The Electron Microscopy Facility is a Core Research Facility serving the research and teaching needs of faculty and graduate students in the physical and biological sciences at Brown University and is available to outside academic and, in most cases, industry users. The Electron Microscopy Facility is operated by the Institute for Molecular and Nanoscale Innovations (IMNI).

Access to the facility is on a user fee basis. The Electron Microscopy Facility is located in the Barus Holley Building on the Brown University campus, and is accessible to authorized users of the Brown research community by card access on a 24 hour/7 day basis. Authorized users are able to reserve time on the instruments using an on-line web-based system. Visit the IMNI website to “become a member” and learn about the other IMNI Core Research facilities. www.brown.edu/IMNI.

Our current Tools include:

**FEI CM20 Transmission Electron Microscope**

**CM20 Specifications**
- 20, 40, 80, 120, 160 and 200 kV analytical TEM
- energy dispersive x-ray spectroscopy.
- resolution (0.23 nm).
- High tilt double tilt holder.
- low background holder.
- Liquid nitrogen temperature holder.

**LEO 1530 Scanning Electron Microscope**

**LEO 1530 Specifications**
- Ultra-high resolution field emitter SEM.
- Allows for 1 nm at a Voltage of 20 kV in high vacuum.
- 2nm at 30 kV in the variable pressure mode.
- EDS for chemical Mapping.
- Nabilty beam blanker.
- Debenn tensile test stage 5kN.

**JEOL 2100F (STEM) Transmission Electron Microscope**

**JEOL 2100F Specifications**
- 200 kV, High-resolution/analytical hybrid instrument.
- 0.10 nm lattice resolution.
- X-ray spectrometer for light element detection.
- Gatan image filter (GIF) for element and phase Analyses and energy filtered imaging.
- High-resolution CCD camera for digital image acquisition and processing.
- STEM mode for EDS line and area scans.
- Bright and dark field STEM detectors.
- High angle annular dark field capable in stem mode.
- High tilt holder for electron tomography.
- Low background double-tilt holder for chemical analysis by EDS.
- Heating holder to 1000°C.
- Heating/straining holder.
- Probes as small as 1 nm in diameter for micro-diffraction experiments.

**FEI HELIOS - FIB – Focused Ion Beam**

**FIB Specifications**
- (near) simultaneous ion /electron beam imaging and patterning of specimens
- Pt is available for ion (or electron) beam stimulated deposition of conducting lines.
- An Omniprobe AutoProbe 200 allows the physical manipulation of samples with Pt metal deposition and standard FIB trenching to allow the selection and removal of electron transparent TEM samples from specific microstructural features.
- A Nabilty pattern generation system (plus beam blanker and external scan interface) controls the electron beam for high resolution, interlaced pattern generation used in the FIB fabrication of nanostructures
- Three dimensional crystallographic data can be generated from specimens using the fully automated EBSD system (Oxford HKL&EBSD-3).
- Debenn heating/cooling holder
- Selective carbon mill is available.
Our current Tools continued:

**JEOL 845 – SEM Scanning Electron Microscope**

**Selected JEOL 845 Specifications**
- Tungsten filament SEM
- 4.0 nm resolution at 25 kv
- Automated Oxford EBSD system with EBSD
- Accepts larger samples

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**Electron Microscopy Facility**

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**Electron Microscopy Facility**

**Location and Access:**

The Electron Microscopy Facility is located in the Barus Holley (BH) building at the corners of Hope and George Streets on the Brown campus. Barus Holley is home to the School of Engineering, Department of Physics, and is one block from the Departments of Chemistry and Earth, Environmental and Planetary Sciences.

The main lab and technical staff office is located in BH rooms 009-014 and the FIB is located in BHO45A. Authorized users are provided 24/7 access, on-line instrument reservation system, and data transfer protocols.

**Current User Rates:**

The usage calculation method includes actual instrument voltage use; any instrument run time that is less than one hour, defaults to one hour minimum except on the CM20 TEM. Effective 7/1/2009 the minimum default time for a CM20 run will be 30 minutes. Hourly rate includes the use of sample preparation tools.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>Brown Univ. Internal Research Use</th>
<th>External Academic (non-profit) Use</th>
<th>External Commercial (for-profit) Use</th>
<th>UNIT</th>
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</thead>
<tbody>
<tr>
<td>JEOL SEM 845; LEO 1530; Philips CM20, and JEOL STEM 2100F</td>
<td>$53.00</td>
<td>$91.00</td>
<td>$132.00</td>
<td>per hour</td>
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<tr>
<td>FIB/Helio’s</td>
<td>$61.00</td>
<td>$104.00</td>
<td>$145.00</td>
<td>per hour</td>
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<td>Self-use facility unless specifically requested as part of the agreement</td>
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<tr>
<td>Instrument Assisted Use by Brown Facility Technical Staff (with prior approval)</td>
<td>$55.00 + instrument</td>
<td>$94.00 + instrument</td>
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<td>per hour</td>
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<tr>
<td>+ Plus Instrument Time</td>
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Visit IMNI website [www.brown.edu](http://www.brown.edu) to become a Member, or more details, requirements, training and user agreements.