



Contribution ID: 120 Contribution code: TUP20

Type: **Poster Presentation**

Scanning and transfer of cryogenic samples in the BioNanoProbe-II instrument at the Advanced Photon Source

Tuesday 16 September 2025 17:00 (1 hour)

A new hard x-ray fluorescence nanoprobe instrument called Bionanoprobe-II (BNP-II) has been designed and will be constructed at 2-ID-D of the upgraded Advanced Photon Source. BNP-II will take advantage of the orders-of-magnitude increase in brightness and coherent flux with advanced sample scanning, metrology, cryogenics, and controls. These advancements will enable high-throughput XRF imaging under cryogenic conditions with 10 nm spatial resolution, 2D survey of mm-sized samples, and fast tomography for 3D visualization. BNP-II also introduces a novel robotic sample transfer system that interconnects a cryogenic plasma focused ion beam (cryo-PFIB) milling station alongside the x-ray nanoprobe. The interconnected instruments enable an iterative workflow between x-ray measurements and cryo-PFIB milling and maintains the integrity of vitrified samples by remaining below 110K even during transfer. Regions of interest can be identified by fast large-area scans, after which the sample geometry can be optimized for nanoscale x-ray imaging and tomography. This work details the engineering advancements required to examine highly complex, multidimensional systems with BNP-II.

Footnotes

Funding Agency

This research used resources of the Advanced Photon Source, a U.S. Department of Energy (DOE) Office of Science user facility under Contract No. DE-AC02-06CH1135

Author: Mr DAVIS, Benjamin (Advanced Photon Source)

Co-authors: Dr CHEN, Si (Advanced Photon Source); BEAN, Sunil (Advanced Photon Source); MOONEY, Tim (Advanced Photon Source); Mr PETERSON, Kevin (Advanced Photon Source); Ms ISIK, Tugba (Center for Nanoscale Materials); MAXEY, Evan (Advanced Photon Source); LIU, Jie (Advanced Photon Source); WOJCIK, Michael (Advanced Photon Source); ZHANG, Xiaozhi (Advanced Photon Source); Dr HAN, Josh (Advanced Photon Source); LAI, Barry (Advanced Photon Source)

Presenter: Mr DAVIS, Benjamin (Advanced Photon Source)

Session Classification: Tuesday Poster Session

Track Classification: BEAMLINES: Sample Environments