

ANALYTICAL SEMINAR

Screening Food for Heavy Metals via X-Ray Fluorescence

Boukar Faye

Graduate Student
Purdue University



Absract: X-ray fluorescence (XRF) is an established analytical tool for elemental analysis in geology and archaeology. It's use in the food industry has been limited thus far; however, recent advances have granted potential for XRF to be utilized as a screening tool. Previous public health examinations have indicated that some populations are being exposed to heavy metals more than others. Portable XRF is being explored as an option for screening foods to determine the presence of heavy metals. This presentation will cover the fundamentals of XRF, its recent applications in the food industry, and how it compares to other well-established techniques.

Bio: Boukar completed his Bachelor of Science in Chemistry at Appalachian State University where he worked on fermentation science research in the Taubman Group. Upon graduation, he worked in a Quality Control laboratory where he completed analyses of surfactants. He decided to further develop his scientific knowledge and completed his Master of Science in Chemistry. During this time, Boukar focused on fungal natural product drug discovery in the Oberlies Research Group at the University of North Carolina at Greensboro. After graduation, he began working in the pharmaceutical industry in analytical research & development. Currently, Boukar is pursuing his PhD at Purdue University under the direction of Dr. McLuckey. Here his work focuses on ion-ion reactions for the analysis of native biomolecules.



Tuesday, November, 5 2024



3:30 pm



WTHR 172



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James Tarpo Jr. and Margaret Tarpo
Department of Chemistry

ANALYTICAL SEMINAR

Atomic-Force-Microscopy-Based Nanoindentation for Probing Mechanical Properties of 2D Materials

Md Arif Faisal

Graduate Student
Purdue University



Abstract: Atomic force microscopy (AFM)-based nanoindentation techniques offer a powerful approach for investigating the mechanical properties of two-dimensional (2D) materials. One method involves combining AFM with Raman spectroscopy to apply and measure high biaxial strains in materials like graphene, achieving unprecedented strain levels (up to 6.1%) and corresponding Raman shifts. Another technique, modulated nanomechanical indentation (MoNI/Å), allows for non-destructive, Angstrom-level resolution measurements of out-of-plane elasticity, even when materials are supported on substrates. These AFM-based approaches enable precise, substrate-independent mechanical characterization of ultra-thin materials, revealing phenomena such as multi-layer stiffness variation in graphene. This research seminar will explore how AFM-based modulated nanoindentation technique can provide critical insights into the mechanical behavior of atomically thin materials under high strain or minimal indentation depths.

Bio: Arif got his bachelors and master's in chemistry from University of Dhaka, Bangladesh. Currently he is working on "Electroanalytical Study of Aqueous and Non-aqueous metal Batteries" in Jeffrey Dick's lab.



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ANALYTICAL SEMINAR

Small Angle Neutron Scattering (SANS) for Analysis of Nanocellulosic Engineered Materials

Sakshi Ailawar

Graduate Student
Purdue University



Abstract: Small-angle neutron scattering (SANS) is a powerful technique for characterizing nanocellulose within a matrix, particularly in terms of its internal structure, dispersion, and orientation at the nanoscale. SANS is ideal for studying soft materials, including hydrogels, composites, and other nanocellulose-based systems, because it provides non-destructive, statistically representative information about the material in bulk. SANS, can be conducted in situ, allowing real-time monitoring of the sample matrices under various environmental conditions, such as temperature, humidity, or mechanical stress. It is suited to use in conjugation with traditional techniques like transmission electron microscopy (TEM) and scanning electron microscopy (SEM) to obtain localized information and to provide a comprehensive understanding of the matrix system.

Bio: Sakshi Ailawar is a second-year graduate student in Dr. Jeffrey Dick's lab. She is originally from Nagpur, India and joined Purdue in fall 2023. She pursued her BS in Chemistry from St. Xavier's College, Mumbai under University of Mumbai and received her MS in Analytical Chemistry from K.J. Somaiya College of Science and Commerce under University of Mumbai. Her research during masters involved synthesis of hybrid-cation perovskite solar cell materials to study their efficiency in solar cells under Dr. Deepa Khushalani at Tata Institute of Fundamental Research, Mumbai. In Dr. Jeffrey Dick's lab, she currently works on the fundamental electrochemistry and electrodeposition behavior of gold for electrocatalysis.



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