

Next-Generation SBF-SEM from ConnectomX : Multimodal, Correlative Imaging and Technical Advancements for 3D Electron Microscopy

Integrated SBF-SEM workflows now combine correlative light and electron microscopy (CLEM) for targeting structures, and analytical modalities such as energy dispersive X-ray spectroscopy (EDS) and electron backscatter diffraction (EBSD) to enable fully correlative structural and compositional 3D imaging. One approach allows SBF to bridge the gap between light microscopy and FIB, allowing sub-100 nm vessels to be found quickly and precisely within large biological volumes. Another approach adds EDS which enables quantitative elemental mapping aligned with SEM-based segmentation, while EBSD provides crystallographic information, revealing grain structures alongside surface ultrastructure in materials datasets. Recent instrumental advances, including improved low-kV backscattered electron detection and in-chamber charge neutralisation, further enhance image quality, stability, and scalability for large-area volume acquisition, supporting the increasingly robust and versatile multimodal SBF-SEM workflows.