Analytical Chemistry Seminar

Tuesday, March 19, 2024
3:30 p.m. ~ WTHR 320

"When Less is More: Compressive Raman Imaging Using Context-Aware System"

Hannah Folarin
Graduate Student, Purdue University

Abstract:

Raman hyperspectral imaging is a powerful technique for noninvasive, label-free chemical analysis of diverse samples. However, its inherent limitations, characterized by weak and non-resonant spontaneous Raman scattering, can hinder efficiency, and prolong data acquisition times. To address these challenges, researchers have developed an innovative technique: context-aware excitation coupled with a compressive imaging strategy. This system selectively targets a smaller Region of Interest (ROI), avoiding unnecessary excitation of background substrate pixels. The result is faster Raman imaging without compromising isotropic resolution or confocality.

This technique finds relevance in studying rapid dynamics within large-scale biological systems and is compatible with other speed-enhancing approaches like SERS, Raman labels, and coherent Raman methods.

Overall, context-aware excitation revolutionizes Raman imaging, making it more efficient and applicable to various scientific investigations.

Bio:

Hannah Folarin is from Nigeria where she bagged a double major bachelor's degree in chemistry and science education in 2020 from the University of Ibadan. Since her undergraduate, she has been passionate about building sustainable planetary health and has explored effects of environmental pollution (adsorption of lead by microplastic pellets, and oxygen demand of gross organic matter) in wastewater samples in her previous research work.

In Fall 2022, Hannah joined Dr. Alex Laskin's research group where her research work centers on studying the multiphase chemistry of atmospheric aerosols and aquatic mixtures. In her free time, she enjoys cooking and exploring new adventures.

References:

1. Analyst, 2023, 148, 4710
2. Anal. Methods, 2024, 16, 583
3. Hang Yuan, et al. Optica 8, 1462-1470 (2021)
4. Anal. Chem. 2020, 92, 1326−1332
5. Hang Yuan et al. Opt. Express 30, 44657-44664 (2022)

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