3D X-ray Microscopy to Extend the Reach of the Central Microscopy Lab

3D x-ray microscopy (XRM) has emerged as a powerful non-destructive imaging technique that provides quantitative microstructural information from a range of materials and systems. X-ray optics with imaging resolutions down to 50 nm, once achievable only at a few synchrotron beamlines, have recently been extended to the laboratory, moving well beyond conventional micro-CT.

This workshop will include an introduction to the x-ray optical architecture employed in Xradia microscopes and provide insight into the applications that benefit from 3D and 4D imaging experiments.
A special focus is placed on *in situ* and 4D experiments that study microstructure evolution as functions of external stressors (temperature, load, etc.), including examples such as crack propagation, deformation of polymer foams under load, and the evolution of defects in battery materials. Examples of phase contrast imaging (Zernike and propagation-based) for low-Z materials, ranging from polymers to unstained biological tissue will also be shown.

Finally, we will explore concepts how 3D XRM can be utilized by other microscopy techniques as a correlative method to provide contextual and evolutionary understanding, prior to complementary FIB-SEM, TEM or Atom Probe analysis.