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A nano-probe facility for researchers in academia, industry, and non-profits.

Contact the NBIC

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Mitochondrial DNA imaged with NBIC atomic force microscope.

Find us at 33rd and Walnut on the Penn campus.
Nano-Bio Interface Facilities at Penn

The Nano-Bio Interface Center user facilities have ten instrumentation platforms to enable fundamental research, proof-of-concept testing, and materials characterization at the nano- and micro-scale. The available instrumentation has capabilities including electrical and mechanical sensing with femtoamp and piconewton sensitivities in atmospheric and controlled environments, as well as Raman spectroscopy and scanning optical microscopy.

**Shared NBIC Instrumentation**

- Veeco Dimension 3100 + Nanoscope IV
  Ambient AFM configured for electrical and piezoelectric sensing with 100 µm range. Closed loop scanner available.

- Asylum Research MFP-3D
  Ambient and fluid AFM with high-precision stage. Integrated microwave frequency impedance measurement capability.

- Desert Cryogenics Probe Station
  Opto-electronic transport in controlled environment from 77 to 350K.

- SemiProbe probe station.

- Agilent PicoPlus 5500 AFM with 10 µm open loop and 100 µm closed loop scanners, fluid cell, heated stage, and environmental chamber. Witek pulsed-force imaging controller.

- Near-field scanning optical microscopy and Raman spectroscopy with turnkey tunable laser source.

- Interfacial force microscope enabling precise displacement-control measurements of surface forces

- Variable Temperature UHV AFM-STM with LEED and Auger spectroscopy.

- VT Omicron STM with RHK controller.

- Asylum MFP-3D + TIRF AFM
  Inverted microscope and total internal fluorescence for tagging and imaging biological specimens. Four laser wavelengths available.

**Capabilities**

- On-site expertise for customization of instruments and measurement techniques.

- In-situ electronic device characterization.

- Optical stimulation and imaging with array of laser sources and filters.

- Contact and tapping mode of atomic force microscopy for nanometer-scale imaging of surfaces and material properties.

- Fluid cells and heated stages for biological specimens. Sealed enclosures permit atmospheric control.

- Broadband electrical excitation and detection of circuits and resonators.

**Applications**

- Real space imaging of nano-scale wires, particles, and structures.

- Characterization of ferroelectric and piezoelectric thin films.

- Observation of local charge / capacitance.

- Frequency response of mechanical and electrical resonators or circuits.

- Probing stiffness and friction with nanometer resolution.

- Measurement of dopant concentration and leakage current.

- Characterization of biological specimens via fluid cell AFM.

- Local surface potential mapping and piezoelectic microlithography.

- Electrochemical analysis.

- Optical stimulation and imaging with array of laser sources and filters.

- Contact and tapping mode of atomic force microscopy for nanometer-scale imaging of surfaces and material properties.

- Fluid cells and heated stages for biological specimens. Sealed enclosures permit atmospheric control.

- Broadband electrical excitation and detection of circuits and resonators.