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- ▶ Labs and Equipment



Mary Tecklenburg, center, discusses the technology in the spectroscopy laboratory with graduate students.

## Labs and Equipment

### Departments

Each department has specialized laboratories and equipment to support student and faculty learning and research. Some notable features are listed below.

- ▶ Biology
- ▶ Chemistry
- ▶ Computer Science
- ▶ Engineering and Technology
- ▶ Geography
- ▶ Geology
- ▶ Mathematics
- ▶ Physics

### Biology

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- ▶ Aquatic Lab
- ▶ High performance/high pressure liquid chromatograph
- ▶ Microbiology, molecular biology, and genetics laboratories
- ▶ Microscopy Facility
- ▶ Neithercut Woodland Nature Center
- ▶ Radioisotope equipment
- ▶ Superspeed and ultrasensitive centrifuge
- ▶ Water Research Center

### Chemistry

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- ▶ Gas chromatograph/mass spectrometer
- ▶ Liquid chromatographic systems/FPLC
- ▶ Ultraviolet, Fourier transform infrared, NMR, and Laser Raman spectrometers
- ▶ Single crystal and powder X-ray diffraction
- ▶ EPR spectrometer
- ▶ Thermal analysis equipment including DSC, TGA, and DMA

### Computer Science

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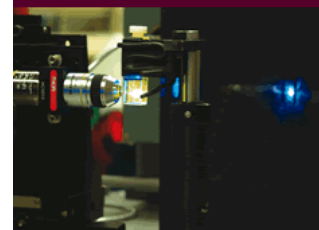
- ▶ Unix and PC labs that support:
  - General and system programming
  - Computer graphics
  - Databases
  - Networking
  - Operating systems
  - Software engineering
  - Computer security
  - Multimedia
  - Internet programming

### Engineering and Technology

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- ▶ Computer-Aided Design, Manufacturing, Engineering (CAD/CAM/CAE)
- ▶ Rapid prototyping
- ▶ Robotics/Automation/Virtual workcell design
- ▶ Programmable Logic Controls (PLC)
- ▶ Electronics/Instrumentation
- ▶ Plastics/Composite Materials processing and mechanical properties testing
- ▶ Computerized Graphics Lab
- ▶ Metallurgy Testing Center
- ▶ Fuel/Lubricant Testing and Development Facility
- ▶ 3-D Body Scanner with thermal imaging

### Lab Equipment Spotlight Raman Spectroscopy



Spectroscopy is used in satellites, infrared imaging, scanners, sensors, and detectors. In particular, Raman spectroscopy uses laser light to look at light scattered from a sample. Slight shifts in wavelengths reveal the energies of molecular vibrations, which in turn provide information about molecular structure.

### NASA Grants Compliance Information

- ▶ [NASA Equal Opportunity Poster](#)
- ▶ [NASA Title VI et al Brochure](#)

## Geography

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- ▶ Labs dedicated for:
  - GIS
  - Remote sensing
  - Image processing
- ▶ Geographic Information Systems Center
- ▶ Meteorology Lab

## Geology

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- ▶ Geochemical laboratories capable of determining major, minor and trace elements in solid and liquid samples. Equipment includes:
  - X-Ray Fluorescence Spectrometer
  - Electron Microprobe
  - ICP-MS
  - Ion Chromatograph
- ▶ Groundwater monitoring equipment
- ▶ Computer-modeling facilities
- ▶ Rock and mineral analysis laboratories (including petrographic microscopes equipped for microphotography and fluid inclusion analysis)
- ▶ Paleontology laboratory
- ▶ Geophysics laboratory

## Mathematics

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- ▶ Macintosh Lab (35 iMac, 5 Mac Towers G4)
- ▶ Portable Wireless Notebook (iBook G3) Computer Lab (36)
- ▶ Gateway 2000 PC Lab (35)
- ▶ Calculator-based laboratory devices
- ▶ Calculator-based rangers
- ▶ TI-92 Plus classroom set
- ▶ Vernier LabPro Data Collection Devices
- ▶ Sensors for: light, temperature, voltage, gas pressure, pH, 3-D accelerometer, force

## Physics

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- ▶ Thin Films Lab
  - Flash evaporation capabilities, Lambda-19 spectrophotometer, and DSC-7
- ▶ Laser Spectroscopy Lab
  - Dye, diode, pulsed and CW lasers and associated equipment capable of high-resolution spectroscopic measurements and time-resolved fluorescence experiments
- ▶ Polymer Physics/Rheology Lab
  - AR2000 rheometer with extend temperature module and both electro- and magneto- rheological capabilities
  - Vilastic-3 capillary rheometer with temperature control for biofluids
  - Molecular dynamics simulation software
- ▶ Condensed Matter/X-Ray Diffraction Lab
  - X'Pert PRO diffractometer capable of analyzing polycrystalline, nano-crystalline, and amorphous materials
  - Applied crystallographic modeling and simulation software
- ▶ Center for High Performance Scientific Computing (CHiPS.Comp)
  - 40+ processor Beowulf cluster running Linux with MPI and PBS Pro
- ▶ Brooks Astronomical Observatory
- ▶ Electronics Shop and Machine Shop
  - Each staffed with a full-time technician