







Available Microscope Technology




Materials Microscopy Student Research
Summer Fellowship






Carl Zeiss Microscopy - Summer 2024



The list below is a summary of the instrumentation available at the ZEISS Microscopy Customer Center. Please note, to learn more about these technologies and be eligible for submitting a proposal, applicants must also attend one of the Informational Webinars. Registration for the webinars is on the program [webpage](#).

Scanning Electron Microscopes & FIB-SEM		
Tungsten Filament, Thermionic SEM	<p>EVO The EVO tungsten filament thermionic SEM combines high performance scanning electron microscopy with an intuitive, user-friendly touchscreen-based experience that appeals to both trained microscopists and new users. Equipped for variable pressure including wet imaging, a peltier cold stage, and SmartEDX detector for elemental analysis.</p>	
Field Emission SEM	<p>Sigma The Sigma combines field emission scanning electron microscope (FE-SEM) technology with an excellent user experience. Operate at low electron beam voltages and benefit from enhanced resolution and contrast at 1 kV or below including with in-lens secondary electron detection. Equipped for variable pressure imaging, analytical microscopy using EDS, and STEM imaging of thin samples.</p> <p>GeminiSEM The flagship ZEISS FESEM delivers effortless imaging with sub-nanometer resolution and extreme surface sensitivity, especially at low electron beam voltages. Equipped for STEM imaging, highest resolution variable pressure imaging with nanoVP, in-lens imaging of secondary or backscatter electrons, and high-resolution EDS.</p>	 
FIB-SEM	<p>Crossbeam Combine imaging and analytical performance of a high-resolution FE-SEM with the processing ability of a next-generation focused ion beam (FIB). Use Ga FIB milling for nanopatterning, cross-sections, 3D nanotomography, or sample preparation including TEM lamellae. One microscope is equipped for cryo operation, and another with fs laser ablation plus EDS and EBSD analysis. Both include manipulators for sample lift-out, as well as the Atlas 5 package to enable the most advanced large area mosaic acquisitions or highest resolution 3D nanotomography.</p>	

3D X-ray Imaging (X-ray Microscopy & Computed Tomography)		
Nanoscale X-ray Microscopy	<p>Ultra</p> <p>With the ZEISS Ultra family, you have 3D non-destructive X-ray tomography with nanoscale resolution (down to 50 nm) and synchrotron-like image quality, based on a transmission X-ray microscope (TXM) architecture. In addition to standard absorption contrast imaging, the instrument is also equipped with Zernike Phase Contrast for low-Z materials. Enables 4D/time-lapse 3D imaging of samples nondestructively through alteration or degradation processes. Suitable samples for imaging with Ultra are typically 100 microns or smaller. Equipped with deep learning-based tomography reconstruction (DeepRecon).</p>	
Sub-micron X-ray Microscopy	<p>Versa</p> <p>Extremely versatile X-ray microscope providing 3D images across a wide range of materials and sample sizes. Features dual-stage magnification based on synchrotron-caliber optics and revolutionary RaaD™ (Resolution at a Distance) technology for 'zooming in' to high resolution inside objects. Optimal resolution down to 450 nm. Equipped for either <i>in situ</i> studies (heating/cooling/tension/compression) or diffraction contrast tomography (DCT) of crystalline samples. Also equipped for advanced reconstruction techniques including deep learning recon (DeepRecon), deep learning-based multiscale resolution recovery (DeepScout), and phase contrast and metal artifact reduction.</p>	
High Resolution microCT	<p>CrystalCT</p> <p>Combines the capabilities of high resolution (absorption-based) microCT imaging with the ability to reveal crystallographic grain microstructures via diffraction contrast tomography (DCT). For absorption imaging, achieve resolution down to the single micron range for small samples. Or image large samples of 10+ cm in size. With DCT, map the 3D spatial and angular distribution of grains in polycrystalline samples (such as metals, additive manufacturing, ceramics, pharmaceuticals and others) to reveal deeper insights into the connections between their microstructure and properties.</p>	

Optical Microscopes		
Digital Microscope	<p>Smartzoom 5 Automated digital microscope for routine imaging and failure analysis. Image presets and enhancement help you get the best image, with a number of image algorithms enabling automatic measurements. With the microscope's swing arm you can view structures on the sample surface from continuously adjustable angles between -45° and +45°.</p>	
Stereo and Zoom Microscopes	<p>SteREO Discovery. V8 Prepare and manipulate your samples - especially in materials screening and quality assurance - thanks to the three-dimensional image perception. Acquire crisp images throughout the whole 8:1 zoom range. The selectable click-stops for discrete magnification steps allow you to calibrate pixel sizes in the imaging software ZEN. Variable illumination options including coaxial reflected light for smooth and highly reflective surfaces.</p> <p>Axio Zoom.V16 The on-axis zoom microscope Axio Zoom.V16 delivers both high resolution and a zoom range of 16x. Zoom seamlessly from overview to the smallest details - with a large free working distance and a single objective. Quickly and easily stitch large tile-images at low to medium magnification with impressive double resolution.</p>	 
Petrographic Analysis Microscope	<p>Axioscan 7 Geo The reliable, reproducible way to digitize your thin sections and create high quality, digitized petrography data in transmitted and reflected light. Uniquely designed for petrographic analysis, the Axioscan 7 Geo combines unique motorized polarization acquisition modes with unprecedented speed and a rich software ecosystem for visualization, analysis, and collaboration.</p>	
Confocal and Widefield Materials Microscope	<p>LSM 900 Upright optical microscope combining widefield imaging and confocal laser scanning. Characterize 3D microstructures' surfaces topography and roughness with the confocal capability. Also access all essential widefield light microscopy contrast techniques (transmission, reflection, brightfield, darkfield, polarization, fluorescence).</p>	

For any questions, please contact the program manager Will Harris: william.harris@zeiss.com

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