



www.aimlab.umd.edu

Cutting-edge instrumentation for
nanocharacterization and microscopy

Supporting research, education, and
technology development

A regional facility open to and serving the
University of Maryland, industry, government labs,
and external academic and nonprofit organizations

SEM image of GSST photonic crystals

Seeing things at the nanoscale and determining how they behave is essential for nanoscience and nanotechnology to progress. Nanoscale imaging, spectroscopy, and properties identified in the AIM Lab tell that story with amazing clarity.

The AIM Lab is part of the Maryland NanoCenter, a partnership of the A. James Clark School of Engineering and the College of Computer, Mathematical and Natural Sciences at the University of Maryland. It is part of a full range of state-of-the-art research facilities at the University of Maryland including TEM, FEGTEM/STEM, AC-TEM/STEM, SEM, FIB/SEM & EPMA.

The AIM Lab supports the University of Maryland's mission of performing cutting-edge research and providing technologies and services for engineering and science researchers in academia, industry and government; developing future professionals who have hands-on experience in advanced microscopy and composition analysis; and promoting a vibrant technological economy in the state of Maryland through interactions with established and emerging companies.

The AIM Lab is supported by the Maryland NanoCenter and the University of Maryland NSF Materials Research Science and Engineering Center (MRSEC).

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UNIVERSITY OF
MARYLAND

CAPABILITIES

TRANSMISSION ELECTRON & SCANNING TRANSMISSION ELECTRON MICROSCOPY (TEM/STEM)

Abberation Corrected TEM
EDS and EELS spectrometers
IDES Reality + Synchrony
4D STEM

Field emission TEM/STEM with EDS, EELS, and holography
LaB₆ TEM with EDS

Equipped with:

Heating and cryo capability
High-tilt and rotation capability
Tomography
Lorentz microscopy
In-situ experimental holders

SCANNING ELECTRON MICROSCOPY (SEM)

FEG SEM

SE, BSE, STEM and ion detectors
Electron backscatter diffraction
Cathodoluminescence
Energy dispersed x-ray spectrometer
Ultrafast heating stages
Wet-cell capability
Electron microprobe with WDS, EDS and CL

FOCUSED ION BEAM

Gallium FIB & Xenon plasma FIB
EBSD, EDS, TOF-SIMS, & CL
5-gas injection system
Peltier heating/cooling stage
Omniprobe nanomanipulator
Kleindiek micromanipulator
Cryo-FIB/SEM capability

SAMPLE PREPARATION

Cutting saw, polisher, dimpler and coring devices
Electro-polishing equipment
Ion beam thinner
Cryo-plunger
Cryo-ultramicrotome
Plasma cleaning system
Sputter & carbon coaters

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THE AIMLAB IS PART OF THE MARYLAND NANOCENTER, A PARTNERSHIP OF:



A. JAMES CLARK
SCHOOL OF ENGINEERING



COLLEGE OF
COMPUTER, MATHEMATICAL,
& NATURAL SCIENCES



SUPPORTED IN PART BY:



APPLICATIONS

CHARACTERIZING MATERIALS AND STRUCTURES

Nanowires and nanotubes
Particles and composites
Ultrathin and multilayer films
Polymers
Defect study
Nanoscale devices
Geological materials
Biological materials (cells, viruses, tissues)

IMAGING AT ATOMIC AND NANO SCALES

Atomic resolution defect imaging
Tomography, 3-D reconstruction

ANALYTICAL COMPOSITION AND IMAGING

Compositional analysis
Local chemical bonding
Elemental mapping

IN-SITU ELECTRON MICROSCOPY EXPERIMENTATION AND TESTING

Thermal response from cryogenic to high temperature
Mechanical, magnetic, and other properties of nano and micro structures
Wet-environmental SEM
Lorentz microscopy

IMAGE CAPTURE AND ANALYSIS

High resolution digital images and video
3-D imaging, tomography

SURFACE ANALYSIS

High resolution surface topography
Chemical and compositional analysis

SMALL DEVICES

Micro-fabrication, repair and modification

