



Thermo Gravimetric Analyzer (TGA) Q50 from TA Instruments

# ADL ANALYTICAL AND DIAGNOSTICS LABORATORY

Providing technical and instrument support for materials, process and device characterization, and failure analysis

**BINGHAMTON**  
UNIVERSITY  
STATE UNIVERSITY OF NEW YORK

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**S<sup>3</sup>IP**

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Field Emission TEM JEM 2100F from Jeol



A microelectronics package being characterized by Scanning Acoustic Microscope

## WORLD CLASS ANALYTICAL AND DIAGNOSTICS EXPERTISE

The Analytical and Diagnostics Laboratory (ADL) of the Small Scale Systems Integration and Packaging (S<sup>3</sup>IP) Center, a New York State Center of Excellence, is a multi-user research lab that provides state-of-the-art equipment support, staff expertise and training to enable high-quality materials, process and device characterization, failure analysis and processing.

The ADL, a world-class research lab established in 2007 with a \$21 million state grant, is staffed by PhD-level scientists and engineers who provide equipment training and maintenance, consultative assistance, operator services and research collaboration to our industry, academic and government partners.

# ANALYTICAL AND DIAGNOSTICS LABORATORY

## ADL CAPABILITIES

- **High-Resolution Electron Microscopy and Microanalysis:** Two High-Vacuum and Variable Pressure SEMs with EDS, WDS, EBSD, Back-scatter Electron Detectors and e-Beam Lithography; Dual-Beam FIB/SEM with EDS and EBSD; Field Emission TEM with STEM, EDS, EFTEM, EELS and Hot Stage
- **Non-Destructive Testing:** X-ray Imaging System with CT Scanner, C-SAM, and IR Microscope
- **Chemical Analysis:** Micro and Macro XPS with SXI Imaging, Mapping and Depth Profiling Capabilities, FTIR Spectrometer and EDS, WDS, EELS on Electron Microscopes
- **Thermal Analysis:** DSC, TGA, DMA, TMA, TGA with Mass Spectrometer, Flash Diffusivity System and Rheometer
- **Surface and Interface Analysis:** AFM with STM, Fluid Imaging, Nano-Indentation, Conductive AFM modes, UHV STM, Stylus and Optical Profilers, Spectroscopic Ellipsometer and XPS
- **Optical Microscopy:** Upright, Inverted and Stereo Advanced Optical Microscopes; two Laser Scanning Confocal Microscopes



Dimension 3100, Nanoscope-V AFM from Veeco Instruments



Versaprobe 5000 XPS, from Physical Electronics

- **Crystallography:** XRD, TEM, EBSD and Small Angle X-Ray Scattering (SAXS)
- **Electrical and Mechanical Testing:** Four-Point Probe Station, Potentiostat/Galvanostat, Two Fatigue Testers, Laser Doppler Vibrometer, Particle Imaging Velocimeter, DMA
- **Materials Processing:** Pulsed Laser Deposition, Inkjet Printer; Sputtering System, E-beam Evaporator, RIE, PECVD, RTP and other photolithography capabilities are available in the S<sup>3</sup>IP Nanofabrication Lab.
- **Extensive Sample Prep Capabilities:** Dual-Beam Ion Mill, Cross-Section Polisher, Dimpler, Ultrasonic Core Drill, Sputter Coaters, Plasma Cleaners, Ion Etcher and Coater, Metallography Tools (such as polishers, grinders, diamond saws, epoxy casting tools)
- **Miscellaneous:** Particle Size Analyzer, Powder Surface Area Measurement, Pycnometer, etc.

For details, please visit [www2.binghamton.edu/adl](http://www2.binghamton.edu/adl).



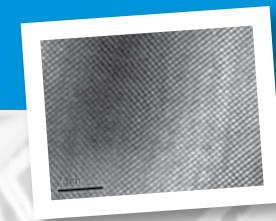
Phoenix Nanome|x x-ray imager from GE

## HOW TO USE THE ADL

- Contact Dr. Larry Lehman, ADL lab director (607-777-6841, [lplehman@binghamton.edu](mailto:lplehman@binghamton.edu)), or visit [www2.binghamton.edu/adl](http://www2.binghamton.edu/adl) and click on "Become an ADL user."
- Define your project goals and equipment needs. Both onsite options (you do the work) and remote options (we do the work) are available.
- Set up a user agreement with the S<sup>3</sup>IP Center. Internal and external academic and member rates are available.
- Attend general orientation, safety and equipment training.
- Begin work.

## CURRENT RESEARCH AT ADL

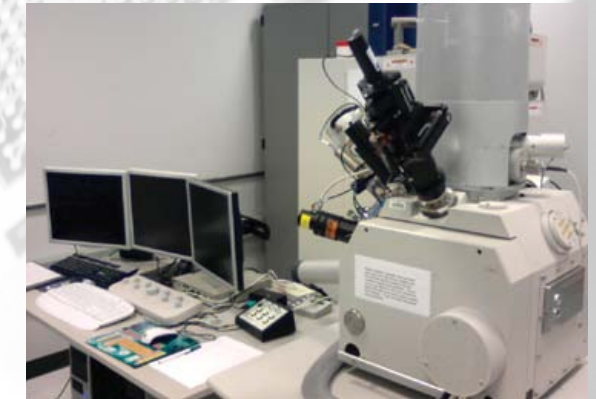
- Microelectronics
- Flexible Electronics
- Nanotechnology
- Materials Research
- MEMS/NEMS
- Micro/Nano Fluidics
- Bio/Chemical Sensors
- Solar Cells



Atomic resolution TEM image of the Au film



SEM image of Vanadium-doped zinc oxide nanostructures



Dual Beam FIB/SEM Nova 600 Nanolab from FEI

## USER SUPPORT

- Extensive user training
- User-scheduled training sessions
- Online training documentation
- Small training classes (usually one-on-one)
- Expert technical support
- Equipment support
- Installation, maintenance and upgrades
- Web-based support
- Online equipment scheduler
- Unlimited data storage
- Online data access
- Automatic email to users for equipment, facilities and training alerts