



# Automation of SEM/SDB

## Bridging the Mesoscale to the Nanoscale: A Multiscale 3D Characterization Workflow

### Large Volume Imaging Techniques: Which is the right one for me?

**When:** 31 August 2017 **Time:** 2.00pm – 5.00 pm

**Where:** Level 3 Seminar Room,  
15 Innovation Walk, Monash University Clayton Campus  
Wellington Road, Clayton VIC 3800

**Who:** Brandon Van Leer - Business Development & Product Marketing Engineer  
Kristian Wadel - Principle Scientist, Large Volume Imaging Workflows Consultant.

**Schedule:** 2.00-3.00 pm Materials focus  
3.00-3.30 pm Coffee  
3.30-4.30 pm Life science focus

The combination of Focused Ion Beams with Scanning Electron Microscopes (FIB/SEM) have enabled accessing microstructural information at and below the surface in 3D. The need is growing for a multiscale workflow that allows for structural and elemental characterization on engineered parts/materials from the mesoscale down to the nanoscale. Imaging and analysis of large feature materials in 3D is key to understanding the context of how a material behaves or gaining knowledge of failure in the system. Until recently, the available technologies have limited the volumes and depths of materials that can be analyzed at high resolution, ultimately restricting the insight into structural, crystallographic, and chemical properties. This is no longer the case. The introduction of the Helios PFIB, a Xe Plasma FIB/SEM technology, offers unrivaled access to regions of interest deep below the surface – combining serial section tomography with statistically relevant data analysis. The PFIB also means that large volumes of interest identified by MicroCT can be investigated in great detail.

Similarly, unraveling complex 3D architecture of cells and tissues in their natural context is crucial for the structure function correlation in biological systems. In recent years, there have been considerable advances in SEM-based methods for 3D reconstruction of large tissue volumes. Serial Block-Face SEM (SBF-SEM) combines in situ sectioning and imaging of plastic embedded tissue blocks within the SEM vacuum chamber in a fully automated fashion for reconstruction of large tissue volumes. However, until now the axial resolution was limited by the minimal section thickness that can be cut from the block-face. With a combination of SBF-SEM and Multi-Energy Deconvolution SEM (MED-SEM) the Apreo VS now enables large volume imaging with truly isotropic 3D resolution.

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*Visitors are most welcome. Please note that there are designated visitor car parks and tickets, at a cost of \$2.00 per hour or \$10.00 all day available from parking meters. Payment is by coin, credit card, or phone app. Further details can be found at the following links:*  
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