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Scanning Electron Microscopy Core

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Microscopy and Imaging Center

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Introduction

The **Microscopy and Imaging Center (SEM Core)** is the core facility of the University of Mississippi providing scanning electron microscopy services to the UM community. The major goal of the facility is to provide students, faculty and staff researchers at the University with access to and training in advanced microscopy techniques.

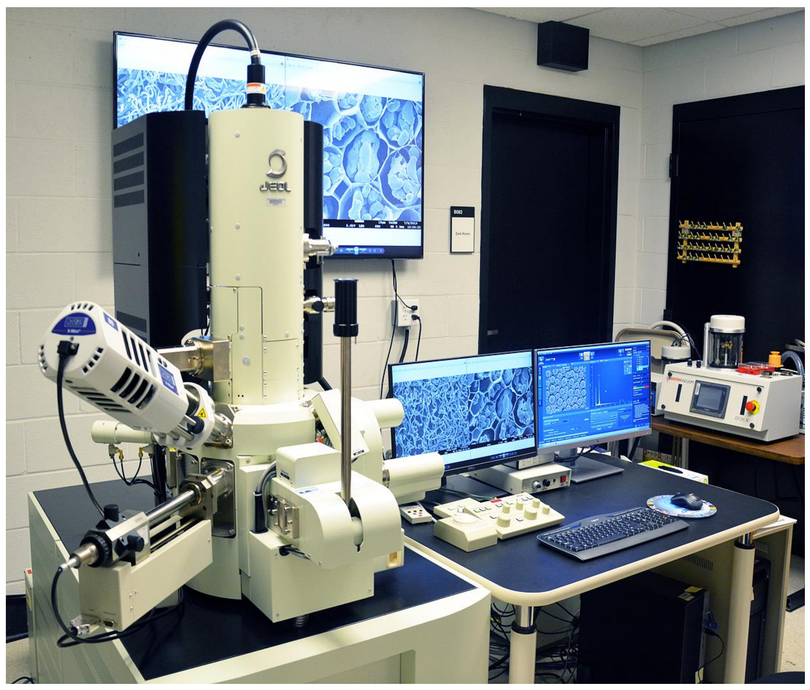
Presently, the Core provides imaging and analysis services with the newly acquired JSM-7200FLV Field-Emission Scanning Electron Microscope. With its high magnification, ultra-high spatial resolution capabilities and multiple detectors, this is a key instrument for several UM departments, and supports a number of multidisciplinary research programs ranging from fundamental biology to nanotechnology.

SEM Core webpage URL: https://pharmacy.olemiss.edu/mic/

SEM reservation: https://secure12.ideaelan.com/secure/Public/AppLogin.aspx

Scan me!

Instruments



JSM-7200FLV (JEOL) Field-Emission Scanning Electron Microscope

Core Services

- High-resolution SEM/STEM/CL imaging
- Elemental analysis and mapping by EDS
- SEM instrumentation demo for student classes
- Hands-on training on sample preparation, SEM operation and software familiarization

SEM Features

Specifications

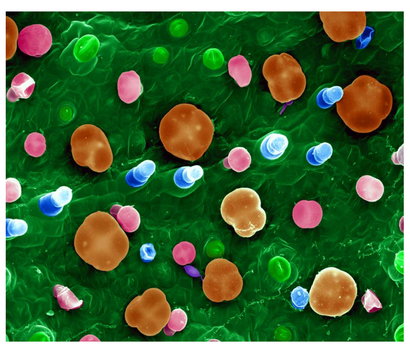
Accelerating voltage	0.01 kV to 30 kV
Probe current	1 pA to 300 nA
Magnification	Up to x1,000,000
Resolution	Up to 1.2 nm

Detectors

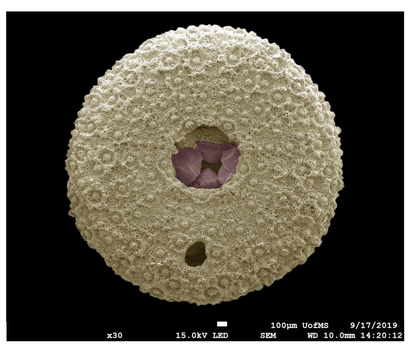
- Secondary Electron (SE) detector
- Back-Scattered Electron (BSE) detector
- Energy Dispersive X-Ray Spectroscopy (EDS) detector
- Scanning Transmission Electron Microscopy (STEM) detector
- Cathodoluminescence (CL) detector

Other Features

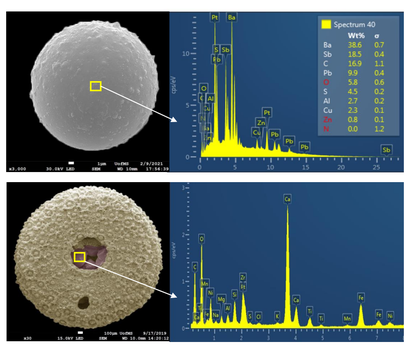
- Low vacuum (LV) capability
- Schottky-type field emission gun
- 5-axis, motorized stage
- Stage navigation system
- Chamber scope
- 65″ LCD display
- Data backup
- Emergency power backup



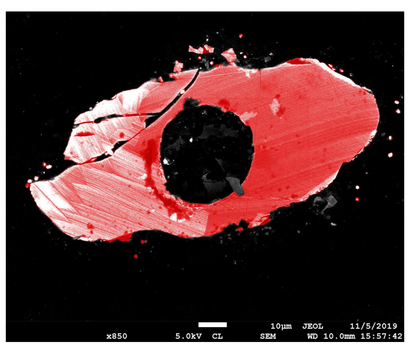
Colorized SEM image of the glandular trichomes of *Salvia divinorum* leaf



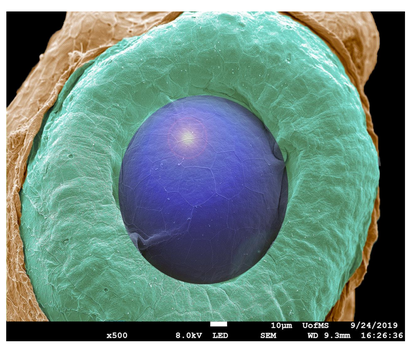
SEM image of a 245 million-year-old echinoid fossil *Periarchus lyelli*



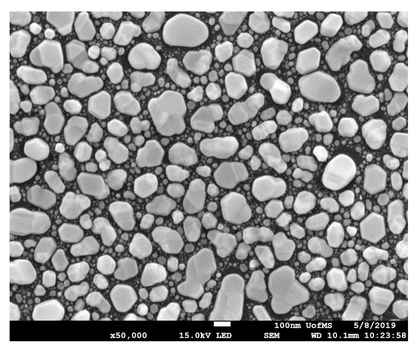
EDS spectra of gun-shot residue (above) and of the minerals found in *P. lyelli*



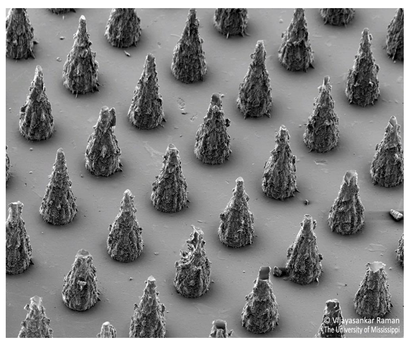
Cathodoluminescence (CL) image of a zircon grain



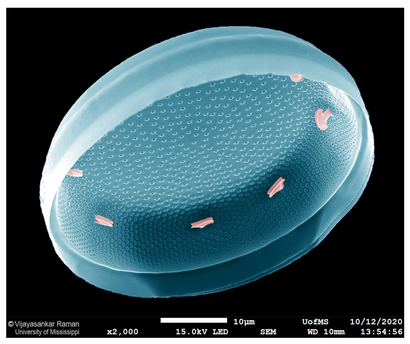
SEM image of a developing eye of a zebrafish embryo (Winner of the 2021 Royal Microscopy Society Scientific Imaging Competition)



Gold nanoparticles from a JEOL Standard

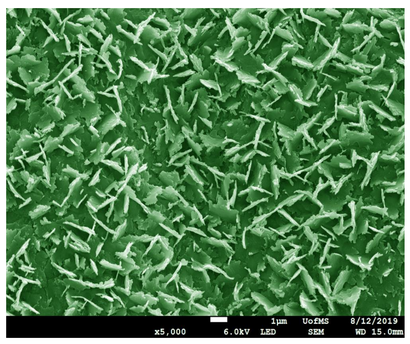


An array of soluble polymer microneedles

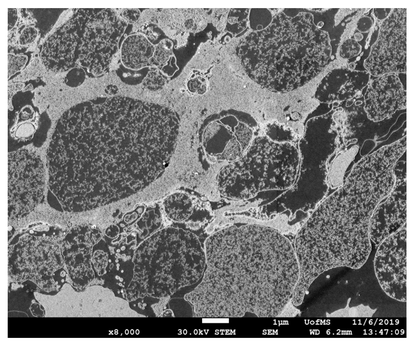


"UFO" SEM image of a centric diatom (Winner of the 2021 JEOL image contest)

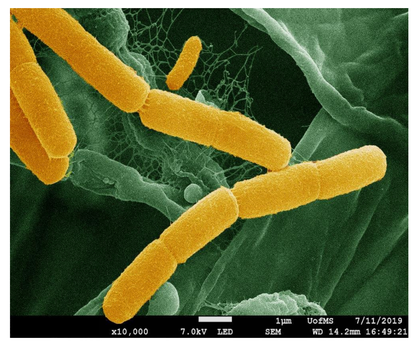
"Alien" plant: Stomata on the floral bract of corpse flower (Winner of the 2019 JEOL image contest)



Waxy deposits on *Tinospora* leaf



STEM image of carbon nanotube sections



Colorized SEM image of *E. coli* bacteria

Sample Preparation

Leica EM CPD300
Critical Point Dryer

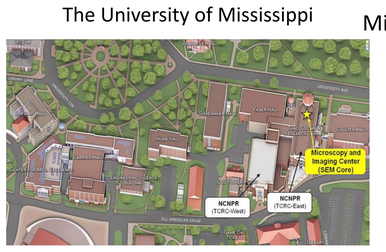
Denton Vacuum Desk V TSC
Sputter Coater

SEM Usage Stats

JSM-5600 (as of June 2019)	JSM-7200F (July2019-Sep2021)
50+ research articles	100+ individual users
25+ conference presentations	22 research groups
30+ Ph.D. theses	~400 instrument hours
Several grant applications	~800 samples

Funding Source: National Science Foundation (Award number 1726880)

SEM Location
B083 Thad Cochran Research Center (East)
NCNPR, School of Pharmacy
The University of Mississippi



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