A. COVER PAGE

Project Title: Deep South Occupational Safety and Health Education and Research Center	
Grant Number: 5 T42 OH 8436-17	**Project/Grant Period**: July 1, 2017 – June 30, 2022
Reporting Period: July 1, 2021 – June 30, 2022	**Date Submitted**: 06/30/2022
Program Director/ Principal Investigator CLAUDIU T LUNGU , BS MS PHD Phone number: 205-934-2072 Email: clungu@uab.edu	**Administrative Official Information** MELINDA COTTEN 701 20th Street South Birmingham, AL 35294 Phone number: 2059758169 Email: mcotten@uab.edu
Change of Contact PD/PI: N/A	
Human Subjects: No	**Vertebrate Animals:** No
hESC: No	**Inventions/Patents:** No

B. ACCOMPLISHMENTS

B.1. What are the major goals of the project?

- Continue streamlining and augmenting successful Interdisciplinary courses by adding new sites and striving for projects that support industry and provide students with invaluable experience.
- Continue supporting and encouraging our faculty and Program Directors' attendance and participation in professional conferences and OHS presentations in the region. Our IH, OHN and OSE/OIP faculty each participate in large-scale PDCs providing training and practical research outcomes regularly.
- Continue successful series of the SERRS by planning for 2023.
- Again, COVID has impacted some interdisciplinary and outreach activities (i.e. bus tour). We will continue to look for new/innovative events/activities to enhance trainee experience and interdisciplinary learning.
- We continue to seek a center-wide research initiative. Meanwhile several faculty and students have been working together on various cross-discipline projects and we will continue this effort in the next reporting period.

B.2. What did you accomplish under these goals?

- ENH680 Interdisciplinary Field Studies and ENH681 Interdisciplinary Worksite Evaluation were again adjusted, due to the continuing impacts of the pandemic. In the fall, students still met in interdisciplinary teams (via Zoom/Teams) to learn about worksite evaluation, complete a team assignment, and attend seminars from the three disciplines. We added a special DEI Lecture to introduce students to disparities in the workplace. In the spring, we were able to return to the on-site visits and projects. 3 sites were visited producing 4 projects on noise, ergonomics, MSDs, and exposures.
- The fifth annual Southeast Regional Research Symposium was held in Chapel Hill, North Carolina March 20-23, 2022. The format for this year's symposium was hybrid. There were 98 registrants for the in person event and 56 registered to attend virtually. The continued collaboration among the ERCs and Ag Centers in the southeast (Sunshine Center ERC (FL), the Southeastern Coastal Center (FL), the Central Appalachian Regional ERC (KY), the Southeast Center for Agricultural Health and Safety Prevention (KY), and the North Carolina Occupational Safety and Health ERC (NC)) was highly successful. This year, there were 28 posters from regional Masters and Doctoral students and, there were 12 Pilot Project Presentations. Projects varied, covering many topics such as, mental health, shift work, stress, exposures and ergonomics. This year's event also highlighted a panel made up of regional representatives from state departments of health on COVID and Occupational Health. Sara L. Tamers, PhD, MPH, Health Research Scientist, NIOSH and Coordinator of the Research Program Development and Collaboration Arm of the Total Worker Health Program was the Dillon-Carnahan Keynote speaker. Governor Ernie Fletcher, MD, the SouthON Keynote Speaker, presented on "Recovery Friendly Workplaces". The collaboration will continue and the sixth annual SERRS will be held back in Florida in 2022.
- In the OSE academic training program at AU, Dr. Gerard Davis ended his tenure as the program director January 2021 when he announced his retirement effective January 2022.
- Dr. Mark Schall transitioned into the Director role. Dr. Schall was named a "Rising Star of Safety" in 2021 by the National Safety Council. He was a co-author on the Chartered Institute of Ergonomics and Human Factors "Ergonomics Best Paper Award" and was the first-author of the "Best Paper in the HFES Occupational Ergonomics Technical Independent Research Category" in 2021.
- Dr. Yadrianna Acosta-Sojo joined the OSE faculty in January 2022 as an Assistant Professor. Dr. Acosta-Sojo was a Post-doctoral Research Fellow in the Department of Industrial and Operations Engineering at the University of Michigan before joining the OSE faculty.
- Dr. Claudiu Lungu continues to work with colleagues from the UAB School of Medicine and the UAB School of Engineering on the new Superfund Research Center. Dr. Lungu is the Co-PI on one of the projects within the Superfund Research Center: Nano-Micro Hybrid Fibrous Materials for Contaminant Removal and Site Remediation.

- Faculty in the Industrial Hygiene program Drs. Jonghwa Oh and Claudiu T. Lungu are actively seeking research support submitting research proposals. Dr. Oh obtained funding for two pilot projects: Development of a Fit-Matching App: Prioritizing Gap Measurement Locations between Safety Eyewear and the Wearer's Face, DSC PPRT and Feasibility of the Current 3D Technology for the Selection of Better-fitting Safety Eyewear, University of N. Carolina Education and Research Center PPRT and applied for NIOSH R03 and R21 projects as PI and Co-PI.
- Dr. Heaton has been the Director of the PhD Program in the UAB SON for seven years, and her competency and leadership were recognized by her invitation to evaluate the University of Pennsylvania's School of Nursing PhD Program. She was also honored by presenting the Catherine Dempsey Memorial Lecture to attendees of the American Association of Occupational Health Nurses annual conference.
- Faculty and students in the Center have conducted numerous research projects to assist regional industries with occupational health problems such as hearing conservation, injury control, workplace design, cost containment, respirator fit, occupational skin disease, and ergonomic hazards. One example of such a project was regarding the use of cooling shirts for linemen at Alabama Power. One of our industrial hygiene doctoral students, Margaret Summers, conducted a study to evaluate effectiveness of various cooling shirts designed by OSH specialists at Alabama Power Co. Her study resulted in an improved-design shirt which was approved by the company's leadership and will be used to prevent heat stress in linemen and other workers exposed to heat.
- Dr. Stephanie Hammond was named Deputy OHN Director in 2021.
- The Continuing Education program of the DSC pivoted due to COVID and created a fully online Audiometric Testing and Hearing Conservation Course. CAOHC supported this effort and has noted the DSC's profound impact on advancing the CAOHC mission with our successful Audiometric Testing and Hearing Conservation Courses. "The Deep South Center for Occupational Health and Safety has proven to be invaluable members of the Hearing Conservation Community by providing the opportunity for those interested in hearing loss to certify as Occupational Hearing Conservationists (OHCs)." The course, both full AT and refresher have been offered over 15 times collectively, since January 2021. Additionally, we were able to provide the exam in Spanish for a native speaker in the course. Over 165 professionals from the Southeast Region and beyond (i.e. Hawaii, Mexico, North Dakota, New York, Washington State and Puerto Rico) have attended the DSC AT Courses this period.
- Due to COVID-19 many events and programs that our Outreach Program participates in (i.e. CASCE) have been canceled during this reporting period. However, we continued to work in the community, by participating in FIESTA, which will returned in September 2021, and the innovative Environmental Occupational Safety and Health Institute (a.k.a. the Summer Institute) was held in person in May, 6 undergraduate students participated in the program. As a spin-off to the DSC Summer Institute, the DSC is partnered with Dr. Lisa McCormick to create a new program, Public Health Influencers, focusing on high school age students. Its initial program was held June 13-17, 2022.
- **Minority Recruitment and Retention:**
  Recruitment and retention of minorities and underrepresented individuals has been one of the primary objectives of the DSC. Currently there minority students represent more than 12% of the student population in our three academic programs. Our main activities related to minority recruitment this past period of time were:

  - While there were no focused trips or in person activities for minority recruitment due to the continued effects of the pandemic, the DSC Director maintained contact with colleagues at HCBUs and the regional TPG, University of North Alabama . These relationships foster collaboration among trainees/faculty as well as opportunities to highlight the DSC program.
  - The Summer Institute continues to grow and is considered an important minority recruitment tool.
  - Recruitment materials for the DSC have been revamped and updated-as the pandemic has eased, plans for recruitment trips to HCBUs, Eastern Kentucky University, Western Carolina, etc., are being made. Staff, faculty and some trainees will participate in recruitment activities.
  - Internally, the OSE faculty continues to work with the College of Engineering's Academic Excellence Program (a minority recruitment and retention program).

B.3. Competitive Revisions/Administrative Supplements

N/A

B.4. What opportunities for training and professional development did the project provide?

- Several students and a number of faculty participated the fifth annual Southeast Regional Research Symposium. Dr. Jonghwa Oh (IH), Duha Ali (OSE), Nathan Pool (OSE) presented their pilot project outcomes and trainees were well-represented in poster presentations. ERC Faculty from OHN, IH, OSE and OIP were in attendance.
- All trainees are member of local chapters of occupational safety and health professional organizations (i.e. ASSP, AIHA, AAOHN, HFES, ACGIH) and participate in local meetings and events.
- Support is provided to trainees to attend and present at national conferences, i.e. AAOHN, HFES, AIHce, etc.

B.5. How did you disseminate the results to communities of interest?

Information pertaining to the center is shared via social media (ie. LinkedIn, Facebook, and twitter), newsletters (ie. Mailchimp), and website.

B.6 - What do you plan to do during the next reporting period to accomplish the goals?

Maintain or increase the number and quality of trainees in each of the academic programs.

- Increase minority recruitment activities with the goal of maintaining at least 20% minority in our academic student population.
- Continue to enhance interdisciplinary activities.
- Increase the online course and degree offerings.
- Promote the DSC to businesses and organizations in the region and continue to attract new partners who will use the DSC's training andOHS resources.
- Increase our collaboration with other ERCs and TPGs. Proposed collaborations are:
    1. Joint NORA research symposium with Sunshine Center and Central Appalachian Region Center starting next project period to make it the primary OHS research event of the region.
    2. Continue and broader the common interdisciplinary activities with Sunshine ERC (Military Occupational Safety and Health Workshop at the Pensacola Naval Air Station) and continue our heat exposure research collaboration.
    3. Share the interdisciplinary activities' results among DSC, Sunshine, NC ERC and Central Appalachian and produce an electronic repository of knowledge gained and solved problems.
    4. Continue and increase our research collaborations with other academic institutions from the Southeast region (University of Georgia, University of South Florida, University of Oklahoma, Mississippi State University, University of Tennessee at Knoxville, Virginia Tech, etc.)
- Increase the Center's research productivity
- Submit at least two major grant applications with co-investigators from at least two of the academic programs

- Continue to engage all the trainees in research projects. Trainees will participate actively in research projects and will submit research proposals. Each doctoral trainee will submit at least one research proposal for a pilot project or other funding mechanisms for doctoral students.
- Continue and increase the effort of diversifying the Continuing Education offerings of courses and programs to a broader audience in the region
- Develop or participate and maintain some distance-learning based courses as requested by participants.
- Strengthen partnerships/collaborative with other ERCs as appropriate to provide excellence in CE.
- Maintain all necessary accreditation to grant CEUs to our constituents.
- Continue and increase our Outreach effort to reach a broad audience and include those in need the most of OHS information such as minorities, Latinos, children, and persons with disabilities.
    - Conduct at least two outreach activities per year focused on populations at risk.
    - Conduct at least two outreach activities per year focused on school students.

C. PRODUCTS

C.1. Publications, conference papers, and presentations

Nothing to Report

C.2. Website(s) or other Internet site(s) – include URL(s)

C.3. Technologies or techniques

Nothing to Report

C.4. Inventions, patent applications, and/or licenses

Nothing to Report

C.5. Other products and resource sharing

Nothing to Report

D. PARTICIPANTS

D.1. What individuals have worked on the project? Please include calendar, academic, and summer months.

Commons ID	S/K	Name	Degrees(s)	Role	Cal	Aca	Sum	Foreign	Country	SS
CLUNGU	K	Claudiu T. Lungu	PhD	Program Director	4.1					
ALLYNH		Allyn Holladay		Deputy Director	2.0					
PSHOLT		Paulisha Holt	MBA	Staff	4.2					
		Virginia Harvard	MBA	Financial Adm	2.0					
jonghwa		Jonghwa Oh	PhD	Faculty	1.8					

D.2 Personnel updates

a. Level of Effort:
b. New Senior/Key Personnel:
c. Changes in Other Support:
d. New Other Significant Contributors:

E. IMPACT

E.1 - What is the impact on the development of human resources, if applicable?
N/A

E.2 - What is the impact the Public Health Relevance and Impact? The investigator should address how the findings of the project relate beyond the immediate study to improved practices, prevention or intervention techniques, legislation, policy, or use of technology in public health.

N/A

F. CHANGES

F.1 – Changes in approach and reasons for change, including changes that have a significant impact on expenditures

Nothing to Report

F.2 - Actual or anticipated challenges or delays and actions or plans to resolve them

Nothing to Report

F.3 - Significant changes to human subjects, vertebrate animals, biohazards, and/or select agents

Nothing to Report

G. Special Reporting Requirements

G.1 Special Notice of Award Terms and Funding Opportunities Announcement Reporting Requirements

N/A

G.2 Responsible Conduct of Research

N/A

G.3 Mentor's Research Report or Sponsor Comments

N/A

G.4 Human Subjects

G.4.a Does the project involve human subjects? No

G.4.b Inclusion Enrollment Data N/A

G.4.c ClinicalTrials.gov N/A

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA? No

G.5 Human Subject Education Requirement

Are there personnel on this project who are newly involved in the design or conduct of human subject's research?

No

G.6 Human Embryonic Stem Cells (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 Vertebrate Animals

Does this project involve vertebrate animals?

No

G.8 Project/Performance Sites

N/A

G.9 Foreign Component

N/A

G.10 Estimated Unobligated Balance

G.10.a Is it anticipated that an estimated unobligated balance (including prior year carryover) will be greater than 25% of the current year's total approved budget? No

G.11 Program Income

Is program income anticipated during the next budget period? No

G.12 F&A Costs

Is there a change in performance sites that will affect F&A costs? No

I. OUTCOMES

I. Provide a concise summary of the outcomes or findings of the award, written for the general public in clear and comprehensible language, without including any proprietary, confidential information or trade secrets

The short term outcomes refer to our graduates, research productivity, interdisciplinary outcomes, assistance to local organizations and industry partners, increased awareness of OHS locally. The medium term outcomes refer to the intended impact the DSC will have through its research and training on applying better methods for developing OHS standards and procedures, on translating research to practice, on changing personal and organizational behavior to prioritize OHS, and on increasing the number of women and minority OHS professionals. The long term outcomes represent our ultimate goals of reducing work related fatalities, injuries and illnesses, improve worker safety and well-being and promoting a sustainable growth of the regional and national economy incorporating OHS findings. We also propose a feedback loop in which periodically we check the outputs of the DSC and report to the constituencies of the input of our Logic model.
The goals for the Center are broader and more general, while each program has specific goals with defined objectives. Outcome evaluation will measure the extent to which the DSC has made progress toward the following goals:

1. Maintain excellence in interdisciplinary education, research and outreach to develop well rounded OSH professionals who protect and promote the health, safety, and wellbeing of workers.
2. Strive to be the main OSH training resource for regional businesses and organizations in the region.
3. Collaborate with other academic institutions, ERCs and TPGs to develop best methods to protect and promote health and safety of workers.
4. Produce high quality fundamental and applied research and translate research to practice to develop the best methods to protect the health and safety of workers.

Note: project outcome information will be made public in NIH RePORTER

B. ACCOMPLISHMENTS

B.1. What are the major goals of the project?

The primary goal of the Industrial Hygiene (IH) academic training component of the Deep South Center (DSC) is to prepare IH professionals who will be leaders in the field and active promoters of occupational health and safety (OHS) practice. The graduate students in this program will be trained to a) anticipate, recognize, evaluate, and control occupational and environmental hazards which may cause injuries, illnesses, and impaired health and well-being, b) understand and conduct research which aims to eliminate/reduce risk, and c) identify solutions that will protect the health and safety of workers using an interdisciplinary approach. The IH program provides students with a comprehensive curriculum that combines theoretical and applied aspects of occupational health and safety, guides students develop skills that will qualify them as exceptional entry-level IH practitioners or scientists, and gives them the knowledge base to grow and develop flexibility as the profession of IH evolves. Because of the change in IH master's program from MPH to MSPH in the Fall semester of 2020, all our master's students are on the Plan I (thesis based) degree which requires a formation of master's thesis committee, presentation of a research proposal, public defense of a master's thesis, and submission of a written thesis. The PhD students are trained to conduct rigorous research in various aspects of occupational health and safety, following the principles of scientific integrity and ethics. They have ample opportunity to practice scientific writing and presentations through class work, seminars, and various conferences and meetings.

Objective 1: Academic training
a) Maintain a competitive IH academic program responding to the professional and scientific needs of the OSH professions. b) Train MSPH and PhD students using didactic courses, laboratory and field experiments, research, and interdisciplinary projects to become successful next generation of IH researchers and practitioners. c) Develop practical skills for the trainees necessary to succeed in the OSH profession through internships, participation and presentations at conferences and professional meetings, and active participation in professional associations. d) Increase minority recruitment activities with the goal of maintaining at least 20 % minority in our academic student population.

Objective 2: Research
a) Faculty and students conduct research to advance the knowledge in occupational health and safety in support of the National Occupational Research Agenda (NORA) and apply for grant support, publish manuscripts, and present research findings at local/national/international conferences and meetings. b) IH trainees conduct supervised research to develop skills necessary to perform jobs as researchers and practitioners in the field of OHS.

Objective 3: Training and continuing education
a) IH students are encouraged to participate (free of charge) in professional continuous education (CE) courses offered through the DSC CE program to enhance their skills. b) IH doctoral students are given opportunity to participate as teaching assistants and instructors in industrial hygiene courses and CE courses to enhance their teaching skills.

B.2. What did you accomplish under these goals?

Major accomplishments of the IH program during the current reporting period (7/01/2021 – 6/30/2022) are as follows:

- Currently there are 8 students enrolled in the IH program: 6 supported at least in part as trainees, 1* supported by the school, and 1† supported by Korea OSHA.

Name	Degree	Department	Adviser	Graduation projected
Jake S. Shedd	PhD	EHS-UAB	Lungu - adviser	July 2022
Margaret C. Summers	PhD	EHS-UAB	Lungu - adviser	July 2022
Nathan Chen	PhD	EHS-UAB	Oh - adviser	December 2023
David K. McMahan	PhD	EHS-UAB	Lungu - adviser	April 2025
Seunghyeon Yang*	PhD	EHS-UAB	Oh - adviser	April 2026
Jasna M. Rosser-Williams	MSPH	EHS-UAB	Lungu - adviser	December 2022
Kelvin Duy Dam	MSPH	EHS-UAB	Oh - adviser	December 2022
Donglee Yang†	MSPH	EHS-UAB	Oh -adviser	December 2022

- The following students started their internships in May 2022.
  - Jasna M. Rosser-Williams: American Cast Iron Pipe Company, Birmingham, AL
  - Kelvin Duy Dam: The Heritage Group, Indianapolis, IN

IH students' achievements (*not captured in the past report):

- Savannah Jones*, MPH started as EHS Engineer at Lockheed Martin, Moulton, AL
- Erin Lindsey*, MPH started as Environment Health Specialist at Henderson County Health Department, Hendersonville, NC
- Andrew Spivey*, MPH started as EHS Site Representative at Bell Flight, Dothan, AL
- Chris Hughes*, MPH started as Industrial Hygienist at The EI Group, Inc., Greenville, SC
- Kelvin Duy Dam*, MSPH student (Oh- adviser): recipient of the ASSP Alabama Chapter Scholarship
- Jasna M. Rosser-Williams*, MSPH student (Lungu- adviser): AIHF Scholarship, American Industrial Hygiene Foundation (AIHF)
- Kelvin Duy Dam*, MPH student (Oh- adviser): Liberty Mutual Scholarship, American Industrial Hygiene Foundation (AIHF)
- Nathan Chen*, PhD student (Oh- adviser): George and Florence Clayton Scholarship, American Industrial Hygiene Foundation (AIHF)
- David K. McMahan*, PhD student (Lungu- adviser): D. Jeff Burton Scholarship and Liberty Mutual Scholarship, American Industrial Hygiene Foundation (AIHF)
- Nathan Chen*, PhD student (Oh- adviser): Award from the AIHA Toxicology Committee, American Industrial Hygiene Conference and Exposition (AIHce)
- Three MSPH students, Kelvin Duy Dam (Oh- adviser), Donglee Yang (Oh- adviser) & Jasna M. Rosser-Williams (Lungu - adviser): were the recipients of Southeast Mine Safety and Health Conference Scholarships
- Four PhD students, Jake S. Shedd (Lungu- adviser), Nathan Chen (Oh- adviser), David K. McMahan (Lungu- adviser) & Seunghyeon Yang (Oh- adviser): were the recipients of AIHA Alabama Local Section Scholarships
- Jake S. Shedd, PhD student (Lungu- adviser): 1st Place Poster Presentation of Section VIII: Environmental and Earth Science, 99th Annual Alabama Academy of Science (AAS) Meeting
- David K. McMahan (Lungu- adviser): 2nd Place Poster Presentation of Section VIII: Environmental and Earth Science, 99th Annual Alabama Academy of Science (AAS) Meeting
- Nathan Chen, PhD student (Oh- adviser): Awards from the AIHA Ergonomics Committee and the AIHA Leadership and Management Committee, American Industrial Hygiene Conference and Exposition (AIHce)
- Seunghyeon Yang, PhD student (Oh- adviser): Awards from the AIHA Real Time Detection Systems Committee and the Oil and Gas Working Group, American Industrial Hygiene Conference and Exposition (AIHce)

- David McMahan, PhD student (Lungu- adviser): Award from the AIHA Leadership and Management Committee, American Industrial Hygiene Conference and Exposition (AIHce)
- Donglee Yang, MSPH student (Oh- adviser): Award from the AIHA Sampling and Laboratory Analysis Committee, American Industrial Hygiene Conference and Exposition (AIHce)
- Jake S. Shedd, PhD student: Awards from the AIHA Cannabis Industry Health and Safety Committee and the Oil and Gas Working Group, American Industrial Hygiene Conference and Exposition (AIHce)

IH Faculty's achievements:

- Drs. Oh and Lungu resubmitted a grant proposal to seek research support: Development of a Fit Matching App for Eye Protection, CDC/NIOSH – R03 (Oh, PI; Lungu, Co-I)
- Jonghwa Oh, PhD submitted a grant proposal to seek research support: Exposure Assessment of Hand-transmitted Vibration (HTV) and Early Health Indicators for Reliable Dose-response Relationship, CDC/NIOSH – R21 (Oh, PI)
- The faculty and students in the IH program produced publications, presented their work at conferences and meetings or were invited as speakers and lecturers at various events (Section C.1.)
- Faculty in the IH program were also invited as speakers and were members on advisory and editorial board panels.
    - Drs. Jonghwa Oh, Claudiu T. Lungu & Mark Schall: Presenters. An Interdisciplinary Approach to OS&H Practice, Training and Research. Center for Engagement in Disability Health and Rehabilitation Sciences (CEDHARS) Seminar Series and the School of Health Professionals Rehabilitation Science PhD Program. In-person (Birmingham, AL) and virtual. June 1, 2021.
    - Claudiu T. Lungu, PhD: Ad Hoc Member, NIH ZRG1 IMST-B(12) Small Business: Instrumentation, Environmental, and Occupational Safety Study Section, June 28-29, 2021, online
    - Jonghwa Oh, PhD: Research Editorial Board member: Global Health Reports
    - Claudiu T. Lungu, PhD: Editorial Advisory Board member, Current Analysis on Instrumentation and Control, Mesford Publisher Inc.

In summary, the IH program had a significant impact on the development and training of new practitioners in the field. This is shown through the accomplishments of the current students and graduates (i.e., awards, scholarships, and jobs) as well as through the productivity of the faculty reflected in manuscripts, presentations, and applications for funding.

Minority Recruitment and Retention

Recruitment and retention of minorities and underrepresented individuals has been one of the primary objectives of the Industrial Hygiene program. Currently there is one minority student in our program representing 13 % of the student population. Our main activities related to minority recruitment this past period of time were:

- The Summer Institute – students from undergraduate institutions across the southeastern US including Historically Black Colleges and Universities (HBCUs) are invited to participate on a competitive bases to a 5-day program at the DSC where they are exposed to many aspects of environmental and occupational health activities including Industrial Hygiene. This NIOSH funded program has been an important vehicle to recruiting minority students in the IH program. We resumed our in-person format this year.

B.3. Competitive Revisions/Administrative Supplements

Nothing to Report

B.4. What opportunities for training and professional development did the project provide?

Besides the academic didactic courses that IH students are taking part of their curriculum, they are participating in a number of training activities, professional development, and interdisciplinary activities.

- A number of IH students presented their research posters at the American Industrial Hygiene Conference and Exposition (AIHce), the Southeast Regional Research Symposium (SERRS), the Alabama Academy of Science, and UAB SOPH Research Poster Session. Master's students also participated in the SERRS.
- A number of IH students participated to the Southeast Mining Safety & Health Conference where they listened to presentations and interacted with the participants.
- IH students participated in the Audiometry (online) course, a CE course offered through the DSC (many CE courses had not been offered due to the pandemic).
- IH students were active in the AL AIHA Local Section and AL AIHA Student Local Section (more face-to-face activities have been initiated).
- IH students participated in the Current Topics in Environmental and Occupational Health and Safety course (ENH 691) in which doctoral students present their research topics and invited speakers present various research and practice topics related to environmental and occupational health.
- All IH students participated in the interdisciplinary courses: Interdisciplinary Field Studies (ENH 680) and Interdisciplinary Worksite Evaluation (ENH 681) with students from UAB Occupational Health Nursing and AU Occupational Safety and Ergonomics.

B.5. How did you disseminate the results to communities of interest?

The main output of the scholarly activity of the IH program is represented by the published scientific manuscripts, presentations at regional, national, and international conferences and other types of professional meetings.

B.6 - What do you plan to do during the next reporting period to accomplish the goals?

The IH program will continue to work on the objectives described above and outlined in the competitive renewal of our program. There are still objectives of the program which were not fully accomplished or could not be accomplished yet. Described below are the items which enter this category:

- ABET accreditation – The MPH program had been accredited before, but because of the small number of students in the past it was considered that the accreditations process is not sustainable and the department did not reapply. However, we recognize the value of the accreditation for the IH program and consider that it will benefit our students and graduates in the future. Our plan is to apply for the ABET accreditation for the Master's program once we see more than four incoming master's students for at least two consecutive years.
- Minority recruitment – We propose to increase minority recruitment activities with the goal of maintaining at least 20 % minority in our academic student population. During the Spring semester of 2020, we reached 23 % but some students graduated and the minority population went lower (13 % as of the Summer of 2021). We will continuously seek ways to recruit minorities to achieve our goal.

C. PRODUCTS

C.1. Publications, conference papers, and presentations

Journal Articles

1. R. Thaper, J. Oh, R. Sesek. 2021. Performance of Smart Device Noise Measurement Applications: A Literature Review. Prof. Safety. 66(06): 38-46.
2. R. Thaper, B. Fagen, J. Oh. 2021. Decontamination of Respirators Amid Shortages due to SARS-CoV-2. Photochem Photobiol Sci. 20(7), 955-965.
3. J. G. Balanay, J. Oh. 2021. Adsorption Characteristics of Activated Carbon Fibers in Respirator Cartridges for Toluene. Int. J. Environ. Res. Public Health. 18(16), 8505.
4. M. Summers, J. Oh, C. T. Lungu. 2022. Determination of Activated Carbon Fiber Adsorption Capacity for Several Common Organic Vapors: Applications for Respiratory Protection. J. Air Waste Manag Assoc. doi: 10.1080/10962247.2021.1985013.
5. S. Jones, J. S. Shedd, J. Oh, C. T. Lungu. 2022. Evaluating the Effects of Modified Windscreens on Organic Vapor Monitor Performance. Environmental Health Insights. 16:1-8
6. E. L. Floyd, J. Oh, K. Sapag, T. M. Oni, J. S. Shedd, C. T. Lungu. 2022. Photothermal Desorption of Toluene from Carbonaceous Substrates Using Light Flash. Nanomaterials. 12(4), 662.
7. J. Oh. Evaluation of Hand-arm Vibration (HAV) Levels among Grounds Maintenance Workers. In review.

Conference Proceedings / Oral presentations* / Posters (†not captured in the past report)

1. C.T. Lungu, J.S. Shedd, J. Oh, W.W. Kuehster, S. Ranjit, A.J. Hauser, E.L. Floyd.*† Thermal Properties of Buckypaper Sorbent used in Newly Developed Volatile Organic Compound (VOC) Sampler. American Industrial Hygiene Conference and Exposition (AIHce). Virtual. May 24-26, 2021.
2. M. Summers, J. Oh, C. T. Lungu.* Activated Carbon Fiber (ACF) as Sorbent Media for Respiratory Protection: Breakthrough Testing and Determination of Absorption Capacity. Safety and Health at Work International Workshop. Virtual. October 13, 2021.
3. J. Oh.* Evaluation of Commercial Kitchen Environments: A Pilot Study. American Public Health Association Annual Meeting and Expo. In-person and virtual. Denver, CO. October 24-27, 2021
4. M. Summers, J. Oh, C. T. Lungu.* Activated Carbon Fiber (ACF) Characterization as Sorbent Media for Respiratory Protection. American Public Health Association Annual Meeting and Expo. In-person and virtual. Denver, CO. October 24-27, 2021.
5. J. Oh.* Development of a Fit-Matching Tool for Safety Eyewear: Fit Examinations. Southeast Regional Research Symposium. Chapel Hill, NC. March 22, 2022.
6. N. Chen, J. S. Shedd, M. Summers.† UAB Doctoral Student Presentation. American Industrial Hygiene Conference and Exposition (AIHce). Virtual. May 24-26, 2021.
7. C. Hughes, N. Chen, J. Oh.† Assessment of Hand-Arm Vibration (HAV) Transmission by Operation Type of a Backpack Blower. American Industrial Hygiene Conference and Exposition (AIHce). Virtual. May 24-26, 2021.
8. N. Chen, C. Hushes, J. Oh.† Transmission of Hand-Arm Vibration (HAV) and Vascular Disorder of Hand-Arm Vibration Syndrome (HAVS): Laboratory Simulation of Grass Trimmer Operations. American Industrial Hygiene Conference and Exposition (AIHce). Virtual. May 24-26, 2021.
9. A. Spivey, D. McMahan, C. T. Lungu, J. Oh.† Evaluation of Noise Exposure during Laboratory Simulation of Grass Trimmer Operations. American Industrial Hygiene Conference and Exposition (AIHce). Virtual. May 24-26, 2021.

10. D. McMahan, A. Spivey, J. Oh, C. T. Lungu.† Backpack Blower Noise Exposure Assessment: A Laboratory Simulation. American Industrial Hygiene Conference and Exposition (AIHce). Virtual. May 24-26, 2021.
11. E. Lindsey, C. T. Lungu, J. Oh.† Development of a Fit-Matching App: Prioritizing Gap Measurement Locations between Safety Eyewear and the Wearer's Face. American Industrial Hygiene Conference and Exposition (AIHce). Virtual. May 24-26, 2021.
12. N. Chen, C. Hushes, J. Oh. Evaluation of Hand-arm vibration (HAV) Transmission: Laboratory Simulation of Grass Trimmer Operations. American Public Health Association Annual Meeting and Expo. In-person and virtual. Denver, CO. October 24-27, 2021.
13. N. Chen, C. L. Boyd, J. Oh. Hand-transmitted Vibration (HTV) Exposure from Hand-held Power Tools. 99th Annual Meeting of the Alabama Academy of Science (AAS). Athens. March 16-18, 2022.
14. S. Yang, J. Wickliffe, G. Kibelka, E. B. Overton, C. T. Lungu, J. Oh. Evaluation of a Portable Gas Chromatograph (GC) at Various Toluene Concentrations. 99th Annual Meeting of the Alabama Academy of Science (AAS). Athens. March 16-18, 2022.
15. D. McMahan, A. Spivey, J. Oh, C. T. Lungu. Noise Exposure during Backpack Blower and Grass Trimming Operations: A Pilot Study. 99th Annual Meeting of the Alabama Academy of Science (AAS). Athens. March 16-18, 2022.
16. J. S. Shedd, E. L. Floyd, J. Oh, C. T. Lungu. Mass Recovery of Diffusively Sampled Volatile Organic Compounds via Photothermal Desorption. 99th Annual Meeting of the Alabama Academy of Science (AAS). Athens. March 16-18, 2022.
17. N. Chen, C. L. Boyd, J. Oh. Laboratory Evaluation of Occupational Exposure to Hand-Arm Vibration (HAV) from Grounds Maintenance Equipment. Southeast Regional Research Symposium (SERRS). Chapel Hill, NC. March 21-23, 2022.
18. S. Yang, J. Wickliffe, G. Kibelka, E. B. Overton, C. T. Lungu, J. Oh. Evaluation of a Portable Gas Chromatograph (GC) at Various Volatile Organic Compound (VOC) Concentrations. Southeast Regional Research Symposium (SERRS). Chapel Hill, NC. March 21-23, 2022.
19. D. McMahan, A. Spivey, J. Oh, C. T. Lungu. Noise Exposure from Backpack Blower and Grass Trimming Operations: A Laboratory Simulation. Southeast Regional Research Symposium (SERRS). Chapel Hill, NC. March 21-23, 2022.
20. J. S. Shedd, E. L. Floyd, J. Oh, C. T. Lungu. Sampling Rate and Mass Recovery Determination of Volatile Organic Compounds Sampled via Photothermal Desorption Compatible Diffusive Samplers. Southeast Regional Research Symposium (SERRS). Chapel Hill, NC. March 21-23, 2022.
21. S. Yang, J. Wickliffe, G. Kibelka, E. B. Overton, C. T. Lungu, J. Oh. Performance of a Prototype Portable Gas Chromatography (GC) coupled with a Flame Ionization Detector (FID) for Volatile Organic Compound (VOC) Analysis. UAB SOPH Research Poster Session. Birmingham, AL. April 7, 2022
22. M. Summers, J. Oh, C. T. Lungu. Particulate Filtration Study of Activated Carbon Fiber: Applications for Respiratory Protection. UAB SOPH Research Poster Session. Birmingham, AL. April 7, 2022
23. N. Chen, C. L. Boyd, J. Oh. Laboratory Evaluation of Hand-Arm Vibration (HAV) Exposure during Gasoline-Powered Grounds Maintenance Equipment Operation. American Industrial Hygiene Conference and Exposition (AIHce). Nashville, TN. May 23-25, 2022.
24. S. Yang, J. Wickliffe, G. Kibelka, E. B. Overton, C. T. Lungu, J. Oh. Laboratory Evaluation of Prototype Portable Gas Chromatography (GC) with a Flame Ionization Detector (FID) for Toluene, Ethylbenzene, and Xylenes Analysis. American Industrial Hygiene Conference and Exposition (AIHce). Nashville, TN. May 23-25, 2022.
25. D. Yang, K. D. Dam, J. Oh. Evaluation of Ventilation Performance and Respirable Particles in Food Trucks. American Industrial Hygiene Conference and Exposition (AIHce). Nashville, TN. May 23-25, 2022.
26. D. McMahan, A. Spivey, J. Oh, C. T. Lungu. Backpack Blower and Grass Trimmer Noise Exposure Assessment: A Laboratory Simulation. American Industrial Hygiene Conference and Exposition (AIHce). Nashville, TN. May 23-25, 2022.
27. J. S. Shedd, E. L. Floyd, J. Oh, C. T. Lungu. Analyte Mass Recovery and Sampling Rate Characterization of a Photothermal Desorption Compatible Diffusive Sampler. American Industrial Hygiene Conference and Exposition (AIHce). Nashville, TN. May 23-25, 2022.

C.2. Website(s) or other Internet site(s) – include URL(s)
https://sites.uab.edu/dsc/

C.3. Technologies or techniques
Nothing to Report

C.4. Inventions, patent applications, and/or licenses
Nothing to Report

C.5. Other products and resource sharing
Nothing to Report

D. PARTICIPANTS

D.1. What individuals have worked on the project? Please include calendar, academic, and summer months.

Commons ID	S/K	Name	Degrees(s)	Role	Cal	Aca	Sum	Foreign	Country	SS
	K	Jonghwa Oh	PhD	Program Director	2.9					
		Claudiu T. Lungu	PhD	Faculty	.5					
		Kristin Zierold	PhD	Faculty	.5					
		Ruzmyn Vilcassim	PhD	Faculty	.3					
		Paulisha Holt	MBA	Staff	1.0					

D.2 Personnel updates

a. Level of Effort:
b. New Senior/Key Personnel:
c. Changes in Other Support:
d. New Other Significant Contributors:

E. IMPACT

E.1 - What is the impact on the development of human resources, if applicable? Not Applicable

E.2 - What is the impact the Public Health Relevance and Impact? The investigator should address how the findings of the project relate beyond the immediate study to improved practices, prevention or intervention techniques, legislation, policy, or use of technology in public health. Not Applicable

F. CHANGES

F.1 – Changes in approach and reasons for change, including changes that have a significant impact on expenditures
Not Applicable

F.2 - Actual or anticipated challenges or delays and actions or plans to resolve them
No

F.3 - Significant changes to human subjects, vertebrate animals, biohazards, and/or select agents
No

G. Special Reporting Requirements

G.1 Special Notice of Award Terms and Funding Opportunities Announcement Reporting Requirements

N/A

G.2 Responsible Conduct of Research
Not Applicable

G.3 Mentor's Research Report or Sponsor Comments

Not Applicable

G.4 Human Subjects

G.4.a Does the project involve human subjects? No

G.4.b Inclusion Enrollment Data N/A

G.4.c ClinicalTrials.gov N/A

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA? No

G.5 Human Subject Education Requirement

Are there personnel on this project who are newly involved in the design or conduct of human subject's research? No

G.6 Human Embryonic Stem Cells (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)? No

G.7 Vertebrate Animals

Does this project involve vertebrate animals? No

G.8 Project/Performance Sites

N/A

G.9 Foreign Component

N/A

G.10 Estimated Unobligated Balance

G.10.a Is it anticipated that an estimated unobligated balance (including prior year carryover) will be greater than 25% of the current year's total approved budget? No

G.11 Program Income

Is program income anticipated during the next budget period? No

G.12 F&A Costs

Is there a change in performance sites that will affect F&A costs? No

I. OUTCOMES

I. Provide a concise summary of the outcomes or findings of the award, written for the general public in clear and comprehensible language, without including any proprietary, confidential information or trade secrets.

Note: project outcome information will be made public in NIH RePORTER

B. ACCOMPLISHMENTS

B.1. What are the major goals of the project?

The overall goal of the OHN program within the Deep South ERC is to prepare nurses with the terminal clinical (DNP) or research (PhD) degrees to translate evidence into best clinical practices (DNP) in occupational health nursing and to build the science of occupational health nursing through research-driven discovery of knowledge (PhD)

B.2. What did you accomplish under these goals?

In the final year, we graduated three DNP students and one PhD student. The three DNPs are working in direct care Occupational Health Nursing. The PhD is a practicing CRNA who is continuing to analyze and publish her dissertation data and findings.

B.3. Competitive Revisions/Administrative Supplements

N/A

B.4. What opportunities for training and professional development did the project provide?

Within the limits imposed by COVID on travel, our students were given the opportunity to attend the virtual AAOHN conference in early June. All but one was able to attend. The students have also been given access to COHN-S certification test bank to assist them in reinforcing key curricular concepts and to prepare them to take the certification exam. Dr. Hammond participated with AAOHN as the co-director and developer of an online COHN review course. Dr. Heaton served as content editor of the AAOHN Core Curriculum 5th edition, published in June 2022. Students were all provided copies of this text.

B.5. How did you disseminate the results to communities of interest?

We presented OHN reports to our ERC Advisory Board and to School of Nursing administration. The scholarly products of student and faculty work were disseminated via presentations and publication and participation in media events.

B.6 - What do you plan to do during the next reporting period to accomplish the goals?

We will continue to implement and evaluate the curriculum in the upcoming year. We anticipate adding two electives in the upcoming year: 1. Total Worker Health and 2. Disaster and Emergency Management. We will continue to work with our students to disseminate their work in national venues. In the upcoming year, we intend to use a kiosk and telehealth based program to promote health and wellness among firefighters. We are excited about this project as it will give opportunities for program evaluation and research for both the DNP and PhD OHN students funded by our program.

C. PRODUCTS

C.1. Publications, conference papers, and presentations

Campbell, J. Poster presentation: Implementation of an Online Workplace Violence Training Intervention for Emergency Nurses in an Urban Emergency Department, American Association of Occupational Health Nurses Annual Conference March 2022.

Carbone, E.

C.2. Website(s) or other Internet site(s) – include URL(s)

Nothing to Report

C.3. Technologies or techniques

Nothing to Report

C.4. Inventions, patent applications, and/or licenses

Nothing to Report

C.5. Other products and resource sharing

Nothing to Report

D. PARTICIPANTS

D.1. What individuals have worked on the project? Please include calendar, academic, and summer months.

Commons ID	S/K	Name	Degrees(s)	Role	Cal	Aca	Sum	Foreign	Country	SS
karen.heaton	K	Karen Heaton	PhD	Program Director	1.2					
		Stephanie Hammond	DNP	Faculty	1.2					
		Melanie Hallman	PhD	Faculty	.6					
		Pamela Bowen	PhD	Faculty	.6					
		Bryan Combs	PhD	Faculty	.6					

D.2 Personnel updates

a. Level of Effort:
b. New Senior/Key Personnel:
c. Changes in Other Support:
d. New Other Significant Contributors:

E. IMPACT

E.1 - What is the impact on the development of human resources, if applicable?

N/A

E.2 - What is the impact the Public Health Relevance and Impact? The investigator should address how the findings of the project relate beyond the immediate study to improved practices, prevention or intervention techniques, legislation, policy, or use of technology in public health.

N/A

F. CHANGES

F.1 – Changes in approach and reasons for change, including changes that have a significant impact on expenditures

N/A

F.2 - Actual or anticipated challenges or delays and actions or plans to resolve them

N/A

F.3 - Significant changes to human subjects, vertebrate animals, biohazards, and/or select agents

N/A

G. Special Reporting Requirements

G.1 Special Notice of Award Terms and Funding Opportunities Announcement Reporting Requirements

N/A

G.2 Responsible Conduct of Research

Nothing to Report

G.3 Mentor's Research Report or Sponsor Comments

Nothing to Report

G.4 Human Subjects

G.4.a Does the project involve human subjects? No

G.4.b Inclusion Enrollment Data N/A

G.4.c ClinicalTrials.gov N/A

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA? No

G.5 Human Subject Education Requirement

Are there personnel on this project who are newly involved in the design or conduct of human subject's research? No

G.6 Human Embryonic Stem Cells (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)? No

G.7 Vertebrate Animals

Does this project involve vertebrate animals? No

G.8 Project/Performance Sites

Nothing to Report

G.9 Foreign Component

Nothing to Report

G.10 Estimated Unobligated Balance

G.10.a Is it anticipated that an estimated unobligated balance (including prior year carryover) will be greater than 25% of the current year's total approved budget? No

G.11 Program Income

Is program income anticipated during the next budget period? No

G.12 F&A Costs

Is there a change in performance sites that will affect F&A costs? No

I. OUTCOMES

I. Provide a concise summary of the outcomes or findings of the award, written for the general public in clear and comprehensible language, without including any proprietary, confidential information or trade secrets

Note: project outcome information will be made public in NIH RePORTER

B. ACCOMPLISHMENTS

B.1. What are the major goals of the project?

The primary goal of the OSE program is to train graduate level professionals, with strong backgrounds in engineering or physical sciences, to: a) identify, analyze and control occupational safety & ergonomics hazards through engineering methodologies and design; b) conduct research in occupational safety & ergonomics; and c) participate as a member of an interdisciplinary occupational safety and health team.
An integral part of the program is instruction in the management of safety and ergonomics activities, including functioning as leaders in the safety and ergonomics professions. In light of these goals and consistent with the missions of Auburn University as a land-grant institution, the specific objectives of the OSE program are:
Objective 1: Training. To provide a) excellent breadth and depth of OSE graduate course work to prepare the next generation of OSE researchers and practitioners; and b) comprehensive OSE educational off-campus opportunities for both full-time and part-time master's and doctoral students as well as OSE practitioners via distance (streaming) course offerings.
Objective 2: Research. To advance knowledge a) in OSE through faculty and student research in direct support of the National Occupational Research Agenda (NORA) culminating in scholarly publication; and b) to enhance the research capabilities of OSE students by involving them in faculty supervised research activities.
Objective 3: Extension (Continuing Education and Outreach). To provide a) opportunities for both basic and advanced level continuing education in occupational safety and ergonomics for practicing engineering, supervisory, occupational medical, and safety personnel; b) OSE educational opportunities for full-time on-campus students at the undergraduate level; and c) assistance on a non-fee basis to those facilities and individuals seeking OSE guidance.

B.2. What did you accomplish under these goals?

Major accomplishments of the OSE program during the current reporting period (7/01/2021 – 6/30/2022) are as follows:

- One NIOSH-funded OSE doctoral student (Connor Lusk) graduated in August 2021 and is now working as a postdoctoral scholar at The Medical University of South Carolina.

- Four NIOSH-funded OSE Masters (non-thesis) students graduated during the reporting period. All four secured excellent jobs at reputable companies in safety-related roles (e.g., Georgia Tech Research Institute; Boeing; GHP, Inc.).

- Another OSE student, Andrew Kauffman, graduated in May 2022 with his MS (thesis option). Andrew will be stationed in Mobile, AL with the U.S. Coast Guard as a safety officer. Andrew also was certified as a Safety Professional this year and was selected as the as one of Auburn University's outstanding master's students for 2021-2022.

- 12 students earned the OSE Graduate Certificate (OSEGC) during the reporting period (summer and fall; spring not available to report yet). Five were NIOSH-supported (Troutman, Gentry, Kik, Pilczuk, Dawson).

- OSE students continue to conduct innovative research. As an example, Duha Ali (PhD student) has continued to execute her pilot project research training grant supporting her work on manual material handling.

B.3. Competitive Revisions/Administrative Supplements

N/A

B.4. What opportunities for training and professional development did the project provide?

Training and professional development is a primary goal of the OSE program. Beyond traditional coursework and mentorship, students in the OSE program regularly engage in training activities designed to build professional skills and experience relevant to a career as an occupational health and safety practitioner. The following brief list of examples highlight such training activities:

• As a part of our OSE/IP Seminar course, some brief examples of guest speakers and/or training sessions included:
a) A recent PhD graduate and faculty member at the United States Naval Academy (Ike Stutts) discussed the importance of ergonomics, safety, and cyber security.
b) A number of proposal and dissertation defenses provided by OSE and OIP doctoral students.

• OSE students regularly attend and participate in interdisciplinary conferences. For example, the Center has helped coordinate the Southeastern Regional Research Symposium in the spring of each year to provide students an opportunity to present their research as well as meet students and faculty from other programs. Participants regularly include students and faculty from the University of Kentucky's Central Appalachian Regional ERC, Southeast Center for Agricultural Health and Injury Prevention, Sunshine ERC at the University of South Florida, and the North Carolina Occupational Safety and Health ERC at the University of North Carolina.

B.5. How did you disseminate the results to communities of interest?

OSE faculty and students have been active participants in, and facilitators of, continuing education (CE) and other events to disseminate results to communities of interest during this reporting period. This participation has been local, regional, national, and international. OSE students and faculty gave presentations or hosted workshops at the following CE events:
• On-Campus: Over 100 undergraduate engineering students were educated by OSE faculty and graduate students in INSY 3020: Occupational Safety and Ergonomics.
• Regionally: Meetings of the American Society of Safety Professionals (ASSP) Alabama Chapter. Annual Southeast Regional Research Symposium in Chapel Hill, N.C.
• Nationally: Annual meeting of the Human Factors and Ergonomics Society. Annual Applied Ergonomics Conference. Participate in the drafting of the National Occupational Research Agenda (NORA) cross-sector agenda for musculoskeletal health.
• Internationally: In Sweden, the Work Environment Authorities has recently stated new regulations that employees that are exposed to forceful and repetitive risky "hand intensive" work tasks should be offered a health examination by the employer. For this there is a need for valid tools to assess when there is a risk. OSE faculty and students are working with collaborators in Sweden to develop guidelines for the occupational health services about how they should implement the work with risk assessments and health examinations according to the new regulations. Dr. Gallagher is visiting Sweden this summer to continue this work.

B.6 - What do you plan to do during the next reporting period to accomplish the goals?

The OSE program faculty will continue to execute the program plan described in the most recent competitive renewal. This includes delivering a curriculum that offers students a comprehensive overview of occupational safety and ergonomics subject matter and by requiring them to accomplish an in-depth research activity (OSH Practicum, MS thesis, or doctoral dissertation) on an occupational safety research topic selected with their advisor / committee as appropriate; providing an engaging environment that encourages interdisciplinary interaction; excellent mentorship; and continued program evaluation.

C. PRODUCTS

C.1. Publications, conference papers, and presentations

Zelik KE, Nurse CA, Schall Jr MC, Sesek RF, Marino MC, Gallagher S. (2022). An ergonomic assessment tool for evaluating the effect of back exoskeletons on injury risk. Applied Ergonomics. 99, 103619. doi: 10.1016/j.apergo.2021.103619

*Zhang X, Schall Jr MC, Chen H, Gallagher S, Davis GA, Sesek RF. (2022). Manufacturing worker perceptions of using wearable inertial sensors for multiple work shifts. Applied Ergonomics. 98, 103579. doi: 10.1016/j.apergo.2021.103579

Peng, X., Acosta-Sojo, Y., Wu, M. I., & Stirling, L. (2022). Actuation Timing Perception of a Powered Ankle Exoskeleton and Its Associated Ankle Angle Changes During Walking. IEEE Transactions on Neural Systems and Rehabilitation Engineering, 30, 869-877.

Schall Jr MC, Sesek RF, Bandekar A. (In Press). Personalizing Ergonomics for the Changing Workforce. In Maynard's Industrial Engineering Handbook, 6th ed. McGraw-Hill Education.

Smidt M, Lynch S, Schall Jr MC, Sesek RF. (Accepted). "Speed and whole body vibration relationships in a sample of grapple skidders from the US South." American Society of Agricultural and Biological Engineers (ASABE) Annual International Meeting. 2022 July 17-20. Houston, TX.

C.2. Website(s) or other Internet site(s) – include URL(s)

Nothing new to report.

C.3. Technologies or techniques

Nothing new to report.

C.4. Inventions, patent applications, and/or licenses

Nothing new to report.

C.5. Other products and resource sharing

Nothing new to report.

D. PARTICIPANTS

D.1. What individuals have worked on the project? Please include calendar, academic, and summer months.

Commons ID	S/K	Name	Degrees(s)	Role	Cal	Aca	Sum	Foreign	Country	SS
MSCHALL	K	Mark Schall	PhD	Program Director	1.3					

		Richard Sesek	PhD	Faculty	.9					
		Richard Garnett	PhD	Faculty	.8					
		Gerard Davis	PhD	Faculty	1.3					
		Sean Gallagher	PhD	Faculty	.8					

D.2 Personnel updates

a. Level of Effort:
b. New Senior/Key Personnel:
c. Changes in Other Support:
d. New Other Significant Contributors:

E. IMPACT

E.1 - What is the impact on the development of human resources, if applicable?

Nothing to Report

E.2 - What is the impact the Public Health Relevance and Impact? The investigator should address how the findings of the project relate beyond the immediate study to improved practices, prevention or intervention techniques, legislation, policy, or use of technology in public health.

Nothing to Report

F. CHANGES

F.1 – Changes in approach and reasons for change, including changes that have a significant impact on expenditures

Nothing to Report

F.2 - Actual or anticipated challenges or delays and actions or plans to resolve them

Nothing to Report

F.3 - Significant changes to human subjects, vertebrate animals, biohazards, and/or select agents

N/A

G. Special Reporting Requirements

G.1 Special Notice of Award Terms and Funding Opportunities Announcement Reporting Requirements

N/A

G.2 Responsible Conduct of Research

Nothing to Report

G.3 Mentor's Research Report or Sponsor Comments

Nothing to Report

G.4 Human Subjects

G.4.a Does the project involve human subjects? No

G.4.b Inclusion Enrollment Data N/A

G.4.c ClinicalTrials.gov N/A

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA? No

G.5 Human Subject Education Requirement

Are there personnel on this project who are newly involved in the design or conduct of human subject's research? No

G.6 Human Embryonic Stem Cells (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)? No

G.7 Vertebrate Animals

Does this project involve vertebrate animals? No

G.8 Project/Performance Sites

N/A

G.9 Foreign Component

Nothing to Report

G.10 Estimated Unobligated Balance

G.10.a Is it anticipated that an estimated unobligated balance (including prior year carryover) will be greater than 25% of the current year's total approved budget? No

G.11 Program Income

Is program income anticipated during the next budget period? No

G.12 F&A Costs

Is there a change in performance sites that will affect F&A costs? No

I. OUTCOMES

I. Provide a concise summary of the outcomes or findings of the award, written for the general public in clear and comprehensible language, without including any proprietary, confidential information or trade secrets

Note: project outcome information will be made public in NIH RePORTER

B. ACCOMPLISHMENTS

B.1. What are the major goals of the project?

The primary purpose of the Occupational Injury Prevention Research Training Program (OIP) is to train graduate level professionals, with backgrounds in engineering or physical sciences, on the public health model as applied to occupational injury prevention. Specifically, trainees are taught to: (1) conduct occupational injury research through interdisciplinary collaborations with experts in occupational epidemiology, public health, medicine, nursing, safety engineering and human factors/ergonomics, thus encouraging them to employ resources and knowledge beyond their primary area of expertise, and (2) address occupational injury issues through interdisciplinary approaches to problem solving using the public health model (i.e., identify and prioritize problems, quantify and prioritize risk factors, identification of strategies to prevent injuries, implement and evaluate controls, and monitor intervention efforts).

Consistent with the missions of Auburn University as a land-grant institution, (i.e., instruction, research, and extension) the objectives of the OIP program are as follows:

Objective 1: Instruction. To provide interdisciplinary occupational injury prevention doctoral-level educational opportunities for full-time trainees.
Objective 2: Research. To provide opportunities for independent occupational injury prevention research and to enhance the injury research capabilities of OIP students facilitated through faculty supervised interdisciplinary research activities.
Objective 3: Extension (Continuing Education and Outreach). To provide a) opportunities for both basic and advanced level continuing education in occupational injury prevention for practicing engineering, supervisory, occupational nursing, medical, and safety personnel; b) OIP educational opportunities for full-time on-campus and other degree-seeking students at the graduate level; and c) assistance to industry and individuals seeking occupational injury prevention information as time and resources permit.

B.2. What did you accomplish under these goals?

Objective 1: Instruction. OIP trainees are only accepted for doctoral training. Graduates receive the Doctor of Philosophy degree in Industrial and Systems Engineering. The focus of OIP on occupational injury epidemiology/statistical methods and the public health model. Three NIOSH trainees are currently in this program (Nathan Pool, Bob Sesek, and Preston Graben).

Objective 2. Research. Current OIP students made substantial progress in their research. OIP students Nathan Pool and Preston Graben have performed data collection on their dissertation topics and trainee Bob Sesek was working on his literature review. Trainee Pool passed his dissertation proposal during the current period and is currently testing the fatigue and creep responses of human flexor and extensor digitorum tendons to repetitive loading. Trainee Graben has been collecting data on the inter-rater and intra-rater reliability of the Distal Upper Extremity Tool (a risk assessment tool for upper extremity intensive tasks developed at Auburn University). Trainee Sesek has a dissertation topic (effects of personal characteristics on MSD risk), and is expected to do his proposal defense by the end of the Fall semester 2022.

Objective 3. OIP faculty have provided opportunities for outreach opportunities for trainees and others. All three trainees have participated in occupational based assessment of musculoskeletal disorder risk OIP faculty have participated in providing educational opportunities to persons seeking graduate level training both to trainees and to

other students who are participating in the OSE graduate certificate program. A number of publications have been completed (published and/or submitted) to high quality journals) during this period.

B.3. Competitive Revisions/Administrative Supplements

N/A

B.4. What opportunities for training and professional development did the project provide?

The project provided a number of opportunities for training and development. Current OIP students Pool and Sesek worked extensively on a funded NIOSH R21 grant examining fatigue failure methods assessing MSD risk in industrial settings, including extensive analysis of field data collected at an automobile manufacturing plant. OIP students have attended and participated in a number of regional and national conferences during the current performance period.

B.5. How did you disseminate the results to communities of interest?

Many methods were used to disseminate the research activities during the current period. As mentioned above, OIP students attended and gave presentations about their research at a number of conferences. In addition, OIP trainees contributed to several proceedings and journal articles either published or submitted for publication during the current period.

In addition to the journal articles and proceedings papers published and/or submitted by OIP faculty and students during this period (listed in C.1. below), Dr. Gallagher (along with long-time collaborator Dr. Mary F. Barbe) published a book entitled "Musculoskeletal Disorders: The Fatigue Failure Mechanism" (Wiley and Sons). This book provides an evidence-based approach and an incisive discussion of how musculoskeletal disorders (MSDs) develop and progress, as well as how they can be prevented and controlled, based on Dr. Gallagher's fatigue failure model of MSD development.

B.6 - What do you plan to do during the next reporting period to accomplish the goals?

We plan to continue to provide (and enhance) the OIP training, research, and dissemination activities that have proven to be successful over the past few decades. It is believed that trainees Pool and Graben will be able to defend their dissertations during the next performance period. We anticipate a number of journal articles to be submitted resulting from this research. New faculty member Dr. Yadrianna Acosta-Sojo will provide an additional research area, concentrating on the use of exoskeletons on physical rehabilitation of individuals experiencing stroke and other disabling conditions.

C. PRODUCTS

C.1. Publications, conference papers, and presentations

Gallagher, S., & Barbe, M. F. (2022). Musculoskeletal Disorders: The Fatigue Failure Mechanism. John Wiley & Sons, 443 pp.

Gallagher, S., & Barbe, M. F. (2022). The impaired healing hypothesis: a mechanism by which psychosocial stress and personal characteristics increase MSD risk?. Ergonomics, 65(4), 573-586.

Bandekar, A. J., Sesek, R., Schall Jr, M., Huangfu, R., Bani Hani, D., & Gallagher, S. (2021, September). Validation of Fatigue Failure Risk Assessment Tools Against Physician-Diagnosed Outcomes. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 65, No. 1, pp. 710-714). Sage CA: Los Angeles, CA: SAGE Publications.

Zelik, K.E., Nurse, C.A., Schall, M.C., Sesek, R.F., Marino, M.C, Gallagher, S. (2022). An ergonomic assessment tool for evaluating the effect of back exoskeletons on injury risk, Applied Ergonomics, 99, 103619.

Nail-Ulloa, I., Gallagher, S., Huangfu, R., Bani-Hani, D., & Pool, N. (2021, September). Validation of a Wireless Sensor System for the Estimation of Cumulative Lumbar Loads in Occupational Settings. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 65, No. 1, pp. 489-494). Sage CA: Los Angeles, CA: SAGE Publications.

Gallagher, S., Huangfu, R., Nail-Ulloa, I., Smith, T. T. G., Krishen, L., & Schmidt, M. (2021). Evaluation of Cumulative Charge Activation Technology in Decreasing Delayed-onset Muscle Soreness after Eccentric Exercise (No. 6511). EasyChair.

Rempel, D., & Gallagher, S. (2022). Workplace Risk Assessment Tools for Preventing Shoulder Disorders. Safety and Health at Work, 13, S29-S30.

Zhang, X., Schall Jr, M. C., Chen, H., Gallagher, S., Davis, G. A., & Sesek, R. (2022). Manufacturing worker perceptions of using wearable inertial sensors for multiple work shifts. Applied Ergonomics, 98, 103579.

Gallagher, S. (2021, September). Determinants of the Fatigue Life of Musculoskeletal Tissues. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 65, No. 1, pp. 484-488). Sage CA: Los Angeles, CA: SAGE Publications.

Pool, N. (2022). Evaluating the Effect of Creep and Cyclic Loading on Human Tendons Paper presented at the Southeast Research Symposium (Chapel Hill, NC)

C.2. Website(s) or other Internet site(s) – include URL(s)

https://eng.auburn.edu/occupational-safety-ergonomics-injury-prevention/

C.3. Technologies or techniques

Auburn researchers in collaboration with researchers from Vanderbilt University developed a new tool (ExoLiFFT) to assess the efficacy of low back exoskeletons. This tool uses Auburn's Lifting Fatigue Failure Tool (LiFFT) to estimate the reduction in risk of low back disorders resulting from the decreased low back moment provided by a low back exoskeletons.

C.4. Inventions, patent applications, and/or licenses

N/A

C.5. Other products and resource sharing

N/A

D. PARTICIPANTS

D.1. What individuals have worked on the project? Please include calendar, academic, and summer months.

Commons ID	S/K	Name	Degrees(s)	Role	Cal	Aca	Sum	Foreign	Country	SS
szg0036	K	Sean Gallagher	PhD	Program Director	.7					
		Mark Schall	PhD	Faculty	.3					
		Richard Sesek	PhD	Faculty	.1					
		Richard Garnett	PhD	Faculty	.2					
		Gerard Davis	PhD	Faculty	.3					

D.2 Personnel updates

a. Level of Effort:
b. New Senior/Key Personnel:
c. Changes in Other Support:
d. New Other Significant Contributors:

E. IMPACT

E.1 - What is the impact on the development of human resources, if applicable?

N/A

E.2 - What is the impact the Public Health Relevance and Impact? The investigator should address how the findings of the project relate beyond the immediate study to improved practices, prevention or intervention techniques, legislation, policy, or use of technology in public health.

Nothing to Report

F. CHANGES

F.1 – Changes in approach and reasons for change, including changes that have a significant impact on expenditures

Nothing to Report

F.2 - Actual or anticipated challenges or delays and actions or plans to resolve them

Nothing to Report

F.3 - Significant changes to human subjects, vertebrate animals, biohazards, and/or select agents

Nothing to Report

G. Special Reporting Requirements

G.1 Special Notice of Award Terms and Funding Opportunities Announcement Reporting Requirements

N/A

G.2 Responsible Conduct of Research

N/A

G.3 Mentor's Research Report or Sponsor Comments

N/A

G.4 Human Subjects

G.4.a Does the project involve human subjects? No

G.4.b Inclusion Enrollment Data N/A

G.4.c ClinicalTrials.gov N/A

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA? No

G.5 Human Subject Education Requirement

Are there personnel on this project who are newly involved in the design or conduct of human subject's research? No

G.6 Human Embryonic Stem Cells (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)? No

G.7 Vertebrate Animals

Does this project involve vertebrate animals? No

G.8 Project/Performance Sites

N/A

G.9 Foreign Component

N/A

G.10 Estimated Unobligated Balance

Nothing to Report

G.10.a Is it anticipated that an estimated unobligated balance (including prior year carryover) will be greater than 25% of the current year's total approved budget? No

G.11 Program Income

Is program income anticipated during the next budget period? No

G.12 F&A Costs

Is there a change in performance sites that will affect F&A costs? No

I. OUTCOMES

I. Provide a concise summary of the outcomes or findings of the award, written for the general public in clear and comprehensible language, without including any proprietary, confidential information or trade secrets

Note: project outcome information will be made public in NIH RePORTER

B. ACCOMPLISHMENTS

B.1. What are the major goals of the project?

The Pilot Project Research Training Program (PPRT) funds small seed grants to graduate students, post-doctoral researchers, and new investigators interested in developing research expertise in Occupational Safety and Health related topics. The goal of the PPRT (and progress toward this goal) follows:

The goal of the Deep South ERC's Pilot/Small Projects Training Program is to promote and expand the research training mission of the Deep South ERC. Accordingly, the Deep South ERC will support small/pilot projects that will emphasize the national Occupational Research Agenda (NORA) established by the National Institute for Occupational Safety and Health.

We 'advertised' our Request for Proposals (RFP) from January through March, 2021. We received seven proposals (8) applications from seven (5) universities in our ERC area. Seven (7) were reviewed by experts in each discipline, and the results evaluated by the Scientific Review Board. After ranking the proposals by priority score, six (6) were selected for funding, and awarded for the 7/1/21-6/30/22 award cycle. Mid-term reports were submitted in accordance with the program requirements.

B.3. Competitive Revisions/Administrative Supplements

Nothing to report

B.4. What opportunities for training and professional development did the project provide?

Nothing to report

B.5. How did you disseminate the results to communities of interest?

The ERC has joined with regional ERCs (USF, KY and North Carolina) to host a joint sponsored symposium, in which the funded PPRT researchers are given a platform to share their final reports with other researchers. This has presented an opportunity for these researchers to present on a larger platform. The ERC has developed a website contains all the PPRT abstracts and shared with attendees of the conference. This year's conference was in-person and had over 100+ attendees (Research, Faculty, staff and students) from the SE ERCs.

B.6 - What do you plan to do during the next reporting period to accomplish the goals?

- Establish relationships with surrounding HBCUs to encourage more submissions from minority colleges/institutions.
- Find regional marketing resources and platforms to share funding announcement.
- Include exit survey for funding recipients
- Develop month webinar for pilot recipients

C. PRODUCTS

C.1. Publications, conference papers, and presentations

N/A

C.2. Website(s) or other Internet site(s) – include URL(s)

https://sites.uab.edu/dsc/; https://www.serrsouthon.com/

C.3. Technologies or techniques

Nothing to Report

C.4. Inventions, patent applications, and/or licenses

N/A

C.5. Other products and resource sharing

Nothing to Report

D. PARTICIPANTS

D.1. What individuals have worked on the project? Please include calendar, academic, and summer months.

Commons ID	S/K	Name	Degrees(s)	Role	Cal	Aca	Sum	Foreign	Country	SS
	K	Claudiu T. Lungu	PhD	Program Director	.6					
		Jonghwa Oh	PhD	Faculty	.2					

D.2 Personnel updates

a. Level of Effort:
b. New Senior/Key Personnel:
c. Changes in Other Support:
d. New Other Significant Contributors:

E. IMPACT

E.1 - What is the impact on the development of human resources, if applicable?

N/A

E.2 - What is the impact the Public Health Relevance and Impact? The investigator should address how the findings of the project relate beyond the immediate study to improved practices, prevention or intervention techniques, legislation, policy, or use of technology in public health.

N/A

F. CHANGES

F.1 – Changes in approach and reasons for change, including changes that have a significant impact on expenditures

N/A

F.2 - Actual or anticipated challenges or delays and actions or plans to resolve them

Nothing to Report

F.3 - Significant changes to human subjects, vertebrate animals, biohazards, and/or select agents

No Change

G. Special Reporting Requirements

G.1 Special Notice of Award Terms and Funding Opportunities Announcement Reporting Requirements N/A

G.2 Responsible Conduct of Research

N/A

G.3 Mentor's Research Report or Sponsor Comments

N/A

G.4 Human Subjects

G.4.a Does the project involve human subjects? No

G.4.b Inclusion Enrollment Data N/A

G.4.c ClinicalTrials.gov N/A

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA?

No

G.5 Human Subject Education Requirement

Are there personnel on this project who are newly involved in the design or conduct of human subject's research?

N/A

G.6 Human Embryonic Stem Cells (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 Vertebrate Animals

Does this project involve vertebrate animals? N/A

G.8 Project/Performance Sites

N/A

G.9 Foreign Component

N/A

G.10 Estimated Unobligated Balance

G.10.a Is it anticipated that an estimated unobligated balance (including prior year carryover) will be greater than 25% of the current year's total approved budget? N/A

G.11 Program Income

Is program income anticipated during the next budget period? N/A

G.12 F&A Costs

Is there a change in performance sites that will affect F&A costs? N/A

I. OUTCOMES

I. Provide a concise summary of the outcomes or findings of the award, written for the general public in clear and comprehensible language, without including any proprietary, confidential information or trade secrets

Note: project outcome information will be made public in NIH RePORTER

B. ACCOMPLISHMENTS

B.1. What are the major goals of the project?

The four primary methods of achieving interdisciplinary interaction among the Center's programs include: (a) courses common to the academic programs, (b) field trips and workplace evaluations, (c) seminars, participation in professional organizations meetings and activities, and (d) research projects. In the two capstone interdisciplinary courses ENH 680 - Field Interdisciplinary Studies and ENH 681 - Interdisciplinary Worksite Evaluations students are required to work in interdisciplinary teams to evaluate actual safety and health problems and propose methods to reduce or eliminate the hazards. In ENH 680, students are presented with lectures on how to conduct background and walkthrough surveys of occupational environments, and how to work effectively in teams. In ENH 681 students are assigned to interdisciplinary teams having a faculty adviser for the purpose of conducting independent evaluations at designated worksites with the goal of solving real-world occupational health problems. The teams interact with the site managers/preceptors and develop reports that describe the problem, cite the applicable standards and regulations, and recommend control methods. After a review by the faculty adviser and the other course faculty, the reports are presented to the safety and health managers at the sites where the evaluations were conducted. The reports are also presented in front of the students and faculty at an end-of-semester seminar. Additionally, all students in these courses are required to keep a log and demonstrate interdisciplinary interactions such as seminars, professional organization meetings, and participation in talks and conferences. A minimum of 20 hours of interactions are needed for ENH 680 and 30 hours for ENH 681.

B.2. What did you accomplish under these goals?

As in previous pandemic impacted semesters, in lieu of the fall 2021 semester site visits, we assigned the teams Health Hazard Evaluations (HHEs). The trainees explored the industry and the hazard(s) noted in the HHE—as well as other potential hazards in that industry or worksite. With an interdisciplinary "eye"—the teams expanded on the HHE and fully explored the site for OHS challenges. The teams presented their findings in both a PowerPoint presentation and a paper.

In addition, we invited Dr. Zeke J. McKinney, MD, MHI, MPH, FACOEM, from the University of Minnesota, School of Public Health to give a presentation on Disparities in Occupational Health. The program included a casual "get to know you" hour on the evening prior to the lecture. Both events were well-attended by a wider audience from both AU and UAB and also our region. Dr. McKinney is the Occupational and Environmental Medicine program director at Health Partners and he is uniquely qualified, based on his work researching the underrepresented and underserved, to present his views on DEI and its relationship to OSH. The students were provided insight into both obvious and more "hidden" disparities. Our goal in the ERC is to assure we have well-rounded courses and offerings for our students and professionals that provide foundational understanding of the variety of ways diversity, equity and inclusion impact us at work, school—home and out in society—hopefully instilling practices that ensure a better outcome for all.

For ENH 681, we were able to resume site specific projects. The sites/projects for 2021-2022 were:

- Nucor Steel: The team was asked to evaluate current noise exposure in different areas of the plant to help identify areas where employees might be exposed to noise levels above the OSHA action level. The students made noise maps of the areas requested by the preceptor. Following their investigation, the students proposed:
    1. Provide enclosed sound booths or sound walls surrounding workstations with the highest exposure
    2. Ensure regular maintenance of machines
    3. Install sound absorbing panels
    4. Continue training and hearing conservation plan/assure HPD are being worn correctly
    5. Relocate employee(s) from high exposure areas

- Birmingham Fire Department: The students were asked to assess and address concerns about diesel exhaust exposure at the fire station. They investigated the potential exposures and health risks associated with diesel fuel exhaust. Suggestions from the team:
    1. Limit idling time of diesel powered vehicles
    2. Maintain service intervals of the NO Smoke System by Ward Diesel during fire truck operation
    3. A complete air sampling study
    4. Install a General Exhaust Ventilation (GAV) system for backup use

- Aviation Factory (name withheld upon request): Study of ergonomic and health hazards related to the handling of heavy build plates in an aviation parts facility. The students investigated the awkward posture and hand-wrist position as well as the tools needed to complete the tasks. Based on the task, students also investigated exposure to metal dusts. Some suggestions proposed:
    1. Design adjustable work spaces—assure they are appropriate for the smallest/shortest population
    2. Place heavy/frequently use items between 38”-49” above the standing surface
    3. Provide rotatable lift tables
    4. Train employees on MSDs and ergonomics
    5. Use appropriate PPE
    6. Employ machine guarding to avoid mechanical injuries

- Birmingham Fire Department: The team was asked to evaluate occupational noise exposure at the fire station. The students used sound level meters and and Octave-band analyzer to characterize the noise. Based on their findings, the students suggested:
    1. Sound absorption materials (mats, paints, floor inlays, etc.)
    2. Assignment rotation
    3. A hearing conservation program
    4. Mandatory HPD and regular maintenance/testing of equipment

B.3. Competitive Revisions/Administrative Supplements

Nothing to report

B.4. What opportunities for training and professional development did the project provide?

Nothing to report

B.5. How did you disseminate the results to communities of interest?

Interdisciplinary students presented their findings in a group presentation to preceptors, faculty and students via zoom.

B.6 - What do you plan to do during the next reporting period to accomplish the goals?

We sincerely hope to return to the more traditional outline for the courses next year—but due to the success of the larger availability of seminars and webinars (through Zoom/Teams/etc.) we hope to continue to offer the trainees the same variety ongoing. The ability to collaborate, ask questions and see each other more frequently, though remotely, enhanced the experience and opportunities for all.

C. PRODUCTS

C.1. Publications, conference papers, and presentations

N/A

C.2. Website(s) or other Internet site(s) – include URL(s)

https://sites.uab.edu/dsc/

C.3. Technologies or techniques

Nothing to Report

C.4. Inventions, patent applications, and/or licenses

N/A

C.5. Other products and resource sharing

Nothing to Report

D. PARTICIPANTS

D.1. What individuals have worked on the project? Please include calendar, academic, and summer months.

Commons ID	S/K	Name	Degrees(s)	Role	Cal	Aca	Sum	Foreign	Country	SS
ALLYNH	K	Allyn Holladay		Program Director	.6					

D.2 Personnel updates

a. Level of Effort:
b. New Senior/Key Personnel:
c. Changes in Other Support:
d. New Other Significant Contributors:

E. IMPACT

E.1 - What is the impact on the development of human resources, if applicable?

N/A

E.2 - What is the impact the Public Health Relevance and Impact? The investigator should address how the findings of the project relate beyond the immediate study to improved practices, prevention or intervention techniques, legislation, policy, or use of technology in public health.

N/A

F. CHANGES

F.1 – Changes in approach and reasons for change, including changes that have a significant impact on expenditures

N/A

F.2 - Actual or anticipated challenges or delays and actions or plans to resolve them

Nothing to Report

F.3 - Significant changes to human subjects, vertebrate animals, biohazards, and/or select agents

No Change

G. Special Reporting Requirements

G.1 Special Notice of Award Terms and Funding Opportunities Announcement Reporting Requirements N/A

G.2 Responsible Conduct of Research

N/A

G.3 Mentor's Research Report or Sponsor Comments

N/A

G.4 Human Subjects

G.4.a Does the project involve human subjects? No

G.4.b Inclusion Enrollment Data N/A

G.4.c ClinicalTrials.gov N/A

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA?

No

G.5 Human Subject Education Requirement

Are there personnel on this project who are newly involved in the design or conduct of human subject's research?

N/A

G.6 Human Embryonic Stem Cells (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 Vertebrate Animals

Does this project involve vertebrate animals? N/A

G.8 Project/Performance Sites

N/A

G.9 Foreign Component

N/A

G.10 Estimated Unobligated Balance

G.10.a Is it anticipated that an estimated unobligated balance (including prior year carryover) will be greater than 25% of the current year's total approved budget? N/A

G.11 Program Income

Is program income anticipated during the next budget period? N/A

G.12 F&A Costs

Is there a change in performance sites that will affect F&A costs? N/A

I. OUTCOMES

I. Provide a concise summary of the outcomes or findings of the award, written for the general public in clear and comprehensible language, without including any proprietary, confidential information or trade secrets

Note: project outcome information will be made public in NIH RePORTER

B. ACCOMPLISHMENTS

B.1. What are the major goals of the project?

The Deep South Center Continuing Education Program has been supporting professionals in the field for over 30 years. DSC trains, on average, over 1,100 professionals in our region annually (COVID-19 has impacted these numbers since 2020). Our continuing education program's mission is to provide high quality courses for professionals and students on established and emerging OSH topics. We offer standard courses in Spirometry, Audiometric Testing and Hearing Conservation and Respirator Fit Testing. We further impact the OHS community with our participation in conferences and symposiums in the region. Our goal in the ERC is to assure we have well-rounded courses and offerings for our students and professionals that provide foundational understanding of the variety of ways diversity, equity and inclusion impact us at work, school—home and out in society—hopefully instilling practices that ensure a better outcome for all.

Our goals are:

- To broaden our reach within our region through a wide variety of courses
- Use social media to engage professionals and disseminate information on OHS topics and emerging issues
- To create innovative courses/instruction methods with a broad reach
- To provide OHS training to underserved workers
- Make courses accessible for those in need of financial assistance (through the Andy Perkins Scholarship, and financial assistance in special cases)
- To provide courses and/or presentations on topics of interests per the results of the updated (2020/2021) All ERC Needs and Interest Survey.

B.2. What did you accomplish under these goals?

For the majority of this reporting cycle, meetings, conferences and events that we participate in have slowly begun to return—either in a hybrid/fully online or in-person manner. A CE presence has been maintained with all of the professional organizations and conferences that is participated in prior to 2020. The American Society for Safety Professionals has resumed monthly meetings in 2021, virtually—and as of the beginning of 2022, these meetings are now hybrid. The DSC provides CEUs and participates in the leadership of this organization. Also, the Southeast Mine Safety and Health Conference Planning Committee continues to meet monthly (virtual) and held its 2021 conference in Birmingham, November 2-4. The CE Director was promoted to a leadership position on the planning committee. Over 255 participants were awarded CEUs for attending the educational sessions at the conference. The 2022 conference is planned for November. The Alabama Governor's Safety and Health Conference in August 2021 was canceled due to a hurricane. This year, the Executive Director of the Continuing Studies Program at the University of Alabama charged the planning committee with a revamping of the conference. The CE Director led the Innovation and Research (best practices) Committee. The conference is being held in Orange Beach, AL in August 2022.

A great success during this period was the fifth annual Southeast Regional Research Symposium (SEERS). It was held in Chapel Hill, North Carolina March 20-23, 2022. The format for this year's symposium was hybrid. There were 98 registrants for the in person event and 56 registered to attend virtually. The continued collaboration among the ERCs and Ag Centers in the southeast (Sunshine Center ERC (FL), the Southeastern Coastal Center (FL), the Central Appalachian Regional ERC (KY), the Southeast Center for Agricultural Health and Safety Prevention (KY), and the North Carolina Occupational Safety and Health ERC (NC)) was highly successful. This year, there were 28 posters from regional Masters and Doctoral students and, there were 12 Pilot Project Presentations. Projects varied, covering many topics such as, mental health, shift work, stress, exposures and ergonomics. This year's event also highlighted a panel made up of regional representatives from state departments of health on COVID and Occupational Health. Sara L. Tamers, PhD, MPH, Health Research Scientist, NIOSH and Coordinator of the Research Program Development and Collaboration Arm of the Total Worker Health Program was the Dillon-Carnahan Keynote speaker. Governor Ernie Fletcher, MD, the SouthON Keynote Speaker, presented on "Recovery Friendly Workplaces". This collaboration will

continue and the sixth annual SERRS will be return to Florida in 2023.

We continue to contribute and participate in *The NIOSH Education and Research Centers Webinar Series* is a collaborative effort offering free monthly webinars on various topics in Industrial Hygiene in addition to the ongoing Ergonomics webinars. The goal of the series is to provide access to current research supported through NIOSH ERC Programs.
Our core CE courses, much like conferences and symposiums have been negatively impacted by the pandemic. Spirometry has been suspended since spring 2020. However, beginning in early 2022, we started providing contract Spirometry Courses and Refreshers to occupational health clinics associated with hospitals in the region. We have held the course 4 times since January 2022—with plans for 2 more courses in August. Georgia Rhodes, Paulisha Holt, and Laura Wilson worked together to develop a fully online Audiometric Testing and Hearing Conservation (AT) Course. Their hard work—finding innovative ways to share practical, hands on, knowledge—was rewarded with CAOHC approval and unprecedented participation. Our full AT and refresher have been offered over 9 times collectively since June 2021. Additionally, we were able to provide the exam in Spanish for a native speaker in the course. Over 180 professionals from the Southeast Region and beyond (i.e. Hawaii, Mexico, North Dakota, New York, Washington State and Puerto Rico) have attended the DSC AT Courses in 2021-2022. We continue to have interest in Respirator Fit Testing—and have held 4 contract and planned courses this cycle. DSC CE Instructors have been serving as resources to various industries and businesses during the pandemic.

We continue to improve and enhance our presence in social media, understanding that it serves best as a tool to heighten awareness. Currently, we have more than 353, total page "likes", and we have steadily increased our touch (185 visits in 2019—up to 1850 in 2020 and trending well in 2021-2022) on Facebook. Also, on Twitter we have 211 followers and we're following 92. On LinkedIn we have over 1200 connections, are active in 23 groups, and connected to 26 pages. These social media platforms enable us to stay connect to our alumni, share awareness information in real time, and grow connections with other ERCs, industrial partners, governmental group, etc.

We have fully revamped our website, *https://sites.uab.edu/dsc/*, making links easier to see and follow and creating a more dynamic experience for anyone visiting the site. Beginning in 2022, we will be more proactive in cross posting events that we help plan or sponsor to assure constituents are able to access all of the CE opportunities the Center supports/contribute to.
The Andrew Perkins Scholarship for Audiometric Testing and Hearing Conservation Scholarship continues to be a valuable tool in providing assistance to a professional in need. Awareness is increasing and in 2022 we will have a pool of applicants to choose from.

B.3. Competitive Revisions/Administrative Supplements

N/A

B.4. What opportunities for training and professional development did the project provide?

As part of our mission to include DEI recognition, principles and best practices to our programs at the DSC, the CE and Outreach teams have completed Diversity, Equity and Inclusion trainings. These sessions included, but were not limited to: Safe Zone training, Cultural Awareness Building Blocks, Bystander Intervention and Unconscious Bias. We will continue to encourage staff, faculty and trainees to participate in DEI courses made available by the ERC (as appropriate) and the University.

The Outreach Deputy Director received a Diversity, Equity and Inclusion in the Workplace certification from the University of South Florida School of Business. Further, she completed UAB DEI Ambassador training. She was recently appointed Program Director for the School of Public Health Office of DEI.

We will strive to have all CE and Outreach staff achieve DEI Ambassador status in the next cycle as well as align our programs with ERC DEI principles and practices and SOPH diversity initiatives.

B.5. How did you disseminate the results to communities of interest?

We have returned to face to face meetings for organizations and events as much as possible this cycle. We continue to use social media, our newsletter and direct email as communication regarding events and courses (. FIESTA, CACSCE, PESCA have not occurred since 2019—as the pandemic continues to wane, we hope to see these important activities return. The CE Director and Deputy Director continue to participate on committees that plan both outreach and continuing education events using these partnerships and contacts to further promote and disseminate information on OHS training and research. Professionals in our courses leave with the educational materials and handouts pertaining to our training and other activities.

B.6 - What do you plan to do during the next reporting period to accomplish the goals?

- Maintain focus on core classes to assure quality and excellence
- Look for opportunities to offer 1-2 special courses in response to emerging issues in OHS
- Continue support of All ERC initiatives to broaden reach, collaborate and provide training
- Maintain involvement in key conferences, committees and organizations that support the mission, goals and provide opportunities to support excellence in OHS training and education
- Continue strengthening the Southeast Regional Research Symposium to enhance its visibility as an important tool for sharing new and emerging research in OHS
- Work to further connect with the underserved workers in the region. Find other potential venues, such as CACSCE to reach them
- Maintain website and social media
- Look internally for potential CE offerings via OHN, OSE, OIP that fit the most recent Needs Assessment results
- Continue to offer Andrew Perkins Scholarship and support for financially disadvantaged professional

C. PRODUCTS

C.1. Publications, conference papers, and presentations

N/A

C.2. Website(s) or other Internet site(s) – include URL(s)

https://sites.uab.edu/dsc/

C.3. Technologies or techniques

Nothing to Report

C.4. Inventions, patent applications, and/or licenses

N/A

C.5. Other products and resource sharing

Nothing to Report

D. PARTICIPANTS

D.1. What individuals have worked on the project? Please include calendar, academic, and summer months.

Commons ID	S/K	Name	Degrees(s)	Role	Cal	Aca	Sum	Foreign	Country	SS
ALLYNH	K	Allyn Holladay		Program Director	6.2					
		Paulisha Holt	MBA	Deputy Director	.8					
		Laura Wilson		Program Coordinator	4.0					

D.2 Personnel updates

a. Level of Effort:
b. New Senior/Key Personnel:
c. Changes in Other Support:
d. New Other Significant Contributors:

E. IMPACT

E.1 - What is the impact on the development of human resources, if applicable?

N/A

E.2 - What is the impact the Public Health Relevance and Impact? The investigator should address how the findings of the project relate beyond the immediate study to improved practices, prevention or intervention techniques, legislation, policy, or use of technology in public health.

N/A

F. CHANGES

F.1 – Changes in approach and reasons for change, including changes that have a significant impact on expenditures

N/A

F.2 - Actual or anticipated challenges or delays and actions or plans to resolve them

Nothing to Report

F.3 - Significant changes to human subjects, vertebrate animals, biohazards, and/or select agents

No Change

G. Special Reporting Requirements

G.1 Special Notice of Award Terms and Funding Opportunities Announcement Reporting Requirements N/A

G.2 Responsible Conduct of Research

N/A

G.3 Mentor's Research Report or Sponsor Comments

N/A

G.4 Human Subjects

G.4.a Does the project involve human subjects? No

G.4.b Inclusion Enrollment Data N/A

G.4.c ClinicalTrials.gov N/A

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA?

No

G.5 Human Subject Education Requirement

Are there personnel on this project who are newly involved in the design or conduct of human subject's research?

N/A

G.6 Human Embryonic Stem Cells (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 Vertebrate Animals

Does this project involve vertebrate animals? N/A

G.8 Project/Performance Sites

N/A

G.9 Foreign Component

N/A

G.10 Estimated Unobligated Balance

G.10.a Is it anticipated that an estimated unobligated balance (including prior year carryover) will be greater than 25% of the current year's total approved budget? N/A

G.11 Program Income

Is program income anticipated during the next budget period? N/A

G.12 F&A Costs

Is there a change in performance sites that will affect F&A costs? N/A

I. OUTCOMES

I. Provide a concise summary of the outcomes or findings of the award, written for the general public in clear and comprehensible language, without including any proprietary, confidential information or trade secrets

Note: project outcome information will be made public in NIH RePORTER

B. ACCOMPLISHMENTS

B.1. What are the major goals of the project?

Outreach has been a core value of the Deep South ERC since its inception in 1982. Faculty, students and staff have all played important roles in outreach activities impacting occupational health and safety practitioners, and provided information and assistance to other organizations. We have well-established relationships with NIOSH supported Training Project Grants (TPGs) in our region and interact with other institutions of higher learning to integrate safety and health into their curricula. The Outreach Program is intended to establish partnerships and encourage integration among disciplines involved in safety and health protection and health promotion research and to promote the translation of the products of that research to the practicing occupational safety and health community.

Our goals are:

- Continue offering our successful Summer Institute in Environmental and Occupational Safety and Health for undergraduate students
- Continue involvement in community events centered on underserved populations to provide OSH information and establish the ERC as resource in the community
- Development of a professional development program geared toward science teachers at local middle schools
- Introduce IH to high school students
- Teachers will be provided educational information for environmental and occupational safety and health
- Continue to partner with the civic organizations to create and participate in free events for healthcare workers

B.2. What did you accomplish under these goals?

While COVID-19 continues to interrupt many events our Outreach Program participates in, we have added some new activities that have been very successful. In March 2021, the UAB Occupational Health & Safety department reached out to our Outreach Program to assist in the development of a tiered, team-based, hands-on safety training to emphasize the concept of "Safer Together" for the environmental services and maintenance employees. These employees are exposed to a variety of hazards like harmful chemicals and biological hazards that can cause diseases during their routine work schedule. There is also a high risk for physical hazards like trips and falls and ergonomic hazards caused by repetitive motion and other injuries caused by strains and overexertion. Covid-19 pandemic has made the situation even worse by making them frontline workers. The pandemic also introduced a new set of hazards including highly infectious biological agents, new cleaning materials and new cleaning strategies with more labor-intensive constant disinfection trends. We are committed to providing resources and training support from our ERC trainees to assist this new training program. Training was held in January 2022. The Outreach Program is allocating resources for the next project period to continue support of this initiative.

During this funding cycle the Outreach program successfully executed the 13th Annual Environmental Occupational Safety & Health Institute (EOSH Institute). With this milestone, we focused our efforts on improving and updating the program, and expanding our recruiting efforts to include underserved students from 2-year colleges in the vicinity. We also recruited heavily from regional community colleges, 4-year colleges and universities. The 13th Annual EOSH Institute brought in over 20 competitive applications, from those; we selected 6 undergraduate students to participate. We decided to offer the EOSH in-person. Due to COVID-19 policy, we reduced the number of participants to 6. We had a high female / minority attendance in the program (4 Females, 2 Males)/ (3 African American, 1 Hispanic, and 2 Caucasian). We utilized our board members to deliver presentations focused on a day in the life, featuring their occupational health and safety careers. Our alumnus, Holden Phillips, led a tour at his work site, ACIPCO, with the assistance of intern, Jasna Williams (MSPH, UAB IH). Scholars also traveled to Auburn University, to visit OSE labs, and hear presentation by OIP/OSE faculty.

We also launched our first Public Health Influencer Summer program geared towards local urban and county high

school students. This program was a collaboration between Deep South ERC, UAB Superfund, UAB School of Public Health, and Alabama Regional Center for Infection Prevention and Control. We had over 35 applications and accepted 18 into the program. This 5-day program, provided students an introduction to Public Health and Occupational Health and Safety. Students learned about infectious disease, public safety, built environment, social determinants of health, environmental and social justice, tools used in occupational health and safety, air quality and lung health. We hope to repeat this program in the future.

As part our Outreach Program's DEI Initiative the program sponsored Dr. Zeke McKinney, MD, MHI, MPH, FACOEM, Program Director, HealthPartners Occupational and Environmental Medicine Residency Affiliate Assistant Professor, University of Minnesota School of Public Health, to provide a webinar addressing disparities in occupational health. This program was marketed to our students and members of the public using both social media and our extensive distribution list. This program was well attended by ERC students, faculty and community.

FIESTA returned Sept 2021, Ms. Holt organized a booth, and students from the IH and OSE program assisted with disbursement of hearing protection, protective glove and safety glasses. It was a great opportunity for students to participate in the ERC outreach activities.

B.3. Competitive Revisions/Administrative Supplements

N/A

B.4. What opportunities for training and professional development did the project provide?

As part of our mission to include DEI recognition, principles and best practices to our programs at the DSC, the CE and Outreach teams have completed Diversity, Equity and Inclusion trainings. These sessions included, but were not limited to: Safe Zone training, Cultural Awareness Building Blocks, Bystander Intervention and Unconscious Bias. We will continue to encourage staff, faculty and trainees to participate in DEI courses made available by the ERC (as appropriate) and the University.

The Outreach Deputy Director received a Diversity, Equity and Inclusion in the Workplace certification from the University of South Florida School of Business. Further, she completed UAB DEI Ambassador training. She was recently appointed Program Director for the School of Public Health Office of DEI.

We will strive to have all CE and Outreach staff achieve DEI Ambassador status in the next cycle as well as align our programs with ERC DEI principles and practices and SOPH diversity initiatives.

B.5. How did you disseminate the results to communities of interest?

Information is shared using the Deep South ERC newsletter, social media platforms (i.e., Facebook, LinkedIn, and Twitter), and website. Outreach events and opportunities to connect to the ERC are promoted at all CE events. The CE Director and Deputy Director participate on committees that plan both outreach and continuing education events using these partnerships and contacts to further promote and disseminate information on OHS training and research. Our presence at community events, programs and schools is key to providing information to students, professionals and other OSH impacted individuals. We have printed material that we provide as "take aways" whenever we are out in the community. For CACSCE, we have translated all of the conference related materials into Spanish—and the attendees leave with contact information for OSHA, the DSC and helpful documents on OSH.

B.6 What do you plan to do during the next reporting period to accomplish the goals?

- Based upon the huge success of our Public Health Influencers Summer Program, we will offer for next funding cycle.
- Continue to offer Environmental Occupational Safety & Health Institute,
- We will also develop an advisory board with local educational leaders to help create a robust event for the students.
- Creation of a Hispanic Adversary Board to help the ERC extend their reach into the Hispanic community. This board will comprise of area resource organizations in the Hispanic community and provide entre to more opportunities to connect with this community.
- Work to develop more DEI related program for our stakeholders.

C. PRODUCTS

C.1. Publications, conference papers, and presentations

N/A

C.2. Website(s) or other Internet site(s) – include URL(s)

https://sites.uab.edu/dsc/

C.3. Technologies or techniques

Nothing to Report

C.4. Inventions, patent applications, and/or licenses

N/A

C.5. Other products and resource sharing

Nothing to Report

D. PARTICIPANTS

D.1. What individuals have worked on the project? Please include calendar, academic, and summer months.

Commons ID	S/K	Name	Degrees(s)	Role	Cal	Aca	Sum	Foreign	Country	SS
	K	Allyn Holladay		Program Director	.2					
		Paulisha Holt	MBA	Deputy Director	3.0					
		Laura Wilson		Program Coordinator	.5					

D.2 Personnel updates

a. Level of Effort:
b. New Senior/Key Personnel:
c. Changes in Other Support:
d. New Other Significant Contributors:

E. IMPACT

E.1 - What is the impact on the development of human resources, if applicable?

N/A

E.2 - What is the impact the Public Health Relevance and Impact? The investigator should address how the findings of the project relate beyond the immediate study to improved practices, prevention or intervention techniques, legislation, policy, or use of technology in public health.

N/A

F. CHANGES

F.1 – Changes in approach and reasons for change, including changes that have a significant impact on expenditures

N/A

F.2 - Actual or anticipated challenges or delays and actions or plans to resolve them

Nothing to Report

F.3 - Significant changes to human subjects, vertebrate animals, biohazards, and/or select agents

No Change

G. Special Reporting Requirements

G.1 Special Notice of Award Terms and Funding Opportunities Announcement Reporting Requirements N/A

G.2 Responsible Conduct of Research

N/A

G.3 Mentor's Research Report or Sponsor Comments

N/A

G.4 Human Subjects

G.4.a Does the project involve human subjects? No

G.4.b Inclusion Enrollment Data N/A

G.4.c ClinicalTrials.gov N/A

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA?

No

G.5 Human Subject Education Requirement

Are there personnel on this project who are newly involved in the design or conduct of human subject's research?

N/A

G.6 Human Embryonic Stem Cells (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 Vertebrate Animals

Does this project involve vertebrate animals? N/A

G.8 Project/Performance Sites

N/A

G.9 Foreign Component

N/A

G.10 Estimated Unobligated Balance

G.10.a Is it anticipated that an estimated unobligated balance (including prior year carryover) will be greater than 25% of the current year's total approved budget? N/A

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