Missouri S&T Chemistry Seminar

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4:00 pm at 126 Schrenk Hall

Environmental Exposure Assessment: From Occupational Exposure to Biomarker Discovery

Bio: Patrica-Ivy Agorsor is a fourth-year Ph.D. student in Analytical Chemistry and a member of the Eze Research Lab. Her research focuses on investigating chemical exposures associated with wildland firefighter protective gear and identifying VOC biomarkers of PFAS exposure using lung cell models. She utilizes HS-SPME coupled with GC-HRMS and non-targeted chemical analysis to characterize chemical exposures and biological responses. She earned her MPhil and BSc in Chemistry from Kwame Nkrumah University of Science and Technology (KNUST), Ghana. Patrica-Ivy has authored/co-authored 2 research articles and 1 review paper. She is a recipient of the 2026 ACS-ANYL Younger Chemist Conference Travel Grants and the ACS Certificate of Merit from the ACS Division of Analytical Chemistry and the ACS Division of Environmental Chemistry, respectively.

Abstract: Environmental and occupational exposures often involve complex mixtures of chemicals that may have important implications for human health. Understanding these exposures requires identifying the chemicals people encounter and determining how exposure may affect biological systems. This work uses non-targeted mass spectrometry and metabolomics to characterize chemical exposures and investigate potential biological responses. The first part of this presentation will discuss occupational exposure to wildland fire toxicants and the effectiveness of laundering as a decontamination strategy. We will also present practical solutions available to active firefighters so as to mitigate secondary exposure and adverse long-term health effects. With the occupation of firefighting officially recognized as a Group 1 carcinogen by the International Agency for Research on Cancer, there is a need to identify chemicals driving the higher rates of cancer in the fire service. Non-targeted analysis revealed a broad range of combustion-derived compounds, and several compounds that remained detectable post-washing.

The second part of this talk focuses on PFAS exposure and pulmonary responses. Because inhalation represents an important route of PFAS exposure, we investigated how lung epithelial cells respond to PFAS and whether changes in their volatile metabolic profiles could provide insight into early biological responses. Together, these studies demonstrate how non-targeted analysis using HRMS can characterize chemical exposures and identify chemical signatures associated with early biological responses, thereby bridging exposure assessment and biomarker discovery.