



Center for Occupational and Environmental Health  
University of California  
50 University Hall, #7360  
Berkeley, CA 94720-7360  
Web: <http://coeh.berkeley.edu>

## Course Syllabus

### The Nuts and Bolts of the Revised Strain Index & NIOSH Lift Equation

**Overview:** The UC Ergonomics Research & Graduate Training Program, Center for Occupational and Environmental Health, the Nor Cal HFES Chapter and the ASSE present a 2-day course on the Revised Strain Index and NIOSH Lift Equation. This course includes seminars and lectures with hands-on technique labs for participants to learn how to collect data, calculate scores, and apply them to surveillance, risk assessment, job analysis, and design.

**Target Audience:** This educational activity is intended for ergonomists, physical therapists, occupational therapists, occupational health nurses, industrial hygienists, industrial/mechanical engineers, safety professionals, and others involved in ergonomic exposure assessment.

**Topics:** This 2-day course provides hands on and didactic training on the Revised Strain Index and Revised NIOSH Lifting Equation. Applications for surveillance, risk assessment, job analysis, and job design/intervention will be explored. Participants will learn how to collect data and calculate the simple, cumulative, and composite SI/LI scores for both simple and complex tasks, and for job rotation. Collecting, quantifying, and interpreting data will be practiced in a hands-on technique lab, with a maximum 8:1 student-to-faculty ratio.

#### Objectives:

At the completion of this activity, the learner will be able to:

- Describe the components of the revised strain index and the revised NIOSH Lift Equation
- Demonstrate ability to consistently collect measurements/data as inputs to the RSI & LI
- Calculate the simple, cumulative and composite indices (RSI & LI)
- Use a problem based approach to applying the RSI and LI to surveillance, risk assessment, job analysis, and job intervention/design

**Practice Gap:** This course is meant to help practitioners properly understand and measure task and job level physical exposures in the workplace using the latest technology and research available. Further, the course will teach practitioners how to interpret quantified and predicted exposures in terms of increased risk for MSDs.

**Course Organizing Committee:** Carisa Harris, Jay Kapellusch, Meg Honan, and Melissa Afterman

**Course Faculty:** Carisa Harris, Jay Kapellusch, Meg Honan, Melissa Afterman, and Alan Barr

**Wednesday, July 11, 2018**

**7:30 AM - 8:00 AM:** *Registration, Check-In*

**8:00 AM - 8:15 AM:** *Welcome, Overview of the Day (Shuttle arrives from Downtown Berkeley at 8:05 AM)*

**8:15 AM - 9:30 AM:** *Lecture - Understanding the Constructs of the Revised Strain Index with Dr. Jay Kapellusch*

**9:30 AM - 10:30 AM:** *Lecture - Collecting Data for the Simple RSI: Challenging Case Studies with Drs. Jay Kapellusch & Carisa Harris*

**10:30 AM - 10:45 AM:** *Break*

**10:45 AM - 12:15 PM:** *Hands-On Technique Lab - Practicing Collecting Data (8:1 Student-to-Faculty Ratio Maximum) - All Faculty*

**12:15 PM - 1:00 PM:** *Lunch (On-site Deli available)*

**1:00 PM - 2:00 PM:** *Hands-On Technique Lab - Calculating the Simple, Composite, and Cumulative RSI (8:1 Student-to-Faculty Ratio Maximum) - All Faculty*

**2:00 PM - 3:00 PM:** *Lecture - Applying the RSI to Surveillance, Analysis, and Interventions with Dr. Carisa Harris*

**3:00 PM - 3:30 PM:** *Break (Coffee & Light Snacks)*

**3:30 PM - 4:45 PM:** *Lecture & Hands-On Technique Lab - Problem Based Approach to Applying the RSI to Job Rotation with Dr. Jay Kapellusch (All faculty assisting with lab)*

**5:00 PM:** *Shuttle leaves for Downtown Berkeley*

**Thursday, July 12, 2018**

**7:30 AM - 8:00 AM:** *Registration, Check-In*

**8:00 AM - 8:15 AM:** *Welcome, Overview of the Day (Shuttle arrives from Downtown Berkeley at 8:05 AM)*

**8:15 AM - 9:30 AM:** *Lecture - Understanding the Constructs of the NIOSH Lift Equation with Dr. Jay Kapellusch*

**9:30 AM - 10:30 AM:** *Lecture - Collecting Data for the LI: Challenging Case Studies & Proposed Modifications with Drs. Jay Kapellusch & Carisa Harris*

**10:30 AM - 10:45 AM:** *Break*

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**10:45 AM - 12:15 PM:** *Hands-On Technique Lab - Practice Collecting Data (8:1 Student-to-Faculty Ratio Maximum) - All Faculty*

**12:15 PM - 1:00 PM:** *Lunch (On-site Deli available)*

**1:00 PM - 2:00 PM:** *Hands-On Technique Lab - Calculating the Simple, Composite, and Cumulative LI (8:1 Student-to-Faculty Ratio Maximum) - All Faculty*

**2:00 PM - 3:00 PM:** *Lecture - Applying the LI to Surveillance, Analysis, and Interventions with Dr. Carisa Harris*

**3:00 PM - 3:30 PM:** *Break (Coffee & Light Snacks)*

**3:30 PM - 4:45 PM:** *Lecture & Hands-On Technique Lab - Problem Based Approach to Applying the LI to Job Rotation with Dr. Jay Kapellusch (All faculty assisting with lab)*

**5:00 PM:** *Shuttle leaves for Downtown Berkeley*

### **Course Faculty**

#### **Carisa Harris PhD, CPE, PT**

*Director*

*UCSF/UCB Ergonomics Research & Graduate Training Program*

Dr. Harris is Assistant Professor in the Department of Medicine at UC San Francisco and in the School of Public Health at UC Berkeley. She is also the Director of the UCSF/UCB Ergonomics Research & Graduate Training Program. Dr. Harris' current research ranges from epidemiological studies on healthy worker survivor bias in the assessment of physical, personal and work psychosocial factors associated with Carpal Tunnel Syndrome and subsequent work disability to the development of personal monitoring devices to quantify physical exposures on the individual level. She also collaborates on numerous other projects at the UC Ergonomics lab that explore the ergonomic improvements for endoscopists, hand-arm computer interactions (gestures), work related cardiovascular strain, sedentarianism and the impact of exoskeleton devices on manual material handlers.

#### **Jay Kappellusch PhD**

*Co-director*

*Ergonomics Laboratory for Independent Living Environment & Occupation UWM*

Dr. Kappellusch is co-director of the Ergonomics Laboratory for Independent Living Environment & Occupation at the University of Wisconsin Milwaukee (UWM). Dr. Kapellusch's primary research interests are in development of quantitative ergonomics job design algorithms that can be proactively used to design highly productive, safe jobs in manufacturing and service industries. He is working to integrate these algorithms with modern Industrial Engineering philosophies, such as Lean Manufacturing and Six Sigma, as well as traditional Industrial Engineering tools and techniques, such as methods engineering and statistical quality control, to provide industry with a comprehensive job design system. On a parallel track, Kapellusch is interested in studying the physical capabilities of older and disabled

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populations with the primary objective of developing simple yet effective devices and/or equipment that would enable these individuals to be more functional and productive members of society. He also works with members of the UWM Center for Ergonomics to build upon his ergonomics systems work with industry to create comprehensive job risk management software, training packages and to extend state of art consulting services/resources to industry on a “fee for service” basis.

**Meg Honan RPT, MS, CPE**

*Principal Ergonomist*

*Genentech*

Meg Honan is Principal Ergonomist at Genentech, California. Her ergonomics experience has focused on employee work area and work method assessment, and ergonomics program development in Plant, Laboratory, R&D and Office work environments. At Genentech, the Ergonomics Group supports a staff of 14,000 on the South San Francisco site. She works with interdisciplinary teams, including design, process and production engineers, EHS and safety teams to integrate ergonomics into the Genentech’s continuous improvement process. She is a board Certified Professional Ergonomist with a MS in Environmental Health Sciences from the University of California, Berkeley, which included a research focus on wrist and shoulder postures during alternative keyboard use. Prior to her degree in ergonomics, Meg had over ten years of clinical experience as a Physical Therapist, specializing in treatment of work-related injuries and development of skills-based back education and training programs. She is a member of the Office Ergonomics Research Committee (OERC) and HFES.

**Melissa Afterman MS-HFE, CPE**

*Senior Ergonomist & Project Manager*

*VSI Consulting*

Melissa Afterman is a Senior Ergonomist and Project Manager with VSI Consulting. She earned her Bachelor’s degree from Cal Poly SLO in BioResource/Agricultural Engineering with a Dance Minor, and her Master's degree in Human Factors/Ergonomics Engineering from San Jose State University. Since the turn of the century, Melissa has provided human factors and ergonomics consulting services, specializing in biotechnology and pharmaceutical R&D and manufacturing work environments. She also enjoys developing ergonomics programs and educational resources. Melissa is a Board Certified Professional Ergonomist (CPE) and a member of the San Francisco Bay Area Ergonomics Roundtable (BAER).

**Alan Barr**

*Principal Development Engineer, Ergonomics Program*

*UC Berkeley*

Alan Barr is Principal Development Engineer for the Ergonomics Program at UC Berkeley. His undergraduate degree was the biomechanics track of the Exercise Science BS degree at Davis. Ever since completing that degree, almost 20 years ago, he has been studying how the human body interacts with and responds to physical factors in the real world. He has a strong curiosity and understanding of the physical demands placed on the human body during a wide range of human activity. For the last 17 years he has been employed as an engineer with the Division of Occupational and Environmental Medicine at UCSF and the primary engineer for the Ergonomics Graduate Training Program at UC Berkeley. He has spent the last 13 years collaborating on research related directly to health and safety issues surrounding the use of hand-operated drills as they are used in concrete drilling. As part of his research, he has designed and built many prototypes to be formally studied as effective interventions in mitigating potentially harmful effects associated with traditional drilling methods. He has also been the primary engineer on three CPWR/NIOSH funded projects designing and evaluating jigs and other interventions for concrete drilling that have led to several peer reviewed publications

## **Accreditation**

### **Certified Professional Ergonomists**

Certified Professional Ergonomists may be eligible to earn up to 14 contact hours (7 CoC points) for this course. Visit [http://www.bcpe.org/wp-content/uploads/BCPE\\_CoC\\_FAQs\\_April2016.pdf](http://www.bcpe.org/wp-content/uploads/BCPE_CoC_FAQs_April2016.pdf) for more information.

### **Physical Therapists**

Approved for 1.4 CEUs by CPTA #18-288.

### **Registered Nurses**

Provider approved by the California Board of Registered Nursing, Provider Number 12983, for 14 contact hours.

### **Registered Environmental Health Specialists**

This course has been approved for 14 contact hours, REHS. The Center for Occupational and Environmental Health (COEH) UC Berkeley is a Registered Environmental Health Specialist (REHS) Program Continuing Education Accreditation Agency approved by the California Department of Public Health.

### **Occupational Therapists**

Occupational Therapists may be eligible to earn up to 14 contact hours for this course. Visit [http://www.bot.ca.gov/board\\_activity/laws\\_regs/cc\\_regulations.shtml#4161](http://www.bot.ca.gov/board_activity/laws_regs/cc_regulations.shtml#4161) for more information.

### **Industrial Hygienists**

ABIH® Diplomates may be eligible to earn up to 14 contact hours for this course. Visit <http://www.abih.org/maintain-certification/cm-credit-education-events> for more information.

### **Safety Professionals**

Certified Safety Professionals may be eligible to earn up to 14 contact hours for this event. Visit <http://www.bccsp.org/Certifications/Recertification> for more information.

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