Scheduled to open in 2011…

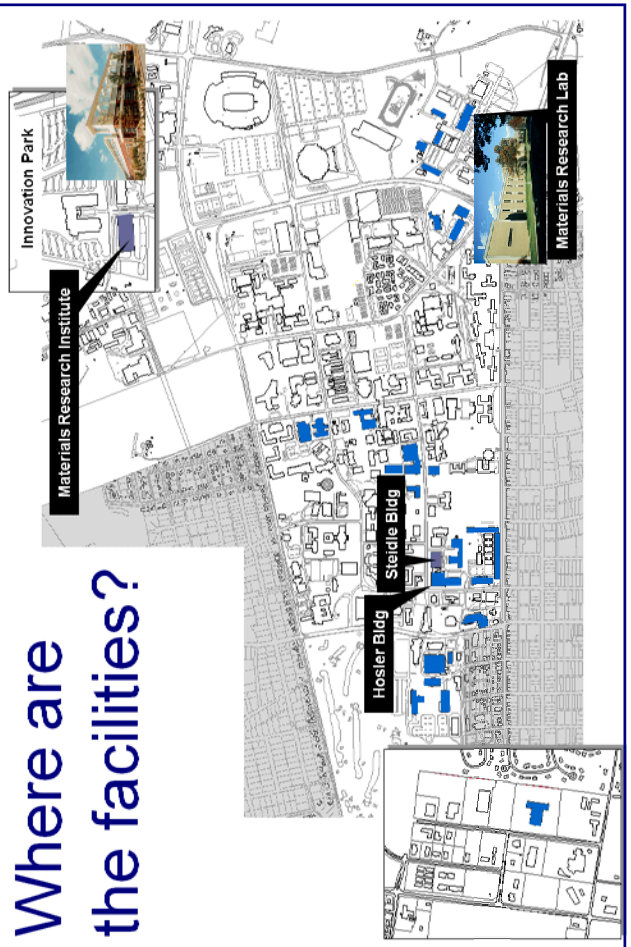
The Millennium Science Complex

New Interdisciplinary Materials and Life Sciences Building

New Building Highlights

- Located on central campus for convenient access by researchers
- State-of-the-art space on separate isolated slab to achieve low acoustic and electromagnetic noise levels
- Electron microscopes for both materials and life sciences will be co-located in "quiet lab" space
- Will more than double the amount of Clean Room space on campus

MSC



Where are the facilities?

Contact Us:

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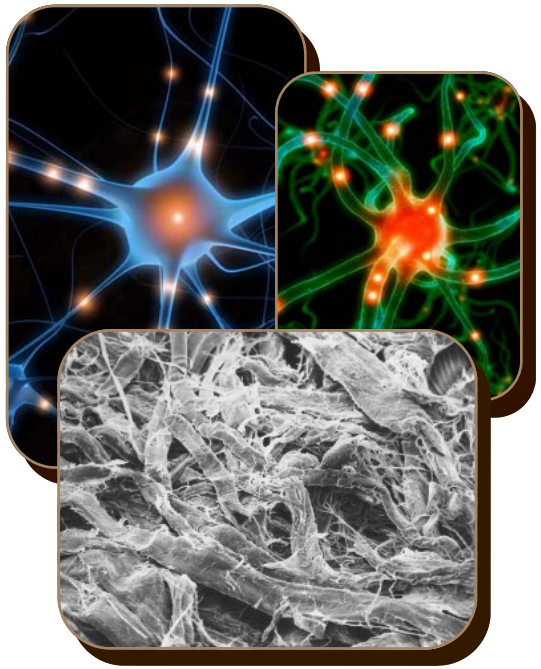
Materials Research Institute



Materials Characterization Laboratory (MCL)

A leader in interdisciplinary research

PENNSTATE
1855

Materials Research Institute

Materials Characterization Laboratory (MCL)

About MCL

The Materials Characterization Laboratory (MCL) offers state-of-the-art analytical instrumentation and more than 20 highly trained technical staff to help researchers identify and understand the properties of novel materials. Users learn through analyzing their own samples under the guidance of the technical staff members and/or by participating in short courses and seminars offered throughout the year.

Offsite users are welcome to travel to the facility to perform their own analyses or work remotely in close concert with the technical staff members to achieve their analytical objectives.

MCL Provides:

- ◊ World-class equipment
- ◊ Dedicated lab space for materials characterization and materials processing
- ◊ Opportunities to become educated in materials characterization
- ◊ Full-time professional staff

Capabilities include:

Microscopy—scanning electron microscopy, transmission electron microscopy, focused ion beam microscopy and lithography, atomic force microscopy, near-field scanning optical microscopy, orientation imaging microscopy, optical profilometry

Surface Analysis—Auger electron spectroscopy, X-ray photoelectron spectroscopy

Optical Spectroscopy—FT-IR microscopy, ultraviolet-visible spectroscopy, confocal Raman spectroscopy

Physical Property Determination—electrical characterization, particle analysis, thermal analysis, mechanical testing, nanoindentation

Structural Analysis—X-ray diffraction, small angle X-ray scattering

Materials Processing—sputter coater, sintering furnaces, hot press, hot isostatic press, cold isostatic press, machine shop, sample preparation and polishing

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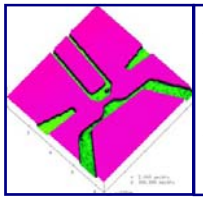
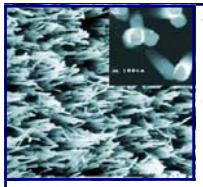
Research



Schematic of a chemical AFM of lithographically carved thin film for an electronic nanochip.

Samarth Group, Penn State



Through electrodeposition of metals into porous membranes,researchers are able to fabricate nanowires of a wide variety of metals with diameters as small as 6nm, high aspect ratio, and controllable crystalline order. The superconducting characteristics of these nanowires have been studied by means of transport and thermodynamic measurements down to 0.05K.

Bright-field TEM image of germanium islands deposited on a silicon nanowire. The growth of 3D Ge islands around Si nanowires could open up a new opportunity for integrating quantum dots with semiconductor nanowires for nanoscale electronics.

Short courses and seminars are held throughout the year providing in-depth training on characterization techniques and analytical tools available.