ANALYTICAL SEMINAR

Electrochemistry Near the Synapse: Fast Scan Cyclic Voltammetry Enables Measurement of Neurotransmitters in Real Time

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Fast Scan Cyclic Voltammetry (FSCV) is an electrochemical technique that provides high temporal and spatial resolution in the quantitation of various electro-active analytes, among other applications. One analytical challenge that FSCV lends itself towards is the study of neurotransmitter release. Leveraging biocompatible carbon fiber microelectrodes, FSCV offers a unique capability to monitor neurotransmitter release at the scale of single neuron interactions, making it invaluable in studying brain function. This presentation will cover the fundamentals of FSCV, its application towards the detection of dopamine in vivo, and recent strides to improve the sensitivity of this technique, which is ever evolving.

Tuesday, December 3, 2024 | 3:30 pm | WTHR 172

PURDUE UNIVERSITY | James Tarpo Jr. and Margaret Tarpo Department of Chemistry

ANALYTICAL SEMINAR

Machine Learning for Point-Scanning Imaging Systems

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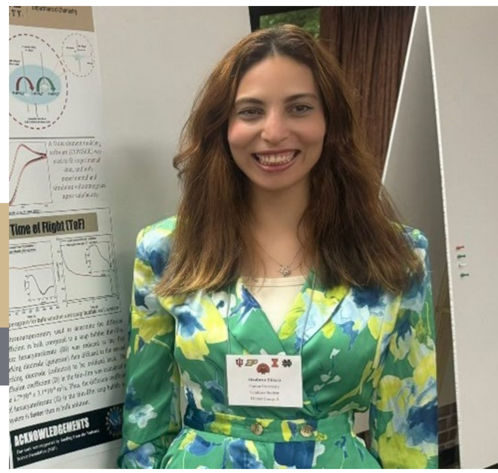

Development in computational practices has significantly enhanced analytical techniques and their capabilities in biological and material sciences imaging analysis[1,2]. Recent years have witnessed the development of deep learning and machine learning frameworks to drive innovations in single-molecule localization microscopy[3–5] as a modernized tool for diverse and representative imaging-based super-resolution technique[6]. Furthermore, utilizing machine learning algorithms such as convolutional neural networks (CNNs) and Gaussian mixture models[7] for enhanced single particle analysis with high image resolution and signal-to-noise ratio[8,9]. Also, machine learning overcomes limitations of eternal triangle of compromise in resolution, speed, and sensitivity in microscopy. Here, a deeper understanding of spatiotemporal patterns in biological samples for high confidence topographical precision and accuracy for dynamic and super-resolution imaging[10].

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