FACTS

Basic Energy Sciences

BROOKHAVEN NATIONAL LABORATORY

Center for Functional Nanomaterials

Nanoscience and Nanotechnology Opportunities for Industry

Purpose:

To address the nanoscience and nanotechnology challenges of the industrial community, and to advance the science and technology of nanomaterials that target the nation's energy challenges.

Sponsor:

U.S. Department of Energy's Office of Basic Energy Sciences

Facilities & Capabilities:

- Atomic resolution, real-time, and spectroscopic scanning probe microscopy and characterization
- Time resolved absorption and emission spectroscopy
- Variable temperature and variable magnetic field, conformal optical and photocurrent microscopy

CFN User Community Includes:

- Over 350 domestic and international users annually from industry, academia, and government laboratories
- Industry users from General Electric, IBM, Graphene Laboratories, and HGST, among others

Convenient Location and Accommodations:

- Located less than 65 miles east of midtown Manhattan and three major airports
- Temporary housing available on site for visiting researchers

http://www.bnl.gov/cfn

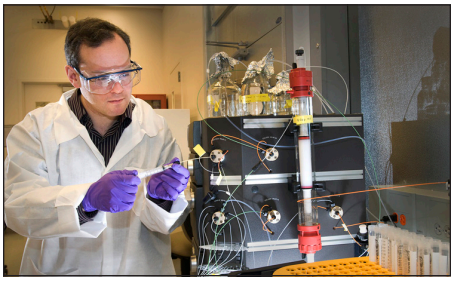
The Center for Functional Nanomaterials at Brookhaven Lab

The Center for Functional Nanomaterials (CFN) at Brookhaven National Laboratory is an internationally recognized, user-oriented research facility. Its dual mission is to serve as an open facility for the nanoscience and nanotechnology research communities and to advance the science and technology of nanomaterials that address the nation's energy challenges.

Internal research programs at the CFN focus on three experimental and theoretical areas: Interface Science for Nanocatalysis; Electronic Nanomaterials; and Soft & Biological Nanomaterials. External users of the CFN investigate diverse research topics, such as efficient catalysts, fuel cell chemistries and architectures, and photovoltaic (solar cell) components. These users can take advantage of the wealth of capabilities and facilities that CFN has to offer:

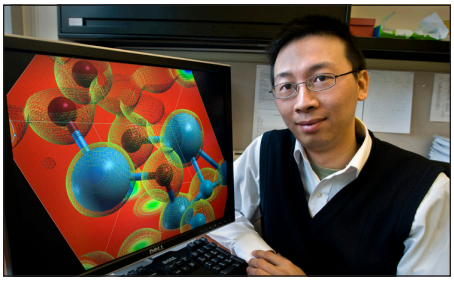
Nanofabrication

- Thin film nanofabrication and processing capabilities with a 5000 ft^2 Class 100/1000 cleanroom facility
- Thin film deposition and plasma etching systems
- Electrical and optical device characterization



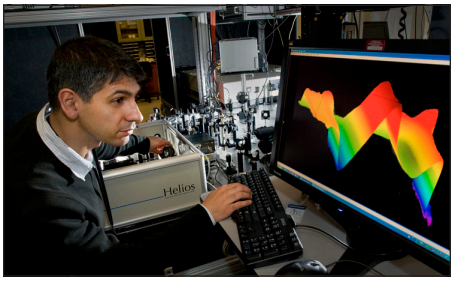
Materials Synthesis

- Organic nanomaterials (polymers,…DNA, graphene, etc.) synthesis and characterization
- Inorganic nanomaterials (quantum dots, metallic nanoparticles, etc.) synthesis and characterization
- UV, visible, and infrared advanced optical methods, down to single molecule levels



Theory & Computation

- Theory and diverse software packages for quantum chemistry and materials property calculations with a supporting computer cluster
- Modeling of soft materials, nanoscale assemblies, and pathways in catalysis



Advanced Optics

- Time resolved absorption and emission spectroscopy
- Variable temperature and variable magnetic field, conformal optical, and photocurrent microscopy
- Advanced data analysis methods, including single decay and global fits using kinetic models

Information about additional capabilities available to researchers at the CFN — electron microscopy, proximal probes and dedicated beamlines at the National Synchrotron Light Source (NSLS) and the future NSLS-II — is included on p. 2.

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Center for Functional Nanomaterials

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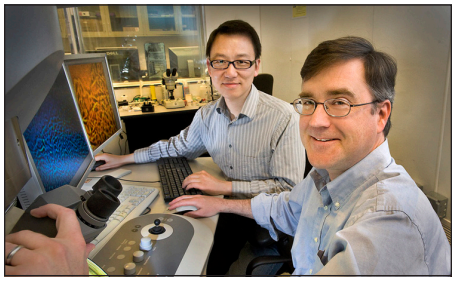
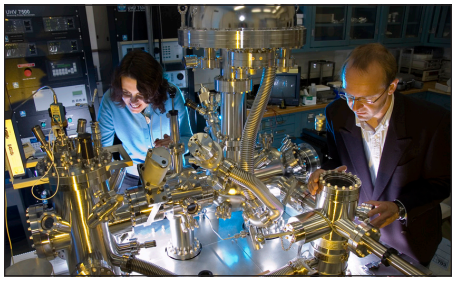


Electron Microscopy

- Atomic resolution imaging of materials structure with scanning transmission (STEM) and transmission (TEM) electron microscopy
- Spectroscopic characterization of materials with energy dispersive x-ray spectroscopy (EDS) and electron energy loss spectroscopy (EELS)

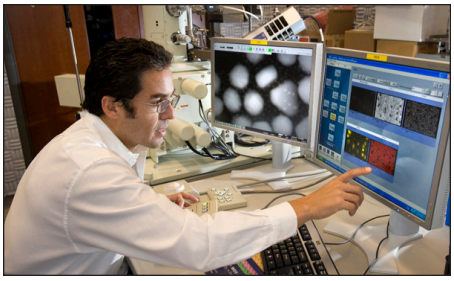


Proximal Probes

- Elevated-pressure and flow-reactor scanning probe microscopy
- Atomic-resolution, real-time, and spectroscopic surface microscopy of dynamic surface processes
- In-situ transport measurements on single nanostructures in UHV and in reactive gases

Dedicated Beamlines at NSLS & NSLS-II

- Three dedicated NSLS end stations, tailored for nanomaterials research
- Small-angle and Wide-angle X-ray Scattering
- Low Energy Electron Microscopy and X-ray Photo-Emission Electron Microscopy
- Ambient Pressure X-ray Photoelectron Spectroscopy
- NSLS-II will extend these capabilities with nanometer resolution



Becoming a User

Both proprietary and non-proprietary research opportunities are available:

- Non-proprietary research activities
  - Access through a non-proprietary user agreement and user program proposal
    - Consists of pre-competitive research to be published
    - External review of proposal; successful proposal valid for two years with no fee for use
- Proprietary research activities
  - Access through a proprietary user agreement and user program proposal
    - Confidential review of proposal
    - Successful proposals have full cost recovery for use
  - Work for Others (WFO)
  - Cooperative Research and Development Agreements (CRADA)
  - Agreement to Commercialize Technology (ACT)

Contact Information

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