ASU Department of Physics
Arizona State University

Cowley Distinguished Lecture

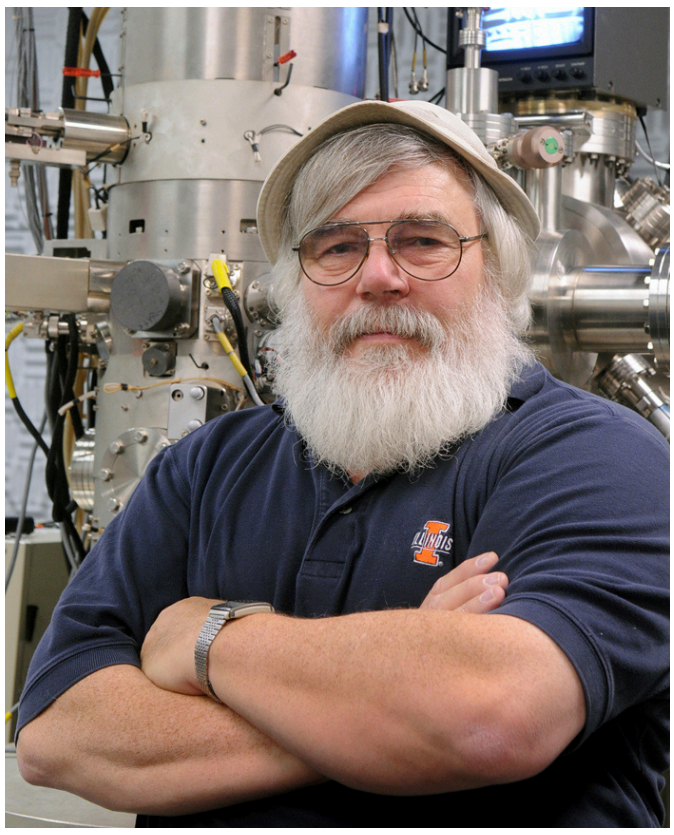
Thursday, May 1, 2025

Refreshments at 3:15pm outside PSF 101
Lecture from 3:30pm - 4:30pm in PSF 101

Metrology With Electron Beams

Dr. Nestor J. Zaluzec

University of Chicago



Abstract:

Present day electron-optical beam lines represent unique and powerful metrology tools that can be highly tuned to answer burning questions about today's complex engineered materials. These advanced instruments enable qualitative and ideally quantitative description of materials, structure, and/or processes. The ongoing evolution in beam line capabilities, providing hyperspectral, multi-dimensional, multi-modal, in-situ and correlative resources, open up new frontiers and new opportunities to address the next generations of challenging physical, chemical and materials problems. Measurements require the detection of signals, ideally unique, but sometimes obscured by noise, background and/or interferences which can be instrumental, physical, temporal or sometimes even all of these combined. This talk will describe how state-of-the-art analytical transmission electron microscopy is being applied to a wide variety of materials problems ranging from amorphous to crystalline solids, organic/inorganic interfaces, energy materials, as well as nanoarrays and catalysts Some of the unique capabilities and also challenges of using these modern metrological instruments will also be illustrated through selected investigations in both hard and soft matter encountered using the prototype Analytical PicoProbe Electron Optical Beam Line based at ANL.

Biography:

Nestor Zaluzec received his BS in Physics at Illinois Institute of Technology in Chicago and his PhD in Materials at the University of Illinois Urbana-Champaign. He is a Fellow of Oak Ridge National Laboratory (ORNL) , the Microscopy Society of America (MSA) , the Microanalysis Society (MAS, and a Lifetime Honorary member of the Australian Microscopy and Microanalysis Society (AMMS). Nestor has and continues to hold the tripartite role of Electron Metrologist of Energy and Quantum Materials, Educator and Inventor at the University of Chicago. As an innovator, his research includes development of state-of-the art of instrumentation and techniques for atomic resolution x-ray & electron spectroscopy, and electron microscopy. In addition to creating tools for science, as a researcher he also uses these bleeding edge technologies to study vexing problems in technologically important materials. He continues to investigate how aberration-corrected instruments can be re-engineered to improve the sensitivity of spectroscopy in analytical, multi-modal, multi-dimensional, in-situ studies of hard and soft materials.

Host: Prof. Dave Smith
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