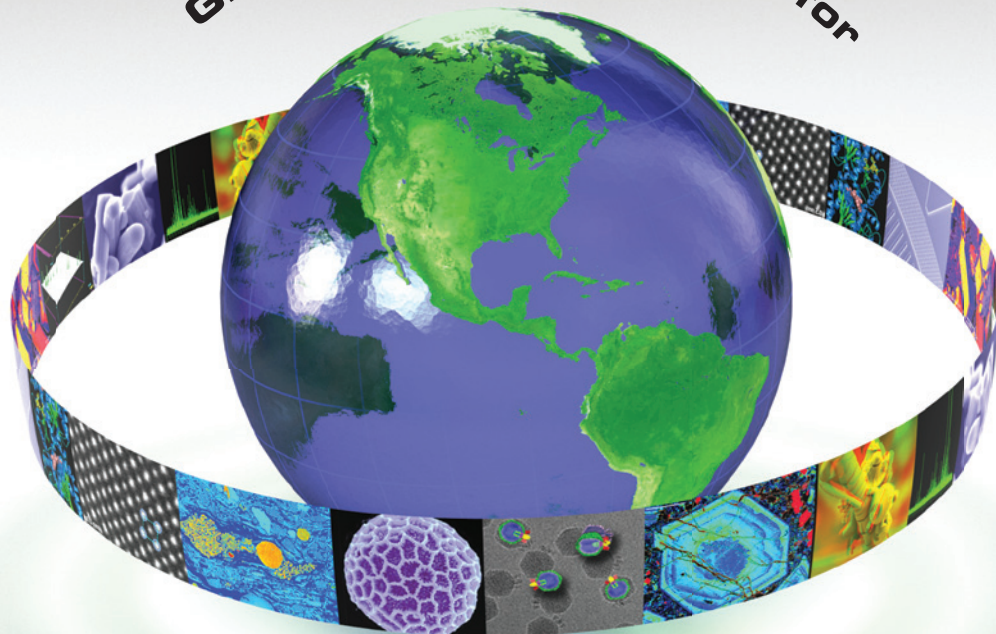


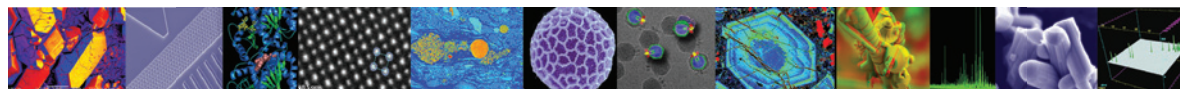
JEOL

Global Solution Provider for

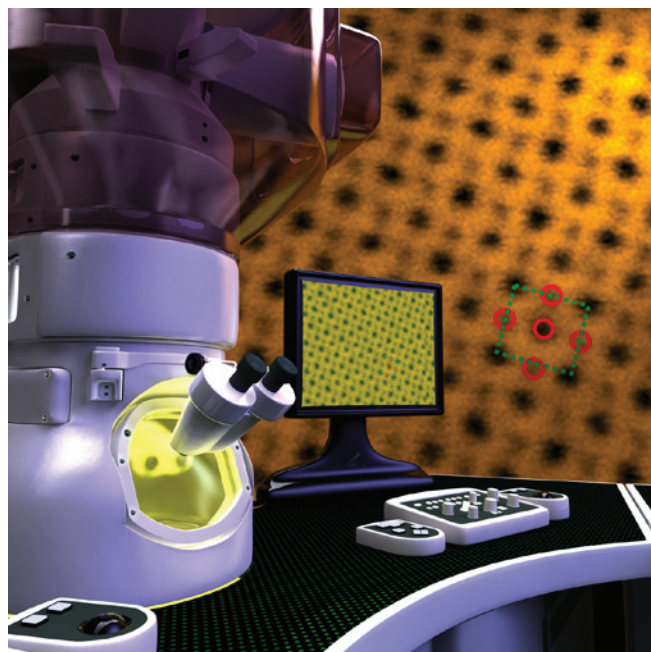


Advanced Technology

JEOL USA
Serving the Americas



Thank you for your interest in JEOL



JEOL is a leading global supplier of electron microscopes, ion beam instruments, mass spectrometers and NMR spectrometers. JEOL instruments are helping to advance scientific research throughout the world. Among our customers are winners of the Nobel Prize, recipients of major research grants, and world-renowned scientists. JEOL customers use our instruments to support discoveries in virology,



biological and medical research, drug discovery and genomics, national defense, forensics, failure analysis, nanotechnology, and novel materials. What can we help you achieve?

JEOL USA - Your JEOL Partner

JEOL has over 30 offices worldwide, the result of global demand for JEOL innovations and unparalleled support.

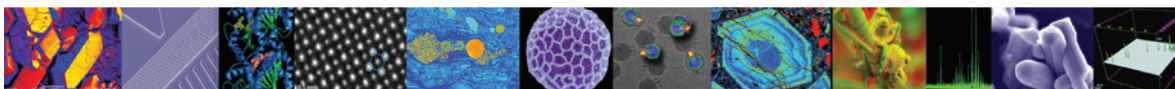
We take great pride in the long-term stability of our organization and employees who help make JEOL a valuable partner. JEOL customers not only acquire an instrument that will be of value for many years, they forge a relationship with an organization that will be a lifelong resource



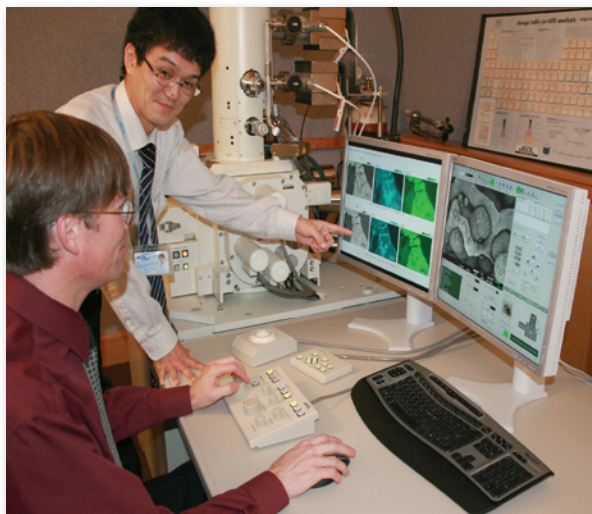
for their laboratory, fab, and business challenges.

Founded in 1962, JEOL USA is a wholly-owned subsidiary of JEOL, Ltd. in Akishima, Japan. Our headquarters are located 20 minutes north of Boston in Peabody, Massachusetts. Included here are our administrative offices, parts depot, main demonstration lab, and applications support staff. In addition, we have 14 regional service offices and a demonstration lab in Pleasanton, California.

Images (clockwise from above):
JEOL USA Headquarters
Manufacturing facilities at JEOL, Ltd.
Atomic level resolution TEM



Innovation and Support for Science and Industry

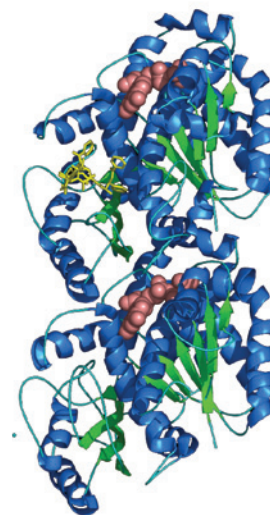


The JEOL legacy is one of exemplary customer support and innovation in developing leading-edge technology. We take great pride in providing high performance instrumentation for scientific frontiers, as well as highly flexible, reliable equipment for routine applications. JEOL spotlights the achievements of several of our customers in an ongoing series of REALab case studies on our website at www.jeolusa.com.

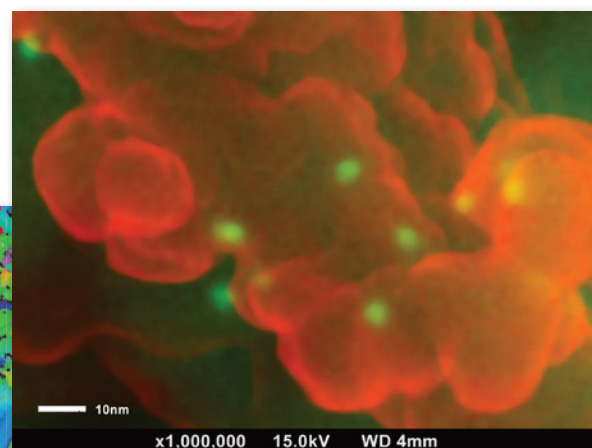
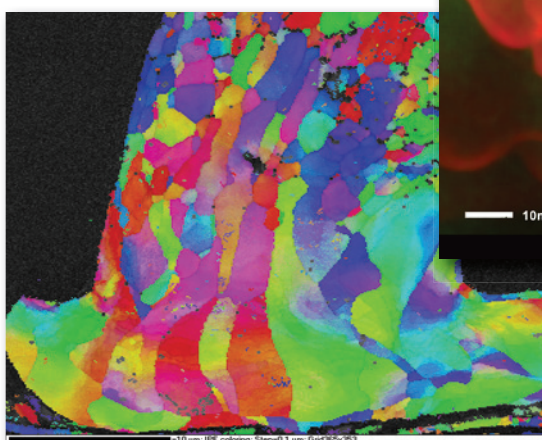
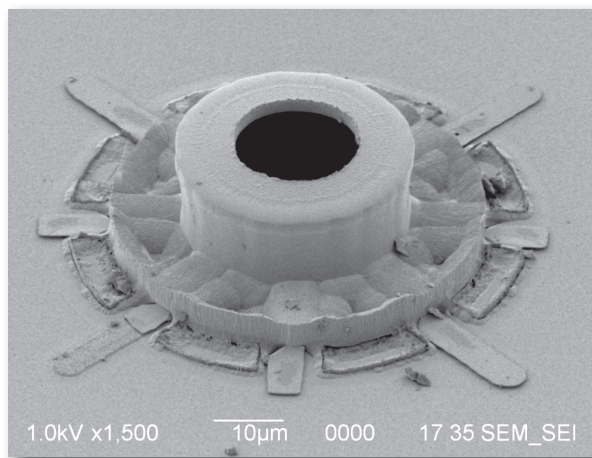
Applications Expertise

JEOL USA is well known as a resource for unsurpassed expertise in SEM and TEM imaging, mass spectrometry and NMR. Our microscopists, spectrometrists, chemists, biologists, and metallurgists work closely with our customers to establish routine processes or pioneer new applications.

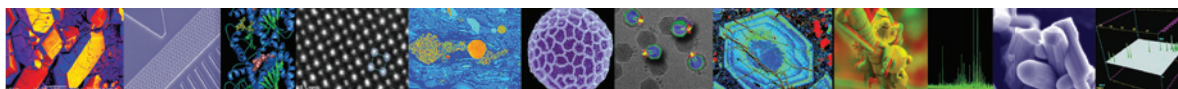
In the JEOL demonstration labs in Peabody, Massachusetts we maintain the most current high resolution tungsten and field emission SEMs, state-of-the-art mass spectrometers and NMR spectrometers, and the latest versions of hardware and software from third party vendors, including EDS, EBSD, CLD, WDS, and NMR probes. Our Pleasanton, California facility services our western area customers. On-site demonstrations and applications support are also available at select locations, including customer sites for the latest in TEM technology.



Nogales, Wolf and Downing



Images (clockwise from top right):
 3.7Å Reconstruction of α,β Tubulin
 2-4nm gold immunolabeled cells
 EBSD image of cross section of wire bond
 Nanocage MEMS device
 Combined expertise for applications success



Transmission Electron Microscopes



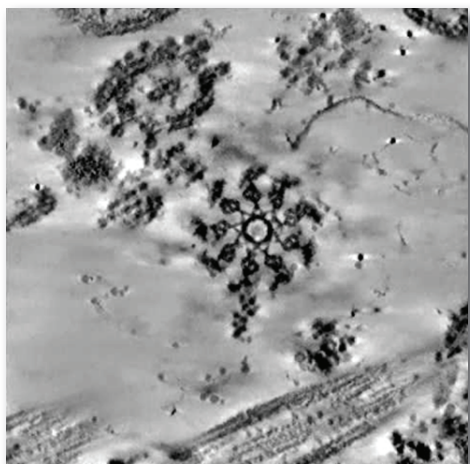
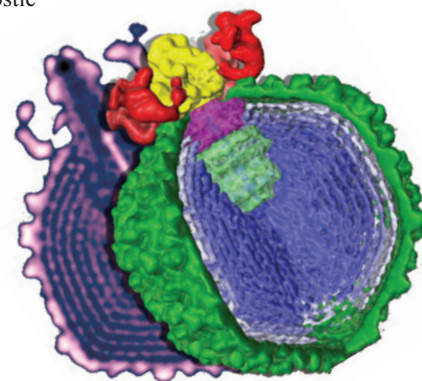
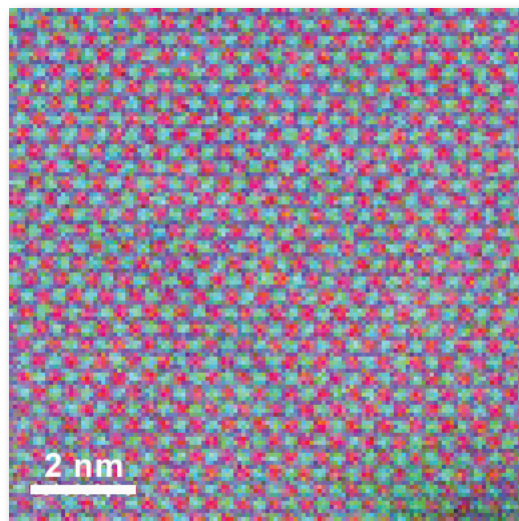
Atomic resolution. Aberration correction. Tomography. Cryo-microscopy. Structural biology. STEM. JEOL Transmission Electron Microscopes — TEMs — are at the forefront of science with the most advanced imaging and analysis capabilities commercially available.

JEOL TEMs are used in all areas of biological and biomedical investigations because of

their ability to view the finest cell structures, and in hospital pathology labs as diagnostic tools. For the crystallographer, metallurgist or semiconductor research scientist, JEOL TEMs are crucial to developing materials with custom-tailored

properties. With the addition of energy dispersive X-ray analysis (EDXA) or energy loss spectrometry (EELS), the TEM becomes an elemental analysis tool, capable of identifying elements in areas less than 0.5nm (approximately two atoms) in diameter.

JEOL began its legacy of leadership in microscopy with the introduction of its first TEM in 1949, and has achieved significant strides in imaging technology throughout its history. JEOL state-of-the-art TEMs range from the 100 keV to 1.3 MeV platform, enabling simultaneous STEM, HAADF, and energy filtering.



Courtesy of Dr. Geimer, University of Bayreuth

Courtesy of Dr. Wah Chai, Baylor College of Medicine, Houston, Texas

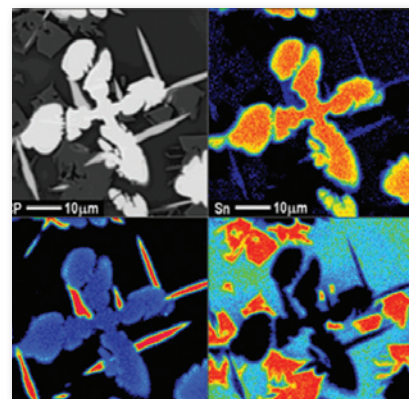
Surface Analysis

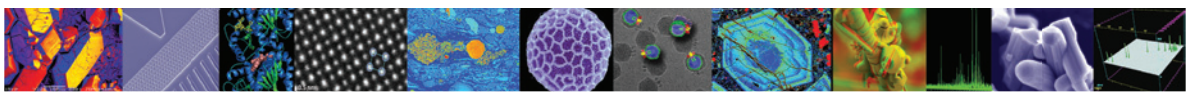
JEOL surface analysis instruments are renowned for their performance.

The Electron Probe Microanalyzer (EPMA) utilizes X-ray spectroscopy for combined quantitative and qualitative analysis of nanometric sample areas and surfaces.

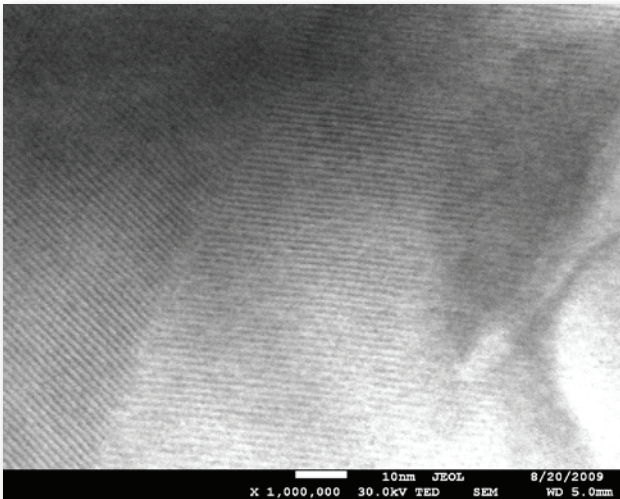
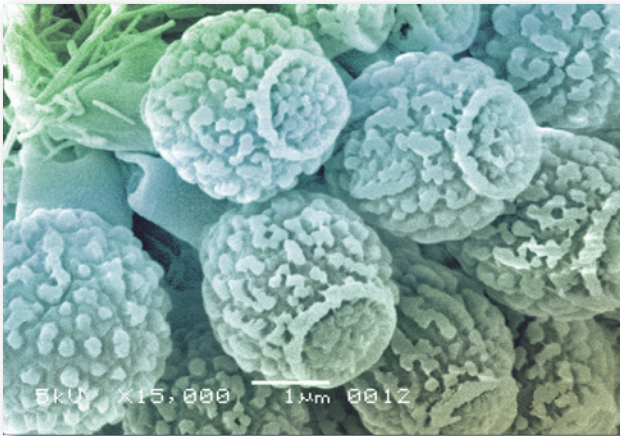
The Auger Microanalyzer combines Auger Electron Spectroscopy (AES), ion sputtering, and secondary electron imaging to determine 2D and 3D elemental distributions on solid surfaces. Films as thin as a few monolayers can be analyzed.

The Photoelectron Spectrometer systems are capable of qualitative, quantitative, and state analysis of micro-areas for a broad range of samples.





Scanning Electron Microscopes

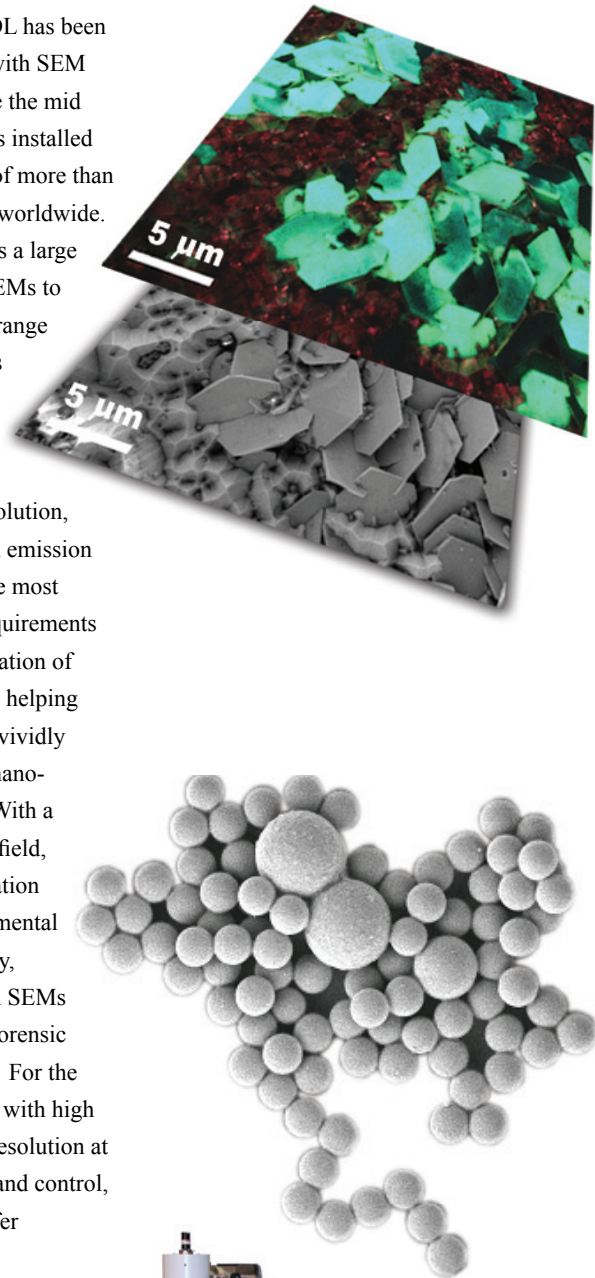


The name JEOL has been synonymous with SEM expertise since the mid 1960s. JEOL's installed base consists of more than 10,000 SEMs worldwide.

JEOL offers a large selection of SEMs to match a wide range of applications throughout industry and science.

Ultra-high resolution, analytical field emission SEMs meet the most demanding requirements for characterization of fine structures, helping researchers to vividly see details of nano-fabrications. With a large depth of field, high magnification range, and elemental mapping ability, JEOL tungsten SEMs

provide answers quickly and clearly for failure analysis, pathology studies, forensic investigations, metallurgical development, and environmental examinations. For the ultimate in flexibility and affordability, JEOL offers a unique benchtop SEM with high depth of field and selectable settings. Features of JEOL SEMs include high resolution at low voltages, C_s and C_c correction, large specimen chambers, stage stability and control, and simple-to-use, easily customized graphical interface. In addition, we offer a vast array of specimen holders and options.

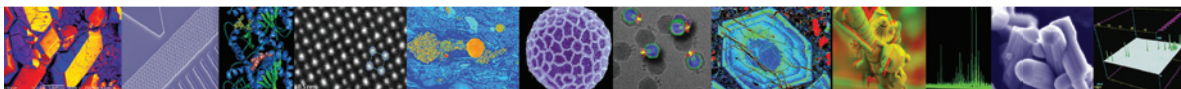


Images (clockwise from top right this page):

Aluminum Gallium Nitride micrograph overlaid with ChromaCL image
SEI image of latex beads
Analytical Thermal FE SEM
FE SEM STEM image of faujasite with 7.4 Å spacing at 1,000,000X
Microbial growth on fabric

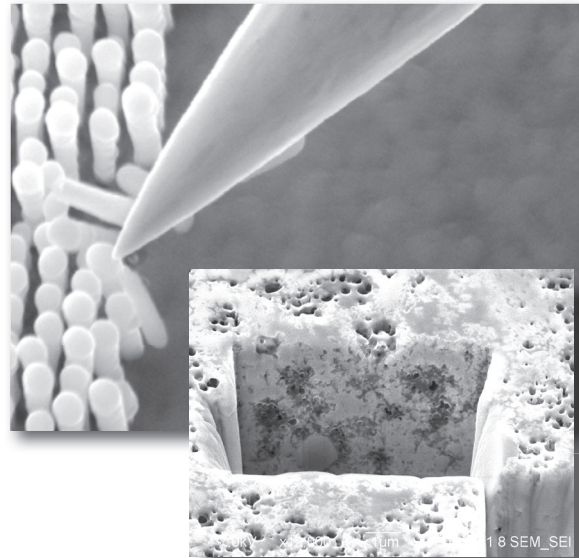
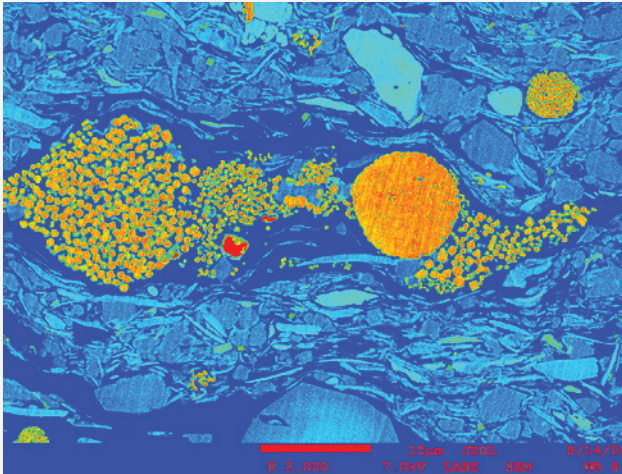
(Clockwise from top right previous page):

Composite EELS map of SrTiO_3 (Sr=red, Ti=green, O=blue)
3D reconstruction of bacteriophage
EPMA image of small oxide phases in cross-sectioned ceramic
Tomography of resin-embedded basal bodies
Atomic resolution C_s corrected TEM



Sample Preparation and FIB Tools

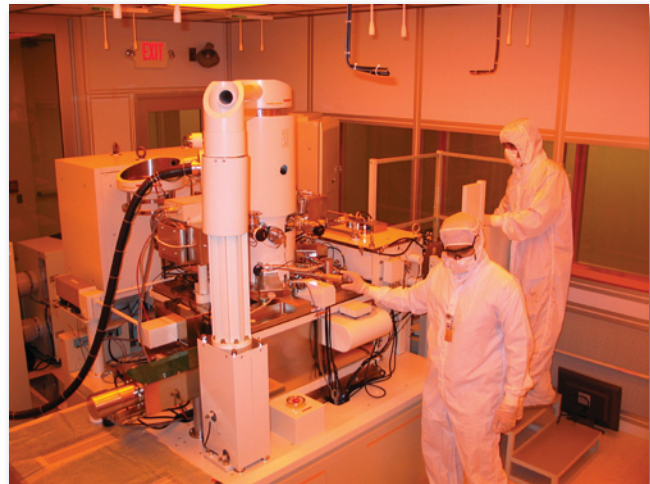
JEOL produces high precision instruments designed to prepare samples prior to imaging with the SEM or TEM. These include Focused Ion Beam (FIB) systems for nanometric specimens, a benchtop cross section polisher for large area samples, and an ion slicer for thin film specimens. Our specialized instruments quickly prepare precise cross sections of semiconductor devices, metals, ceramics, and composites of hard and soft materials.



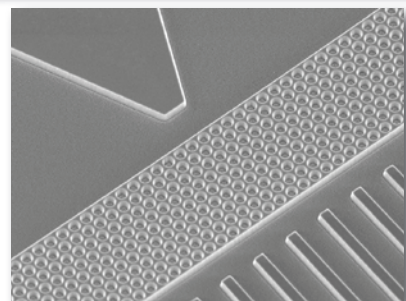
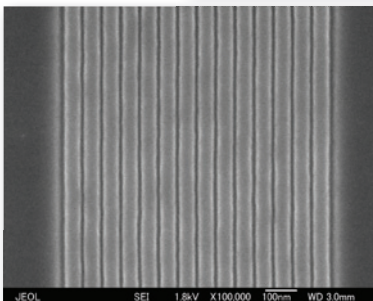
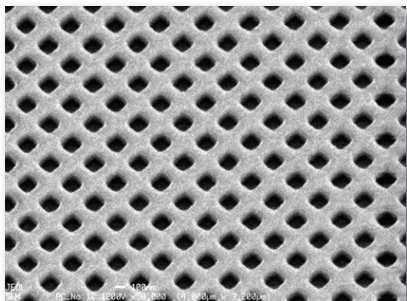
Images (clockwise from top right):
 Nanomanipulation with FIB
 Serial slicing with FIB
 MultiBeam SEM/FIB
 Direct write e-beam lithography lab
 Photonic crystals
 <10nm line widths
 Photomask
 Oil shale cross section

E-Beam Lithography Expertise

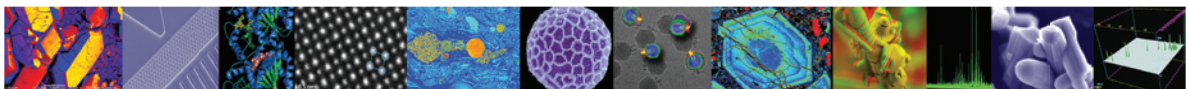
Our e-beam expertise spans more than 40 years and today we offer the widest range of e-beam tools available for mask, reticle, and direct-write lithography. JEOL e-beam systems are used worldwide for high volume mask production as well as advanced research and development of NIL, photonic crystals, and sub-10 nanometer linewidths. Unmatched support and reliability is key to the success of our vector scan, shaped beam mask maker, vector scan spot beam direct write tools, and highly flexible and expandable field emission SEM with lithography capability.



Courtesy of Georgia Institute of Technology



Courtesy of Georgia Institute of Technology

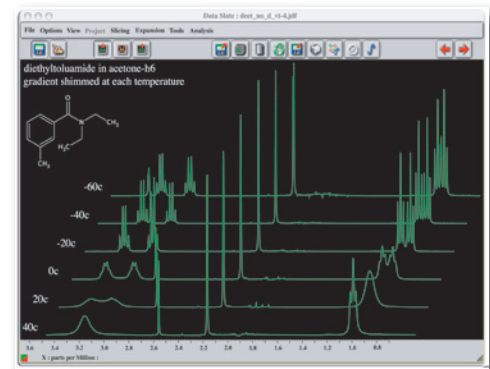


Mass Spectrometry



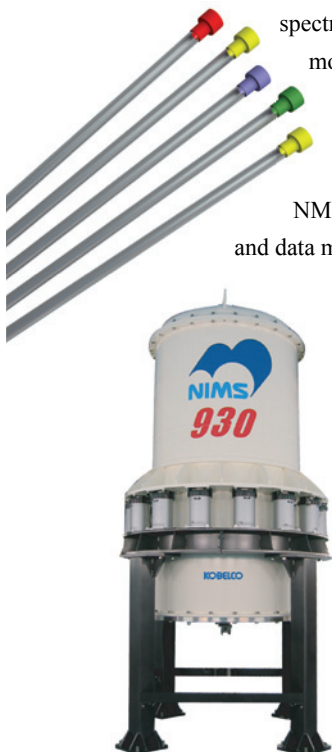
JEOL mass spectrometers support synthetic, organic, and pharmaceutical chemistry, materials science, environmental research, explosives detection, biotechnology, and forensic chemistry. JEOL developed Direct Analysis in Real Time (DART™) for time-of-flight mass spectrometry. Our patented open air ion source used on the AccuTOF™ mass spectrometer

fulfills the need for instant analysis in homeland security, law enforcement, and pharmaceutical screening. Our liquid chromatograph (LC) and gas chromatograph (GC) mass spectrometers are used to precisely identify chemical compositions and detect trace contaminants. These instruments have extremely high stability, sensitivity, and resolution. They are used in both quantitative and qualitative analysis, including high-resolution, accurate mass measurements for the determination of elemental composition.



NMR Spectrometry

For more than 50 years, JEOL has produced high performance Nuclear Magnetic Resonance (NMR) Spectrometers for structural analysis of proteins, protein/drug interaction, organic synthesis, and genetic engineering. The NMR spectrometer is an indispensable tool for structural determination of molecules, molecular motions, and interactions.



JEOL offers a wide range of high-performance NMR spectrometers ranging from 300MHz to 930MHz and beyond. JEOL NMRs feature Delta™, the most advanced NMR software platform available, combining spectrometer control and data management into a single robust application. Delta allows concurrent processing of multiple data sets and simple, seamless operation that unifies NMR data acquisition, processing, visualization, and output.

Electron Spin Resonance

High performance Electron Spin Resonance (ESR), or Electron Paramagnetic Resonance (EPR), Spectrometers are specifically valued in solid state physics, materials development, and in the biological, pharmaceutical, and medical fields because of their enhanced sensitivity and resolution for the detection of paramagnetic species.

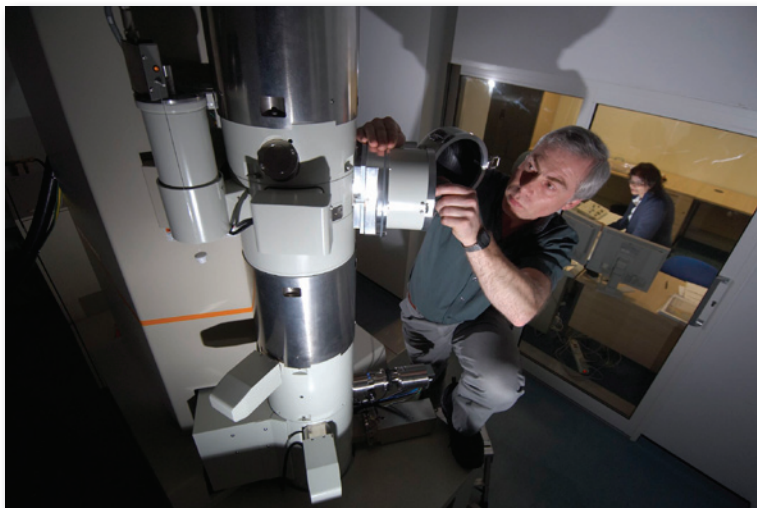
Images (clockwise from top right):
Direct mass spec analysis of
drugs on currency
NMR spectra
400MHz NMR magnet and console
930MHz NMR magnet
Time-of-flight mass spectrometer



Highest Level of Customer Support

JEOL offers the highest level of technical experience and product support. JEOL USA's large, experienced service organization provides a local, personal style of service while connected to a national service scheduler and database operation. More than 200 JEOL service personnel work from regional service centers in the U.S., Canada, and Mexico.

The company has been honored to receive the Omega Northface Scoreboard Award for several consecutive years, VLSI awards for service, and, most importantly, supplier awards from our valued customers.



The JEOL Institute for Expert Training



Through comprehensive training classes in the operation of electron microscopes, ion beam instruments, NMR, and mass spectrometers, we teach our customers how to get the most from their instruments. Our training courses are designed to familiarize the new user with the basic theory, operation, and applications of the instrument to the user's specific area of interest.

JEOL Institute courses provide intensive hands-on training. Class sizes are typically limited to five students per instrument, and training is adapted to all levels of experience.

In 2009, JEOL and the College of Microscopy, the educational arm of the McCrone

Group, created a partnership that ensures expert, real world instruction for college students pursuing related degrees, and hands-on training in the field of microscopy.

Electron Optics
SEM
FE-SEM
Benchtop SEM
TEM/STEM
FE-TEM
SPM
EPMA

Sample Preparation
SEM/FIB
Cross Section Polisher
Ion Slicer
Vacuum Evaporator

Analytical Instruments
NMR
LC/MS, GC/MS, TOF, DART
ESR

Semiconductor Tools
Direct Write E-Beam
Photomask Lithography

JEOL

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