Event Agenda

27th Pilot Research Project Symposium

Thursday, October 08, 2026

Careers Workshop

1:00 PM – 5:00 PM | Location: Kettering Lab G18

Lab tours and Q&A meeting with current ERC graduate students. Workshop is for students interested in learning about and pursuing UC ERC graduate programs: https://med.uc.edu/depart/eh/centers/erc/programs

The groups will be touring the following labs; Aerosol/Bioaerosol Lab, Respiratory Protection and Exposure Chamber, Low Back Biomechanics and Workpace Stress Lab, Early Detection of Degenerative Disorders & Innovative Solutions Lab, SafeMoves Patient Handling Simulation Lab.

Ethical dilemmas in Industrial Hygiene (how to spot them and what to do)

4:00 PM – 6:00 PM | Location: Kehoe Auditorium

Ethical decision-making is a foundational responsibility of industrial hygiene (IH) professionals, yet practitioners are frequently confronted with situations where competing priorities, incomplete information, and organizational pressures create difficult ethical challenges. This presentation explores the ethical principles that guide professional IH practice and examines real-world examples of ethical dilemmas encountered in occupational and environmental health settings.

Participants will discuss how scientific evidence informs ethical decision-making, evaluate common ethical failures, and apply established ethical frameworks to practical workplace scenarios. Through case studies and interactive discussion, attendees will gain tools to recognize ethical risks, strengthen professional judgment, and implement ethical practices that protect worker health, maintain scientific integrity, and support organizational trust.

This session is designed for industrial hygienists, occupational health professionals, EHS practitioners, researchers, and safety leaders seeking to strengthen their ethical decision-making skills and professional effectiveness.

Upon completion of this session, participants will be able to:

Explain the ethical principles and responsibilities that underpin industrial hygiene practice.
Reflect on and discuss experiences involving ethical dilemmas in occupational health and safety.
Apply scientific findings and evidence-based approaches to ethical decision-making.
Implement ethical practices when faced with real-world workplace challenges.
Identify indicators of ethical failures and develop strategies to prevent them.

Speaker



Jay Vietas

Senior Director, Research | National Safety Council

Welcome Reception

6:00 PM – 8:00 PM | Location: Kettering Lab G19

All symposium attendees are invited to attend the welcome reception as an opportunity to meet other symposium attendees and network before the symposium presentations on Friday. Dinner will be provided from Ollie's Trolley.

Friday, October 09, 2026

Registration and Breakfast

7:30 AM – 8:00 AM | Location: Kettering Lobby

Welcome Remarks and Introductions

8:00 AM – 8:10 AM | Location: Kehoe Auditorium

Welcome remarks and introduction of the Education and Research Center and Pilot Research Project Program.

Speakers



Amit Bhattacharya

Professor | University of Cincinnati, Environmental and Public Health Sciences



Kelly Brunst

Interim Chair, Department of Environmental and Public Health Sciences | University of Cincinnati

Between Care and Crisis: The Impact of Lived Experience on Mental Health and Suicide Risk Among Veterinarians

8:10 AM – 8:30 AM | Location: Kehoe Auditorium

Veterinarians face disproportionate occupational risks that contribute to elevated rates of mental health challenges, including burnout, anxiety, depression, and suicidal ideation. Evidence indicates that veterinarians are significantly more likely to attempt suicide than the general population, yet they remain a critically understudied group in occupational and mental health research. The purpose of this project is to explore the professional and personal lived experiences of veterinarians that may contribute to mental health distress and suicide risk. A descriptive phenomenological approach will be used to capture the depth and complexity of these experiences, emphasizing participants' subjective perspectives. Data will be analyzed to identify common themes that illuminate how occupational pressures, role expectations, and personal factors intersect to influence wellbeing. The expected outcomes of this project are threefold: (1) to generate new knowledge on the unique mental health risks faced by veterinarians, (2) to provide a foundation for the development of evidence-based, targeted interventions, and (3) to establish a basis for longitudinal research that can monitor changes in mental health outcomes over time. Ultimately, the findings will contribute to reducing burnout and suicide risk within the veterinary profession, enhancing resilience, and informing occupational health policy and practice. By addressing a high-risk, high-need population, this study has the potential for significant long-term impact on both individual wellbeing and workforce sustainability within veterinary medicine.

2025-26 AWARDEE

Speaker



Afton Erbe

Assistant Professor | University of Cincinnati, College of Nursing

Energy Metabolism and Bone Health in Race Riders: From Rest to Recovery

8:30 AM – 8:50 AM | Location: Kehoe Auditorium

Collaborators: Jody Clasey, Department of Kinesiology at the University of Kentucky

Purpose: To 1) evaluate bone health, 2) assess low energy availability, and 3) quantify the metabolic demands of a complete race-cycle using a mechanical simulator in American race riders (jockeys and exercise riders).

Design: Observational cross-sectional study with a convenience sample.

Methods: Race riders are currently being recruited to undergo total-body dual-energy X-ray absorptiometry (DEXA) to assess bone mineral density (BMD) Z-scores, with Z-scores <−1.0 indicating poor bone health. Predicted resting metabolic rate (pRMR), calculated using the Cunningham, Harris-Benedict, and Koehler equations, is compared with measured RMR (mRMR) via indirect calorimetry; an mRMR:pRMR <0.90 indicates low energy availability. Participants complete a simulated race cycle (3-min warm-up, 2-min race, 15-min recovery), with VO_2 and EPOC measured to estimate caloric expenditure.

Results: To date, three jockeys (one female, 30 ± 2.6 years) have completed the data collection. Age-matched BMD Z-scores ranged from 0.2-0.9, indicating above-average bone health. Participants' mRMR:pRMR ranged from 0.97-1.23, indicating no evidence of low energy availability. The total energy expenditure across the full race cycle was 48.2 ± 8.0 kcal, with EPOC accounting for 46.5-57.4% of the caloric expenditure.

Conclusion: Preliminary findings suggest the current race riders studied do not exhibit impaired bone health or low energy availability associated with relative-energy deficiency in sport; however, these conclusions are limited by the small sample size and data collection still underway. EPOC accounted for ~50% of the total race-cycle energy expenditure, suggesting that assessments evaluating the race itself may substantially underestimate the energy demands of race riding. Continued recruitment is needed to determine whether these findings persist in a larger sample.

Impact Statement: Accounting for post-race energy expenditure may improve estimates of race riders' total energy requirements and inform nutrition strategies that support adequate energy availability and long-term health.

2025-26 AWARDEE

Speaker



Michaela Keener

Assistant Professor | University of Kentucky, Athletic Training & Clinical Nutrition

Occupational Heat Stress: Comparing Subjective Symptoms and Physiological Signs

8:50 AM – 9:10 AM | Location: Kehoe Auditorium

Purpose: Heat stress poses a significant risk to workers in high heat industries, yet limited research has examined how workers' subjective symptoms align with physiological indicators during real world occupational tasks. This pilot study evaluated the feasibility of collecting continuous physiological data and repeated subjective symptom reports among auto manufacturing workers in a high temperature production environment.

Design: A descriptive, field-based feasibility study was conducted during summer months.

Methods: Nine auto manufacturing workers were recruited from a high heat facility where employees performed physically demanding tasks such as welding and assembly. Participants wore a Zephyr Bimodule to collect physiological metrics (heart rate, estimated core temperature), Subjective symptoms), clothing, work tasks, and prevention behaviors were reported by the participants via Redcap surveys. Environmental conditions (WBGT, heat index were also collected. Feasibility outcomes included enrollment success, diversity of participants, device adherence, subjective reporting compliance, and barriers encountered.

Results: Data collection was completed with nine participants. Physiological monitoring was feasible, though device related technical issues occurred. Subjective symptom reporting had several issues including technical issues lack of participant reporting.

Conclusion: Collecting simultaneous physiological, subjective, and environmental heat stress data in an active manufacturing environment is feasible but requires protocol adjustments to improve device data collection and subjective reporting consistency.

Impact Statement: Findings support the development of improved field protocols for occupational heat stress monitoring and provide foundational evidence for future studies comparing subjective and physiological indicators to guide worker centered heat illness

prevention strategies.

2025-26 AWARDEE

Speaker



Ashley Velez

Postdoc | University of Cincinnati, College of Nursing

Development of Metal-Composite 3D Graphene Sheets for Electromagnetic Interference (EMI) Shielding in Occupational and Personal Environments

9:10 AM – 9:30 AM | Location: Kehoe Auditorium

Purpose:
Electromagnetic interference (EMI) from expanding wireless networks, medical telemetry systems, and high-frequency electronics poses increasing challenges to device reliability and occupational safety. This study investigates ultrathin metal-functionalized three-dimensional graphene sheets (3DGS) as lightweight, flexible, and scalable EMI shielding materials that overcome key limitations of conventional metallic shields, including high density, corrosion susceptibility, and poor wearability.

Design:
A systematic material platform was developed by combining three-dimensional graphene sheets (3DGS), cold-rolled three-dimensional graphene sheets (C-3DGS), and metal-functionalized graphene architectures incorporating silver (Ag), copper (Cu), and hybrid Ag+Cu coatings. The influence of structural densification and metal incorporation on electromagnetic attenuation, conductivity, thickness-normalized shielding performance, and shielding mechanisms was evaluated.

Methods:
Three-dimensional graphene sheets were synthesized through chemical vapor deposition and subsequently densified using a cold-rolling process to produce ultrathin C-3DGS architectures. Metal-functionalized structures were fabricated through surface metal deposition. Microstructural evolution was characterized using scanning electron microscopy, while electrical conductivity and electromagnetic shielding effectiveness were evaluated using electrical characterization methods and vector network analyzer measurements in the X-band frequency range (8-12 GHz).
Results:
Structural densification converted porous 3DGS into ultrathin C-3DGS architectures, reducing thickness to ~6 μm while increasing conductivity to >940 S cm^{-1}. The resulting materials delivered >40 dB EMI shielding with SSE/t values reaching 5.07×10^4 $dB \cdot cm^2 \cdot g^{-1}$. Combined with metal functionalization, these lightweight graphene architectures exhibited absorption-dominated attenuation and thickness-normalized performance rivaling or surpassing that of substantially thicker conventional shielding materials.

Conclusion:
Structural densification through cold rolling, coupled with metal functionalization, enables ultrathin graphene architectures with exceptional thickness-normalized EMI shielding performance while preserving lightweight and scalable characteristics. These results demonstrate the potential of engineered graphene materials to overcome longstanding tradeoffs between shielding effectiveness, thickness, weight, and processability.

Impact Statement:
The developed materials provide a scalable pathway toward lightweight EMI mitigation technologies for healthcare facilities, research laboratories, advanced manufacturing environments, aerospace systems, and wearable protective equipment. By achieving high shielding performance in ultrathin and lightweight form factors, these materials may contribute to reducing occupational EMI exposure while enabling the next generation of flexible shielding platforms for worker protection and electromagnetic compatibility applications.

2025-26 AWARDEE

Speaker



Ayush Raut

PhD Student | University of Cincinnati, Mechanical and Materials Science & Engineering

Poster Session 1 & Break

9:30 AM – 10:10 AM | Location: Kettering Atrium

Poster presentations by the 2026-27 PRP Awardees, Targeted Research Training Projects, and Other accepted posters

Assessing Postural Stressors and Musculoskeletal Discomfort among Automobile Mechanics and Technicians.

9:30 AM – 10:10 AM

Work-related musculoskeletal disorders (WMSDs) are considered to be one of contributors to disability and loss of workdays in occupations including automobile mechanics and technicians, a workforce of more than 800,00 that is projected to grow by 4% in the coming decade. These workers frequently perform tasks involving awkward postures, repetitive motions, forceful exertions, vibrations, and prolonged static postures, all of which elevate the risk of WMSDS, Despite the high prevalence of injuries, limited research has qualified actual postural stressors in this occupation. This cross-sectional study will employ wearable motion sensors (Xsens MVN Awinda) to continuously monitor posture of 30 automobile mechanics and technicians in Cincinnati, Ohio, during a typical work shift. Self-reported body discomfort surveys will be administered before and after the shift to evaluate musculoskeletal symptoms across multiple body regions. The primary objectives are to quantify postural demands and assess their association with discomfort. Findings will provide baseline ergonomic data on an understudied workforce, enabling development of evidence-based interventions to reduce WMSDs. The study's innovative use if wearable sensors technology allows for continuous posture monitoring, offering deeper insights than traditional observational methods. Results will advance occupational safety research and inform strategies to improve worker health, comfort, and productivity.

2026-27 AWARDEE

Speaker



Dickson Rungere

PhD Candidate | University of Cincinnati, Environmental and Public Health Sciences

Academy Adaptations: Evaluating Health in Firefighter Recruits

9:30 AM – 10:10 AM

Collaborators: Dr. Matthew Chatlaong, School of Human Services, University of Cincinnati

Firefighters are vital to ensuring public safety. Unfortunately, firefighters suffer high rates of fatal and nonfatal injuries while working. Fatal injuries are often linked to overexertion and strain on the job. In addition, non-fatal injuries are usually to the musculoskeletal system and the result of sprains and strains due to slips, trips, and falls. To prepare for a career in the fire service, there are extensive training requirements to ensure firefighter recruits are physically ready for the occupational demands. Although most fire academies have mandated physical training components, there is very little known information on the physiological adaptations that may be occurring in firefighter recruits throughout the academy. The primary purpose of this study is to examine the effectiveness of the academy on cardiometabolic metrics (body composition, aerobic capacity, diet). A secondary aim of the study is to investigate adaptations to neuromuscular function (muscle size and quality, strength, balance) during the firefighter academy. This study will occur with a local firefighter training academy and the recruit classes. Recruits will be assessed pre-, mid-, and post-training during the academy. The findings from this study will be beneficial in understanding physiological adaptations that may need to occur in the academy to best prepare recruits for a career in the fire service.

2026-27 AWARDEE

Speaker



Kealey Wohlgemuth

Assistant Professor | University of Cincinnati, CECH, School of Human Services, Exercise Science

Occupational Exposure to Understudied Toxicants in Aviation Gasoline (Avgas) Combustion Emissions

9:30 AM – 10:10 AM

This pilot project will investigate the chemical composition and physical characteristics of emissions from aviation gasoline (avgas) combustion under piston-engine–relevant operating conditions, with the goal of identifying toxic pollutants beyond lead that are relevant to occupational health. The central research question is: What highly toxic and previously understudied organic combustion byproducts are emitted from leaded avgas (100LL) and commercially available unleaded avgas (UL94), and how are these toxicants distributed across fine and ultrafine particulate matter fractions that govern inhalation and respiratory deposition? Avgas remains widely used in general aviation and is the largest remaining source of lead emissions in U.S. transportation; however, the historical focus on lead has left a critical knowledge gap regarding non-lead toxicants produced during avgas combustion. Compounds such as thio-PAHs, nitro-PAHs, oxygenated PAHs, α-dicarbonyls, and related hazardous organic species are well known from other combustion sources but have not been systematically characterized for avgas, particularly under conditions relevant to worker exposure at small airports. Moreover, no prior study has integrated chemical speciation with real-time aerosol size measurements to evaluate exposure-relevant properties such as size-resolved toxicant partitioning. Using a custom lab-scale combustor designed to replicate piston-engine operation, emissions from 100LL and UL94 avgas will be generated under controlled, repeatable conditions. Diluted exhaust will be sampled for both gas- and particle-phase species. Organic compounds will be collected using solid-phase extraction media and analyzed via gas chromatography–mass spectrometry (GC-MS) and high-performance liquid chromatography (HPLC). In parallel, particle number concentrations and size distributions will be measured in real time using a Fast Mobility Particle Sizer (FMPS) and a Scanning Mobility Particle Sizer (SMPS). We anticipate identifying previously unmeasured toxic organic compounds in avgas emissions and determining whether these toxicants are preferentially associated with ultrafine (<100 nm) and fine (<2.5 μm) particles, which have the highest respiratory deposition efficiency. Comparative results between 100LL and UL94 will provide critical, exposure-relevant data to inform occupational risk prioritization, guide future field-based exposure assessments, and support safer transitions to unleaded avgas in general aviation.

2026-27 AWARDEE

Speaker



Onyinye A. Ezeifeka

PhD Student | University of Cincinnati, Environmental and Public Health Sciences

Wearable Cool Pants for High-Temperature Work Environments

9:30 AM – 10:10 AM

Extreme working environments pose significant health risks due to prolonged heat exposure, leading to heat stress and reduced productivity. To mitigate these risks, this proposal aims to develop an advanced wearable thermal management solution tailored for harsh working environments by introducing “Cool Pants”. These pants integrate innovative cooling strategies and materials to enhance worker safety and comfort in high-temperature environments, with a particular focus on mitigating heat stress in the legs. The proposed Cool Pants employ two primary cooling strategies: short-term intensive cooling and sustained moderate cooling. The design incorporates lightweight and portable cooling devices, including fans, batteries, coolant packs (cold packs/dry ice), and temperature and humidity sensors, all housed in a compact unit within a pant pocket. Additionally, an alternative cooling system utilizing a portable, thermoelectric unit is being explored as a coolant-free solution that is energy-efficient and compact. To enhance cooling distribution, a novel graphite-based composite fabric is integrated into the thigh area. Thus, this research focuses on engineering a functional prototype and evaluating its performance in real world conditions. The effectiveness of cooling distribution, user comfort, and practicality will be assessed through comparative testing against traditional work pants. Thereby promoting a way to reduce the risk of heat-related illnesses and enhance occupational safety, comfort, and productivity. Furthermore, the Cool Pants could prove beneficial for first responders, firefighters, and military personnel carrying out missions in hot environments.

2026-27 AWARDEE

Speaker



Maliha Marzana

PhD Student | University of Cincinnati, Mechanical and Materials Science & Engineering

OHS Motivation and Error Performance in Aviation: A Cognitive Approach

9:30 AM – 10:10 AM

Adequate performance of safety-related tasks, free of error, is critical in the aviation industry. Despite the variety of physical, chemical, and biological hazards that jeopardize the health and safety of aviation workers, controls are well-established. Still, up to 75% of accidents and incidents are attributable to human factors and errors. This creates a pressing need to explore additional factors that can influence occupational performance and worker health and safety outcomes. Occupational health and safety motivation has emerged as a pillar in the industrial hygiene industry aimed at investigating why workers are motivated to behave safely. It has not been articulated what types of motivation or how motivation causes workers to behave safely. Cognitive control has been suggested as a potential mediator between motivation and task performance. How cognitive control (i.e., one’s ability to inhibit voluntary reactions and respond according to known policies and procedures) is related to both motivation and task performance has not been determined. This study will examine the impact of occupational health and safety motivation on the frequency and type of errors committed in simulated task performances. This study will also characterize the pathway from occupational health and safety motivation to error performance with cognitive control as a potential mediator. The Self-Determined Safety Motivation (SDSM) Scale and Multidimensional Work Motivation Scale (MWMS) will be used to assess motivation, while the Behavior Inventory of Executive Functioning – Adult (BRIEF-A) and Cognitive Failure Questionnaire (CFQ) will assess cognitive control. Vagally mediated heart rate variability (vmHRV) will also be collected. Performance outcomes will be assessed through participant performance on the Stroop Test, Go/No-Go Task, and the Wisconsin Card Sorting Test. Error frequency and type will be self-reported by participants over a six-month period. Frequency type and error will be examined for patterns and associations with occupational health and safety motivation factors and cognitive control levels. Cognitive control will be tested as a mediator between occupational health and safety motivation and error performance. The collected vmHRV will also be isolated and tested as a mediator between occupational health and safety motivation and cognitive control. By providing critical insight into this pathway and how motivation may ultimately be a protective factor in terms of error performance, this study aims to fill the existing research gap. The results of this study will be used to design targeted evidence-based interventions to improve the error performance of aviation workers. Beyond this, this study is the first of its kind, and may serve as a basis for further investigation into the individual, organizational, and environmental factors that influence occupational health and safety performance in the workplace.

2026-27 AWARDEE

Speaker



Hannah Frame

PhD Student | University of Cincinnati, Environmental and Public Health Sciences

Changes in Self-Reported Vocal Symptoms Among University Professors Before and After a Teaching Semester

9:30 AM – 10:10 AM

Collaborators: Dr. Shulunda Gibson, CCC-SLP, The Speech & Voice Care Center
Dr. Sophia S. Leggett, Department of Behavioral and Environmental & Occupational Health, Jackson State University
Kylan Jones, Department of Speech Language Pathology Audiology, Jackson State University

Grade school teachers are the largest occupational voice group studied with a very high prevalence of developing voice disorders. University Professors are understudied although they rely heavily on their voice to engage students during long periods of teaching in academic settings. Kyriaki et al., 2017 surveyed 196 university faculty using VDI, with 35% responding having slight, moderate, or profound voice disorder. The aim of this pilot project is to 1) Educate the importance of vocal health and 2) Understand the frequency of experience vocal symptoms before & after a teaching semester via Qualtrics survey. Vocal symptoms occur due to vocal abuse and/or misuse, which is excessive or inappropriate use of the vocal mechanism. Lingering vocal symptoms can develop into vocal pathologies. Vocal pathologies such as cysts, nodules, or polyps can occur, which can interfere with teaching effectiveness. They can be benign or malignant, which is a concern for occupational health and a safety hazard affecting the workforce. It is estimated that one-third of voice users are absent from work with related cost of $2.5 billion annually within the United States (Verdolini & Ramig, 2001). The purpose of this pilot project is to highlight awareness of vocal symptoms by educating University Professors throughout the course of a teaching semester. The research design is a pre/post survey assessing the frequency of their experienced vocal symptoms. An on-line webinar, Caring for Your Voice: Maintaining Vocal Health for Teaching, will serve as education prior to the post-survey. This project is relevant to Public Health by decreasing economic burdens, and to highlight preventative strategies and vocal symptoms occurrences. This approach is innovative because it employs a pre-post survey with targeted educational webinar, addresses significant population gap, measurement innovation through a self-developed survey, & extends beyond data collection to include an in-person vocal health workshop to disseminate findings & education participants. This component bridges research and practice by promoting vocal awareness, prevention strategies, and community engagement, thereby enhancing the practical impact of the study. The expected outcomes include greater awareness of appropriate vocal use, early detection of vocal symptoms, adaptation to the use evidence-based strategies, promote self-monitoring practices, and increased knowledge of vocal health.

The attendees will be able to:
1) Identify common vocal symptoms among university professors.
2) Discuss the frequency of change in perceptions of vocal awareness.

2026-27 AWARDEE

Speaker



Dawn Stanley

Assistant Professor | Jackson State University

Air Pollutant Emissions from Major Ohio Airports: A Comparative Analysis of the 2023 EPA National Emissions Inventory

9:30 AM – 10:10 AM

Additional Authors: Hend Ali; Jiahe Wang; Makiah Burnell; Oluwasegun Abolade; Sydney Pierce; Tolu Solomon | University of Cincinnati

Abstract: Airports are complex emission environments in which aircraft operations and supporting activities emit criteria air pollutants as well as hazardous air pollutants. These emissions could have effects on air quality and are of concern for workers who regularly operate near aircraft and other sources of emissions at airports. Yet there is very little comparative information available regarding the amount and composition of emissions from the major commercial airports that serve Ohio. Objective: The aim of this study was to characterize and compare the emissions of air pollutants from the major commercial airports in Ohio and to investigate whether any differences in these emissions were linked to the level of airport activity. Additionally, the study sought to identify the pollutants and emission patterns that should be subject to further investigation from both an occupational and an environmental health point of view. Methods: A secondary analysis was carried out on the U.S. Environmental Protection Agency's 2023 National Emissions Inventory (NEI). The major commercial airports in Ohio were chosen as case studies on the basis of their commercial passenger traffic and the ones included were Cleveland Hopkins International Airport (CLE), John Glenn Columbus International Airport (CMH), James M. Cox Dayton International Airport (DAY), Akron-Canton Airport (CAK), and Cincinnati/Northern Kentucky International Airport (CVG). The emissions at the airport level were obtained from the EPA's point-source and facility-level datasets. The criteria pollutants and the selected hazardous air pollutants were assessed, these comprising nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOCs), particulate matter ($PM_{2.5}$ and PM_{10}), sulfur dioxide (SO_2), and the available air toxics. The emissions were compared between the airports for each pollutant and were evaluated in relation to airport activity using data from the Federal Aviation Administration. Results: The analysis showed that there was variation both in the amount and in the make-up of the air pollutant emissions reported for the selected airports. Emission patterns varied depending on the pollutant and the airport, which means that the total emissions from an airport cannot be properly described by reference to a single pollutant or to a measure of airport activity. When the emissions were compared with airport activity, this also gave a basis for telling the differences caused by the scale of airport operations apart from those related to the emission profiles of the pollutants. The analysis found that there were certain pollutants and airports for which more detailed investigation should be carried out. Impact:This study involves a comparative evaluation of aviation-related emissions at the main commercial airports in Ohio, based on nationally available data. The results form the basis upon which pollutants and airport environments can be prioritised for future air-quality monitoring and for the assessment of occupational exposure. Since the NEI gives estimated emissions rather than actual measurements of worker exposures or ambient concentrations, the findings should be understood as indicating only the level of emissions, not as evidence of occupational exposure or health risk.

2026-27 AWARDEE

Speaker



Onyinye A. Ezeifeka

PhD Student | University of Cincinnati, Environmental and Public Health Sciences

Authors

Hend Ali (University of Cincinnati), Jiahe Wang (University of Cincinnati), Makiah Burnell (University of Cincinnati), Oluwasegun Abolade (University of Cincinnati), Sydney Pierce (University of Cincinnati), Tolu Solomon (University of Cincinnati)

Assessment of Indoor Mold Burden in a Residential Setting using a Multi-layered Strategy: A Case Study

9:30 AM – 10:10 AM

Additional Authors: Perminder Kaur, Jagjit Yadav, and Sripriya Nannu Shankar: Department of Environmental and Public Health Sciences, University of Cincinnati College of Medicine, OH, USA

Aaron Grant: People Working Cooperatively, Cincinnati, OH, USA

Abstract: Indoor mold exposure contributes to respiratory irritation, allergic responses, and asthma exacerbation, particularly among susceptible individuals. This study focuses on the field assessment of a multi-layered sampling/control strategy aimed at minimizing exposure risks to fungal spores. In February 2026, a Cincinnati resident experienced respiratory issues, raising concerns about indoor air quality. An initial third-party assessment using Spore trap method found elevated mold levels in the bedroom (13,280 spores/m3) and bathroom (25,480 spores/m3). In both rooms, Aspergillus/Penicillium spores were predominant (Bedroom: 12,920 spores/m3; Bathroom: 25,240 spores/m3), while Basidiospores, Epicococcum, Smuts/Periconia/Myxomycetes, and hyphal fragments contributed to the remainder. While the resident fixed plumbing leaks, changed HVAC filters, and used a mold-control wipe, respiratory symptoms persisted, prompting a temporary relocation during a complete bathroom renovation. In April 2026, our team sought to quantify mold concentrations across the affected rooms and evaluate the effectiveness of a multi-layered, 24-hour control strategy in the bathroom (an EPA-recommended mold-control agent, an air purifier, UV-C lamps, and natural ventilation). The GRIMM spectrometer, Instascope, and a spore trap were used to record the total aerosol concentration, total fungal/pollen concentrations, and a comprehensive panel of mold diversity, respectively. Data from the Instascope revealed no significant difference in total mold/pollen concentrations in the bedroom on both sampling days (Day 1 and Day 2), whereas the bathroom showed a 73% reduction after implementing the control strategy. A comprehensive microscopic analysis (ASTM D7391 methods) revealed the presence of diverse fungal spores. On Day 1, the predominant spores were Aspergillus/Penicillium and Cladosporium spores, as well as Basidiospores, although Alternaria, Epicoccum, Myxomycetes, Ascospores, and hyphal fragments were also present in both rooms. Curvularia, Ganoderma, Nigrospora, and Ulocladium were only present in the bedroom, as compared to the bathroom, where Pithomyces and Torula were unique. On Day 2, after 24 h of the multi-layered control strategy, the total spores/m3 declined by ~84% in the bedroom and ~55% in the bathroom. Only Aspergillus/Penicillium spores and Basidiospores were present in the bathroom, while Basidiospores, Aspergillus/Penicillium, Ascospores, Nigrospora and hyphal fragments were present in the bedroom. Notably, there was a reduction in Aspergillus/Penicillium spores: ~58% in the bathroom and ~94% in the bedroom post-implementation of the multi-layered control strategy. Compared to the levels in February, the total spore concentrations had declined by 85-88% post-interventions. Cumulatively, our study demonstrates the need for a multi-layered control strategy to minimize exposure risks from bioaerosols and the significance of real-time bioaerosol monitoring paired with rigorous microbiological techniques.

POSTER PRESENTER

Speaker



Judith Arthur

Ph.D. Candidate | University of Cincinnati

Evaluating the Variance in Representative Wildfire Pollutant Deposition According to Lung Morphometry

9:30 AM – 10:10 AM

Additional Authors: Judith Arthur and Dr. Sripriya Nannu Shankar Department of Environmental and Public Health Sciences, University of Cincinnati College of Medicine

Abstract: As climate change intensifies wildfires in the United States, it is paramount that the air quality measurements reported to the public appropriately convey the ensuing aerosol risks to their health. Wildfire emissions invariably consist of particles of different sizes, which can deposit in different parts of the lung, dependent on several parameters including gender, age, sex, and lung volume. For example, small particles can be deposited in the alveolar region, driving reductions in lung function, and accelerating chronic respiratory conditions. By understanding where and how these particles deposit in the lung, proper PPE can be suggested for emergency responders and firefighters involved in wildfire events. In addition, comprehending the variance in deposition between demographic groups provides occupational health organizations the scientific basis for exposure guidelines and safety recommendations for vulnerable affected groups, like young adult workers overrepresented in seasonal outdoor labor. This study sought to clarify that link by modeling the impact of particulate matter from a representative wildfire with varied morphometry across age and sex, yielding data that could be used to revise how environmental reporting and occupational health organizations communicate risk to the public. Analysis of emissions from two representative chamber fires, including logarithmic regression and dosimetry modeling, yielded stark differences in deposition fractions for the same exposures. Models for adult men and women recorded higher absolute mass deposition than the 10-year-old child model, with the female model receiving nearly 10% higher deposition in deeper, pulmonary regions than men, more closely associated with negative respiratory health effects. Despite diminished aggregate deposition, the child model exhibited nearly 20% higher deposition in the tracheobronchial region, with substantially different pollutant settling patterns caused by smaller lung volumes and increases in respiratory rate. However, a more detailed inspection of the data, normalizing anatomical differences between the demographic groups, pulls back the curtain on the pitfalls of ambient air and deposition fraction guidance. When adjusting for surface area of the lungs, women and children demonstrated significantly sharper peak pollutant depositions deeper in the lung, meaning lower deposition fractions could be significantly more harmful. These preliminary findings reinforce the possibility of uniform air quality standards being unable to effectively assess risk for different demographic groups and provide a data-driven basis for occupational health organizations and emergency responders to appropriately protect at-risk workers and their families.

POSTER PRESENTER

Speaker



Luke Greiner

PhD Student | University of Cincinnati

Keynote Presentation: Tackling the Problem of Occupational Heat Exposure: A Collaborative Effort

10:10 AM – 11:00 AM | Location: Kehoe Auditorium

The presentation is a survey of the collaborative efforts from the foundation of the physiology lab at the NPPTL through the present and the value of these efforts.

Objectives: Understanding the nature of physiological testing of PPE and value of collaborations in terms of expertise, cost sharing, and

facilities sharing to engage in an expanded research program.

Collaborators: Dr. Amit Bhattacharya, Department of Environmental Health
University of Cincinnati Medical College

KEYNOTE

Speaker



Warren (Jon) Williams

Research Physiologist | National Personal Protective Technology Laboratory/NIOSH/CDC

Examining the Role of Social Support on Nurses' Mental and Physical Health

11:00 AM – 11:20 AM | Location: Kehoe Auditorium

Collaborators:

Clare Barratt, Psychology, BGSU
Sarah Rohr, Psychology, BGSU
Jake Solka, Psychology, BGSU

Purpose: Despite our knowledge that social support takes different forms, little research has examined if and how they individually buffer the negative effects of nurse stress. Further, as social support is both given and received, research is even more scarce in examining how the balance (or imbalance) in giving and receiving support at work buffers against the negative effects of nurse stress. This study aimed to identify which types of support are most beneficial for nurses' mental and physical health, and whether a balance in giving and receiving support further balances or exacerbates health outcomes.

Design: This project utilized a two-part research design, combining a cross-sectional survey to capture a snapshot of workplace experiences along with a two-week daily diary study to examine fluctuations of social support and mental and physical health.

Methods: This study recruited 224 full-time nurses across Ohio to complete the survey. Of those, 53 took part in a 14-day follow-up study where they completed daily surveys before and after their work shifts. Upon completion, nurses were then invited to participate in a daily diary study. The study measured various variables such as social support, occupational stress, burnout, physical health, and psychological well-being using self-report questionnaires.

Results: Results indicated that nurses reported relatively high levels of both receiving and providing instrumental and emotional support, although they generally reported providing more support than they received. Initial study analyses showed that social support was associated with lower stress and burnout and greater well-being, with emotional support demonstrating more consistent unique associations with outcomes than instrumental support. Analyses examining the balance between giving and receiving support provided partial evidence that more balanced support exchanges were associated with lower burnout and greater psychological wellbeing, particularly for emotional support. However, these relationships were less consistent in daily diary analyses, with few significant within-person effects. Overall, findings highlight the potential importance of considering not only the type of social support nurses experience, but also the balance between support given and received.

2025-26 AWARDEE

Speaker

Barbara Warner

PhD Student | Bowling Green State University, Psychology

Extended Reality (XR) in OHS Training: Assessment of Aviation Worker Outcomes

11:20 AM – 11:40 AM | Location: Kehoe Auditorium

This study quantified occupational health and safety (OHS) motivation and focus during training in aviation healthcare personnel. Both focus and OHS motivation are positively associated with improved health and safety outcomes. However, how they may interact has been unknown. To address this knowledge gap, we measured focus utilizing eye-tracking glasses that participants wore while they underwent seven consecutive training simulations. Focus was measured using fixation count, which describes how many times participants' eyes focused on one element of the environment. On the final day of training, participants self-reported their OHS motivation by completing the Self-Determined Safety Motivation (SDSM) Scale. This work was driven by the hypothesis that aviation workers who exhibit internal OHS motivation (i.e., identified and intrinsic OHS motivation) demonstrate higher focus during repeated training simulations when compared to workers with lower levels of internal OHS motivation. Focusing on the human factors that drive aviation workers' behavior is especially critical, given the disproportionate number of incidents and injuries affecting aviation workers specifically. To test this relationship, a repeated-measures study design was utilized. Participants were recruited from the Critical Care Air Transport Team (CCATT) training at Wright-Patterson Air Force Base (WPAFB). This training is two weeks in length and consists of seven consecutive patient care simulations. Participants wore eye-tracking glasses while completing a scenario-based clinical simulation to evaluate their focus. The results suggest that there is not a significant relationship between focus and motivation and that these constructs are not associated with one another. There was a positive association between focus and training simulation, suggesting that training repetition increases focus among trainees, making them more likely to register critical information. Our findings suggest that as training courses progress, trainees become more focused on content, potentially improving learning outcomes. This study found no association between OHS motivation and focus, which suggests that efforts to improve one construct is likely to have a null impact on the other. The participants in this study reported high levels of internal motivation. Future work should focus on investigating additional motivation subtypes beyond internal motivation to capture a broader range of motivation typology. Recruitment efforts should be expanded to increase the sample size and further test the significance of the association between focus and a two-week series of immersive clinical simulations.

2025-26 AWARDEE

Speaker



Hannah Frame

PhD Student | University of Cincinnati, Environmental and Public Health Sciences

AI-Driven Assessment of Hand Activity and Force Using IMU-Embedded Tactile Gloves

11:40 AM – 12:00 PM | Location: Kehoe Auditorium

Purpose: The purpose of this study is to use synchronized tactile-glove and wrist-IMU measurements to provide an objective, automated assessment of hand activity level (HAL), force demand (NPF), and ACGIH Hand Activity Level Threshold Limit Value (HAL-TLV) exposure during repetitive manual material handling (MMH) tasks.

Design: A Controlled laboratory study with participants performing series of one-handed package transfer tasks across prescribed hand activity levels and package load conditions.

Methods: Participants completed the MMH tasks while wearing a tactile glove measuring hand contact pressure and a wrist IMU measuring acceleration and angular velocity. The collected data stream was analyzed using two complementary approaches: (1) linear/generalized additive mixed-effects models using extracted force and motion features and (2) a multimodal Transformer deep learning model using synchronized raw time-series.

Results: The Mixed-effects model showed strong HAL correlation from the IMU kinematic features (best conditional $R^2 = 0.878$ for linear mixed effects models (LMM)). Glove-derived features modeled NPF (conditional $R^2 = 0.453$), with improved performance when acceleration–force interactions were included (conditional $R^2 = 0.519$); and the best nonlinear interaction model reached conditional $R^2 = 0.586$. In the peak pressure-based LMM, the interaction effects of finger force × acceleration ($\beta = -0.217$, $p < 0.01$) and palm force-gradient × acceleration ($\beta = -0.257$, $p < 0.01$) were significant, demonstrating that the relationship between measured grip behavior and reference NPF changed with movement intensity. Derived TLV estimates improved with nonlinear modeling and subject-specific effects (RMSE = 0.269; Spearman $\rho = 0.655$). The deep-learning model that was built upon separate Transformer-based encoders for the tactile-glove and wrist-IMU signals achieved a mean absolute error (MAE) of 0.0878 and an R^2 of 0.83 for HAL-TLV prediction. Conclusion: Hand pressure and wrist kinematics can provide complementary information for automated hand-intensive ergonomic assessment. The result shows that considering hand force and motion interactively can lead to more accurate and comprehensive representation of ergonomics risks.

Impact Statement: The project demonstrates a practical pathway toward continuous, sensor-based assessment of repetitive MMH, reducing reliance on manual observation and subjective force estimation.

2025-26 AWARDEE

Speaker



Haozhi Chen

PhD Student | Purdue University, Industrial Engineering

Sponsor presentations

12:00 PM – 12:10 PM | Location: Kehoe Auditorium

Networking Lunch, Posters, & Break

12:10 PM – 1:00 PM | Location: Kehoe Auditorium

Assessing the Relationship Between Workplace Ergonomics and Respirable Crystalline Silica Exposure in Construction Industry Workers

1:00 PM – 1:20 PM | Location: Kehoe Auditorium

This pilot research seeks to investigate the correlation between inadequate workplace ergonomics specifically, non-neutral trunk postures and repetitive motions and elevated levels of respirable crystalline silica exposure among construction workers in industrial environments. Construction workers are often exposed to silica dust, a Group 1 carcinogen associated with lung cancer, silicosis, airway obstruction, and mycobacterial infections (IARC, 2012; Hodgson & Darnton, 2000; Leung et al., 2012). This work expands upon the results of Whitehead et al. (2022), Eturki et al. (2024), and Bellacov et al. (2025) by transitioning laboratory-based observations to a real-world context by including personal air monitoring, respiratory assessment, and posture evaluation in a practical industrial environment. The research focuses on three principal domains: Evaluating Ergonomic Risk: Employing wearable inertial measurement units (IMUs) and observational checklists to objectively monitor workers' trunk postures and physical strain during active work shifts. Assessing Silica Exposure: Providing workers with affordable portable aerosol monitors and personal air sampling instruments to measure the content of respirable crystalline silica in their inhalation zones. Linking Ergonomics to Exposure: Examining the correlation between ergonomic factors (including non-neutral postures and repetitive motions) and silica exposure levels to ascertain if inadequate ergonomics contribute to heightened inhalation of silica dust. The research also includes respiratory evaluations with a ProComp Infiniti respiration sensor and a VO2 master device to quantify changes in breathing patterns and lung capacity throughout work. The primary hypothesis is that industrial construction workers displaying non-neutral trunk postures and increased mechanical strain will have higher amounts of respirable crystalline silica than those with more favorable ergonomic profiles. The pilot's research aims to provide essential empirical evidence that correlates ergonomic risk factors with silica exposures. This first data will guide further study on the impact of workplace ergonomics on lung cancer risk and facilitate the formulation of focused intervention methods and occupational health policies to mitigate silica-related respiratory illnesses.

2025-26 AWARDEE

Speaker



Mercy Omoifo-Irefo

PhD Student | University of Cincinnati, Environmental and Public Health Sciences

Assessment of Intrinsic and Extrinsic Factors as Predictors of Fall Occurrences for Patients in Long-Term Care Facilities and Home Healthcare Centers.

1:20 PM – 1:40 PM | Location: Kehoe Auditorium

Purpose:
The purpose of this study is to identify intrinsic and extrinsic factors that contribute to patient falls in long-term care facilities and home healthcare environments with the sole aim of protecting caregivers who experience a burden in handling or dealing with patient falls.

Significance:
In healthcare, patient and caregiver safety go hand in hand. When a patient falls, the natural reaction for a caregiver is to try to catch or hold them up. This can result in further injury to both the patient and the caregiver. Lifting and transferring patients or trying to catch them as they fall, are common sources of strain and sprain injuries. Therefore, the objective of this study is to identify intrinsic and extrinsic factors that contribute to patient falls in long-term care facilities and home healthcare environments with the sole aim of protecting caregivers who experience a burden in handling or dealing with patient falls.

Methods:
This study is a quantitative and direct observation intended to thoroughly assess fall risks for patients in long-term care and home healthcare settings. Forty full-time residents who are 65 years and older will be considered for this study. 20 participants will be recruited from long-term care facilities and 20 participants will be recruited from home healthcare centers in the Cincinnati/Tristate area (within 30 minutes of the University of Cincinnati). To gain a broad understanding of the participants' extrinsic environment, a validated observation tool developed by Bien et al,2021 will be used to capture risk factors for slips, trips, and falls. In understanding and capturing intrinsic risk factors two of the most common fall risk assessment tools will be used in assessing intrinsic fall factors, which are: 1) St. Thomas's Risk Assessment Tool in Falling Elderly Inpatients (STRATIFY) and 2) Morse Fall Scale (MFS). STRATIFY is a tool utilized in assessing falls mainly used in elderly hospital in patients. In quantifying physical activities of the participants, the ActivePAL (PAL Technologies Ltd, Glasgow, UK) sensor will be utilized. These devices are miniature dual-axis accelerometer-based physical activity loggers that are light (20 g) and small (54 mm x 35 mm x 7 mm). In attempting to understand how postural balance contribute to falls, Postural balance assessments will be achieved through the utilization of a microprocessor-based strain-gauge type force platform system.

2025-26 AWARDEE

Speaker



Amour Dondi

Environmental, Health and Safety Leader | GE Aerospace

Carbon-based Lead Composite as a Flexible and Lightweight Shield against Roentgen and Gamma Radiation

1:40 PM – 2:00 PM | Location: Kehoe Auditorium

Purpose: To develop and evaluate a flexible, lightweight, lead-free radiation-shielding composite for occupational use, with emphasis on reducing the weight burden associated with conventional lead aprons.

Design: Experimental materials-development study comparing three bismuth/indium (Bi/In)-carbon composite configurations with lead reference data.

Methods: Bi/In alloy was integrated with carbon veil, with or without graphite-foil encapsulation, using hot pressing and exploratory dip coating. Linear attenuation was measured at North Carolina State University at 31, 81, 356, and 662 keV. Mass attenuation, required areal density for 0.5-mm Pb equivalence at 81 keV, and mass half-value layer were evaluated.

Results: The Bi/In (1:2)-carbon veil and graphite-encapsulated Bi/In (1:1)-carbon veil composites showed the strongest overall mass attenuation at 81, 356, and 662 keV. The best-performing graphite-encapsulated Bi/In (1:1) composite required the lowest areal density to provide 0.5-mm Pb-equivalent protection at 81 keV, corresponding to an estimated 56% reduction in shielding-layer weight relative to pure lead. Hot pressing produced the most compact and well-encapsulated structure.

Conclusion: Carbon-supported Bi/In composites are promising lead-free candidates for lighter and potentially flexible radiation-shielding PPE. Their principal limitation is likely higher material cost, especially because of indium, and additional mechanical, durability, and prototype testing is needed.

Impact Statement: This project establishes a materials pathway for reducing the ergonomic burden of radiation-protective garments while maintaining meaningful attenuation across medically and industrially relevant photon energies.

By the end of this presentation, participants will be able to:

Describe the occupational and ergonomic challenges associated with conventional lead-based radiation-protective garments.
Explain how Bi/In alloys, carbon veil, and graphite foil can be integrated to create lightweight, lead-free radiation-shielding composites.
Interpret the relationship between radiation attenuation, areal density, photon energy, and potential weight reduction when evaluating materials for radiation-protective PPE.

2025-26 AWARDEE

Speaker



Qichen Fang

Postdoc | University of Cincinnati, Chemical Engineering

Poster Session 2 & Break

2:00 PM – 2:20 PM | Location: Kettering Atrium

Assessing Postural Stressors and Musculoskeletal Discomfort among Automobile Mechanics and Technicians.

2:00 PM – 2:20 PM

Work-related musculoskeletal disorders (WMSDs) are considered to be one of contributors to disability and loss of workdays in occupations including automobile mechanics and technicians, a workforce of more than 800,00 that is projected to grow by 4% in the coming decade. These workers frequently perform tasks involving awkward postures, repetitive motions, forceful exertions, vibrations, and prolonged static postures, all of which elevate the risk of WMSDS, Despite the high prevalence of injuries, limited research has qualified actual postural stressors in this occupation. This cross-sectional study will employ wearable motion sensors (Xsens MVN Awinda) to continuously monitor posture of 30 automobile mechanics and technicians in Cincinnati, Ohio, during a typical work shift. Self-reported body discomfort surveys will be administered before and after the shift to evaluate musculoskeletal symptoms across multiple body regions. The primary objectives are to quantify postural demands and assess their association with discomfort. Findings will provide baseline ergonomic data on an understudied workforce, enabling development of evidence-based interventions to reduce WMSDs. The study's innovative use if wearable sensors technology allows for continuous posture monitoring, offering deeper insights than traditional observational methods. Results will advance occupational safety research and inform strategies to improve worker health, comfort, and productivity.

2026-27 AWARDEE

Speaker



Dickson Rungere

PhD Candidate | University of Cincinnati, Environmental and Public Health Sciences

Academy Adaptations: Evaluating Health in Firefighter Recruits

2:00 PM – 2:20 PM

Collaborators: Dr. Matthew Chatlaong, School of Human Services, University of Cincinnati

Firefighters are vital to ensuring public safety. Unfortunately, firefighters suffer high rates of fatal and nonfatal injuries while working. Fatal injuries are often linked to overexertion and strain on the job. In addition, non-fatal injuries are usually to the musculoskeletal system and the result of sprains and strains due to slips, trips, and falls. To prepare for a career in the fire service, there are extensive training requirements to ensure firefighter recruits are physically ready for the occupational demands. Although most fire academies have mandated physical training components, there is very little known information on the physiological adaptations that may be occurring in firefighter recruits throughout the academy. The primary purpose of this study is to examine the effectiveness of the academy on cardiometabolic metrics (body composition, aerobic capacity, diet). A secondary aim of the study is to investigate adaptations to neuromuscular function (muscle size and quality, strength, balance) during the firefighter academy. This study will occur with a local firefighter training academy and the recruit classes. Recruits will be assessed pre-, mid-, and post-training during the academy. The findings from this study will be beneficial in understanding physiological adaptations that may need to occur in the academy to best prepare recruits for a career in the fire service.

2026-27 AWARDEE

Speaker



Kealey Wohlgemuth

Assistant Professor | University of Cincinnati, CECH, School of Human Services, Exercise Science

Occupational Exposure to Understudied Toxicants in Aviation Gasoline (Avgas) Combustion Emissions

2:00 PM – 2:20 PM

This pilot project will investigate the chemical composition and physical characteristics of emissions from aviation gasoline (avgas) combustion under piston-engine–relevant operating conditions, with the goal of identifying toxic pollutants beyond lead that are relevant to occupational health. The central research question is: What highly toxic and previously understudied organic combustion byproducts are emitted from leaded avgas (100LL) and commercially available unleaded avgas (UL94), and how are these toxicants distributed across fine and ultrafine particulate matter fractions that govern inhalation and respiratory deposition? Avgas remains widely used in general aviation and is the largest remaining source of lead emissions in U.S. transportation; however, the historical focus on lead has left a critical knowledge gap regarding non-lead toxicants produced during avgas combustion. Compounds such as thio-PAHs, nitro-PAHs, oxygenated PAHs, α-dicarbonyls, and related hazardous organic species are well known from other combustion sources but have not been systematically characterized for avgas, particularly under conditions relevant to worker exposure at small airports. Moreover, no prior study has integrated chemical speciation with real-time aerosol size measurements to evaluate exposure-relevant properties such as size-resolved toxicant partitioning. Using a custom lab-scale combustor designed to replicate piston-engine operation, emissions from 100LL and UL94 avgas will be generated under controlled, repeatable conditions. Diluted exhaust will be sampled for both gas- and particle-phase species. Organic compounds will be collected using solid-phase extraction media and analyzed via gas chromatography–mass spectrometry (GC-MS) and high-performance liquid chromatography (HPLC). In parallel, particle number concentrations and size distributions will be measured in real time using a Fast Mobility Particle Sizer (FMPS) and a Scanning Mobility Particle Sizer (SMPS). We anticipate identifying previously unmeasured toxic organic compounds in avgas emissions and determining whether these toxicants are preferentially associated with ultrafine (<100 nm) and fine (<2.5 μm) particles, which have the highest respiratory deposition efficiency. Comparative results between 100LL and UL94 will provide critical, exposure-relevant data to inform occupational risk prioritization, guide future field-based exposure assessments, and support safer transitions to unleaded avgas in general aviation.

2026-27 AWARDEE

Speaker



Onyinye A. Ezeifeka

PhD Student | University of Cincinnati, Environmental and Public Health Sciences

Wearable Cool Pants for High-Temperature Work Environments

2:00 PM – 2:20 PM

Extreme working environments pose significant health risks due to prolonged heat exposure, leading to heat stress and reduced productivity. To mitigate these risks, this proposal aims to develop an advanced wearable thermal management solution tailored for harsh working environments by introducing “Cool Pants”. These pants integrate innovative cooling strategies and materials to enhance worker safety and comfort in high-temperature environments, with a particular focus on mitigating heat stress in the legs. The proposed Cool Pants employ two primary cooling strategies: short-term intensive cooling and sustained moderate cooling. The design incorporates lightweight and portable cooling devices, including fans, batteries, coolant packs (cold packs/dry ice), and temperature and humidity sensors, all housed in a compact unit within a pant pocket. Additionally, an alternative cooling system utilizing a portable, thermoelectric unit is being explored as a coolant-free solution that is energy-efficient and compact. To enhance cooling distribution, a novel graphite-based composite fabric is integrated into the thigh area. Thus, this research focuses on engineering a functional prototype and evaluating its performance in real world conditions. The effectiveness of cooling distribution, user comfort, and practicality will be assessed through comparative testing against traditional work pants. Thereby promoting a way to reduce the risk of heat-related illnesses and enhance occupational safety, comfort, and productivity. Furthermore, the Cool Pants could prove beneficial for first responders, firefighters, and military personnel carrying out missions in hot environments.

2026-27 AWARDEE

Speaker



Maliha Marzana

PhD Student | University of Cincinnati, Mechanical and Materials Science & Engineering

OHS Motivation and Error Performance in Aviation: A Cognitive Approach

2:00 PM – 2:20 PM

Adequate performance of safety-related tasks, free of error, is critical in the aviation industry. Despite the variety of physical, chemical, and biological hazards that jeopardize the health and safety of aviation workers, controls are well-established. Still, up to 75% of accidents and incidents are attributable to human factors and errors. This creates a pressing need to explore additional factors that can influence occupational performance and worker health and safety outcomes. Occupational health and safety motivation has emerged as a pillar in the industrial hygiene industry aimed at investigating why workers are motivated to behave safely. It has not been articulated what types of motivation or how motivation causes workers to behave safely. Cognitive control has been suggested as a potential mediator between motivation and task performance. How cognitive control (i.e., one’s ability to inhibit voluntary reactions and respond according to known policies and procedures) is related to both motivation and task performance has not been determined. This study will examine the impact of occupational health and safety motivation on the frequency and type of errors committed in simulated task performances. This study will also characterize the pathway from occupational health and safety motivation to error performance with cognitive control as a potential mediator. The Self-Determined Safety Motivation (SDSM) Scale and Multidimensional Work Motivation Scale (MWMS) will be used to assess motivation, while the Behavior Inventory of Executive Functioning – Adult (BRIEF-A) and Cognitive Failure Questionnaire (CFQ) will assess cognitive control. Vagally mediated heart rate variability (vmHRV) will also be collected. Performance outcomes will be assessed through participant performance on the Stroop Test, Go/No-Go Task, and the Wisconsin Card Sorting Test. Error frequency and type will be self-reported by participants over a six-month period. Frequency type and error will be examined for patterns and associations with occupational health and safety motivation factors and cognitive control levels. Cognitive control will be tested as a mediator between occupational health and safety motivation and error performance. The collected vmHRV will also be isolated and tested as a mediator between occupational health and safety motivation and cognitive control. By providing critical insight into this pathway and how motivation may ultimately be a protective factor in terms of error performance, this study aims to fill the existing research gap. The results of this study will be used to design targeted evidence-based interventions to improve the error performance of aviation workers. Beyond this, this study is the first of its kind, and may serve as a basis for further investigation into the individual, organizational, and environmental factors that influence occupational health and safety performance in the workplace.

2026-27 AWARDEE

Speaker



Hannah Frame

PhD Student | University of Cincinnati, Environmental and Public Health Sciences

Changes in Self-Reported Vocal Symptoms Among University Professors Before and After a Teaching Semester

2:00 PM – 2:20 PM

Collaborators: Dr. Shulunda Gibson, CCC-SLP, The Speech & Voice Care Center
Dr. Sophia S. Leggett, Department of Behavioral and Environmental & Occupational Health, Jackson State University
Kylan Jones, Department of Speech Language Pathology Audiology, Jackson State University

Grade school teachers are the largest occupational voice group studied with a very high prevalence of developing voice disorders. University Professors are understudied although they rely heavily on their voice to engage students during long periods of teaching in academic settings. Kyriaki et al., 2017 surveyed 196 university faculty using VDI, with 35% responding having slight, moderate, or profound voice disorder. The aim of this pilot project is to 1) Educate the importance of vocal health and 2) Understand the frequency of experience vocal symptoms before & after a teaching semester via Qualtrics survey. Vocal symptoms occur due to vocal abuse and/or misuse, which is excessive or inappropriate use of the vocal mechanism. Lingering vocal symptoms can develop into vocal pathologies. Vocal pathologies such as cysts, nodules, or polyps can occur, which can interfere with teaching effectiveness. They can be benign or malignant, which is a concern for occupational health and a safety hazard affecting the workforce. It is estimated that one-third of voice users are absent from work with related cost of $2.5 billion annually within the United States (Verdolini & Ramig, 2001). The purpose of this pilot project is to highlight awareness of vocal symptoms by educating University Professors throughout the course of a teaching semester. The research design is a pre/post survey assessing the frequency of their experienced vocal symptoms. An on-line webinar, Caring for Your Voice: Maintaining Vocal Health for Teaching, will serve as education prior to the post-survey. This project is relevant to Public Health by decreasing economic burdens, and to highlight preventative strategies and vocal symptoms occurrences. This approach is innovative because it employs a pre-post survey with targeted educational webinar, addresses significant population gap, measurement innovation through a self-developed survey, & extends beyond data collection to include an in-person vocal health workshop to disseminate findings & education participants. This component bridges research and practice by promoting vocal awareness, prevention strategies, and community engagement, thereby enhancing the practical impact of the study. The expected outcomes include greater awareness of appropriate vocal use, early detection of vocal symptoms, adaptation to the use evidence-based strategies, promote self-monitoring practices, and increased knowledge of vocal health.

The attendees will be able to:
1) Identify common vocal symptoms among university professors.
2) Discuss the frequency of change in perceptions of vocal awareness.

2026-27 AWARDEE

Speaker



Dawn Stanley

Assistant Professor | Jackson State University

Air Pollutant Emissions from Major Ohio Airports: A Comparative Analysis of the 2023 EPA National Emissions Inventory

2:00 PM – 2:20 PM

Additional Authors: Hend Ali; Jiahe Wang; Makiah Burnell; Oluwasegun Abolade; Sydney Pierce; Tolu Solomon | University of Cincinnati

Abstract: Airports are complex emission environments in which aircraft operations and supporting activities emit criteria air pollutants as well as hazardous air pollutants. These emissions could have effects on air quality and are of concern for workers who regularly operate near aircraft and other sources of emissions at airports. Yet there is very little comparative information available regarding the amount and composition of emissions from the major commercial airports that serve Ohio. Objective: The aim of this study was to characterize and compare the emissions of air pollutants from the major commercial airports in Ohio and to investigate whether any differences in these emissions were linked to the level of airport activity. Additionally, the study sought to identify the pollutants and emission patterns that should be subject to further investigation from both an occupational and an environmental health point of view. Methods: A secondary analysis was carried out on the U.S. Environmental Protection Agency's 2023 National Emissions Inventory (NEI). The major commercial airports in Ohio were chosen as case studies on the basis of their commercial passenger traffic and the ones included were Cleveland Hopkins International Airport (CLE), John Glenn Columbus International Airport (CMH), James M. Cox Dayton International Airport (DAY), Akron-Canton Airport (CAK), and Cincinnati/Northern Kentucky International Airport (CVG). The emissions at the airport level were obtained from the EPA's point-source and facility-level datasets. The criteria pollutants and the selected hazardous air pollutants were assessed, these comprising nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOCs), particulate matter ($PM_{2.5}$ and PM_{10}), sulfur dioxide (SO_2), and the available air toxics. The emissions were compared between the airports for each pollutant and were evaluated in relation to airport activity using data from the Federal Aviation Administration. Results: The analysis showed that there was variation both in the amount and in the make-up of the air pollutant emissions reported for the selected airports. Emission patterns varied depending on the pollutant and the airport, which means that the total emissions from an airport cannot be properly described by reference to a single pollutant or to a measure of airport activity. When the emissions were compared with airport activity, this also gave a basis for telling the differences caused by the scale of airport operations apart from those related to the emission profiles of the pollutants. The analysis found that there were certain pollutants and airports for which more detailed investigation should be carried out. Impact:This study involves a comparative evaluation of aviation-related emissions at the main commercial airports in Ohio, based on nationally available data. The results form the basis upon which pollutants and airport environments can be prioritised for future air-quality monitoring and for the assessment of occupational exposure. Since the NEI gives estimated emissions rather than actual measurements of worker exposures or ambient concentrations, the findings should be understood as indicating only the level of emissions, not as evidence of occupational exposure or health risk.

2026-27 AWARDEE

Speaker



Onyinye A. Ezeifeka

PhD Student | University of Cincinnati, Environmental and Public Health Sciences

Authors

Hend Ali (University of Cincinnati), Jiahe Wang (University of Cincinnati), Makiah Burnell (University of Cincinnati), Oluwasegun Abolade (University of Cincinnati), Sydney Pierce (University of Cincinnati), Tolu Solomon (University of Cincinnati)

Assessment of Indoor Mold Burden in a Residential Setting using a Multi-layered Strategy: A Case Study

2:00 PM – 2:20 PM

Additional Authors: Perminder Kaur, Jagjit Yadav, and Sripriya Nannu Shankar: Department of Environmental and Public Health Sciences, University of Cincinnati College of Medicine, OH, USA

Aaron Grant: People Working Cooperatively, Cincinnati, OH, USA

Abstract: Indoor mold exposure contributes to respiratory irritation, allergic responses, and asthma exacerbation, particularly among susceptible individuals. This study focuses on the field assessment of a multi-layered sampling/control strategy aimed at minimizing exposure risks to fungal spores. In February 2026, a Cincinnati resident experienced respiratory issues, raising concerns about indoor air quality. An initial third-party assessment using Spore trap method found elevated mold levels in the bedroom (13,280 spores/m3) and bathroom (25,480 spores/m3). In both rooms, Aspergillus/Penicillium spores were predominant (Bedroom: 12,920 spores/m3; Bathroom: 25,240 spores/m3), while Basidiospores, Epicococcum, Smuts/Periconia/Myxomycetes, and hyphal fragments contributed to the remainder. While the resident fixed plumbing leaks, changed HVAC filters, and used a mold-control wipe, respiratory symptoms persisted, prompting a temporary relocation during a complete bathroom renovation. In April 2026, our team sought to quantify mold concentrations across the affected rooms and evaluate the effectiveness of a multi-layered, 24-hour control strategy in the bathroom (an EPA-recommended mold-control agent, an air purifier, UV-C lamps, and natural ventilation). The GRIMM spectrometer, Instascope, and a spore trap were used to record the total aerosol concentration, total fungal/pollen concentrations, and a comprehensive panel of mold diversity, respectively. Data from the Instascope revealed no significant difference in total mold/pollen concentrations in the bedroom on both sampling days (Day 1 and Day 2), whereas the bathroom showed a 73% reduction after implementing the control strategy. A comprehensive microscopic analysis (ASTM D7391 methods) revealed the presence of diverse fungal spores. On Day 1, the predominant spores were Aspergillus/Penicillium and Cladosporium spores, as well as Basidiospores, although Alternaria, Epicoccum, Myxomycetes, Ascospores, and hyphal fragments were also present in both rooms. Curvularia, Ganoderma, Nigrospora, and Ulocladium were only present in the bedroom, as compared to the bathroom, where Pithomyces and Torula were unique. On Day 2, after 24 h of the multi-layered control strategy, the total spores/m3 declined by ~84% in the bedroom and ~55% in the bathroom. Only Aspergillus/Penicillium spores and Basidiospores were present in the bathroom, while Basidiospores, Aspergillus/Penicillium, Ascospores, Nigrospora and hyphal fragments were present in the bedroom. Notably, there was a reduction in Aspergillus/Penicillium spores: ~58% in the bathroom and ~94% in the bedroom post-implementation of the multi-layered control strategy. Compared to the levels in February, the total spore concentrations had declined by 85-88% post-interventions. Cumulatively, our study demonstrates the need for a multi-layered control strategy to minimize exposure risks from bioaerosols and the significance of real-time bioaerosol monitoring paired with rigorous microbiological techniques.

POSTER PRESENTER

Speaker



Judith Arthur

Ph.D. Candidate | University of Cincinnati

Evaluating the Variance in Representative Wildfire Pollutant Deposition According to Lung Morphometry

2:00 PM – 2:20 PM

Additional Authors: Judith Arthur and Dr. Sripriya Nannu Shankar Department of Environmental and Public Health Sciences, University of Cincinnati College of Medicine

Abstract: As climate change intensifies wildfires in the United States, it is paramount that the air quality measurements reported to the public appropriately convey the ensuing aerosol risks to their health. Wildfire emissions invariably consist of particles of different sizes, which can deposit in different parts of the lung, dependent on several parameters including gender, age, sex, and lung volume. For example, small particles can be deposited in the alveolar region, driving reductions in lung function, and accelerating chronic respiratory conditions. By understanding where and how these particles deposit in the lung, proper PPE can be suggested for emergency responders and firefighters involved in wildfire events. In addition, comprehending the variance in deposition between demographic groups provides occupational health organizations the scientific basis for exposure guidelines and safety recommendations for vulnerable affected groups, like young adult workers overrepresented in seasonal outdoor labor. This study sought to clarify that link by modeling the impact of particulate matter from a representative wildfire with varied morphometry across age and sex, yielding data that could be used to revise how environmental reporting and occupational health organizations communicate risk to the public. Analysis of emissions from two representative chamber fires, including logarithmic regression and dosimetry modeling, yielded stark differences in deposition fractions for the same exposures. Models for adult men and women recorded higher absolute mass deposition than the 10-year-old child model, with the female model receiving nearly 10% higher deposition in deeper, pulmonary regions than men, more closely associated with negative respiratory health effects. Despite diminished aggregate deposition, the child model exhibited nearly 20% higher deposition in the tracheobronchial region, with substantially different pollutant settling patterns caused by smaller lung volumes and increases in respiratory rate. However, a more detailed inspection of the data, normalizing anatomical differences between the demographic groups, pulls back the curtain on the pitfalls of ambient air and deposition fraction guidance. When adjusting for surface area of the lungs, women and children demonstrated significantly sharper peak pollutant depositions deeper in the lung, meaning lower deposition fractions could be significantly more harmful. These preliminary findings reinforce the possibility of uniform air quality standards being unable to effectively assess risk for different demographic groups and provide a data-driven basis for occupational health organizations and emergency responders to appropriately protect at-risk workers and their families.

POSTER PRESENTER

Speaker



Luke Greiner

PhD Student | University of Cincinnati

Establishing a Risk Map Regarding Chemical Exposure for 3D Printing

2:20 PM – 2:40 PM | Location: Kehoe Auditorium

Purpose: Feasibility study to evaluate direct on filter Raman analysis for qualitative characterization of nano- and microplastic (NMP) aerosols generated during fused filament 3D printing and to evaluate variation by filament type, brand, and formulations.

Design: NMP aerosols generated from acrylonitrile butadiene styrene (ABS), polyethylene terephthalate glycol (PETG), and polylactic

acid (PLA) filaments were compared with source filament spectra and with aerosol samples generated from other filament type, brand, and formulations.

Methods: NMP aerosols emissions were characterized by optical particle sizer and collected on silver membrane filters before being analyzed by Raman. Filament type, brand, and formulation were evaluated, and preliminary relationships among sampling time, collected mass, Raman spectra, peak area, and aerosol structure were assessed.

Results: The tested filament types were differentiated by their spectra and particle emission characteristics. PETG NMP aerosols differed from their source filaments and produced library matches to polyethylene or polyamide. The brand and formulation of the PETG filaments were associated with differences in collected mass, Raman response, and crystallinity.

Conclusion: Direct on filter Raman analysis demonstrated promise for characterizing NMP aerosols from 3D printing. The results were also positive for using Raman for quantitative analysis of NMP aerosols, but additional work is still needed to expand the spectral library and better understand the underlying causes that lead to the variation in Raman response.

Impact Statement: This work supports the development of faster, cheaper, and easier testing methods for the 3D printing NMP aerosols. This could be used to improve occupational and environmental exposure assessment as well as risk management strategies.

2025-26 AWARDEE

Speaker



Slater Payne

PhD Student | University of Cincinnati, Environmental and Public Health Sciences

Evaluation of Emesis Containers with Integrated Air Filtration to Reduce Airborne Infections

2:40 PM – 3:00 PM | Location: Kehoe Auditorium

Purpose: The objective of this study was to develop a standardized laboratory protocol for evaluating aerosol emissions from emesis containers and to assess the aerosol reduction of the developed emesis container during simulated vomiting events. Conventional emesis containers are designed primarily to contain vomitus but do not incorporate mechanisms specifically intended to capture aerosols. This project aimed to establish an experimental framework for evaluating aerosol containment and to support the development of an enhanced emesis container with an integrated air filter.

Design: This study involved the design, fabrication, and evaluation of a novel emesis container. A three-dimensional (3D) model was developed from a human head model and conventional emesis container designs. Components were 3D printed and assembled. Aerosol reduction was evaluated under controlled laboratory conditions using aerosolized salt particles and compared among developed emesis containers.

Methods: A laboratory system was developed to simulate aerosol emissions during vomiting events using a head mannequin, vibrating mesh nebulizer, compressed air supply, monitoring chamber, and direct-reading aerosol instruments. Aerosolized salt particles were generated and released through the mouth of the head model at airflow rates of 5 and 10 L/min. Particle number concentrations from 0.010 to 10 μm were measured using a NanoScan scanning mobility particle sizer and an optical particle sizer. Aerosol emission reduction, pressure drop, and filter quality factor (QF) were evaluated for the conventional and developed emesis containers.

Results: The developed emesis container reduced aerosol emissions by 54.6–99.1% with surgical mask and MERV-rated filter media, compared with 33.4–36.1% for the conventional container. Aerosol reduction increased with filter performance. MERV 13 and MERV 16 filters achieved 85.9–99.0% and 98.2–99.1% reductions, respectively, while the MERV 16 filter 2 produced a substantially greater pressure drop. The QF values for the MERV 8, MERV 13, and MERV 16 filters ranged from 0.34–4.93 Pa-1 across flow rates.

Conclusion: The standardized laboratory protocol successfully differentiated aerosol emission performance among emesis container configurations and filtration media. Integrating the filter with the developed emesis container substantially reduced aerosol emissions compared with a conventional container. MERV 8–13 filters provided the most favorable balance between aerosol reduction and pressure drop and may be optimally suited for integration into the emesis container.

Impact: The developed testing approach and enhanced emesis container have the potential to reduce occupational exposure to pathogen-containing aerosols generated during vomiting events. The findings may contribute to improved infection-control practices for healthcare, hospitality, food service, and other workers who may encounter emetic events.

2025-26 AWARDEE

Speaker



Subin Han

PhD Student | Purdue University, Health Sciences

Occupational Exposure to Aircraft Exhaust in Aviation Workers and Biofuels

3:00 PM – 3:20 PM | Location: Kehoe Auditorium

Purpose: Switching from traditional petroleum-based aviation fuels to sustainable aviation fuels (SAFs) could change the chemical and physical properties of the emissions from aircraft engines and as a result might affect the level of occupational exposure that aviation workers suffer. The
present study is intended to identify the organic pollutants and particulate matter produced by the combustion of SAFs and to compare their emission patterns with those of conventional aviation fuels (Jet A) under controlled combustion conditions that are relevant to turbine engines.

Design: To obtain emission data under controlled conditions which simulate those found in the combustion process in aircraft turbine engines, the study makes use of a specially designed, labscale jet fuel combustor operating at high pressure. Experiments were conducted under controlled low-power conditions, maintaining airflow (3.8 g/s), fuel flow (0.1773 g/s), inlet temperature (150 °C), chamber pressure (2 atm), and equivalence ratio (0.7) throughout. In order to allow a comparison to be made with SAFs and with mixtures of SAF and conventional fuel, conventional aviation fuels (Jet A) are taken as the reference fuels. Combustion experiments were carried out on several occasions to examine the reproducibility of the emissions when the same fuel and operating conditions were used.

Methods: Controlled combustion experiments were conducted using a swirl-stabilized lab-scale combustor supplied with liquid fuel and heated, compressed air. Combustion parameters, including fuel flow, airflow, pressure, and equivalence ratio, are controlled to

investigate their influence on emissions. Particulate emissions were characterized using real-time aerosol sizing instruments, i.e., the Fast Mobility Particle Sizer (FMPS), Optical Particle Sizer and NanoScan Scanning Mobility Particle Sizer (SMPS), while particles were collected using a Series 110B Spot Sampler for electron microscopy analysis to assess the morphological and elemental characteristics of the generated particle emissions. A minimum of three replicated experiments were conducted.

Results: Jet A combustion-generated aerosols are dominated by ultrafine particles. FMPS and SMPS measurements consistently identified a principal particle number mode of approximately 20 - 30 nm across three replicate experiments, while OPS measurements showed substantially lower concentrations in the 0.3 - 10 µm range. Absolute particle number concentrations varied between replicates, with between-replicate CVs of 38.5%, 28.9%, and 59.1% for FMPS, SMPS, and OPS, respectively. Despite concentration variability, particle size-distribution profiles and modal diameters were comparatively consistent across replicates.

Conclusion: The findings establish baseline particle emission characteristics for conventional Jet A combustion under controlled, turbine-engine-relevant (low power) conditions. The consistent ultrafine particle mode observed independently by FMPS and SMPS indicates that particle size characteristics were more reproducible than absolute concentrations. These baseline data provide a reference for subsequent comparison with SAFs and SAF blends to determine whether changes in fuel composition alter particulate emissions with potential relevance to occupational exposure among aviation workers.

Impact Statement: This project has established preliminary baseline emissions data for conventional Jet A fuel under controlled, turbine-engine-relevant combustion conditions, providing a reference for subsequent comparison with sustainable aviation fuels (SAFs) and SAF blends. The work has also established and refined experimental protocols for reproducible combustion, aerosol sampling, particle size characterization, and collection of particulate matter for morphological analysis. This progress directly supports the project's broader goal of generating evidence needed to assess potential changes in occupational exposure as the aviation industry transitions toward SAF use.

2025-26 AWARDEE

Speakers



Onyinye A. Ezeifeka

PhD Student | University of Cincinnati, Environmental and Public Health Sciences



Yevgen Nazarenko

Assistant Professor | University of Cincinnati, Environmental and Public Health Sciences

Closing Remarks, Evaluation, and Voting Reminder

3:20 PM – 3:30 PM | Location: Kehoe Auditorium

Closing reminders for all attendees:

Vote for your favorite poster and podium presenters, voting will close at the end of the day Monday 10/12 and winners will be announced via email.

Complete the event evaluation for the symposium and the ethics course.

All attendees that checked in will receive a continuing education certificate via email on Monday from no-reply@certifier.io. Be sure to check you spam/junk folder.

Speakers



Amit Bhattacharya

Professor | University of Cincinnati, Environmental and Public Health Sciences



Jessica Bloomer

ERC Continuing Education Director | University of Cincinnati

Steering Committee (closed meeting)

3:30 PM – 4:30 PM | Location: Kettering Lab G19

Closed meeting for the PRP steering committee members