ANALYTICAL SEMINAR

Katherine Lee

Graduate Student
McLuckey Group
Purdue University

"CRISPR/Cas12a-based Detection of microRNAs for Early Cancer Diagnosis"

MicroRNA (miRNA) can be extracted from human blood as a noninvasive cancer biomarker. However, bodily fluids contain only small abundances of miRNA, especially in early stages of cancer. While there are several methods used to detect miRNA, many struggle with sensitivity and lack single-nucleotide identification of miRNA variants. Recent advances in miRNA detection use the abilities of clustered regularly interspaced short palindromic repeats (CRISPR) in tandem with other methods to achieve high sensitivity and specificity. This seminar will discuss methods of direct and indirect detection of miRNA using CRISPR/Cas12a that have been developed to improve diagnosis of early forms of cancer.

ANALYTICAL SEMINAR

Kristine Maxwell

Graduate Student
Simpson Group
Purdue University

"Vortex Assisted Dispersion Liquid-Liquid Microextraction and Deep Eutectic Solvents"

In analytical chemistry, efficient and eco-friendly sample preparation is still a major challenge, especially for trace analysis in complicated matrices. Although dispersive liquid–liquid micro-extraction (DLLME) provides high enrichment factors and quick extraction, it is frequently restricted by the use of hazardous organic solvents and challenges with phase separation. Because of their strong solvation capabilities, low volatility, and adjustable characteristics, and deep eutectic solvents (DESs) have become attractive green alternative. When combined with vortex-assisted dispersion, DES based DLLME exhibits enhanced droplet formation, increased interfacial area, and improved mass transfer without the need for additional solvents. This seminar will discuss the fundamental principles and advantages of integrating deep eutectic solvents and vortex-assisted DLLME, highlighting their synergistic effects and applications in complex sample matrices. This combined approach represents a powerful, green, and miniaturized solution for modern analytical sample preparation.