exhaust and dilution ventilation systems.
8. Describe the basic principles of noise and heat stress, the basis for the standards and regulations developed for them, and the instrumentation employed in assessing them in occupational environments.
9. Use industrial hygiene resource materials, including peer-reviewed journals and documents from government and consensus organization to research an occupational health hazard and present the findings in a comprehensive, cohesive paper.

Program Outcomes:

This course will contribute to the students overall ability to:

1. Apply knowledge of math, science and engineering related applied sciences.
2. Design and conduct experiments, as well as to analyze and interpret data.
3. Function on multi-disciplinary teams
4. Identify and solve engineering-related problems
5. Acquire the broad education necessary to understand the impact of solutions in a global and societal context.
6. Use the techniques, skills, and modern scientific and technical tools necessary for professional practice.

Grading:

Exam 1: 45%; Exam 2: 40%; Reports: 10%; Calculations and Assignment: 5.

EOHS 759 Industrial Site Visits
Spring 2006

Time and place: Mondays, 8:00—9:45 PM, Brookdale Campus Room E102

Instructor: Jen Richmond-Bryant Office: 1027W
Office phone: (212) 481-7580 Cell phone: (919) 360-1466
Email: jrichmon@hunter.cuny.edu

Office Hours: Mondays, 4:00—5:50 PM. Note: students are welcome to visit my office at any time. Office hours are times when I guarantee that I will be in my office.
Additionally, given that many students in the class work during the day, I will be happy to meet students by appointment at their work or at some central location during lunchtime to answer questions (within Manhattan). Please notify me of your work location, telephone number(s) and email address(es) to facilitate this.

Text and Course Materials:
Required:
Burgess. (1995) *Recognition of Health Hazards in Industry: A Review of Materials and Processes, 2nd Edition.* New York: John Wiley & Sons.
Additional materials will be made available on-line or in class.

Course Requirements and Grading:
There will be five industrial site visits, of which you are responsible to attend and report on ***at least three***. Additionally, you will be asked to visit at least one site independently and report upon it. You must submit at least ***five*** reports, which will each count towards 20% of your grade. If you want to submit more than five reports, then the five with the highest grades will count towards your final grade for the class. There will be no mid-term or final examination.

Course Objectives:
1) Become familiar with various industrial processes and occupational hazards.
2) Learn to recognize occupational hazards.
3) Learn to perform and report upon site inspections.

Important Notes:
1) You are required to sign up for Blackboard (Hunter's electronic course information system) by Monday 2/6 so that you can retrieve course materials and announcements.
2) PowerPoint lecture notes will be available for download on Blackboard at least 24 hours prior to class. You are responsible for printing out a copy of the notes &bringing them to class.
3) You are responsible for all lecture and written material covered in class, even if you miss a class.
4) Reports are due two weeks after a site visit.
5) It is ***highly*** recommended that site visits are spread out through the semester, and not lumped together at the end.
6) If you have an emergency and need to miss class or a deadline, please contact me by email or telephone to catch up on material and facilitate submission of assignments.
7) ***Apparel***: You must wear closed-toe shoes (no sandals)! Clothes can become soiled, so do not wear anything you cannot part with. Some plants have very sensitive chemical processes. Avoid wearing perfumes or make-up in certain cases.

COURSE OUTLINE

Day	Date	Topic	Assigned Reading*
			*additional readings may be assigned throughout the semester
Mon	1/30	Introduction; Elements of a site visit	Burgess, Ch. 1
Mon	2/6	Lead-acid battery manufacturing;	Burgess, Ch. 24
		Power Battery Site pre-briefing	
Wed	***2/8***	***SITE VISIT: POWER BATTERY***	
Mon	2/13	NO CLASS—LINCOLN'S BIRTHDAY	
Mon	2/20	NO CLASS—PRESIDENTS' DAY	
Tues	2/21	Power Battery Site de-briefing;	
		Pharmaceuticals; Pfizer pre-briefing	Handout
CLASSES FOLLOW MONDAY SCHEDULE			
Wed	***2/22***	***SITE VISIT: PFIZER***	
Mon	2/27	Pfizer de-briefing	
		Metals cleaning and degreasing	Burgess, Ch. 4 & 5
Mon	3/6	Metals grinding and electroplating	Burgess, Ch. 6 & 13
		Printing; NY Times Printing Plant pre-briefing	Handout
Wed	***3/8***	***SITE VISIT: NY TIMES PRINTING PLANT***	
Mon	3/13	NY Times Printing Plant de-briefing;	
		Metals machining and welding	Burgess, Ch. 9 & 10
Mon	3/20	Hospitals and health care	Handout
		NYU Hospitals pre-briefing	
Wed	***3/22***	***SITE VISIT: NYU HOSPITAL***	
Mon	3/27	NYU Hospital de-briefing;	
		Paint manufacturing	Burgess, Ch. 20
Mon	4/3	Painting;	Burgess, Ch. 15
		Dry cleaning	Handout
INDEPENDENT SITE VISIT TO A LOCAL DRY CLEANER			
Mon	4/10	Dry cleaner de-briefing; Automotive repairs	Handout
INDEPENDENT SITE VISIT TO A LOCAL MECHANIC			
Mon	4/17	NO CLASS—SPRING BREAK	
Mon	4/24	Mechanic de-briefing;	
		Construction health and safety;	Handout
INDEPENDENT SITE VISIT TO VIEW A CONSTRUCTION SITE (FROM OUTSIDE THE SITE)			
Mon	5/1	Construction site de-briefing;	
		Waste management ;	Handout
		Hazardous waste site pre-briefing	
SITE VISIT: HAZARDOUS WASTE SITE			
Mon	5/8	Waste site de-briefing;	
		Office work and ergonomics	Handout
INDEPENDENT SITE VISIT TO OBSERVE OFFICE WORKERS			
Mon	5/15	Office work de-briefing; class wrap-up	
Mon	5/22	NO CLASS	

Appendix B. Tables 4a. and 13

[ ] Program

Center Director:

ERC Applicant Institution: Hunter College
Program Director: J. Caravanos
Discipline: IH Program (year 1 of 5)

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1]	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Master's degree							
MS - EOHS - IH	Master of Science - Environmental and Occupational Health Sciences	8	6	10	4	17 (non-degree)	8

Refer to: Supplemental Instructions, page 8.

[1] Trainee counts include all students in the approved programs.

[2] Does not include trainees counted in any of the full-time or part-time categories

Page

Table 4a

ERC Applicant Institution: Hunter College
Program Director: J. Caravanos
Discipline: IH and HSAT* (Combined--A single admissions process)

Table 13
Minority Recruitment Data[1]
Since Beginning of Current Project Period

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
Year 1: July 1, 2005 to June 30, 2006						
10	9	7	A	in attendance	NIOSH	NA
			B	in attendance	NIOSH	NA
			C	in attendance	NIOSH	NA
			D	in attendance	private	NA
			E	in attendance	private	NA
			F	in attendance	private	NA
			G	in attendance	private	NA

Refer to: Supplemental Instructions, page 11.

[1] First three columns are a group total; last four columns refer to individual trainees.

Appendix C. Faculty Publications (2005-2006)

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, 2006

S. Klitzman, J. Caravanos, C. Belanoff, L. Rothenberg; A multi-hazard, multi-strategy approach to home remediation. Environmental Research, Vol 99(3):294-306. Nov. 2005

S. Klitzman, J. Caravanos, D. Deitcher, L. Rothenberg, C. Belanoff, R. Kramer, L Cohen,; Prevalence and Predictors of Residential Health Hazards: Results of a Pilot Study. Journal of Occupational and Environmental Hygiene, 2: 293-301; June 2005

J. Greenbaum and D. Kotelchuck, "Got Air? The Struggle for Improved Indoor Air Quality at the City University of New York", Chapter in Safety First? The Politics of Occupational Safety and Health in a Deregulated World, Vernon Mogenson, Editor, M.E. Sharpe Publishers (2006).

P. Landrigan, P. Grandjean and D. Kotelchuck, "Principles for Prevention of the Toxicity of Metals", Chapter in Handbook on the Toxicology of Metals (2nd edtn.), S. Hernberg, Editor (2006 – in press).

Richmond-Bryant, J., Eisner, A.D., Flynn, M.R. "Considerations for modeling particle entrainment into the wake of a circular cylinder." Aerosol Science & Technology. 40: 42-51(2006)

2. Mount Sinai Occupational Medicine Residency Program

Appendix A. Program Curriculum, Sample Course Curricula and Measures of Effectiveness

Program curriculum: The academic program curriculum for the MPH can be viewed at http://www.mssm.edu/cpm/mph/archive_curriculum_guide.shtml

A sample schedule for the OEM residents' academic courses is shown below.

Year 1		
Fall Semester	**Winter Semester**	**Spring Semester**
Env & Occup Medicine	Behavioral Medicine	Env & Occup Medicine
Introduction to Data Management	Multivariable Methods	Culture, Health & Illness
Introduction to Epidemiology	Developing the Thesis Proposal	Infectious Disease Epidemiology
Introduction to Biostatistics		
Clinical Research & Policy Analysis	Elective	Clinical Preventive Medicine
HCO: Med Econ, Organiz Mgmt		HCO: Organiz Mgmt, Health planning
Interdisciplinary Seminar		Principles of Industrial Hygiene
		Industrial Processes and Site Visits (ERC)

Year 2		
Fall Semester	**Winter Semester**	**Spring Semester**
Env & Occup Medicine	Case Studies in EOM	Env & Occup Medicine
HCO: Decision Theory, Cost-Effectiveness	Health Care in Communities & the Public Sector	Management of Organizations
Master's Thesis	Introduction to Qualitative Research Methods	HCO: Health Care Quality Measures
Elective	Master's Thesis	Master's Thesis

Sample course curricula:

ENVIRONMENTAL & OCCUPATIONAL MEDICINE P521
Environmental and occupational exposures known to cause human disease are examined from the perspectives of clinical diagnosis, toxicology, and treatment. Regulatory and other approaches to reduce exposure will be deliberated. Important public health and policy implications will be discussed. This course is limited to currently licensed physicians. (Wednesdays, 4pm – 5.30pm 2 credits)

P521 (Core OEM Requirement)
Clinical Occupational and Environmental Medicine
Fall 2005
Jacqueline Moline, MD, MSc

Learning Objectives: The goal of this course is to teach fundamental concepts in Occupational and Environmental Medicine. The course is conducted over four-semesters, with each semester covering related topics.

Fall 2005 covers occupational pulmonary disease, including asbestos-related diseases, pneumoconioses, lung irritants, byssinosis and asthma, hypersensitivity pneumonitis, as well as cardiac disease and stress, and noise-induced hearing loss.

Evaluation will be based on a take-home mid-term (33%) and final examination (67%).

The learning objectives of this semester are to:
- Understand the basic principles of occupational pulmonary disease.

- Understand the disease processes related to asbestos exposure, including cancer, pulmonary fibrosis and pleural disease.
- Understand which dusts cause pneumoconiosis, and how they are typically diagnosed and
- treated.
- Understand which chemicals are pulmonary irritants and the ways in which the lung might be
- affected.
- Understand the pathophysiology and etiologies of bysinossis and occupational asthma.
- Understand the causes and treatment for hypersensitivity pneumonitis.
- Understand the occupational factors that can contribute to cardiac disease, and the impact of
- work-related stress on workers.

Course Objective: The goal of this course is to teach fundamental concepts in Occupational and Environmental Medicine. The course is conducted over four-semesters, with each semester covering related topics.

Textbook: Textbook of Clinical Occupational and Environmental Medicine, Second Edition; Linda Rosenstock, Mark Cullen, Carl Brodkin and Carrie Redlich, eds. Reading assignments noted weekly.

September 14 Asbestos-Related Disease J. Moline, MD, MSc
pp. 364-379
September 21 Health Effects Related to the WTC Disaster R. de la Hoz, MD, MPH
Prezant DJ, et.al. Cough and Bronchial Responsiveness in Firefighters at the World Trade Center Site. N Engl J Med 2002;347:806-815.
September 28 Coal Workers Pneumoconiosis/Silicosis J. Szeinuk, MD, MSc
pp. 380-407
October 5 Hypersensitivity Pneumonitis/Byssinosis N. Schachter, MD
pp. 309-322, 346-356
October 12 Occupational Cancer A. Afilaka, MD, MSc
pp. 727-743 (optional 744-824)
October 19 Medicolegal Aspects S. Levin, MD
pp. 1237-1246
October 26 Work-Related Stress P. Landsbergis, PhD
pp. 931-942
Landsbergis P. (2003). "The changing organization of work and the health and safety of working people: A commentary." Journal of Occupational and Environmental Medicine **45** (1): 61-72.
Belkic K., P. Schnall, et al. (2000). "The workplace and cardiovascular health: Conclusion and thoughts for a future agenda." Occupational Medicine: State of the Art Reviews **15** (1): 307-322.
November 2 Occupational Asthma J. Szeinuk, MD, MSc
pp. 293-308
November 9 Beryllium Disease/Welding/ J. Szeinuk, MD, MSc
Other Pneumoconises
pp. 357-363
November 16 Pathology of Occupational Lung Disease D. Zhang, MD, PhD, MPH
TBA
November 23 No Class
November 30 Final
Additional Recommended Readings:
WKC Morgan, NL Lapp. Respiratory Disease in Coal Miners. Am Rev Respir Dis, 1976; 113: 531-559.

****

JOURNAL CLUB P401 (OEM Core)

The Journal Club provides students with a functional opportunity to learn to read, analyze, and critique the professional literature under the guidance of a variety of faculty members from the Mount Sinai Medical

Center. At least one week before each scheduled Club meeting, the invited faculty member selects a current article from the public health literature. The faculty member serves as discussion moderator and students attend class prepared to discuss the assigned reading. In the Winter and Spring Terms, students will have a role in selecting the topics to be discussed.

****

PROFESSIONALISM & ETHICAL ISSUES IN CLINICAL RESEARCH P211 (OEM elective)

This course addresses the key issues related the use of human subjects in biomedical research. It involves seminar discussion, extensive reading, and two short research papers. Topics include: the evolution of clinical

trial oversight, informed consent, assent, assessment of risks and benefits, research design, research with minors and other vulnerable subjects, inducements for research subjects, conflict of interest, payments for researchers, confidentiality, privacy, scientific fraud, and whistle blowing. The seminar uses historical examples as well as contemporary dilemmas such as surgical trials, gene therapy trials, and international research. It also explains the IRB & GCRC review processes.

PROFESSIONALISM & ETHICAL ISSUES IN CLINICAL RESEARCH

MSSM: CLR 510 CUNY: MALS 74300, code #7946
Syllabus: 2006 Monday 5:00-6:30 p.m., Atran/Berg 1-31
September 11- December 18, 2006
Faculty: Karin Meyers & Rosamond Rhodes
Readings available at: http://webed.mssm.edu

Objectives

By the end of this course participants should be able to:

- Refer to the historical evolution of research ethics and the development of protections for human subjects.
- Identify and employ the guiding principles of research ethics.
- Evaluate clinical studies in terms of ethical considerations.
- Review the research ethics literature and use it in addressing questions related to clinical research.
- Justify decisions about the ethical conduct of research in terms of reasons that other reasonable clinicians could accept.

This course is intended as a graduate seminar. The readings listed were selected a) to provide a framework for understanding the central issues of ethics and professionalism that arise in the conduct of clinical research and b) to serve as a basis for further research on these topics. Seminar participants are expected to prepare for discussions by reading the listed materials. Because of the limited time allowed for seminar meetings, it is likely that we will not have an opportunity to discuss every reading.

9/11 Justification and Justice in Human Subject Research

Hans Jonas, "Philosophical Reflections on Experimenting with Human Subjects"@ 1969 chapter in Paul A. Freund (editor) *Experimentation with Human Subjects*, American Academy of Arts and Sciences: 105-31.

Jay Katz, Alexander M. Capron and Eleanor Swift Glass, "Some Basic Questions About Human Research"@ 1972 *The Hastings Center Report* 2(6): 1-3.

Thomas C. Chalmers, "Ethical Aspects of Clinical Trials"@ 1975 *American Journal of Ophthalmology* 79(5): 753-58.

Steven D. Pearson, Franklin G. Miller, Ezekiel J. Emanuel, "Medicare's Requirement for Research Participation as a Condition of Coverage: Is it Ethical?"@ 2006 *JAMA* 296(8): 988-90.
Ruth Macklin, Reversing the Presumption: The IOM Report on Women in Health Research@ 1994 *JAMWA* 49(4): 113-16, 121.
Marcia Angell, Evaluating the Health of Breast Implants@ 1996 *NEJM* 334(23): 1513-8

9/18 Historical Abuses of Human Subjects

Robert L. Berger, "Nazi Science: The Dachau Hypothermia Experiments"@ 1990 *NEJM* 322(20): 1435-40.
Todd L. Savitt, "The Use of Blacks for Medical Experimentation and Demonstration in the Old South" 1982 *The Journal of Southern History* 48(Aug): 331-48.
Sheldon H. Harris, "Factories of Death: Japanese Biological Warfare, 1932-45, and the American Cover-Up,"@ 1992 Routledge.
Advisory Committee on Human Radiation Experiments, "Final Report: The Manhattan District Experiments"@ 1995 U S Government Printing Office: 240-52.
Gregory E. Pence, "Development of the Tuskegee Case"@ 1995 in *Classic Cases in Medical Ethics*, second edition, McGraw-Hill: 235-241.
David J. Rothman and Sheila M. Rothman, "The Willowbrook Hepatitis Experiments"@ 2003 in Bonnie Steinbock et al. (editors) *Ethical Issues in Modern Medicine*, 6th ed., McGraw-Hill: 717-21.
Henry K. Beecher, "Ethics and Clinical Research"@1966 *NEJM* 274(24): 1354-60.

9/25 Evolution of Clinical Trial Oversight

The Nuremberg Code http://www.hhs.gov/ohrp/references/nurcode.htm
The Belmont Report: "Ethical Principles and Guidelines for the Protection of Human Subjects of Research" http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.htm
Federal Regulations Regarding the Protection of Human Subjects of Research [Common Rule] http://pw1.netcom.com/~alalli/BillSite_Documents/CommonRule.html
World Medical Association Declaration of Helsinki (2002) http://www.wma.net/e/policy/b3.htm
Jay Katz, "The Nuremberg Code and the Nuremberg Trial: A Reappraisal"@ 1996 *JAMA* 276(20): 1662-66.
Tom Beauchamp, "The Legacy and the Future: 30 years after the Belmont Report Protecting Human Subjects"@2004 http://www.science.doe.gov/ober/humsubj/summer04.pdf

10/2 No Class - Yom Kippur

10/9 Research Design

Arthur Schafer, "The Ethics of Randomized Clinical Trials"@ 1982 *NEJM*, 307(12):719-24.
Benjamin Freedman, "Equipoise and the Ethics of Clinical Research"@ 1987 *NEJM*. 317:141-45.
Robert Temple & Susan S. Ellenberg, "Placebo-Controlled Trials and Active-Control Trials in the Evaluation of New Treatments: Part 1B Ethical Issues"@ 2000 *Medicine and Public Issues*, 133(6):455-63.
Franklin G. Miller & Howard Brody, "What Makes Placebo-Controlled Trials Unethical?"@ 2002 *AJOB* 2(2): 3-9.
Robert J. Levine, "Placebo Controls in Clinical Trials of New Therapies for Conditions for which there are Known Effective Treatments"@ 2002 chapter in Guess HA, et al. (editors) *The Science of the Placebo: Toward an Interdisciplinary Research Agenda*, BMJ Books: London.
Thomas B. Freeman et al., "Use of Placebo Surgery in Controlled Trials of Cellular-Based Therapy for Parkinson's Disease"@ 1999 *NEJM*, 341(13): 988-92.
Ruth Macklin, "The Ethical Problem with Sham Surgery in Clinical Research"@1999 *NEJM*, 341(13):992-96.

10/16 Risk-Benefit and the Assessment of Novel Therapies

Douglas K. Martin et al. "The Incommensurability of Research Risks and Benefits: Practical Help for Research Ethics Committees"@ 1995; *IRB*, 17(2):8-10.

Thomas Shannon and Ira S Ockene, "Approving High Risk, Rejecting Low Risk: The Case of Two Cases"@1985 *IRB* 7(1):6-8.

Robert Steinbrook, "How Best to Ventilate? Trial Design and Patient Safety in Studies of the Acute Respiratory Distress Syndrome"@ 2003 *NEJM* 348(14): 1393-1401.

Sheryl Gay Stolberg, "The Biotech Death of Jesse Gelsinger"@ 1999 *New York Times Magazine*, Nov. 28:136-140, 149-150.

Ganesh Suntharalingam *et al*., "Cytokine Storm in a Phase 1 Trial of the Anti-CD28 Monoclonal Antibody TGN1412"@ 2006 *NEJM* 355: 1018-28.

Jeffrey M. Drazen, "Volunteers at Risk"@ 2006 Editorial, *NEJM* 355:1060-1.

Elliot Marshall, "Lessons from a Failed Drug Trial"@ 2006 *Science* 313: 901.

10/23 Informed Consent

Alan Donagan, "Informed Consent in Therapy and Experimentation"@ 1977 *The Journal of Medicine and Philosophy*, 2(4): 310-327

Franz J. Ingelfinger, "Informed (but Uneducated) Consent"@ 1972 *NEJM* 287: 465-66.

Lynn A. Jansen, "The Problem with Optimism in Clinical Trials"@ 2006 *IRB* 28(4): 13-19.

Razelle Kurzrock and Robert S. Benjamin, "Risks and Benefits of Phase 1 Oncology Trials, Revisited"@ 2005 *NEJM* 352(9): 930-31.

George Robinson and Avraham Merav, "Informed Consent: Recall by Patients Tested Postoperatively"@ 1976 *Annals of Thoracic Surgery*, 22(3): 209-12.

Ruth Barcan Marcus et al. Letters: "Uninformed Consent"@ 1979 *Science* 205:644, 646-47.

Robert A. Burt, "The Suppressed Legacy of Nuremberg"@ 1996 *The Hastings Center Report* 26(3): 30

Ana S. Iltis, "Costs to Subjects for Research Participation and the Informed Consent Process: Regulatory and Ethical Considerations"@ 2004 *IRB: Ethics & Human Research*, November-December: 9-13.

10/30 Research with Children: Consent & Assent

Benjamin Freedman, et al., "In Loco Parentis: Minimal Risk as an Ethical Threshold for Research upon Children"@ *The Hastings Center Report* 1993; 23(2): 13-19.

Bruce Gordon et al., "The Use of Normal Children as Participants in Research on Therapy"@ 1996 *IRB*: 5-8.

Loretta Kopelman, "Children as Research Subjects: A Dilemma"@ 2003 *Ethics & Health Care*, 2-7.

OHSR information sheet on Research Involving Children: http://ohsr.od.nih.gov/info/sheet10.html

NIH Policy and Guidelines on the Inclusion of Children as Participants in Research Involving Human Subjects @ 1998. http://grants.nih.gov/grants/guide/notice-files/not98-024.html

AAP Policy Statement on Informed Consent, Parental Permission, and Assent in Pediatric Practice (RE9510), @ 1995: 314-317. http://www.cirp.org/library/ethics/AAP/

Additional DHHS Protections for Children Involved as Subjects in Research: http://www.ithaca.edu/jwiggles/research/informed_consent/consent_forms_examples/dhhs_

Celia B. Fisher and Susan F.Kornetsky, "SACHRP Recommendations for Review of Children's Research Requiring DHHS Secretary's Permission"@2005 *IRB* 27(3): 8-10.

"Concerns over Risk to Pediatric Participants Leads to Study's End"@ 2005, *IRB* 27(6): 61-64.

11/6 Research with Other Vulnerable Subjects

Baruch A. Brody, "Research Involving Vulnerable Subjects"@ 1998 chapter 6 in *The Ethics of Biomedical Research*, Oxford.

Louis C. Charland, "Cynthia's Dilemma: Consenting to Heroin Prescription"@ 2002 *AJOB*, 2(2): 37-47.

Rhodes R. "UnSafe Presumptions in Clinical Research"@ 2002 *AJOB*, 2(2): 49-51.

Norman Poythress, "Obtaining Informed Consent for Research: A model for Use with Participants who are Mentally Ill"@ 2002 (Special Symposium) *Journal of Law Medicine & Ethics* 30(3):367-74.

Ian Urbina, "Panel Suggests Using Inmates in Drug Trials"@ 2006 *New York Times*, August 13:1, 21.

Committee on Ethical Considerations for Revisions to DHHS Regulations for Protection of Prisoners Involved in Research, "Ethical Considerations for Research Involving Prisoners"@ 2006 National Academy of Sciences.

11/13 Research Without Consent & Community Consultation and Notification (Guest speaker: Lynne Richardson, MD)

Michelle H. Biros *et al.*, "Implementing the FDA's Final Rule for Waiver of Informed Consent in Certain Emergency Research Circumstances"@ 1999 *Academic Emergency Medicine* 6(12):1272-82.

Katie B. McClure *et al*., "Attitudes of Emergency Department Patients and Visitors Regarding Emergency Exception from Informed Consent in Resuscitation Research, Community Consultation, and Public Notification"@ 2003 *Academic Emergency Medicine* 10(4): 352-359.

Exceptions from informed consent for studies conducted in emergency settings: http://www.fda.gov/oc/ohrt/irbs/except.html

11/20 Confidentiality and Privacy in Clinical Research

Jennifer L Kelsey, "Privacy and Confidentiality in Epidemiological Research Involving Patients"@ 1981 *IRB* 3(2): 1-4.

Ellen Wright Clayton, "A Panel Comment: Why the Use of Anonymous Samples for Research Matters"@ 1995 *Journal of Law, Medicine & Ethics* 23:375-77.

Beverly Woodward, "Medical Record Confidentiality and Data Collection: Current Dilemmas"@ 1997 *Journal of Law, Medicine & Ethics*, 25: 88-97.

Mark Barnes & Sara Krauss, "The Effects of HIPAA on Human Subject Research"@ 2001 *BNA Health Law Reporter* 10(26):1026-34

George Annas, "HIPPA Regulations: A New Era of Medical-Record Privacy?"@ 2003 *NEJM*, 348(15): 1486-90.

David I. Shalowitz and Franklin G. Miller, "Disclosing Individual Results of Clinical Research"@ 2005 *JAMA* 294(6): 737-40.

11/27 Inducements for Researchers and Research Subjects:

1) Conflict of Interest and Payments for Researchers

Evan G. DeRenzo, "Coercion in the Recruitment and Retention of Human Research Subjects, Pharmaceutical Industry Payments to Physician-Investigators, and the Moral Courage of the IRB"@ 2000 *IRB*, 22(2): 1-5.

NIH Grants Policy Statement, "Part II: Terms and Conditions of NIH Grant Awards, Ethical and Safe Conduct in Science and Organizational Operations"@ http://grants.nih.gov/grants/policy/nihgps/part_ii_2.htm

AAMC Task Force on Financial Conflicts of Interest in Clinical Research, "Protecting Subjects, Preserving Trust, Promoting Progress I: Policy and Guidelines for the Oversight of Individual Financial Interests in Human Subject Research"@ 2003 *Academic Medicine*, 78(2): 225-50.

Karine Morin *et al*, "Managing Conflicts of Interest in the Conduct of Clinical Trials"@ 2002 *JAMA* 287(1)78-84.

Christensen JA and Orlowski JP. "Bounty-Hunting and Finder's Fees"@2005 *IRB* 27(3):16-19.

2) Subject Inducements

Ruth Macklin, "'Due' and 'Undue' Inducements: On Paying Money to Research Subjects"@ 1981 *IRB* 3: 1-6.

Julian Savulescu, "The Fiction of 'Undue Inducement': Why Researchers Should be Allowed to Pay Participants Any Amount of Money for Any Reasonable Research Project"@ 2001 *AJOB* 1(2): online.

Scott D. Halpern et al., "Empirical Assessment of Whether Moderate Payments Are Undue or Unjust Inducements for Participation in Clinical Trials"@ 2004 *Arch Intern Med* 164: 801-3.

Matthew Miller, "Phase I Cancer Trials"@2000 *The Hastings Center Report* 30(4): 34-42.

12/4 The IRB & GCRC Review Process (Guest speaker: Ilene Wilets, Ph.D.)

http://www.hhs.gov/ohrp/policy/hsp_final_rpt.pdf

Including discussion of topics such as IRB rules for: epidemiological research, research that involves access to medical records, surveys, interviews, expedited review.

Baruch A. Brody et al., "A Consensus and Controversy in Clinical Research Ethics"@ 2005 *JAMA* 294(11): 1411-14.

12/11 Contemporary Dilemmas: Tissue Use & Vaccine Development

Rebecca Skloot, "Taking the Least of You"@ 2006 *New York Times Magazine*, April. 16: 38-45, 75, 79-81.

Mark E. Sobel and Sandra R. Wolman, "Ethical Considerations in the Use of Human Tissues in Research"@ 1999 *Cytometry B* 38: 192-3.

Franklin G. Miller and Christine Grady, "The Ethical Challenge of Infection-Inducing Challenge Experiments"@2001 *CID* 33(Oct.1): 1028.

Bernard Lo, "HPV Vaccine and Adolescents' Sexual Activity"@ 2006 *BMJ* 332:1106-7.

12/18 Contemporary Dilemmas: International Research

Marcia Angell, "Editorial: The Ethics of Clinical Research in the Third World"@ 1997 *NEJM* 337: 847-9.

Douglas Lackey, "Clinical Trials in Developing Countries: A Review of the Moral Issues"@2001 *MSJM* 68(1): 4-12.

"ABAC Panel Proposes Rules for Research Abroad"@ 2000 *Science* 2990: 28.

CIOMS, "Ethical Guidelines 10"@2002 http://cioms.ch/frame_guidelines_sept2002.htm

L.H. Glantz *et al*.,"Research in Developing Countries: Taking BenefitsSeriously,"@1998 *The Hastings Center Report* 28(6): 38-42.

David Orentlicher. "Universality and Its Limits"@ 2002 (Special Symposium) *Journal of Law Medicine & Ethics* 30(3): 403-410.

Alex John London, "Justice and the Human Development Approach to International Research,"@2005 *The Hastings Center Report* 35(1): 24-37.

Supplementary Reading:

Arthur L. Caplan, "Is There a Duty to Serve as a Subject in Biomedical Research"@ 1984 *IRB* 6(5): 1-5.

Rhodes R., "Rethinking Research Ethics"@ 2005 *American Journal of Bioethics* 5(1): 7-28.

Assignments:

Seminar Presentation: Each student will commit to a date for serving as "Primary Reviewer(s)" of the assigned readings. As Primary Reviewer the student will be responsible for 1) presenting some of the central issues raised by the articles, and for 2) posing questions to lead a discussion of the material. 1) In your presentation you should be sure to refer to the relevant principles and concepts that have been introduced in the course of the seminar. 2) In leading the discussion you should help the group identify the core dilemma at issue. If two or more students are Primary Reviewers for the same date, they are expected to communicate and agree on how to divide the material for their presentations.

Written Assignments (2-4 pp., typed, double-spaced, 1" margins):

1) Select one paper from those for which you were Primary Reviewer. Write a short commentary on that paper. Include a short summary of the key point that you want to critically engage. **Due one week after your Seminar Presentation.**

2) Select one paper from another topic during the course of the seminar **or** some clinical study, either a study discussed in a seminar reading, a study in the literature or news, or one from your own experience. Provide a critical analysis of the article or case. Be sure to employ the **concepts** studied in the seminar and to refer to some of the relevant **literature** from the syllabus or your own research. If you should choose to discuss an example of clinical research be sure to address the following in your discussion:

a. What is the clinical study that raises this question? (Briefly describe the study.)

b. What question of ethics does this case raise? (Formulate a question, e.g., "Should the researcher . . . ?")

c. Which ethical principles/concepts are relevant to the question?

d. What should the researcher do in this situation? Why? (Provide **reasons** for your conclusion. Be sure to discuss the principles/concepts listed above.)

Due: One paper is due by **November 6th.** The **second** is due by **Dec. 18*th*.**

Rosamond Rhodes, Ph.D., Professor, Medical Education, Director, Bioethics Education
email: rosamond.rhodes@mssm.edu fax: 212-241-5028
phone: 212-241-3757 assistant, Karen Smalls: 212-241-6602

Appendix B. Updated data Tables 4a and 13

[ ] Program

Center Director:

ERC Applicant Institution: Mount Sinai School of Medicine
Program Director:Jacqueline Moline
Discipline: Occupational Medicine Residency

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1]	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
MPH	Masters of Public Health	4	4	0	0	0	2
Doctorate degree							
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.)[3]							
Residency	Occupational Medicine	4	4	0	0	0	2
Other (specify, e.g., undergraduate Certificate program trainees)							

Refer to: Supplemental Instructions, page 10.

[1] Trainee counts include all students in the approved programs.

[2] Does not include trainees counted in any of the full-time or part-time categories

[3] In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

Page

Table 4a

ERC Applicant Institution:Mount Sinai School of Medicine
Program Director: Jacqueline Moline
Discipline: Occupational Medicine Residency

Table 13
Minority Recruitment Data[1]
Previous Budget Period: July 1, 2005 to June 30, 2006

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
7	4	2		graduated	NIOSH	2 at MSSM/staff physician/faculty
		2		in training	NIOSH	still in program

Refer to: Supplemental Instructions, page 13.
[1] First three columns are a group total; last four columns refer to individual trainees.

Appendix C. Faculty Publications (July 2005 -June 2006)

Jacqueline Moline

Simon D, Moline J, Helms G, Friedl T, Bhattacharya D. Divergent histories of rDNA group I introns in the lichen family Physciaceae. J Mol Evol. 2005 Apr; 60(4):434-46.

Piligian G, Szeinuk J, Levin S, Moline J, Milek D, Afilaka A, Wilk-Rivard E. Nonspecific triggers also provoke occupational asthma. Am J Respir Crit Care Med. 2006 Feb 1; 173(3):357.

Moline J., Herbert R., Nguyen N. Health Consequences of the September 11th World Trade Center Attacks: A Review". Cancer Invest. 2006 Apr-May; 24(3):294-301.

Trasande L, Schechter C, Falk R, Graber N, Boscarino J, Dunkel G, Geslani J, Kaplan-Liss E, Moline J, Miller RK, Korfmacher K, Carpenter D, 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. Journal of Urban Health. 2006 Jul;83(4):760-72.

Philip Landrigan

Landrigan P, 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. 2006 (in press).

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 P. Related Articles, Links 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.

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David A. Savitz

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Appendix D. World Trade Center Workshops (2005-2006)

1. 9/7/-05- WTC Health Concerns (English)
2. 10/5/05- Accessing Workers' Compensation & Related Benefits (English)
3. 11/9/05-WTC Health Concerns (English)
4. 11/17/05- Accessing Workers' Compensation & Related Benefits (Spanish)
5. 12/7/05- Accessing Workers' Compensation & Related Benefits (English)
6. January 10, 2006, WTC Health Concerns (English)
7. January 18, 2006, WTC Health Concerns (Spanish)
8. January 19, 2006, WTC Health Concerns (Polish)
9. February 1, 2006, Accessing Workers' Compensation & Related Benefits (Spanish)
10. February 8, 2006, Accessing Workers' Compensation & Related Benefits (Polish)
11. February 15, 2006, Accessing Workers' Compensation & Related Benefits (English)
12. March 14, 2006, WTC Health Concerns (English)

13. March 15, 2006, WTC Health Concerns (Spanish)
14. March 16, 2006, WTC Health Concerns (Polish)
15. April 5, 2006, Accessing Workers' Compensation & Related Benefits (Spanish)
16. April 12, 2006, Accessing Workers' Compensation & Related Benefits (Polish)
17. April 19, 2006, Accessing Workers' Compensation & Related Benefits (English)
18. May 9, 2006, WTC Health Concerns (English)
19. May 17, 2006, WTC Health Concerns (Spanish)
20. May 18, 2006, WTC Health Concerns (Polish)
21. June 21, 2006, Accessing Workers' Compensation & Related Benefits (English)
22. June 7, 2006, Accessing Workers' Compensation & Related Benefits (Spanish)
23. June 14, 2006, Accessing Workers' Compensation & Related Benefits (Polish)

3. UMDNJ - Occupational Medicine

Appendix B Tables 4a and 13

[ ] Program

Center Director:

ERC Applicant Institution: UMDNJ-Robert Wood Johnson Medical School
Program Director: Michael Gochfeld
Discipline: Occupational Medicine

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1]	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
MPH	Master of Public Health	4	3			16	7
Doctorate degree							
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.)[3]							
residents	occupational medicine	4	3				
Other (specify, e.g., undergraduate Certificate program trainees)							

Refer to: Supplemental Instructions, page 10.

[1] Trainee counts include all students in the approved programs.

[2] Does not include trainees counted in any of the full-time or part-time categories

[3] In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

Page

Table 4a

ERC Applicant Institution: UMDNJ-Robert Wood Johnson Medical School
Program Director: Michael Gochfeld
Discipline: Occupational Medicine

Table 13
Minority Recruitment Data[1]
Previous Budget Period: July 1, 2005 to June 30, 2006

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
3	2	1		good standing	NIOSH	still in program

Refer to: Supplemental Instructions, page 13.

[1] First three columns are a group total; last four columns refer to individual trainees.

APPENDIX C. Publications

RESIDENT POSTERS AT MEETINGS:

Damir Mazlagic, MD, MPH: Skin-Test Reactivity to Allergens and Neuropsychological effects Attrib to Indoor Mold Exposure in the workplace: Pilot Study

Julie Caruth, MD, MPH: Seaport Accident Prevention in a Developing Country

FACULTY PUBLICATIONS:

Michael Gochfeld, MD, PhD: Residency Director

Burger, J, Stern, AH, **Gochfeld, M**: Mercury in commercial fish: Optimizing individual choices to reduce risk. Environmental Health Perspectives 113(3), 266-271, 2005.

Gochfeld, M: Chronologic history of occupational medicine. Journal of Occupational and Environmental Medicine 47(2):96-114, 2005.

Gochfeld, M: Occupational medicine practice in the United States since the industrial revolution. Journal of Occupational and Environmental Medicine 47(2):115-131, 2005.

Burger J**, Gochfeld M.** A framework and information needs for the management of the risks from consumption of self-caught fish. **Environ Research**. 2005 (in press)

Burger J, **Gochfeld M**. Heavy metals in commercial fish in New Jersey. Environ Res. 2005 Nov; 99(3):403-12

Burger J, **Gochfeld M**. Effects of lead on learning in herring gulls: an avian wildlife model for neurobehavioral deficits. Neurotoxicology. 2005 Aug; 26(4):615-24

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Garetano G, **Gochfeld M**, Stern AH. Comparison of indoor mercury vapor in common areas of residential buildings with outdoor levels in a community where mercury is used for cultural purposes. Environ Health Perspectives. 2006 Jan; 114(1):59-62.

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; 69:1217-38.

Gochfeld M. Framework for gender differences in human and animal toxicology. Environ Research. 2006 Apr 6 (in press)

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. Applied Occupational and Environmental Hygiene. 2006. in press.

Nancy Fiedler, PhD.

Fiedler N, Stein LB. Psychosocial Stressors and Psychiatric Disorder in the Workplace in Textbook of Clinical Occupational and Environmental Medicine 2nd Edition. L. Rosenstock, M.R.Cullen, C.A. Brodkin, C.A. Redlich eds. Elsevier Saunders, Philadelphia, PA. 2005:pp. 686-694.

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Howard Kipen, MD, MPH. Division Director

Laumbach RJ and **Kipen HM.** Bioaerosols and sick building syndrome: particles, inflammation and allergy. Current Opinion in Allergy and Clinical Immunology, 5(2):135-9, 2005.

Laumbach, RJ, Fiedler N, Gardner CR, Laskin DL, Fan ZH, Zhang J, Weschler CJ, Lioy PJ, Devlin RB, Ohman-Strickland P, Kelly-McNeil K, **Kipen HM**. Nasal Effects of a Mixture of Volatile Organic Compounds and their Ozone Oxidation Products. Journal of Occupational and Environmental Medicine, 47(11): 1182-1189, 2005.

Fiedler N, Laumbach R, Kelly-McNeil K, Lioy P, Fan ZH, Zhang J, Ottenweller J, Ohman-Strickland P, **Kipen H**. Health effects of a mixture of indoor air volatile organics, their ozone oxidation products, and stress. Environ Health Perspect 113(11):1542-8, 2005.

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Ozakinci G, Hallman WK, **Kipen HM**. Persistence of Symptoms in Veterans of the First Gulf War: 5-Year Follow-up. Environ Health Perspect 114(10):1553-57, 2006.

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Robert Laumbach, MD, MPH

Laumbach RJ, Kipen HM. Bioaerosols and sick building syndrome: particles, inflammation and allergy. Current Opinion in Allergy and Clinical Immunology**:** 5(2):135-9. 2005

Laumbach RJ, Fiedler N, Gardner CR, Laskin DL, Fan ZH, Zhang J, Weschler CJ, Lioy PJ, Devlin RB, Ohman-Strickland P, Kelly-McNeil K, Kipen HM. Nasal effects of a mixture of volatile organic compounds and their ozone oxidation products. Journal of Occupational and Environmental Medicine, 47:1182-1189. 2005.

Fiedler N, **Laumbach RJ**, Kelly-McNeil K, Lioy PJ, Fan ZH, Zhang J, Ottenweller J, Ohman-Strickland P, Kipen HM. Health effects of a mixture of indoor air volatile organics, their ozone oxidation products and stress. Environmental Health Perspectives. 113(11) 1542-8, 2005.

Omowunmi Osinubi, MD, MSc: Associate Residency Director

Siegel M, Barbeau EM, **Osinubi, OY**. The impact of tobacco use and secondhand smoke on hospitality workers, Clin Occup Environ Med. February 2005 5(1): 31-42.

Osinubi OY, Barbeau EM, Williams JM, Sorensen G. Tobacco Control in the Workplace. Nova Science Publishers, Hauppauge, NY. 2005.

Osinubi OY, Barbeau EM, Williams JM, Sorensen G. Curbing the tobacco epidemic: The role of workplace tobacco control policies and programs. In Focus on Smoking and Health Research. Nova Science Publishers, Hauppauge, NY. 2005.

Iris Udasin, MD. Director of Employee Health.

Herbert R, Moline I, Stellman J, Levin S, Udasin I, et al; The World Trade Center Disaster and Health of Workers a Five Year Assessment: Submitted for Publication, July 2006

4. NJIT- Safety and Health Engineering

Appendix Tables 4a and 13

[ ] Program

Center Director:

ERC Applicant Institution: New Jersey Institute of Technology
Program Director: Ariit K. Sengupta
Discipline: Occupational Safety and Health Engineering

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1]	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
	MS OSE	9	6	9	0	25	2
Doctorate degree							
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.)[3]							
Other (specify, e.g., undergraduate Certificate program trainees)							

Refer to: Supplemental Instructions, page 10.

[1] Trainee counts include all students in the approved programs.

[2] Does not include trainees counted in any of the full-time or part-time categories

[3] In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

Page

Table 4a

ERC Applicant Institution: New Jersey Institute of Technology
Program Director: Ariit K. Sengupta
Discipline: Occupational Safety and Health Engineering

Table 13
Minority Recruitment Data[1]
Previous Budget Period: July 1, 2005 to June 30, 2006

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
13	8	6	21305478	In training	NIOSH scholarship	N/A
			21389350	In training		
			21450891	In training		
			21390654	Left the program	Provost scholarship	
			21307803	In training		
			21540561	In training		

Refer to: Supplemental Instructions, page 13.

[1] First three columns are a group total; last four columns refer to individual trainees.

5. NYU -Ergonomics and Biomechanics

APPENDIX A: Program curricula, course requirements, and sample curricula by academic program

The Graduate Program of Ergonomics and Biomechanics, Graduate School of Arts and Science, New York University, requires 36-credits with equal emphasis on Biomechanics and Ergonomics.

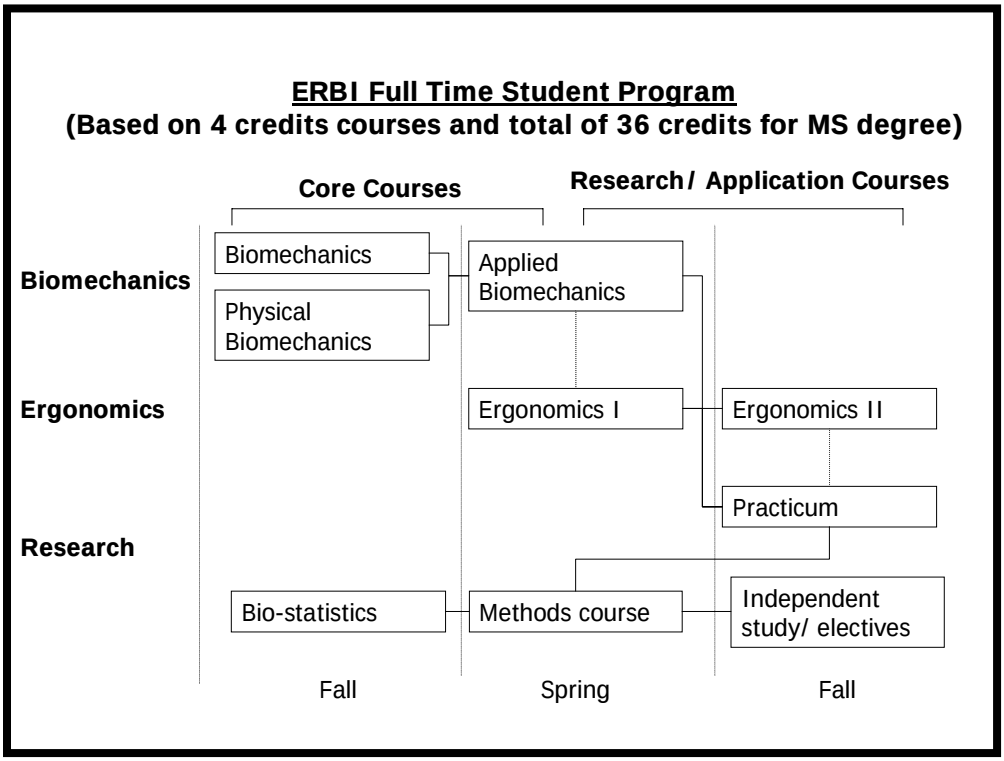

Figure 1. ERBI full time student program.

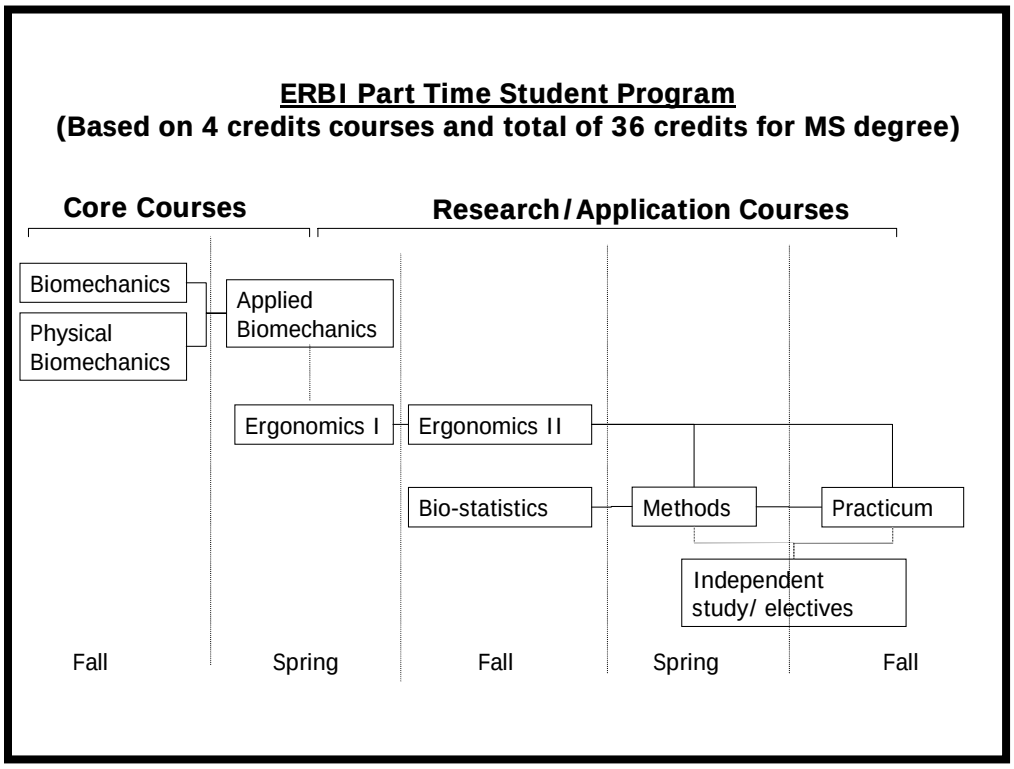

Figure 2. ERBI part time student program.

Course Name: Physical Biomechanics

Course Number: G48.2111

Pre-requisites: Undergraduate course on Basic Anatomy
Undergraduate course on Basic Physiology
Recommendations:
Musculoskeletal and Nervous System

Semester Offered: Fall

Instructor: Margareta Nordin, P.T., Dr.Sci.
Angela Lis, P.T., M.A.

Day & Time: Tuesday 5:30 to 8:15 p.m.

Location: Conference Room
Occupational & Industrial Orthopaedic Center
Hospital for Joint Diseases Orthopaedic Institute
63 Downing Street
New York, New York 10014

Credits: 4

Office Hours: By appointment

Course Description:
This course consists of two parts. In the first section of the course 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.

In the second part of the course basic biomechanical concepts will be use to describe motion undergone by various body/joint segments and the forces acting on these body parts during normal daily activities. To facilitate the understanding of the basic tissue/ joint musculoskeletal biomechanics, selected case studies will be used over the course of the semester.

Course Goals:
1. For the students to acquire a greater understanding of the basic biomechanical principles and their application in body tissues mechanical deformation and the analysis of body motion and related injuries.
2. Improve the students' communication skills (writing and oral) and their ability to convey results and present projects through weekly discussions and a final project that consists of the creation of a hypothetical injury model from a selected case study.

Specific Learning Objectives:

1. Promote knowledge of basic biomechanical concepts and their application in tissue and joint mechanics
2. Induce analytical and critical thinking through the understanding of patho-mechanics and its comparison with the biomechanical response of a "healthy" tissue/ joint.

Course Materials:
Nordin, M., Frankel, VH. (2001). *Basic Biomechanics of the Musculoskeletal System* (Third Edition). Lippincott Williams & Wilkins, Philadelphia.

Assigned readings

Course Requirements:
1. Students must know how to use a computer with basic software (Word, Adobe Acrobat Reader, Excel).
2. Prerequisites of basic anatomy and physiology of the musculoskeletal system.

Course Grading:
1. Home assignments, midterm and final examination (multiple choice and essay questions)
2. Final paper (The student will choose in collaboration with the instructor a case study that will facilitate the application of the biomechanical concepts reviewed in class into the creation of a biomechanical model used to analyze mechanisms of injury, risk factors and associated factors)

Activity	**Percentage**
1. Attendance, discussion and Home Assignments	20%
2. Midterm Exam	30%
3. Final Exam	30%
4. Final paper and presentation	20%
TOTAL	*100%*

Weekly Schedule:

	Topic	***Readings/Home assigments***
Week 01	**Introduction:** Basic Biomechanical Concepts	**Nordin, M., Frankel, VH.** Chapter 1
Week 02	**Basic Biomechanics:** Tendons and Ligaments	**Nordin, M., Frankel, VH.** Chapter 4
	Patho-mechanics: Tendons and Ligaments	
Week 03	**Basic Biomechanics:** Bone	**Nordin, M., Frankel, VH.** Chapter 2
	Patho-mechanics: Bone Tissue	
Week 04	**Basic Biomechanics:** Articular Cartilage	**Nordin, M., Frankel, VH.** Chapter 3
	Patho-mechanics: Articular Cartilage	
Week 05	**Basic Biomechanics:** Skeletal Muscle	**Nordin, M., Frankel, VH.** Chapter 5 and 6
	Basic Biomechanics: Peripheral Nerve	
Week 06	**Patho-mechanics:** Peripheral Nerve and Skeletal Muscle	**Nordin, M., Frankel, VH.** Chapter 5 and 6
Week 07	**Midterm Examination**	**Nordin, M., Frankel, VH.** Chapter 8
	Biomechanics: Hip	
Week 08	**Biomechanics** Knee	**Nordin, M., Frankel, VH.** Chapter 7
Weel 09	**Biomechanics:** Foot and Ankle	**Nordin, M., Frankel, VH.** Chapter 9
Week 10	**Biomechanics:** Shoulder Complex and Elbow	**Nordin, M., Frankel, VH.** Chapter 12 and 13.
Week 11	**Biomechanics:** Wrist and Hand	**Nordin, M., Frankel, VH.** Chapter 14
Week 12	**Biomechanics:** Cervical and Thoracic Spine	**Nordin, M., Frankel, VH.** Chapter 11
Week 13	**Biomechanics:** Lumbar and Sacral Spine	**Nordin, M., Frankel, VH.** Chapter 10
Week 14	**Biomaterials:** Research in Biomechanics	**Guest Lecturer TBA**
Week 15	**Final Exam and Student Presentations**	

Course Name: Biomechanics

Course Number: G48.2101

Pre-requisites: Undergraduate course on Physics, calculus (differential and integral), trigonometry, vector algebra, or instructor's permission

Semester Offered: Fall

Instructor: David Goldsheyder, M.S., M.A., CIE
dg28@nyu.edu

Day & Time: Thursday 5:30 to 8:15 p.m.

Location: Conference Room
Occupational & Industrial Orthopaedic Center
Hospital for Joint Diseases Orthopaedic Institute
63 Downing Street
New York, New York 10014

Credits: 4

Office Hours: By appointment

Course Description:
This course consists of two parts. In the first part the basic concepts of mechanics, such as force and torque, are introduced. These concepts are first applied to analyze relatively simple mechanical systems. Analogies between basic mechanical elements and human body parts are formed, and the principles of mechanics are then applied to analyze muscle and joint reaction forces controlling and coordinating the movements of major joints of human musculoskeletal system.

The second part is devoted to the analyses of "moving" systems with applications to human motion analyses and sports mechanics. The topics to be covered in the second part include description and causes of linear and rotational motion, one and two dimensional linear and angular kinematics and kinetics motion analysis as well as concepts of work, energy, power, impulse, and momentum and their application for the analysis of bodies in motion. Course lectures will be carried out by solving examples and problems on the covered topics.

Course Goals:
1. Develop a deeper comprehension of classical engineering mechanics as it applies to the human body.
2. Reiterate the fundamental aspects of mechanics to understand the purpose and value of biomechanics for the prevention of musculoskeletal disorders and injuries.
3. Encourage critical thinking concerning potential applications of biomechanics in the occupational setting.
4. Provide an appreciation of the discipline and stimulate student's commitment to biomechanical research and development.

Specific Learning Objectives:
1. Learn basic concepts, theories, and methods of engineering mechanics and demonstrate their application for the analysis of human body in rest and motion.

2. Understand the structure and function of the human musculoskeletal system through principles and theories of engineering mechanics.
3. Acquire skills to perform biomechanical analysis of major joints of the human musculoskeletal system.
4. Demonstrate application of biomechanics as potential control strategy aimed at reducing the risk of musculoskeletal injury.

Course Materials:
N. Ozkaya and M. Nordin (1999). "Fundamentals of Biomechanics: Equilibrium, Motion and Deformation." Second Edition. Springer-Verlag, New York.

Course Requirements:
1. Basic knowledge on physics, calculus (differential and integral), trigonometry and vector algebra.
2. A scientific calculator, that can perform trigonometric functions.
3. Solving 3-5 biomechanical problems in class and weekly home assignments of 6-10 problems distributed at the end of each class. The problems are directly related to the topic of the class and are similar to the ones cited in the assigned chapter from the textbook.

Course Grading:

Activity	**Percentage**
1. First examination	30%
2. Second examination	30%
3. Final examination	30%
4. Participation in the class	10%
TOTAL	*100%*

Weekly Schedule:

	Topics	Readings/home assignments
Week 01	**Introduction to the class:** Mechanics and Biomechanics. Basic concepts of biomechanics. Newton's laws of mechanics. Dimensional analysis. Systems of units. Conversion of units. Mathematical tools. Scalars and vectors. Modeling and approximation. Procedure for solving problems in biomechanics. **Exercise problems.**	**Ozkaya, N., Nordin, M.** Chapter I, pp. 1 - 16. **Home Assignment:** 3-5 Practical Exercise Problems given by the instructor
Week 02	**Force Vector:** Definition of force. Force as a vector quantity. Dimension and units of force. Force systems. Classification of forces: external and internal; normal and tangential; tensile and compressive; coplanar, collinear, concurrent, and parallel forces. Gravitational force or weight. Distributed force systems and pressure. Frictional forces. **Exercise problems.**	**Ozkaya, N., Nordin, M.** Chapter 2, pp. 17 – 28 **Home Assignment:** 3-5 Practical Exercise Problems given by the instructor
Week 03	**Moment and Torque:** Definitions of moment and torque vectors. Magnitude and direction of moment vector. Dimension and units of moment. Fine points about the moment vector. The resultant moment. The couple and couple-moment. Translation of forces. **Exercise problems.**	**Ozkaya, N., Nordin, M.** Chapter 3, pp. 29 – 46. **Home Assignment:** 3-5 Practical Exercise Problems given by the instructor
Week 04	**Examination #1**	
Week 05	**Analysis of Systems in Equilibrium:** Conditions for equilibrium. Free-body diagrams. Analysis of systems in equilibrium. Equations of equilibrium. Constrains and reactions. Simply supported structures. Cable-pulley systems and traction devices. Built-in structures. Systems involving friction. Center of gravity determination. **Exercise problems.**	**Ozkaya, N., Nordin, M.** Chapter 4, pp. 47 – 80. **Home Assignment:** 3-5 Practical Exercise Problems given by the instructor

	Topics	Readings/home assignments
Week 06	**Application of Statics to Biomechanics:** Overview of skeletal joints and skeletal muscles, their structure and function. Basic considerations, assumptions and limitations. Mechanics of the elbow. Mechanics of the shoulder. **Exercise problems.**	**Ozkaya, N., Nordin, M.** Chapter 5, pp. 85 – 95. **Home Assignment:** 3-5 Practical Exercise Problems given by the instructor
Week 07	**Application of Statics to Biomechanics:** Mechanics of the spinal column. Mechanics of the hip. Mechanics of the knee. Mechanics of the ankle. Discussion. **Exercise problems.**	**Ozkaya, N., Nordin, M.** Chapter 5, pp. 95 – 115. **Home Assignment:** 3-5 Practical Exercise Problems given by the instructor
Week 08	**Examination #2**	
Week 09	**Introduction to Dynamics:** Dynamics. Kinematics and kinetics. Linear, angular and general motions. Distance and displacement. Concepts of velocity, acceleration, inertia, and momentum. Degree of freedom. Concept of particle. Reference frames and coordinate systems. Prerequisites for dynamic analysis. **Exercise problems.**	**Ozkaya, N., Nordin, M.** Chapter 10, pp. 220 – 226. **Home Assignment:** 3-5 Practical Exercise Problems given by the instructor
Week 10	**Linear Kinematics:** Uniaxial motion. Position, displacement, velocity and acceleration. Dimensions and units. Measured and derived quantities. Examples of uniaxial motions. **Exercise problems.**	**Ozkaya, N., Nordin, M.** Chapter 11, pp. 228 – 239. **Home Assignment:** 3-5 Practical Exercise Problems given by the instructor
Week 11	**Linear Kinematics:** Biaxial motion. Position, velocity and acceleration vectors. Biaxial motion with constant acceleration. Projectile motion. Applications to athletics. **Exercise problems.**	**Ozkaya, N., Nordin, M.** Chapter 11, pp. 240 – 254. **Home Assignment:** 3-5 Practical Exercise Problems given by the instructor

	Topics	Readings/home assignments
Week 12	**Linear Kinetics:** Equations of motion. Special cases of translational motion. Procedure for problem solving in kinetics. Work and energy methods. Mechanical work. Potential and kinetic energy. Work-energy theorem. Principle of conservation of mechanical energy. Dimension and units of work and energy. Concept of power. Applications of energy methods. **Exercise problems.**	**Ozkaya, M., Nordin, M.** Chapter 12, pp. 254 – 272. **Home Assignment:** 3-5 Practical Exercise Problems given by the instructor
Week 13	**Angular Kinematics:** Polar coordinates. Angular position, displacement, velocity and acceleration. Dimensions and units. Rotational motion about fixed axis. Relationship between linear and angular quantities. Uniform circular motion. Rotational motion with constant acceleration. **Exercise problems.**	**Ozkaya, N., Nordin, M.** Chapter 13, pp. 274 – 284. **Home Assignment:** 3-5 Practical Exercise Problems given by the instructor
Week 14	**Angular Kinetics:** Angular Kinetics. Kinetics of angular motion. Torque and angular acceleration. Mass moment of inertia. Parallel-axis theorem. Radius of gyration. Rotational kinetic energy. Angular work and power. **Exercise problems.** Linear momentum and impulse. Application of the Impulse-Momentum method for motion analysis. **Exercise problems.**	**Ozkaya, N., Nordin, M.** Chapter 14, pp. 296 – 313 Chapter 15, pp. 317 – 322. **Home Assignment:** 3-5 Practical Exercise Problems given by the instructor
Week 15	**Final Examination**	

Signature of department head _____Date: _____

Type Name _____

Recommendation of the Graduate Curriculum Committee_____

***Date:* _____ *Signature of Chair:*_____**

Course Name: Ergonomic Issues I: Physical Factors in the Workplace

Course Number: G48.2131

Pre-requisites: Biomechanics and Physical Biomechanics, or instructor permission

Semester Offered: Spring

Instructor: Manny Halpern, Ph.D., CPE
mh31@nyu.edu

Day & Time: Wednesday 6:10 to 8:45 p.m.

Location: Conference Room
Occupational & Industrial Orthopaedic Center
Hospital for Joint Diseases Orthopaedic Institute
63 Downing Street
New York, New York 10014

Credits: 4

Office Hours: By appointment

Course Description:
Ergonomics is the study of fitting the workplace to the capabilities of the human worker. Ergonomists apply knowledge from biomechanics, physiology, psychology and engineering to the design of tasks, work organization, work environment, workstations, and tools.

Taking a "systems approach" to the design of work, this course examines the interactions between the human worker and the equipment used at work. The course focuses on the design of the manufacturing process in the context of implementing an ergonomics program for injury prevention. In the first half, it demonstrates how the principles of physiology and biomechanics apply to workstation and tool design. The second half of the course covers industrial ergonomics applications: controlling cumulative trauma disorders of the upper extremities, office work, and manual material handling.

Ergonomic Issues is a two-part course: (1) G48.2131 Ergonomic Issues I: Physical Factors in the Workplace, and (2) G48.2132 Ergonomic Issues II: Environmental Factors in the Workplace. This first section 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.

Course Goals:
1. Offer students an understanding of the ergonomic concerns of the human worker.
2. Develop an appreciation for the complexities in planning and implementing human-oriented work systems and injury prevention programs.
3. Provide an opportunity to the students to apply theory to workplace design.

Specific Learning Objectives:
1. Be able to analyze the physical problems of workers in the context of a work system

2. Practice representative methods for analyzing physical job demands
3. Demonstrate a critical approach to the selection of methods to analyze job demands
4. Demonstrate the application of the ergonomic problem solving process at the workplace.

Course Materials:
This course relies on Blackboard—the web-based learning management system of NYU—as the means to communicate and administer the course. Readings, assignments, tests and analytic tools are available through Blackboard.

Required Reading
Nordin, M., Andersson, G.B.J., & Pope, M. H. (Eds.) (1997) Musculoskeletal Disorders in the Workplace. Mosby, New York.

Chaffin, D.B. & Andersson, G. Occupational Biomechanics (2nd edition)(1991). John Wiley & Sons, New York.

Wilson, J.R. & Corlett, E.N. (Eds.)(2^{nd} edition)(1995) Evaluation of Human Work. Taylor & Francis, London.

Kroemer K.H.E & Grandjean E. Fitting the Task to the Man (5th edition)(1997). Taylor & Francis, London.

G. Salvendy (ed.), Handbook of Human Factors & ergonomics, 3rd Edition (2006). John Wiley & Sons, Hoboken, NJ.

Other Readings:
Additional handouts supplement the readings and will be distributed to the students.

All class notes and additional readings are available on-line through Blackboard

Students have access to subscription-based on-line analytic ergonomic tools available from ErgoWeb. These include such tools as Strain Index, RULA, 2D and 3D biomechanical models, Modified Garg Tool, AAMA/Bernard Metabolic Tool, Energy Expenditure Program (University of Michigan), NIOSH Lifting Equation 1994, psychophysical measures (acceptable weights for pushing/pulling and carrying from Snook et al)

Course Requirements:
1. Students must know how to use a computer with basic software (Word, Adobe Acrobat Reader, Excel, various media players) and internet access to obtain the course materials.
2. The major learning activities consist of lectures, reading, discussion, site visits and practice in form of assignments and lab sessions.

Course Grading:
1. Various measures are used to evaluate student performance, including individual and team assignments:
Assessment of knowledge. Written mid term and final examinations
Assessment of understanding. Case studies or scenarios as assignments and part of the examinations, and class participation. These will challenge the students to come up with an action plan to solve a case problem.

Activity	Percentage
1. Midterm (cover material up to that date)	35%
2. Final (cover material from mid-term to end)	40%
3. Class participation (and presentation)	4%

4. Assignments, including a group term project 21%

TOTAL *100%*

2. Impression of student participation consists of answering questions raised in class, raising questions in class or privately with the instructor, raising relevant issues during class and participation in an on-line discussion board.

3. Problem solving skills will be assessed based on:

- problem identification
- scope of the solution space
- defining variables of interest
- measurement techniques and instruments
- deriving solutions from the data
- assessing feasibility

Weekly Schedule:

	Topics	Readings/home assignments
Week 01	**Introduction:** 1. Definition of Ergonomics 2. The ergonomic process of problem solving 3. Principles of Ergonomics 4. Course organization 5. Term assignment: Ergonomics on the WWW	**Wilson, JR., Corlett, EN.** Pp: 1-29 **Handouts** Class notes PDF Format (Salvendy Ch. 13)
Week 02	**Anthropometric Workstation and Tool Design:** 1. Anthropometry 2. Postural considerations 3. Reach envelopes 4. Applications for workstation layout 5. Applications for tool design **Demo:** SafeWork **Assignment:** Anthropometric design of a press workstation	**Wilson, JR., Corlett, EN** Pp: 560-573 **Handouts** Class notes PDF Format (Salvendy Ch. 8)
Week 03	**Physical Factors at Work 1:** Force and Effort 1. Static vs dynamic / systemic vs local work 2. Methods for measuring static work 3. Measuring local muscular work vs. systemic work 4. Methods for measuring dynamic work 5. EMG in ergonomics	**Wilson, JR., Corlett, EN.** Pp 640-679, 681-692 **Salvendy, G. (2nd ed)** Chapter 9, 10 **Handouts** Class notes, PDF Format (Kroemer, KHE., Grandjean, E. Ch. 1)
Week 04	**Physical Factors at Work 2:** Posture 1. Anatomical/kinesiological perspective 2. Engineering/analytic perspective 3. Functional/ergonomic perspective 4. Posture as a risk factor for MSD **Assignment:** Video analysis of an assembly task (task elements, risk factors)	**Handouts** Nordin, M., Andersson, GBJ., Pope, M., Chapter. 8 Class notes Wilson JR., Corlett, EN. (2nd ed), Chapter 23, "Working posture" Hazelgrave, Ergonomics '94
Week 05	**Practice:** NYU computer lab 1. Posture & Motion Analysis	**Handouts** CD with video clips ErgoWeb: RULA, Strain Index

	Topics	Readings/home assignments
Week 06	**Hazard Surveillance & Job & Task Analysis** 1. Job & task analysis as part of an ergonomics program 2. Approaches to job & task analysis 3. Employee-based methods for job analysis 4. Expert-based methods for job analysis 5. Macro-ergonomic systems (O*NET and Dictionary of Occupational Titles) 6. Planning a walk-through evaluation	**Wilson, JR., Corlett, EN. (2nd ed)** Pp 892-920 **Handouts** Nordin, M, Andersson, GBJ., Pope, M. Chapter 14-15 Class notes, PDF Format (Salvendy Ch. 14)
Week 07	**Practice:** Site Visit - School of Dentistry **Assignment:** Analyzing dental clinical care workstations	**Handouts** ErgoWeb: checklists, RULA, Strain Index Job analysis (PAQ/AET)
Week 08	**Injury Surveillance** 1. Surveillance as part of an ergonomics program 2. Active & passive surveillance Use of injury/accident data in prevention	**Handouts** Nordin, M., Andersson, GBJ., Pope, M. Chapter 2 Class notes, PDF Format: "Surveillance"
Week 09	**Assignment:** Site visit results **Group term project:** Evaluation of websites on different ergonomic topics	**Midterm** Take-home exam on-line
Week 10	**Ergonomic application:** Upper Extremity CTD 1. Definition 2. Occupational risk factors 3. Evaluation of UECTD risk factors 4. Prevention strategies 5. Administrative controls 6. Engineering controls	**Salvendy, G. (2nd ed)** Chapter 35 **Handouts** Nordin, M., Andersson, GBJ., Pope, M. Chapter 12 Class notes, PDF Format (Salvendy Ch. 31)
Week 11	**Ergonomic application:** Office Work 1. Sedentary work 2. VDT workstations **Practice:** Case studies	**Handouts** Class notes
Week 12	**Site visit:** Showroom of office systems	

	Topics	Readings/home assignments
Week 13	**Ergonomic application:** Manual Material Handling 1. Occupational risk factors 2. Methods of analysis 3. Psychophysical techniques 4. Biomechanical models 5. NIOSH Work Practices Guidelines for Lifting	**Salvendy (2nd ed)** Chapter 23, pp 777-783, 790-818, Chapter 34 **Handouts** Nordin, M., Andersson, GBJ., Pope, M. Chapters 9-10 Class notes, PDF Format (Salvendy Ch.30)
Week 14	**Practice:** NYU Computer lab 1. Energy Expenditure Prediction Program 2. 2D Biomechanical Model 3. 3D Static Strength Prediction Program 4. NIOSH lifting equation	**Handouts** Case study exercises of NIOSH lifting equation ErgoWeb University of Michigan software
Week 15:	**Summary** 1. Setting up an ergonomic program 2. Professional advancement (marketing ergonomic services, keeping up with new developments, associations and certification) 3. Presentation of group term project	**Final exam** Take-home exam on-line

ERC Applicant Institution: New York Unviversity
Program Director: Nordin, M.
Discipline: Ergonomics and Biomechanics

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1]	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
Ergonomics & Biome	Master of Science	5	3	6	1		7
Doctorate degree							
Ergonomics & Biome	Doctor of Philosophy			11			1

ERC Applicant Institution: New York Unviversity
Program Director: Nordin, M.
Discipline: Ergonomics and Biomechanics

Table 13
Minority Recruitment Data[1]
Since Beginning of Current Project Period

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
Year 1: July 1, 200x to June 30, 200x						
3	3	3	N19728571	in traing	ERC Tuition Award & NORA Research	
			N11-10-7074	in traing	ERC Tuition Award	
			N13303204	in traing	-	Physical therapist, Occupational and Industrial Orthopaedic Center
Year 2: July 1, 200x to June 30, 200x						
Year 3: July 1, 200x to June 30, 200x						
Year 4: July 1, 200x to June 30, 200x						

Refer to: Supplemental Instructions, page 11.

[1] First three columns are a group total; last four columns refer to individual trainees.

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Table 13

APPENDIX C

Publications by program area of faculty and trainees during the reporting period that have resulted, in whole or part, from ERC training grant support. (2005-2006)

1. Balagué F, Nordin M, Schafer D, Sheikhzadeh A, Lenz ME, Thonar EM. The potential value of blood biomarkers of intervertebral disk metabolism in the follow-up of patients with sciatica. Eur Spine J. May 2006;15(5):627-633.

2. Campello MA, Weiser SR, Nordin M, Hiebert R. Work retention and nonspecific low back pain. Spine. Jul 15 2006;31(16):1850-1857.

3. Egol KA, Paksima N, Puopolo S, Klugman J, Hiebert R, Koval KJ. Treatment of external fixation pins about the wrist: a prospective, randomized trial. J Bone Joint Surg Am. Feb 2006; 88(2):349-354.

4. Egol KA, Weisz R, Hiebert R, Tejwani NC, Koval KJ, Sanders RW. Does fibular plating improve alignment after intramedullary nailing of distal metaphyseal tibia fractures? J Orthop Trauma. Feb 2006; 20(2):94-103.

5. France MA, Koval KJ, Hiebert R, Tejwani N, McLaurin TM, Egol KA. Preoperative assessment of tibial nail length: accuracy using digital radiography. Orthopedics. Jul 2006; 29(7):623-627.

6. Hagins M, Pietrek M, Sheikhzadeh A, Nordin M. The effects of breath control on maximum force and IAP during a maximum isometric lifting task. Clin Biomech (Bristol, Avon). Oct 2006; 21(8):775-780.

7. Halpern M. Ergonomics and Occupational Biomechanics. In Environmental and Occupational Medicine. Editor WH Rom 4th edition, Ch. 57. Lippincott-Raven Publishers, Philadelphia, PA, USA, 2006 (in press).

8. Hiebert R, Nordin M. Methodological aspects of outcomes research. Eur Spine J. Jan 2006;15 Suppl 1:S4-S16.

9. Hiebert R, Weiser S, Campello M, Nordin M. Nonspecific Low Back Pain. In Environmental and Occupational Medicine. Editor WH Rom 4th edition. Lippincott-Raven Publishers, Philadelphia, PA, USA, 2006 (in press).

10. Lis AM, Black KM, Korn H, Nordin M. Association between sitting and occupational LBP. Eur Spine J. May 31 2006.

11. Nordin M, Andersson GBJ, Pope MH Editors: Musculoskeletal Disorders in the Workplace. Principles and Practice, 2nd Edition. Mosby Elsevier, Philadelphia, PA, USA, 2006

12. Nordin M, Balagué F, Cedraschi C. Nonspecific Lower Back Pain: Surgical versus nonsurgical treatment. Clin Orthop Relat Res. 2006; 443: 156-167.

13. Nordin M, Balagué F, Cedraschi C: Lower back, treatment options. In Musculoskeletal Disorders in the Workplace. Principles and Practice. Editors M Nordin, GBJ Andersson and MH Pope. 2nd Edition. Mosby Elsevier, Philadelphia, PA, USA, 2006, pp. 125-134.

14. Sheikhzadeh A: Biomechanics of the hip and knee. In Musculoskeletal Disorders in the Workplace. Principles and Practice. Editors M Nordin, GBJ Andersson and MH Pope. 2nd Edition. Mosby Elsevier, Philadelphia, PA, USA, 2006, pp. 273-288.

15. Skovron ML, Hiebert R: Introduction to epidemiologic concepts in musculoskeletal disorders. In Musculoskeletal Disorders in the Workplace. Principles and Practice. Editors M Nordin, GBJ Andersson and MH Pope. 2nd Edition. Mosby Elsevier, Philadelphia, PA, USA, 2006, pp. 1-12.

16. Su ET, Kubiak EN, Dewal H, Hiebert R, Di Cesare PE. A proposed classification of supracondylar femur fractures above total knee arthroplasties. J Arthroplasty. Apr 2006; 21(3):405-408.

17. Vignon E, Valat JP, Rossignol M, Avouac B, Rozenberg S, Thoumie P, Avouac J, Nordin M, Hilliquin P. Osteoarthritis of the knee and hip and activity: a systematic international review and synthesis (OASIS). Joint Bone Spine. Jul 2006;73(4):442-455.

18. 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 HN Herkowitz, SR Garfin, FJ Eismont, GR Bell and RA Balderston. Fith Edition. Saunders Elsevier, Philadelphia, PA, USA 2006, pp. 1595-1606.

19. Weiser S, Nordin M, Campello M, Pietrek M: Selfcare techniques for acute episodes of low back pain. In Best Practice and Research Compendium: Pain, Editors H Breivik and M Shipley. Elsevier, Oxford, Great Britain (in press).

20. Weiser S, Rossignol M. Triage for nonspecific lower-back pain. Clin Orthop Relat Res. Feb 2006; 443:147-155.

21. Weiser S; Psychosocial aspects of work related-musculoskeletal disorders: Clinical implications. In Musculoskeletal Disorders in the Workplace. Principles and Practice. Editors M Nordin, GBJ Andersson and MH Pope. 2nd Edition. Mosby Elsevier, Philadelphia, PA, USA, 2006, pp. 13-22.

APPENDIX D NYU ERBI Faculty

Margareta Nordin, Med. Dr. Sci., CIE has been the Program Director since 1984. She holds a Research Professorship at the Departments of Orthopedic Surgery and Environmental Medicine, School of Medicine, New York University. She is responsible for continuous improvement and excellence of the program. Dr. Nordin has the principle responsibility for the ERBI program. She oversees the doctoral program run by Dr. Ali Sheikhzadeh and the masters program run by Angela Lis, PT, MA, CIE. Dr. Nordin supervises the budget, the hiring of adjunct faculty and instructors, and the acceptance of graduate students in conjunction with the ERBI faculty Steering Committee. She supervises masters and doctoral student research. Dr. Nordin's primary research interests are prevention of musculoskeletal injury and disability, clinical outcome studies, and ergonomics and biomechanics.

Ali Sheikhzadeh, PhD, CIE is an Assistant Research Professor, in the Departments of Orthopedic Surgery and Environmental Medicine, School of Medicine, New York University and the Assistant Director of Research at the Occupational and Industrial Orthopaedic Center (OIOC), NYMC. Dr. Sheikhzadeh substitutes as ERC ERBI interim Director when necessary. He is responsible for the doctoral program under the guidance of Dr. Nordin. Dr. Sheikhzadeh teaches (G48.2121) Practicum in Ergonomics and Biomechanics. The ERBI program has a biomechanics laboratory located at OIOC, which focuses on muscle recruitment, electromyography and EMG driven models derived from data collection. Dr. Sheikhzadeh directs all laboratory activities and projects. In addition to training students in the laboratory, he has initiated and developed a network with other laboratory directors for student and faculty collaboration. He also participates on dissertation committees. Dr. Sheikhzadeh's primary research interests are biomechanics, electromyography, modeling and experimental research.

Marco Campello, Ph.D., PT., CIE is an Assistant Clinical Professor, in the Department of Orthopedic Surgery and Associate Director of the OIOC. Dr. Campello teaches (G48.2112) Applied Biomechanics in the Analysis of Human Performance and supervises MS and PhD. Students and participates on dissertation committees. Dr. Campello is an active clinician and researcher and has a special interest in transfer and exchange of knowledge. Dr. Campello's primary research interests are rehabilitation of musculoskeletal disorders, low back pain, return to work and work retention.

Manny Halpern, PhD, CPE is an Assistant Research Professor, in the Departments of Environmental Medicine and Orthopaedic Surgery, School of Medicine, New York University and the Senior Manager of Ergonomics at the OIOC. Dr. Halpern teaches (G48.2131) Ergonomic Issues I: Physical Factors in Workplace Design. Dr. Halpern advises doctoral students in their research and on dissertation committees and supervises master and doctoral students participating in ergonomic contracts. Dr. Halpern's primary research interests are the implementation of ergonomic principles in the health care industry and office environment, upper extremity cumulative trauma disorders and the prevention of musculoskeletal disorders in the work place.

Sherri Weiser, PhD is a Research Assistant Professor, in the Departments of Environmental Medicine and Orthopaedic Surgery, School of Medicine, New York University and the Senior Manager of Psychological Services at the OIOC. Dr. Weiser is a research psychologist with a clinical license. She co-teaches (G48.2123) Research Methods with Rudi Hiebert ScM. Dr Weiser is a research advisor for masters and doctoral students and participates on several doctoral committees. Dr. Weiser is an expert in the bio-psychosocial model of musculoskeletal disorders and its application in research and clinical practice. Dr. Weiser's primary research interests are psychosocial factors associated with musculoskeletal disorders, stress and coping and prevention of disability.

Angela Lis, PT, MS, CIE is adjunct instructor in the ERBI Program and the Clinical Associate Director

at the OIOC. Ms. Lis has a background in physical therapy, ergonomics, biomechanics and motor performance. She has been instrumental in the revision of the ERBI Masters of Science curriculum and has engaged faculty and students in this project. She co-teaches (G48.2111) Physical Biomechanics. She supervises masters' students. She has a special interest in involving students in projects through the OIOC and the ERBI program. Ms. Lis research interests include the transfer and exchange of knowledge and the application of research findings to clinical practice.

Rudi Hiebert, ScM is an adjunct instructor in the ERBI program and an epidemiologist at the OIOC. He is an injury epidemiologist and is a full-time member of the OIOC's research team. He co-teaches (G48.2123) Research Methods), with Dr. Weiser and mentors MS and PhD student in research methods and skills. Mr. Hiebert's primary research interests are occupational injury prevention, study design, disability prevention and the development of excellence in research training.

David Goldsheyder, MS, MA, CIE, is an adjunct Assistant Research Professor, in the Department of Orthopaedic Surgery, School of Medicine, New York University. Mr. Goldsheyder teaches (G48.2101) Biomechanics. Mr. Goldsheyder currently holds a position as ergonomist at the Department of Labor, OSHA, New York, NY.

Diane Trainor, Ph.D., CIEH, is an adjunct instructor, in the Graduate School of Arts and Sciences. Dr. Trainor is a Professor and Chairman of the Department of Environmental Science/Chemistry, at Middlesex County College, Edison, New Jersey. Dr. Trainor is also a consultant for Graphic Environmental Services, in New Jersey. She provides on site community-based projects for students through this affiliation. Dr. Trainor has expertise in hazardous waste management, environmental science, air pollution and prevention. She teaches (G48.2132) Ergonomics Issues II: Environmental factors in the Workplace.

APPENDIX E Continuing Education Training Activities by ERBI Faculty

- June 2005: “The Role of Ergonomists in Return-to-Work Accommodations” Eastern Ergonomics Conference and Exposition, New York, NY (Halpern)
- September, 2005: The "Ergonomic" Label - What Does It Really Mean? ErgoForum - HumanScale, New York, NY (Halpern)
- October 26-27, 2005: “From Research to Clinical Practice-Examples from Spine Studies. Opening Lecture” Swedish Association of Physical Therapy Annual Meeting 2005, Stockholm, Sweden (Nordin)
- November 10-11 , 2005: Whiplash and Headache, Swiss Society for the Study Pain, Bern, Switzerland (Nordin)
- November 21, 2005: “The Neck Pain Task Force. Gaps in knowledge: Diagnosis and treatment” Conference on Whiplash Associated Disorders. Karolinska Institute, Stockholm, Sweden. (Nordin)
- November, 2005: Healthy Computing - faculty training, Staten Island Academy, New York, NY (Halpern)
- December 5-10, 2005: “Triage of patients with low back pain”, “Exercise and Cognitive Behavior”, and “The Impact of MVA’s and Whiplash Associated Disorders”. Medical Association of Ho Chi Minh City in collaboration with the International Society for the Study of the Lumbar Spine, Ho Chi Minh City, Vietnam. (Nordin)
- December 15-16, 2005: Creating a Healthy Workplace: Principles of Ergonomics and Stress Management for Office Workers United Nations Head Quarters, Medical Services Department, New York, NY. (Halpern, Lis and Weiser)
- March 27: “Functional Capacity Evaluations”, Department of Occupational Therapy, Touro College, New York, NY. (Lis)
- March 29, 2006: “ Work Conditioning Programs: Facilitating Return to Work”, department of Occupational Therapy, Touro College, New York, NY (Lis).
- April 18-21, 2006: “Return to Work Programs for Low Back Pain”, “How to use clinical evidence-based outcomes in clinical practice: Examples from Low Back and Neck Pain”, “The Biomechanics of Low Back Pain and Their Implications for Rehabilitation” and “How to Use Experimental Evidence in Clinical Practice: Examples from biomechanics and ergonomics field”. Visiting Professor Department of Rehabilitation Science, The Hong Kong Polytechnic University, Hong Kong. (Nordin)
- April 27, 2006: “Development of Occupational Low Back Pain Management and Treatment Protocol”. CEREST SC Regional Reference Center in Occupational Health. Florianopolis, SC, Brazil. (Campello)
- May 11, 2006 “Do not Medicalize Non-specific Low Back Pain”. Symposium: Critical Decision-making Process in the Management of the Degenerative Motion Segment. Montreal, Spine Arthroplasty Society, Canada. (Nordin)
- June 19 – 30, 2006: " Chronic Backache: a burden for society, a challenge to understand, a duty to intervene" Clinical Rounds and Seminar Series, New York University School of Medicine, New York, NY. (Hiebert)
- July 17 – 22, 2006: "Epidemiology of Low Back Pain" Mt Sinai School of Medicine Summer Resident's Program in Occupational Medicine, Mt Sinai School of Medicine, New York, NY. (Hiebert)

APPENDIX F

Measures of Effectiveness

Goals	Measures of effectiveness	Status
Enrollment	Number of qualified applicant to the ERBI program be above 5 per year	Achieved for 05-06.
Requirement	At least one minority students recruited in the next two years	Achieved for 05-06.
Average years to graduate	Average full time students graduate less than 2 years and part-time students less than 4 years.	Achieved for 05-06.
Teaching	Average teaching evaluation for ERBI faculty exceeds 3.5 (3= average & 4=above average)	Achieved in six of 7 courses for 05-06
Program certification	ERBI program remain certified by Oxford Research Institute	ERBI program recertified 2006 through 2008
Research	At least 50% of ERBI faculty participate in formal scientific dissemination of information such as peer-reviewed journal and conference presentation	Achieved for 05-06.

6. Center Administration

Appendix A. INTERDISCIPLINARY SEMINAR on OCCUPATIONAL SAFETY AND HEALTH
(Fall 2006 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:1or 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 20** and will continue for five Wednesdays until Wednesday, November 1. Students who are interested in the seminar or who have further questions should contact their program director, Dr. Kimberly Morland at Kimberly.morland@mssm.edu or Dr. David Kotelchuck, Hunter College and Deputy Director of the NY/NJ ERC, at dkotelch@hunter.cuny.edu.

DATE	GUEST LECTURER	TOPIC
Sept. 20	Paul Landsbergis, PhD Mount Sinai	The Changing Nature of Work, Work Organizations, Stress and Health
Sept. 27	David Kotelchuck, PhD	A Review of Studies Addressing the WTC Disaster (IH, EPI and CLINICAL)
Oct. 4	Jack Caravanos, DrPH, CIH Hunter College	International Environment and Occupational Health concerns with ULABs (used lead acid batteries) recycling.
Oct. 11	Arijit Sengupta	Upper Body Stress & Fatigue in Glove Box Work
Oct. 18	Steven Markowitz, MD MPH Queens College	An Epidemiological Investigation of Bladder Cancer in a Chemical Plant
Oct. 25	NO CLASS	
Nov. 1	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 18. 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 November 1 to receive a passing grade. Grades will be Pass/Fail, unless otherwise required.

Appendix B. NIOSH ERC Course: SITE VISITS AND INDUSTRIAL PROCESSES

Faculty: Drs. David Kotelchuck, Michael Gochfeld and Jennifer Richmond-Bryant
Required Course for ERC interns and students at
Hunter College, UMDNJ, NJIT, NYU, Mt. Sinai
Spring 2006 semester

Feb. 1 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. 8 Power Battery Company (Paterson, NJ)
Feb 15 Debriefing discussion and preparation for Hunter office building site visit
Feb 22 Hunter College IAQ and other H&S site visit
Mar 1 Debriefing discussion and preparation for NY Times site visit
Mar 8 NY Times printing plant (Edison, NJ)
Mar 15 Debriefing discussion and preparation for Pfizer and Univ. Hospital site visit
Mar 22 Pfizer pharmaceutical plant (Brooklyn, NY)
Mar 29 UMDNJ University Hospital (Newark, NJ)
Apr 5 Debriefing discussion for Pfizer and University Hospital. Also attendance at Friday ERC Scientific Conference recommended.
Apr 7 27th annual ERC scientific conference: "Nanoparticles: Health and Technology" Hatch Auditorium, Mt. Sinai Medical Center
Apr12 Construction site visits in lower Manhattan, including WTC (Manhattan, NY)
Apr19 No class
Apr 26 Final Examination
May 3 ERC Student Research Day (at Gutenberg ITC building, NJIT, Newark, NJ)

May 12 Ravenswood Co-Generation power station (Queens, NY) Attendance voluntary.

Text: *Recognition of Health Hazards in Industry* (2nd ed.) by W.A.Burgess, John Wiley and Sons (New York, 1995)

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 C: NIOSH ERC Student/Resident Research Day

Wednesday, May 3, 2006

10 am – 1pm

Campus Center (Room 235)

New Jersey Institute of Technology

Newark, NJ

(NOTE: Breakfast will be served.)

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 and ERC Deputy Director)

10:15 – 10:35 Laryngoscopic Findings in World Trade Center Recovery Workers
-- Hale Yarmohammadi, MD, (Mt. Sinai)

10:35 – 10:50 The Effect of Glove-Port Height on Shoulder Stress in Performing Lab Work Using a Glove Box
-- Jason M. Williams (NJIT)

10:50 – 11:00 Break

11:00 – 11:15 Skin-Test Reactivity to Allergens and Neuropsychological Effects Attributed to Indoor Mold Exposure: A Pilot Study.
-- Damir Mazlagic, MD (UMDNJ) (Presented by Anthony Grippo, MD)

11:15 – 11:30 The Creosote Transit Workers Study: Exposures to Creosote in the Linden, NJ Facility
-- Winston Kwa, MD (Mt. Sinai)

11:30 – 11:45 Seaport Injuries in a Developing Country
-- Julie Caruth, MD (UMDNJ)

11:45 – 12:00 Discussion and Session Evaluation

12:10 – 1:00 LUNCH (hosted by NJIT)

*NOTE: All scheduled times include 5 minutes for questions and discussion.

7. UMDNJ – Continuing Education/Outreach Program

Appendix B Tables 12a and 12b

ERC Applicant Institution: Rev. 01/06

Program Director: Mitchel A. Rosen, MS, CHES

Table 12a

CE Course Offerings by Program Area

Past Year Only

					# Trainees by Profession						# Trainees by Employer						
Course/Seminar Title*	Program Area	Total Trainees	Length of Course	Total Pers Days	MD	NURS	HYG	SAFETY	PARA PROF	OTHER*	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
Comprehensive Industrial Hygiene Review	IH	6	5	30	0	0	6	0	0	0	6	0	0	0	0	0	0
AHERA Inspector	IH	33	3	99	0	0	18	14	0	1	15	0	3	6	0	9	0
AHERA Mgt Planner	IH	15	2	30	0	0	1	12	0	2	11	0	0	0	0	4	0
AHERA Inspector Ref	IH	175	0.5	87.5	0	0	42	91	14	28	150	0	2	23	0	0	0
AHERA Mgt Planner Ref	IH	76	0.5	38	0	0	25	24	0	27	54	0	0	22	0	0	0
Health & Safety for Oil & Gas Operations	IH	24	4	96	0	0	0	24	0	0	24	0	0	0	0	0	0
Overview Indoor Air Quality	IH	5	0.5	2.5	0	0	5	0	0	0	5	0	0	0	0	0	0
Respiratory Protection	IH	4	3	12	0	0	0	4	0	0	4	0	0	0	0	0	0
Bloodborne Pathogens Exposure Control	IH	5	1	5	1	1	3	0	0	0	0	0	2	3	0	0	0
Health Hazard Awareness	IH	83	1	83	0	0	48	33	0	2	63	0	5	15	0	0	0
Scientific Meeting	IH	71	1	71	14	5	23	12	0	17	32	0	2	10	0	27	0
Subtotal IH		**497**		**554**	**15**	**6**	**171**	**214**	**14**	**77**	**364**	**0**	**14**	**79**	**0**	**40**	**0**
NIOSH Spirometry	OHN	28	3	84	4	24	0	0	0	0	24	0	0	3	0	1	0
Trng/Cert in Occ Hearing	OHN	22	3	66	12	9	1	0	0	0	10	1	0	9	0	2	0
Recert in Occ Hearing	OHN	25	1	25	0	25	0	0	0	0	19	0	0	6	0	0	0
Cert. Occ. Health Nurses Reivew	OHN	29	3	87	0	29	0	0	0	0	29	0	0	0	0	0	0
Case Management	OHN	20	2	40	0	20	0	0	0	0	20	0	0	0	0	0	0
Public Health on the Web	OHN	24	1	24	10	14	0	0	0	0	0	0	0	0	0	24	0
NJPHA Meeting	OHN	107	1	107	36	27	11	5	0	28	26	0	27	0	0	54	0
Public Health Literacy Forum	OHN	77	1	77	41	12	0	0	0	24	0	0	10	0	0	67	0
Public Health Symposium	OHN	161	1	161	42	75	9	11	0	24	65	0	19	0	0	77	0
Public Health Seminar Series	OHN	206	1	206	17	115	17	22	0	35	0	0	9	33	0	164	0
Subtotal OHN		**699**		**877**	**162**	**350**	**38**	**38**	**0**	**111**	**193**	**1**	**65**	**51**	**0**	**389**	**0**
Occupational Asthma	OM	10	0.125	1.25	8	2	0	0	0	0	0	0	0	3	0	7	0
Lessons of the Smallpox Vaccination	OM	8	0.125	1	8	0	0	0	0	0	0	0	0	2	0	6	0
Evaluation and Treatment of Spinal Pain	OM	13	0.125	1.625	10	3	0	0	0	0	0	0	0	3	0	10	0

ERC Applicant Institution: Rev. 01/06

Program Director: Mitchel A. Rosen, MS, CHES

Table 12a

CE Course Offerings by Program Area

Past Year Only

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Course/Seminar Title*	Program Area	Total Trainees	Length of Course	Total Pers Days	MD	NURS	HYG	SAFETY	PARA PROF	OTHER*	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
Health & Human Performance	OM	8	0.125	1	8	0	0	0	0	0	0	0	0	0	0	8	0
Molds & Disease	OM	9	0.125	1.125	6	3	0	0	0	0	0	0	0	0	0	9	0
Ergonomics	OM	6	0.125	0.75	6	0	0	0	0	0	0	0	0	0	0	6	0
Fatal Occ Injuries/Assessment & Control Eval	OM	4	0.125	0.5	4	0	0	0	0	0	0	0	0	0	0	4	0
Data: Some Good, Some Bad, Some Ugly	OM	7	0.125	0.875	5	2	0	0	0	0	0	0	0	0	0	7	0
Disaster Psychiatry	OM	7	0.125	0.875	4	3	0	0	0	0	0	0	0	0	0	7	0
Occupational & Environmental Voice	OM	4	0.125	0.5	4	0	0	0	0	0	0	0	0	0	0	4	0
Use of Herbs Prevent & Treat Drug and Envir Toxin Induced Diseases	OM	6	0.125	0.75	4	2	0	0	0	0	0	0	0	0	0	6	0
Traffic Air Pollution and Inner-city Pediatric Asthma	OM	5	0.125	0.625	5	0	0	0	0	0	0	0	0	0	0	5	0
Power Lines, Magnetic Fields & Cancer	OM	7	0.125	0.875	4	3	0	0	0	0	0	0	0	0	0	7	0
Occupational Health Indicators to Actions	OM	4	0.125	0.5	4	0	0	0	0	0	0	0	0	0	0	4	0
Workplace Psychopharmacology V-Tel	OM	41	0.25	10.25	26	12	3	0	0	0	16	0	10	0	0	15	0
The Commercial Driver Medical Examination	OM	6	0.125	0.75	6	0	0	0	0	0	0	0	0	0	0	6	0
Occupational Physicians and Litigation	OM	5	0.125	0.625	5	0	0	0	0	0	0	0	0	0	0	5	0
Emergency Services Lieutenant at Rutgers University	OM	6	0.125	0.75	5	1	0	0	0	0	0	0	0	0	0	6	0
Health in NJ: The Good, The Bad, and The Ugly	OM	5	0.125	0.625	5	0	0	0	0	0	0	0	0	0	0	5	0
Medical Review Officer Certification	OM	6	0.125	0.75	6	0	0	0	0	0	0	0	0	0	0	6	0

ERC Applicant Institution: Rev. 01/06

Program Director: Mitchel A. Rosen, MS, CHES

Table 12a

CE Course Offerings by Program Area

Past Year Only

					# Trainees by Profession						# Trainees by Employer						
Course/Seminar Title*	Program Area	Total Trainees	Length of Course	Total Pers Days	MD	NURS	HYG	SAFETY	PARA PROF	OTHER*	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
Health Effects of Chemical Exposure: Interactions of sensory Perception, Immune Function, Particles and Stress	OM	2	0.125	0.25	2	0	0	0	0	0	0	0	0	0	0	2	0
Blood borne Pathogens	OM	4	0.125	0.5	3	1	0	0	0	0	0	0	0	0	0	4	0
Childhood Lead Poisoning	OM	3	0.125	0.375	3	0	0	0	0	0	0	0	0	0	0	3	0
What Radiation is in our food and water-and so what?	OM	4	0.125	0.5	4	0	0	0	0	0	0	0	0	0	0	4	0
ERC-Trip to Love Canal, Thetford Mines, and Textile Mill	OM	12	5	60	6	0	4	2	0	0	0	0	0	0	0	12	0
Subtotal OM		**192**		**87.625**	**151**	**32**	**7**	**2**	**0**	**0**	**16**	**0**	**10**	**8**	**0**	**158**	**0**
Asbestos Worker Ref	OS	8	1	8	0	0	2	6	0	0	8	0	0	0	0	0	0
Asbestos O&M	OS	6	2	12	0	0	2	4	0	0	6	0	0	0	0	0	0
Asbestos Contr/Sup Ref	OS	58	1	58	0	0	27	26	0	5	48	0	1	9	0	0	0
Asbestos O&M Ref	OS	70	1	70	3	0	11	36	18	2	55	3	1	11	0	0	0
Asbestos Awareness 2 Hr	OS	14	0.25	3.5	0	0	4	10	0	0	14	0	0	0	0	0	0
NJ Asbestos Safety Tech	OS	26	2	52	0	0	6	20	0	0	23	0	0	3	0	0	0
Inspection for Lead Hazards	OS	15	5	75	0	0	4	11	0	0	9	0	0	6	0	0	0
Lead Inspector/Risk Assess Ref	OS	4	1	4	0	0	0	4	0	0	4	0	0	0	0	0	0
Excavation, Trenching and Soil Mechanics	OS	49	3	147	0	0	0	49	0	0	49	0	0	0	0	0	0
Trainer Course Occupational Safety & Health Construction Industy	OS	21	1	21	0	0	0	21	0	0	21	0	0	0	0	0	0
Trainer Course Occupational Safety & Health General Industry	OS	67	4	268	0	0	0	51	16	0	55	0	2	10	0	0	0
Update Construction Industry Outreach Training	OS	19	2	38	0	0	0	19	0	0	19	0	0	0	0	0	0

ERC Applicant Institution: Rev. 01/06

Program Director: Mitchel A. Rosen, MS, CHES

Table 12a

CE Course Offerings by Program Area

Past Year Only

					# Trainees by Profession						# Trainees by Employer						
Course/Seminar Title*	Program Area	Total Trainees	Length of Course	Total Pers Days	MD	NURS	HYG	SAFETY	PARA PROF	OTHER*	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
Update Course for General Industry Outreach Trainers	OS	3	2.5	7.5	0	0	0	3	0	0	3	0	0	0	0	0	0
Occupational Safety & Health Standards Construction	OS	62	4	248	0	0	0	31	14	17	58	0	0	4	0	0	0
Occupational Safety and Health Standards for the General Industry	OS	41	4	164	0	0	0	29	12	0	32	0	0	9	0	0	0
Principles of Ergonomics Applied to Work-Related Musculoskeletal and Nerve Disorders	OS	9	3	27	0	0	0	9	0	0	9	0	0	0	0	0	0
Ergonomic Guidelines for the Health Care Industry	OS	27	1	27	0	0	0	27	0	0	27	0	0	0	0	0	0
Public Warehousing and Storage	OS	20	1	20	0	0	0	20	0	0	20	0	0	0	0	0	0
Introduction to Machinery and Machine Safeguarding	OS	13	1	13	0	0	0	13	0	0	13	0	0	0	0	0	0
Introduction to Safety and Health Mgmt	OS	18	1	18	0	0	0	18	0	0	18	0	0	0	0	0	0
Introduction to Accident Investigation	OS	21	1	21	0	0	0	21	0	0	21	0	0	0	0	0	0
Subtotal OS		**571**		**1302**	**3**	**0**	**56**	**428**	**60**	**24**	**512**	**3**	**4**	**52**	**0**	**0**	**0**
Haz Waste 40 Hr	HST	78	5	390	0	0	0	34	21	23	53	7	13	5	0	0	0
Haz Waste Supervisor	HST	8	1	8	0	0	0	8	0	0	8	0	0	0	0	0	0
Haz Waste Refresher	HST	555	1	555	0	0	0	411	65	79	389	89	33	44	0	0	0
Incident Command Center Training	HST	39	1	39	10	29	0	0	0	0	39	0	0	0	0	0	0
Haz Mat DOT	HST	239	1	239	0	0	0	185	33	21	190	0	12	37	0	0	0
Awareness	HST	49	1	49	0	0	0	41	8	0	45	0	1	3	0	0	0
Operations	HST	220	1	220	0	0	0	159	50	11	189	0	6	25	0	0	0
Haz Materials Technician	HST	5	3	15	0	0	0	5	0	0	5	0	0	0	0	0	0
Confined Space	HST	23	2	46	0	0	0	23	0	0	23	0	0	0	0	0	0
RCRA Awareness	HST	222	0.5	111	0	0	0	157	65	0	194	2	5	21	0	0	0
Disaster Site Train-the-Trainer	HST	17	4	68	0	0	0	17	0	0	17	0	0	0	0	0	0
Disaster Site Worker	HST	79	2	158	0	0	0	56	23	0	73	0	0	6	0	0	0

ERC Applicant Institution: Rev. 01/06

Program Director: Mitchel A. Rosen, MS, CHES

Table 12a

CE Course Offerings by Program Area

Past Year Only

					# Trainees by Profession						# Trainees by Employer						
Course/Seminar Title*	**Program Area**	**Total Trainees**	**Length of Course**	**Total Pers Days**	**MD**	**NURS**	**HYG**	**SAFETY**	**PARA PROF**	**OTHER***	**Private Industry**	**Fed Gov**	**State Gov**	**Local Gov**	**Foreign Country**	**Academic**	**Other**
Permit Required Confined Space Entry	HST	23	2.5	57.5	0	0	0	23	0	0	23	0	0	0	0	0	0
Permit Required Confined Space Standard	HST	22	1	22	0	0	0	22	0	0	22	0	0	0	0	0	0
Phase I & II Environmental Site Assessment	HST	14	3	42	0	0	0	14	0	0	14	0	0	0	0	0	0
Subtotal HST		**1593**		**2019.5**	**10**	**29**	**0**	**1155**	**265**	**134**	**1284**	**98**	**70**	**141**	**0**	**0**	**0**
GRAND TOTALS (All Program Areas		**3552**		**4840.1**	**341**	**417**	**272**	**1837**	**339**	**346**	**2369**	**102**	**163**	**331**	**0**	**587**	**0**

*Group together by Program Area and Provide Sub-Totals for Each Program Area- You may add or delete rows as necessary

ERC Applicant Institution: Rev. 01/06

Program Director: Mitchel A. Rosen, MS, CHES

Table 12b

CE Course Offerings - Summary by Program Area

Past Year Only

				# Trainees by Profession						# Trainees by Employer						
Program Area	Total Number of Courses	Total Trainees	Total Pers Days	MD	NURS	HYG	SAFETY	PARA PROF	OTHER*	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
Industrial Hygiene (IH)	34	497	554	15	6	171	214	14	77	364	0	14	79	0	40	0
Occupational Health Nursing (OHN)	27	699	877	162	350	38	38	0	111	193	1	65	51	0	389	0
Occupational Medicine (OM)	25	192	87.63	151	32	7	2	0	0	16	0	10	8	0	158	0
Occupational Safety	53	571	1302	3	0	56	428	60	24	512	3	4	52	0	0	0
Hazardous Substance Training (HST)	91	1593	2019.5	10	29	0	1155	265	134	1284	98	70	141	0	0	0
Agricultural Safety and Health (Ag S&H)																
Other OS&H (e.g. Toxicology, Epidemiology, Ergonomics, Biostatistics)																
TOTAL	**230**	**3552**	**4840.1**	**341**	**417**	**272**	**1837**	**339**	**346**	**2369**	**102**	**163**	**331**	**0**	**587**	**0**

* Other	
Adminstrative	3
Law	0
Education	80
Architecture	0
Env Consulting	89
Engineering	34
Other Occupation	140

8. Hunter -Hazardous Substances Academic Training Program

Appendix A: Curriculum and selected course outlines

HSAT Curriculum

Course	Nr. Of Credits	Required or Elective	If Required, Source of Req't.
EOHS 745 Hazardous Waste Management	3	Required	HSAT Pgm. Req't.
EOHS 759 Industrial Processes and Plant Visits	3	Required	EOHS/MS Track Req't.
EOHS 741 Environmental and Industrial Hygiene Lab.	4	Required	EOHS/MS Track Req't.
EOHS 760 Field Internship	3	Required	EOHS/MS Track Req't.
EOHS 765 Env. Invest-gations & Remediation	3	Elective	--
EOHS 770.75 Indoor Air Quality	3	Elective	--
EOHS 770.93 Biohazards and Emergency Response	3	Elective	--
EOHS 710 Industrial Safety & Emergency Response	3	Elective	--
Totals:	**25 cr. (19 req'd. in HSAT curric.)**		

Selected course curricula are presented below:

EOHS 745 Hazardous Waste Management: Syllabus.
CUNY, Hunter College, Urban Public Health, Environmental and Occupational Health Sciences

MP Bonchonsky

Course intro and objective: Hazardous waste management is a multidisciplinary endeavor involving both regulatory and technical considerations. The field involves aspects of water pollution, air pollution, solid waste, and ground water that affect the environment and human health. You will learn the basic features of regulation and control of hazardous waste in an industrial setting. We will cover the major elements of federal regulation (RCRA, Resource Conservation and Recovery Act and CERCLA, the Superfund law) and the technical approaches utilized in remediation and hazardous waste control.
Textbook: Basic Hazardous Waste Management, by William C. Blackman, Jr., Lewis Publishers, current edition.

Lectures
1. Hazardous Waste Introduction
2. Extent of the Problem
3. RCRA I
4. RCRA II
5. CERCLA I
6. Brownfields/Environmental Justice
7. Midterm (40%)
8. Video: Industrial Workplace
9. Groundwater 101
10. Fate & transport of contaminants
11. Remediation Techniques … Paper due (20%)
12. Underground Storage Tanks
13. Risk Assessment
14. Final (40%)

The paper requires you to select an industry of your choice (eg, steel, paper, organic chemical, etc.). In 5-8 pages describe their production and hazardous waste handling. Also, draw an accompanying schematic that shows the production and the points at which the waste are produced and where the waste goes, that is, how the waste is managed. This should illustrate and relate to your narrative. It is due immediately upon return from Spring break before the final as shown.

EOHS 759 Industrial Site Visits
Spring 2006
Time and place: Mondays, 8:00—9:45 PM, Brookdale Campus Room E102

Instructor: Jen Richmond-Bryant Office: 1027W
Office phone: (212) 481-7580 Cell phone: (919) 360-1466
Email: jrichmon@hunter.cuny.edu

Office Hours: Mondays, 4:00—5:50 PM. Note: students are welcome to visit my office at any time. Office hours are times when I guarantee that I will be in my office.
Additionally, given that many students in the class work during the day, I will be happy to meet students by appointment at their work or at some central location during lunchtime to answer questions (within Manhattan). Please notify me of your work location, telephone number(s) and email address(es) to facilitate this.

Text and Course Materials:
Required:
Burgess. (1995) *Recognition of Health Hazards in Industry: A Review of Materials and Processes, 2nd Edition.* New York: John Wiley & Sons.
Additional materials will be made available on-line or in class.

Course Requirements and Grading:
There will be five industrial site visits, of which you are responsible to attend and report on ***at least three***. Additionally, you will be asked to visit at least one site independently and report upon it. You must submit at least ***five*** reports, which will each count towards 20% of your grade. If you want to submit more than five reports, then the five with the highest grades will count towards your final grade for the class. There will be no mid-term or final examination.

Course Objectives:

4) Become familiar with various industrial industrial processes and occupational hazards.
5) Learn to recognize occupational hazards.
6) Learn to perform and report upon site inspections.

Important Notes:

1) You are required to sign up for Blackboard (Hunter's electronic course information system) by Monday 2/6 so that you can retrieve course materials and announcements.
2) Powerpoint lecture notes will be available for download on Blackboard at least 24 hours prior to class. You are responsible for printing out a copy of the notes &bringing them to class.
3) You are responsible for all lecture and written material covered in class, even if you miss a class.
4) Reports are due two weeks after a site visit.
5) It is ***highly*** recommended that site visits are spread out through the semester, and not lumped together at the end.
6) If you have an emergency and need to miss class or a deadline, please contact me by email or telephone to catch up on material and facilitate submission of assignments.
7) ***Apparel***: You must wear closed-toe shoes (no sandals)! Clothes can become soiled, so do not wear anything you cannot part with. Some plants have very sensitive chemical processes. Avoid wearing perfumes or make-up in certain cases.

COURSE OUTLINE

Day	**Date**	**Topic**	**Assigned Reading***
***additional readings may be assigned throughout the semester**			
Mon	1/30	Introduction; Elements of a site visit	Burgess, Ch. 1
Mon	2/6	Lead-acid battery manufacturing; Power Battery Site pre-briefing	Burgess, Ch. 24
Wed	***2/8***	***SITE VISIT: POWER BATTERY***	
Mon	2/13	NO CLASS—LINCOLN'S BIRTHDAY	
Mon	2/20	NO CLASS—PRESIDENTS' DAY	
Tues	2/21	Power Battery Site de-briefing; Pharmaceuticals; Pfizer pre-briefing	Handout
CLASSES FOLLOW MONDAY SCHEDULE			
Wed	***2/22***	***SITE VISIT: PFIZER***	
Mon	2/27	Pfizer de-briefing; Metals cleaning and degreasing	Burgess, Ch. 4 & 5
Mon	3/6	Metals grinding and electroplating; Printing; NY Times Printing Plant pre-briefing	Burgess, Ch. 6 & 13; Handout
Wed	***3/8***	***SITE VISIT: NY TIMES PRINTING PLANT***	
Mon	3/13	NY Times Printing Plant de-briefing; Metals machining and welding	Burgess, Ch. 9 & 10
Mon	3/20	Hospitals and health care; NYU Hospitals pre-briefing	Handout
Wed	***3/22***	***SITE VISIT: NYU HOSPITAL***	
Mon	3/27	NYU Hospital de-briefing; Paint manufacturing	Burgess, Ch. 20
Mon	4/3	Painting; Dry cleaning	Burgess, Ch. 15; Handout
INDEPENDENT SITE VISIT TO A LOCAL DRY CLEANER			
Mon	4/10	Dry cleaner de-briefing; Automotive repairs	Handout

INDEPENDENT SITE VISIT TO A LOCAL MECHANIC

Mon 4/17 NO CLASS—SPRING BREAK

Mon 4/24 Mechanic de-briefing;
Construction health and safety; Handout

INDEPENDENT SITE VISIT TO VIEW A CONSTRUCTION SITE (FROM OUTSIDE THE SITE)

Mon 5/1 Construction site de-briefing;
Waste management ; Handout
Hazardous waste site pre-briefing

SITE VISIT: HAZARDOUS WASTE SITE

Mon 5/8 Waste site de-briefing;
Office work and ergonomics Handout

INDEPENDENT SITE VISIT TO OBSERVE OFFICE WORKERS

Mon 5/15 Office work de-briefing; class wrap-up

Mon 5/22 NO CLASS

Appendix B. Tables 4a and 13

[ ] Program

Center Director:

ERC Applicant Institution: Hunter College
Program Director: M. Goldberg
Discipline: HSAT Program (year 1 of 5)

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1]	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Master's degree							
MS - EOHS - HSAT	Master of Science - Environmental and Occupational Health Sciences	2	2	1	1	0	2

Refer to: Supplemental Instructions, page 8.

[1] Trainee counts include all students in the approved programs.

[2] Does not include trainees counted in any of the full-time or part-time categories

[3] In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

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Table 4a

ERC Applicant Institution: Hunter College
Program Director: M. Goldberg
Discipline: IH and HSAT* (Combined--A single admissions process)

Table 13
Minority Recruitment Data[1]
Since Beginning of Current Project Period

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
Year 1: July 1, 2005 to June 30, 2006						
10	9	7	A	in attendance	NIOSH	NA
			B	in attendance	NIOSH	NA
			C	in attendance	NIOSH	NA
			D	in attendance	private	NA
			E	in attendance	private	NA
			F	in attendance	private	NA
			G	in attendance	private	NA

Refer to: Supplemental Instructions, page 11.

[1] First three columns are a group total; last four columns refer to individual trainees.

Appendix C. Faculty Publications (2005-2006)

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, 2006

S. Klitzman, J. Caravanos, C. Belanoff, L. Rothenberg; A multi-hazard, multi-strategy approach to home remediation. Environmental Research, Vol 99(3):294-306. Nov. 2005

S. Klitzman, J. Caravanos, D. Deitcher, L. Rothenberg, C. Belanoff, R. Kramer, L Cohen,; Prevalence and Predictors of Residential Health Hazards: Results of a Pilot Study. Journal of Occupational and Environmental Hygiene, 2: 293-301; June 2005

J. Greenbaum and D. Kotelchuck, "Got Air? The Struggle for Improved Indoor Air Quality at the City University of New York", Chapter in Safety First? The Politics of Occupational Safety and Health in a Deregulated World, Vernon Mogenson, Editor, M.E. Sharpe Publishers (2006).

P. Landrigan, P. Grandjean and D. Kotelchuck, "Principles for Prevention of the Toxicity of Metals", Chapter in Handbook on the Toxicology of Metals (2^{nd} edtn.) , S. Hernberg, Editor (2006 – in press).

Richmond-Bryant, J., Eisner, A.D., Flynn, M.R. "Considerations for modeling particle entrainment into the wake of a circular cylinder." Aerosol Science & Technology. 40: 42-51(2006).

9. Mount Sinai – Pilot Project Program

Appendix A. Pilot Projects Research Training Program Publications

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

Submitted for review:
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).

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

Hagins M, Lamberg EM. Natural breath control during lifting tasks: effect of load. Eur J Appl Physiol

10. Mount Sinai -NORA Program

APPENDIX C

Publications by program area of faculty and trainees during the reporting period that have resulted, in whole or part, from ERC training grant support. Names of all trainee authors are underlined.

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.

S. Klitzman, J. Caravanos, C. Belanoff, L. Rothenberg; A multi-hazard, multi-strategy approach to home remediation. Environmental Research, Vol 99(3): pp 294-306; Nov. 2005.

Klitzman S, Kass D, and Freudenberg N, "Coalition Building to Prevent Childhood Lead Poisoning: A Case Study from New York City." In M. Minkler (Ed.), Community Organizing and Community Building for Health, New Brunswick NJ: Rutgers University Press, 2nd edition: 314-327, 2005.

Freudenberg N and Klitzman S, "Teaching Urban Health" in S. Galea and D.Vlahov (Eds.), Handbook of Urban Health, New York: Springer: 521-538, 2005.

Presentations:

Landsbergis PA, Travis A, Schnall PL, Jauregui M. Job Stressors and ambulatory blood pressure among health care workers. APA/NIOSH Conference on Work, Stress and Health 2006, Miami, FL, March 2, 2006.

Landsbergis PA. (keynote address). Work organization, stress, the changing nature of work, and cardiovascular disease. Partnership for a Heart Healthy Stroke Free Massachusetts, Worcester, MA, June 2, 2006.

Landsbergis PA, Travis A, Schnall PL, Jauregui M. Job Stressors and ambulatory blood pressure among health care workers. International Congress of Occupational Health, Milan, Italy, June 12, 2006.

Paik J, Landsbergis PA, Gurnitz KL, Schnall P, Pickering T, Schwartz J. The association of overtime work hours with ambulatory blood pressure in a cohort of female nurses. NIOSH NORA Symposium 2006, Washington, DC, April 18, 2006.

Schnall P, Landsbergis PA, Jauregui M, Dobson M, Baker D. The need for workplace surveillance: The problem of hidden hypertension. NIOSH NORA Symposium 2006, Washington, DC, April 18, 2006.

Sengupta AK. (keynote address). Do industrial back belts reduce back injury risk in manual material handling? Humanizing Work and Work Environment, HWWE 2005 Conference, Indian Society of Ergonomics at the Indian Institute of Technology, Guwahati, Assam, India, December 11, 2005.

Report: Moline JM, Kwa WC, Brown M, Golden AL. The Transit Workers Creosote Study: Exposure to Creosote in the Linden Facility. Report to NYC Transit Workers Union (2006).