

**Live Lab Demo and Tutorial on Atom Probe Tomography and Scanning
Transmission Electron Microscopy**

Thursday, August 3, 2017

Organizers:Jonathan D. Poplawsky (poplawskyjd@ornl.gov)Juan-Carlos Idrobo (idrobojc@ornl.gov)*IMPORTANT- Register early because space will be extremely limited for this tutorial.*

Atom probe tomography (APT) and scanning transmission electron microscopy (STEM) are among the most advanced techniques for understanding material structure and composition relationships at the nanoscale. This APT and STEM tutorial will offer a combination of classroom-style lectures and in-lab live demonstrations of various analytical methods and protocols used in these microscopy techniques. This is a great opportunity to learn the fundamentals of sample preparation, data collection, and data analysis for APT and STEM, and new and prospective users of these techniques are highly encouraged to attend. The tutorial will be split into two sessions with a 3-hour APT session in the morning and a 2-hour STEM session after lunch. Topics to be discussed are as follows:

APT (9:00am – 12 noon)*Invited Speaker: Baishakhi Mazumder, The University of Buffalo*

- Site-selective sample preparation using focused ion beam techniques with an FEI Nova 200 dual-beam FIB.
- Data collection on a LEAP 4000XHR local electrode atom probe.
- Reconstruction of 2D APT detector data into 3D atomic positions using CAMECA IVAS data analysis software.
- 3D data mining using cluster searching algorithms: isoconcentration surfaces, 2D contour plots, and proximity histograms.
- APT artifacts will also be discussed.

STEM (2:00pm – 4:00 pm)

- An overview of aberration correction.
 - Data collection of high-quality, aberration-corrected images, and interpretation of various detector data, including high-angle annular dark-field (HAADF), medium-angle annular dark-field (MAADF), and bright-field (BF) imaging.
 - Data collection and quantification of electron energy loss spectroscopy (EELS) data and potential artifacts.
 - Image processing techniques.
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