## X-RAY Microanalysis Core

More info: <https://research.missouri.edu/x-ray-microanalysis>

The X-ray Microanalysis Core (MizzoµX) explores electron- and X-ray microscopy techniques on fossil materials and has built a broad group of collaborators outside of paleontology and geological sciences to apply these techniques to expansive specimen types. Part of MU's advanced core facilities, the lab is accessible to researchers across campus and around the globe. MizzoµX is a Zeiss microscopy facility with two primary instruments: a Sigma 500 VP scanning electron microscope (SEM) and an Xradia 510 Versa X-ray microscope (µCT). MizzoµX has additional computing and sample preparation capabilities, including a workstation for 3D data analysis with ThermoFisher’s Avizo software package, a Cressington metal sputter coater, and a fully equipped cutting/polishing/embedding lab.

The customized Zeiss Sigma 500 VP scanning electron microscope (SEM) is built on a large chamber platform and equipped with the Gemini field-emission column with extended voltage available, yielding excellent count rates for spectrometry and spatial resolution to ~0.7 nm. The chamber is a dry variable pressure system, using a nitrogen gas atmosphere for low-vacuum analyses, and is equipped with a cascade current secondary electron detector for outstanding low-vacuum imaging quality. MizzoµX additionally has a standard Everhart-Thornley detector, a high-definition 5-segment backscatter detector, and a dual in-lens detector, for a full range of imaging capabilities. For compositional analyses, the Sigma houses dual, co-planar (diametrically opposite), Bruker energy dispersive x-ray spectrometers and an integrated Bruker microspot x-ray fluorescence unit (µXRF). Finally, the system is equipped with the ATLAS control module and a 5-axis Cartesian stage to allow for large sample automated imaging.

The Zeiss Xradia 510 Versa 3D x-ray microscope (XRM or µCT) is the only available µCT on MU’s campus. The Xradia 510 Versa µCT is the industry’s premier in-situ solution for non-destructive 3D imaging, allowing for unique characterization of the microstructure of materials for a diverse array of applications and sample types. The Xradia 510 Versa can achieve between 0.7–55 μm true spatial resolution with minimum achievable voxel size below 70 nm. This µCT has increased versatility for soft or low-Z materials with advanced absorption contrast along with innovative phase contrast to overcome the limitations of traditional computed tomography.