

## About the NSRCs

The Department of Energy's Office of Science is pioneering the new field of nanoscience, the study of matter at the atomic scale.

Nanomaterials -- typically on the scale of billionths of a meter or 10,000 times smaller than a human hair -- offer different chemical and physical properties than bulk materials, and have the potential to form the basis of new technologies. Understanding these properties may allow researchers to design materials with properties tailored to specific needs such as strong, lightweight materials, new lubricants and more efficient solar energy cells. By building structures one atom at a time, the materials may have enhanced mechanical, optical, electrical or catalytic properties.

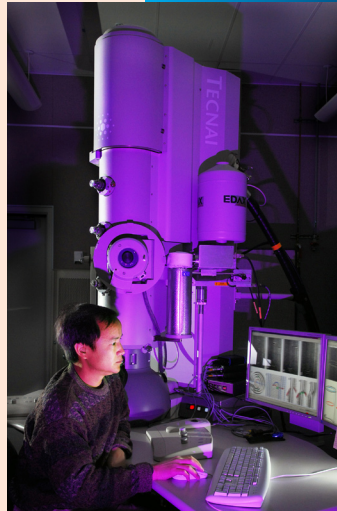
To support the synthesis, processing, fabrication and analysis at the nanoscale, the DOE Office of Science is operating five new Nanoscale Science Research Centers (NSRCs).

These five DOE Office of Science Nanoscale Science Research Centers provide the Nation with resources unmatched anywhere else in the world. The new Center buildings contain clean rooms, laboratories for nanofabrication, one-of-a-kind signature instruments, and other instruments (such as nanopatterning tools and proximal probe microscopes) not generally available except at major scientific user facilities.

As with other Office of Science user facilities, access is through submission of proposals that are reviewed by independent proposal evaluation boards.

The Centers are part of DOE's contribution to the National Nanotechnology Initiative, and they form an integrated network. These facilities are designed to be the Nation's premier user centers for interdisciplinary research at the nanoscale, serving as the basis for a national program that encompasses new science, new tools and new computing capabilities.

Each Center has particular strengths in different areas of nanoscale research, such as materials derived from or inspired by nature; hard and crystalline materials, including the structure of macromolecules; magnetic and soft materials, including polymers and ordered structures in fluids; and nanotechnology integration.



**Office of Basic Energy Sciences  
Office of Science**  
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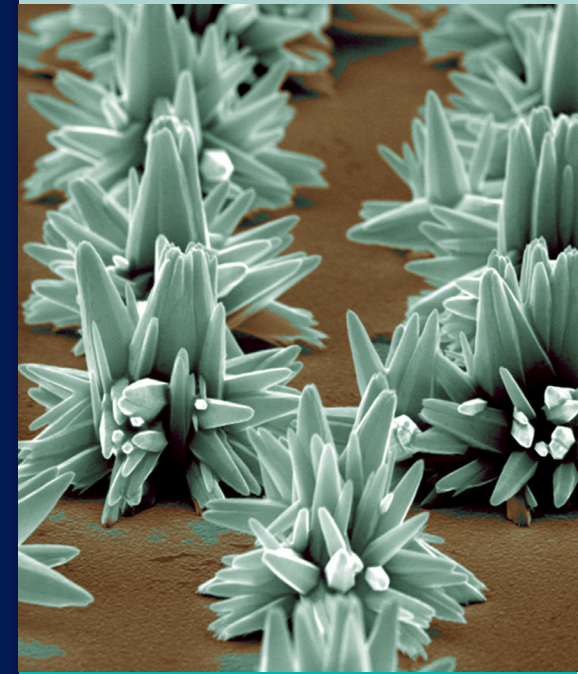
[www.nano.energy.gov](http://www.nano.energy.gov)

*The Nation's Premier Scientific User Facilities for Interdisciplinary Research at the Nanoscale*

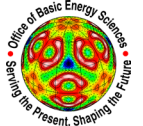
*Flagships of Nanoscience*

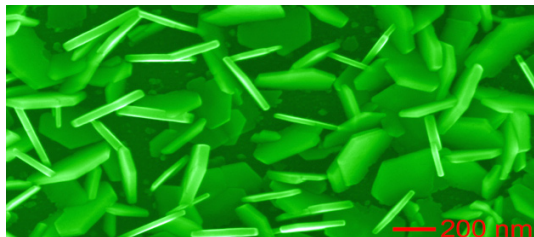
**U.S. Department of Energy's**

# Nanoscale Science Research Centers



**U.S. DEPARTMENT OF  
ENERGY**





**Center for  
Nanoscale  
Materials (CNM)**  
*Argonne National  
Laboratory*

The CNM's mission includes supporting basic research and the development of advanced instrumentation that generates new scientific insights and creates new materials with novel properties. The CNM, with its array of proximal probes, synthetic and computational capabilities, and scientific staff, enables researchers to excel and significantly extend their reach.

The scientific challenges the CNM tackles involve fabricating and exploring novel nanoscale materials and, ultimately, employing unique synthesis and characterization methods to control and tailor nanoscale phenomena. The unique capabilities of Argonne's Advanced Photon Source play a key role in that its hard X-rays, harnessed in a nanoprobe beamline, provide unprecedented capabilities to characterize extremely small structures.

[www.cnm.anl.gov](http://www.cnm.anl.gov)



**Center for  
Functional  
Nanomaterials (CFN)**  
*Brookhaven National  
Laboratory*

The CFN provides state-of-the-art capabilities for the fabrication and study of nanoscale materials, with an emphasis on atomic-level tailoring to achieve desired properties and functions.

As a premier user facility for conducting interdisciplinary nanoscience research, the CFN serves as a focal point and enabler of advanced materials study in the northeastern United States and beyond. Together with the National Synchrotron Light Source (NSLS) and the proposed NSLS-II, these facilities will complement each other to facilitate the nanoscale revolution. The synergy between these world-class resources, with Brookhaven's own scientific staff working along with university, industrial and government laboratory researchers, offers unique opportunities for breakthroughs in energy research.

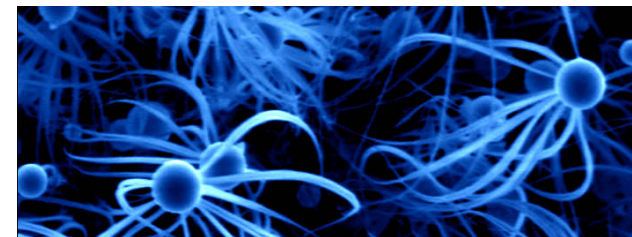
[www.cfn.bnl.gov](http://www.cfn.bnl.gov)

**The Molecular  
Foundry**  
*Lawrence Berkeley  
National Laboratory*

The Molecular Foundry provides users with instruments, techniques, and expertise to enhance their research in the synthesis, characterization, and theory of nanostructures. Its research themes emphasize combinatorial synthesis of nanomaterials, multimodal in situ imaging and spectroscopy, interfaces in nanomaterials, and "single digit" nanofabrication.

The Foundry's six facilities provide synthesis of novel inorganic, organic and biological nanostructured building blocks, measurement and simulation of their properties, and their integration into complex assemblies. Utilization of these capabilities by users is enhanced through close ties to the other DOE user facilities at LBNL, which include the National Center for Electron Microscopy, the Advanced Light Source, and the National Energy Research Scientific Computing Center.

[www.foundry.lbl.gov](http://www.foundry.lbl.gov)



**Center for Nano-  
phase Materials  
Sciences (CNMS)**  
*Oak Ridge National  
Laboratory*

The CNMS integrates nanoscale science with neutron science; synthesis science; and theory, modeling, and simulation. Research focuses on understanding, designing and controlling the dynamics, spatial chemistry, and energetics of functionality of nanoscale systems.

Distinguishing capabilities available to CNMS users include precision synthesis of macromolecular nanomaterials and inorganic nanostructures; advanced probes, neutron and electron scattering, and spectroscopic techniques for imaging nanoscale functionality; and theoretical tools and expertise to address emergent behavior in nanoscale systems. CNMS nanofabrication capabilities include a wide range of tools with emphasis on integrating functionality in hard and soft materials.

[www.cnms.ornl.gov](http://www.cnms.ornl.gov)

**Center for Integrat-  
ed Nanotechnolo-  
gies (CINT)**  
*Los Alamos and Sandia  
National Laboratories*

CINT's vision is to become a world leader in nanoscale science by developing the scientific principles that govern the design, performance, and integration of nanoscale materials.

The distinguishing characteristic of CINT is its emphasis on exploring the path from scientific discovery to the integration of nanostructures into the micro and macro worlds. This pathway involves the experimental and theoretical exploration of behavior, the development of a wide variety of synthesis and processing approaches, and an understanding of new performance regimes, testing design, and integration of nanoscale materials and structures. Integration itself is key to the exploitation of nanomaterials, and the scientific challenges that it poses are at the heart of CINT's mission.

[www.cint.lanl.gov](http://www.cint.lanl.gov)



Center for Nanoscale Materials, Illinois



Center for Functional Nanomaterials, New York



The Molecular Foundry, California



Center for Nanophase Materials Sciences, Tennessee



Center for Integrated Nanotechnologies, New Mexico

