

**University of Alabama at Birmingham**  
**Deep South Center for Occupational Health and Safety**  
**Annual Program Highlights**  
**Reporting Period: July 1, 2012 – June 30, 2013**  
**Principle Investigator: Claudiu T. Lungu, PhD**

## **Overview**

Enhancing the interdisciplinary aspect of our ERC has been a priority for our faculty. After a semester of didactic courses, building teams, and industrial site visits, all the NIOSH trainees are taking Interdisciplinary Worksite Evaluations where under Dr. Elizabeth Maples' direction interdisciplinary teams are conducting independent evaluations at designated worksites. The goal is to have the teams solve real-world occupational health and safety problems with reasonable, achievable controls. Recently, an interdisciplinary team advised by Dr. Shaun Crawford was asked to determine possible sources of cadmium exposures at a foundry in north Birmingham, AL. The site uses recycled steel and serves the southeast market with over 600,000 tons of annual production capacity.

The area of concern for the Interdisciplinary Team was the increase in cadmium (Cd) exposures since 2008. Cadmium personal monitoring results ranged from 2.5 – 5 µg/m<sup>3</sup>. It was hypothesized that the increased exposure was due to increased levels of cadmium in the scrap metal. However, no changes have been made in the suppliers in the past years and spot monitoring of the scrap did not reveal any important Cd sources. After more research it was determined by the team that a new charge-carbon was used in recent years and its Cd content was significantly higher compared with the previous one. Recommendations were made to use a different supplier of charge-carbon. The results of this investigation were communicated at the annual AIH Conference and Exposition in Montreal, CA.

The DSC faculty are conducting innovative research and disseminating the research to improve workplace safety and health. Dr. Sean Gallagher, faculty in the Occupational Safety and Ergonomics program received the prestigious 2013 IEA/Liberty Mutual Medal in Occupational Safety and Ergonomics for a paper he co-authored with John Heberger entitled, "Examining the Interaction of Force and Repetition on Musculoskeletal Disorder Risk: A systematic Literature Review". Dr. Gallagher's paper was published in the Human Factors journal in February 2013.

One of the Center's research priorities in industrial hygiene is the use of novel carbonaceous materials to improve performance in respiratory protection, air sampling and emission control. Using seed money awarded from the UAB SOPH, Dr. Claudiu Lungu collected preliminary data on the use of carbon nanotubes in air sampling devices. Working with a NIOSH trainee, doctoral student, Evan Floyd, the idea was further developed and experimental data was collected on a new concept: the use of energetic visible light flash to desorb vapors from preloaded carbon nanotube felts. This research resulted in a doctoral dissertation for Evan: Photothermal Desorption of Toluene from Single Walled Carbon Nanotubes and Activated Carbon Sorbent and was the bases for a research grant application.

A new NIOSH R21 grant was just awarded having Dr. Lungu as PI and Dr. Floyd (recently hired as assistant professor at University of Oklahoma) as Co-Investigator to further explore this concept in air sampling devices: A novel Desorption Technique for Improved Sensitivity in Sampling for Gases. NIOSH trainee, Samantha Connell, participated in the project and worked on the fabrication and characterization of the carbon nanotube felts, which was part of her MSPH theses: Comparison of Fabricated Carbon Nanotube Sorbent Felts and 3M™ Charcoal Sorbent Wafers to Assess Passive Sampling Capabilities for VOCs. Samantha recently was offered a position as a Research Assistant with the BONAS project at Ecole des

sciences criminelles (ESC) of the University of Lausanne and Institute for Work and Health in Lausanne to work on developing high sensitivity sensors and sampling devices for toxic substances.

Dr. Karen Heaton, an assistant professor in the UAB School of Nursing, was a DSC pilot project funding recipient in 2010. She used the pilot funding to launch her research into the sleep behaviors of truck drivers. Dr. Heaton was awarded a NIOSH R21 grant for testing an online intervention program focusing on sleep and fatigue management among the nation's truck drivers. She has been visiting industry trade shows and reaching out to trucking companies and associations to recruit drivers to participate in the study. Heaton's goal is to arm truck drivers with the information they need to recognize the importance of sleep for safety, well-being, and, ultimately, baseline human health. If the online model proves to be effective in reinforcing the basics of sleep among participants and encouraging them to modify their behavior, Heaton hopes that trucking companies will add it to driver-safety training. The program could even become part of the first health-related requirements for Federal Motor Carrier Safety Administration (FMCSA)-regulated training, something every new long-haul driver would take in the interest of public safety.

## **Center Highlights**

### **Industrial Hygiene**

**Program Director: Claudiu T. Lungu, PhD**

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**Occupational Health Nursing**  
**Program Director: Jennan Phillips, DSN**

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**Occupational Safety and Ergonomics**  
**Program Director: Gerard Davis, PhD**

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