

**University of Alabama at Birmingham  
Auburn University  
Deep South Center for Occupational Health and Safety  
Reporting Period: July 1, 2016 – June 30, 2017  
Principle Investigator: Claudiu T. Lungu, PhD**

**SECTION I**

**PROJECT SUMMARY**

The mission of the Deep South Occupational Health and Safety Education and Research Center (DSC) is to develop professionals who protect and promote the health and safety of workers through interdisciplinary education, research, and outreach programs, and our goal is to be a center of excellence that promotes occupational safety and health through interdisciplinary education and research to serve the needs of Alabama, the Florida panhandle, Georgia, Mississippi and Tennessee. The Center is a consortium of programs at the University of Alabama at Birmingham (UAB) in Birmingham, and Auburn University (AU) in Auburn, AL. The Center includes masters and doctoral academic programs in Industrial Hygiene at the UAB School of Public Health, Occupational Health Nursing at the UAB School of Nursing, and Occupational Safety and Ergonomics at the Department of Industrial and Systems Engineering in the Samuel Ginn College of Engineering, at AU. In addition, the Center maintains a supplementary doctoral program, Occupational Injury Prevention Research within the Occupational Safety and Ergonomics program. The Center also supported in the past funding cycle Continuing Education, Outreach, and Diversity programs. The DSC is administratively located in the UAB School of Public Health. Center activities are coordinated through an Administrative Core consisting of the Center Director, the Deputy Director, an Executive Committee, an external Board of Advisors, and support staff. The Board of Advisors includes representatives from all of the occupational safety and health disciplines, and representatives from government agencies and labor unions from all of the states in our region.

The past project period was one of substantial change and improvement for the Deep South ERC. The number of faculty associated with the Center's has grown due to additions in some of the academic programs and extended collaborations in all programs. We have developed and implemented goals, objectives, and measures of effectiveness to enhance program planning; there have been significant improvements made in our academic program curricula; we have been active in assessing and meeting the needs of our region; we have significantly enhanced interdisciplinary activities for our students; we have continued to graduate masters and doctoral students who are well prepared to pursue their professional careers in occupational safety and health; we have been active in research; and we have provided extensive professional development programs and outreach efforts.

During the project period 109 masters students and 42 doctoral students were enrolled in Center academic programs. There were 104 graduates from these programs during that time: 93 masters and 11 doctoral students. The continuing education program offered 274 courses that reached 6370 attendees. In addition, the continuing education program conducted several needs assessments and focus groups for the ERC to evaluate and assess the impact we have on our region and provide new innovative approaches in occupational health and safety.

Through these activities, the Deep South ERC continues to be a “Center of excellence that promotes occupational health and safety through interdisciplinary education and research” that serves our regions workforce.

## **RELEVANCE**

The regional impact of our academic programs is indicated by the fact that approximately 70% of our graduates are still practicing in the occupational safety and health professions in the southeast. We are also involved in research applicable to the industries in our region and our outreach and continuing education programs have enhanced the knowledge and skills of practitioners through our offering of 65 relevant training courses and seminars reaching over 2787 attendees.

## **KEY PERSONNEL**

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**ERC WEB LINK:** [www.uab.edu/dsc](http://www.uab.edu/dsc)

**University of Alabama at Birmingham  
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Annual Program Highlights  
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**Center Wide Activities  
Center Director: Claudiu T. Lungu**

The DSC ERC began collaborations with regional ERCs (Kentucky Ag Center and Sunshine ERC) to increase the visibility of SouthOn and the DSC Research Symposium. The ERCs joined forces to develop a co-collaborative conference that will roll out in Spring 2018. During this cycle, the Deep South Center ERC invited 3 of Kentucky Ag Center Pilot Project recipients to present at the Deep South ERC Research Symposium. Also, the Sunshine ERC students were invited to submit abstracts for the student poster session. Students from both the Kentucky AG and Sunshine ERC attended the Emerging Issues and Research Symposium. Graduates students from the regional ERC were able to network and discuss future collaborations. The symposium also offered keynote presentations addressing Human Trafficking, returning veterans and ergonomics.

To offer cross sectional training for OSE students, the IH program provided an IH Lab training for MISE students. This interational training experience allowed OSE students to learn IH sampling techniques for hearing and air sampling. Students were also able to ask IH related technical questions to Shaun Crawford, PhD, CIH, IH Instructor.

**Continuing Education  
Outreach and Diversity Recruitment  
Program Director: Allyn Holladay**

The continuing education program enjoyed multiple achievements during 2016-2017 reporting period. We offered 67 courses/workshops/outreach and professional development events serving 2719 attendees. During this period, the military accepted 2 proposals from the CE program to offer two Spirometry courses (June 2017). We continue to be a source for CEUs for our area ASSE Chapters (Birmingham, Tuscaloosa, Auburn and parts of Southern Mississippi). This has been recognized as an added value to monthly and quarterly safety meetings for this group of professionals. The CE program has also added Visify as collaborative partner to develop more online safety training courses. CE instructors worked with Visify's creative online designers to develop 3 online courses available through Visify's online platform. These courses are cross marketed—Visify offers them to clients (among them, occupational workers and long haul trucking companies) and DSC provides links on the website for our constituents.

In an effort to broaden our reach and find meaningful ways to expand our audience, our ERC continues to grow through collaboration. DSC provided support, content or both, to events shared with Kentucky, Florida and North Carolina's ERCs as well as the OHN Nursing Network (SouthOn) and regional businesses and groups providing education to our professionals, such as the Manufacture Alabama, Veterans Disability Symposium and PESCA Conference.

The MSHA (Mine Safety Health Association) Committee has accepted DSC's proposal to provide CEUs for the educational programs and technical sessions during the conference. The CE Director is a member of the MSHA Conference Planning Committee and is directly involved in determining content and instructors for the sessions. The CE Director will attend the conference and be available to assist with rosters and evaluations throughout the event. This is a great opportunity for the DSC to offer a value add to a huge conference in the region.

ASSE has been instrumental in getting the word out about our courses and events. They were sponsors of our Ergo course in August 2016 and have been eager to offer support and sponsorship of other courses and events as we progress on the calendar this year. This partnership is of great value to the CE Program.

Our first Lunch and Learn of the fall was held virtually on N95 Day. Dr. Shaun Crawford, Paulisha Holt and Laura Wilson created youtube videos on respirators selection and use. These videos were later posted on our website and linked to Facebook. We also posted other awareness information to support N95 awareness throughout the day.

The CE Director, Allyn Holladay has expanded her safety role. In spring 2017, Allyn Holladay was elected to serve as ASSE Regional Treasurer and Chairperson for the CACSCE Committee. She continues to serve on multiple planning committees for conferences and events in the region.

### **Outreach**

The Outreach program strengthened its collaboration with the Tuscaloosa Area Health Education Centers (AHEC). The AHEC program is committed to growing the health care workforce, maximizing diversity and facilitating distribution, especially in underserved communities. These events included the 4th Annual Mental Health Summit (Aug 2016), You Are the Key to HPV Prevention Webinar (August 2016) and the First Aid Mental Health Workshops (July 2016 – July 2017). These programs were free to the public and were well-attended by healthcare professionals, social workers and MDs. Ms. Paulisha Holt was invited to host a short seminar for the Dixie AHEC Scholars Program (July 2017) at the University of West Alabama. Ms. Holt's presentation featured hearing safety using the dangerous decibels and Youth@Work: Talking Safety curriculum.

This year's Environmental Occupational Summer Institute welcomed 10 undergraduates from both the DSC regional and beyond. This year we welcomed our 1<sup>st</sup> scholar from the University of Puerto Rico. The Deep South ERC Summer Institute has 90% attendance by minority undergraduate students. We worked to make this year's summer institute more interactive based on feedback received from the prior year. Students visited both UAB and Auburn University campuses, and Nucor Steel in Birmingham, AL. These scholars were given opportunities to network with graduate and doctoral students in the program. It was important and meaningful to us to make sure the students received substantive "takeaways" from Summer Institute; therefore, we asked one of our partners, TrioSafety, to provide CPR certification at the end of the session

As part of the Deep South ERC's objective to increase diversity through improved recruitment, the ERC participated in several career fairs and events at regional Historically Black Colleges and Universities (HBCUs). Ms. Paulisha Holt attended the following career fair and events to help increase the Deep South ERC visibility with regional HBCUs; Alabama State University Graduate School Fair (March 2017); the Joint Annual Research Symposium (JARS), held on the campus of Tuskegee University (March 2017); 2nd Annual Graduate School Recruitment Fair on the campus of Morehouse College (May 2017). These events/career fairs provided a great opportunity for Ms. Holt to discuss the ERC's Annual Summer Institute and the ERC's academic programs. We saw an increase in applications submitted by African American students for the fall 2017 semester., We believe that our increased attendance of HBCU career fairs and events has encouraged the enrollment of more culturally diverse undergraduate students.

**Occupational Health Nursing**  
**Program Director: Karen Heaton**

US News & World Report, in its survey of the Best Nursing Schools for 2016, ranked the UAB School of Nursing 13th in the nation for the quality of its doctoral, masters and baccalaureate programs. The master's level nurse practitioner program was recognized for achieving outstanding balance between quality and affordability and ranked number one in the "Top 50 Best Value MSN Programs of 2015".

OHN students are also encouraged to attend and present at the weekly ENH/ERC seminar at the SOPH on the UAB campus. This provides another opportunity for inter-professional learning and interaction. During these seminars, environmental health, and occupational health and safety personnel from the area present their work, as well as ERC faculty members. Dr. Heaton routinely attends this meeting and has presented some of her work on injury prevention.

**Industrial Hygiene**  
**Program Director: Claudiu T. Lungu**

Claudiu Lungu was Member of the Organizing Committee, International Conference on Environmental Health and Safety, Valencia, Spain, October 24-26. The 18th International Conference on Occupational Health and Safety aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of Occupational Health and Safety. It also provides the premier interdisciplinary forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns, practical challenges encountered and the solutions adopted in the field of Occupational Health and Safety. Dr. Lungu presented the paper: C.T. Lungu, J. Oh, E.L. Floyd: Photothermal Desorption (PTD) of Buckypapers (BPs) for Volatile Organic Compound (VOC) Sampling and Analysis, Claudiu T. Lungu, PhD

**Occupational Safety and Ergonomics**  
**Program Director: Richard Sesek**  
**Occupational Injury Prevention Highlight**  
**Director: Sean Gallagher**

The Auburn OSE/OIP group has developed two new ergonomics risk assessment tools based upon fatigue failure principles: the Lifting Fatigue Failure Tool (LiFFT) (Gallagher, Sesek, Schall, Jr., and Huangfu, 2017) for low back risks associated with manual material handling, and the Distal Upper Extremity Tool (DUET) (Gallagher, Schall, Jr., Sesek, and Huangfu, in review) for upper extremity MSDs. Both of these tools have generated great interest among ergonomics professionals. Both have been validated against cross-sectional databases (demonstrating dose-response relationships between the tool prediction and prevalent outcomes), and DUET has been validated using prospective databases.

The OSE/OIP faculty were awarded several large grants to support their research during the project period. Mark Schall of the Department of Industrial and Systems Engineering along with Michael Zabala and David Bevely of the Department of Mechanical Engineering have partnered with human performance assessment firm Aptima, Inc. to develop a system to improve the motion capabilities of exoskeletons through a sensor suite integrated into a textile base-layer suit. The goal is to improve performance and decrease operator fatigue, reducing injuries and fatalities of military personnel. This work has been sponsored by the U.S. Army Research Office under Contract W911NF-17-C-0062.

The OSE/OIP faculty was awarded a SBIR contract from CFD Research Corp. to develop a cyclic loading model for spinal loading due to helicopter induced vibration exposure, using the fatigue failure theory noted

above. Other objectives of this SBIR were to perform an experiment to validate a muscle fatigue model, and to investigate the effects of long term (4 hour) sitting in both hunched and upright postures.

The OSE/OIP faculty and students have collaborated with investigators at other NIOSH centers to further advance their research agendas. Funding from the Southwest Center for Agricultural Health, Injury Prevention and Education, the Southeast Center for Agricultural Health and Injury Prevention, the Center for Construction Research and Training (CPWR), and the Sunshine Education and Research Center, for example, has supported the dissertation work of numerous OSE/OIP students (Granzow, Lusk). The interdisciplinary research has also led to the publication of several journal articles (Chen, Schall, and Fethke, in press; Granzow et al., 2018)