About the NSRC Program

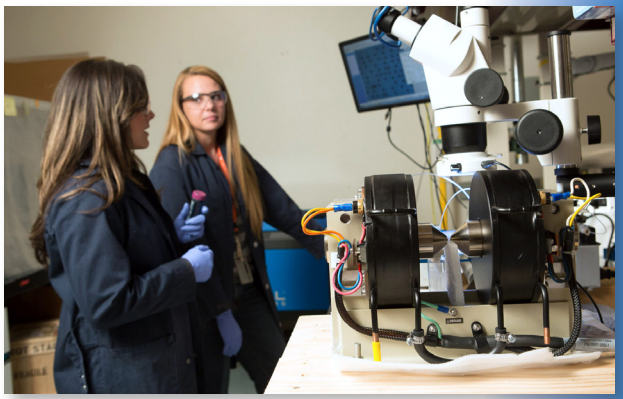
The Nanoscale Science Research Center (NSRC) Program is a major component of the Department of Energy's (DOE) Office of Science contribution to the U.S. Government National Nanotechnology Initiative (NNI). NNI involves twenty departments and agencies that collaborate toward "*a future in which the ability to understand and control matter at the nanoscale leads to a revolution in technology and industry that benefits society*." The Office of Science supports five NSRCs that are strategically located in DOE national laboratories across the U.S. The nanoscience centers are co-located with other major nanoscience-related user facilities such as neutron or synchrotron light sources.

The mission of the NSRCs is twofold: to enable the external scientific community to carry out high-impact nanoscience projects through an open, peer-reviewed user program, and to conduct in-house research to discover, understand, and exploit functional nanomaterials for society's benefit. To fulfill this mission, the NSRCs house the most advanced facilities for nanoscience research and employ world-class scientists who are experts in nanoscience and enjoy working with external users.

The NSRCs complement each other with their instrumentation and capabilities, the different thrusts of their in-house research programs, and the technical expertise of their staff.

The NSRC Program:

- Operates a national network of geographically distributed facilities that leverage other facilities and expertise at DOE national laboratories.
- Has world-leading capabilities and scientific expertise to create, characterize, and understand novel nanostructured materials.
- Provides state-of-the-art nanoscience tools and expertise for research by non-profit or business organizations, both small and large, for use-inspired research.
- Is available free of charge for non-proprietary work if the user intends to publish the research results in open literature.
- Serves users from all U.S. states and many countries around the world.
- Enables thousands of scientists to perform cutting edge nanoscience research each year.
- Contributes to the success of America's current and future research leaders.



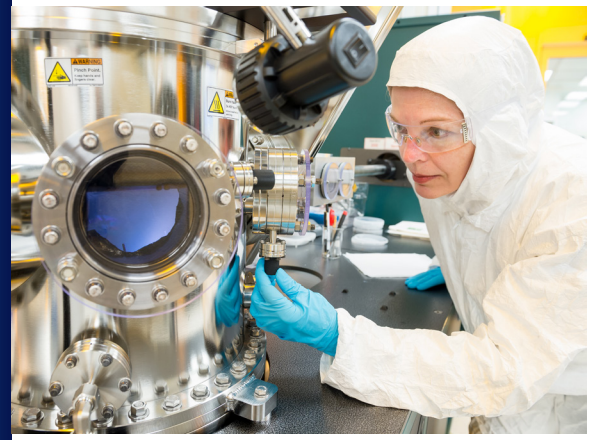
Basic Energy Sciences
U.S. Department of Energy
SC-22/Germantown Building
1000 Independence Ave., SW
Washington, DC 20585

science.energy.gov/bes/suf/user-facilities/nanoscale-science-research-centers/

NSRC Portal
https://nsrcportal.sandia.gov

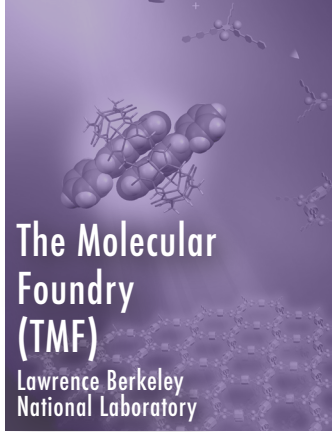
The Nation's Premier Scientific User Facilities for Interdisciplinary Research at the Nanoscale

Nanoscale Science Research Centers



U.S. DEPARTMENT OF ENERGY

Office of Science



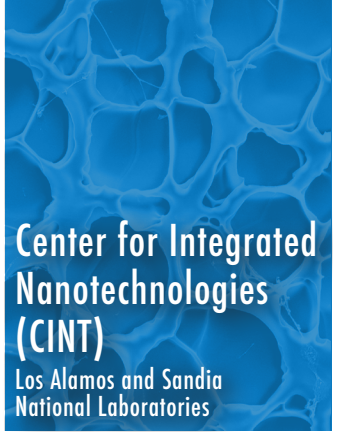
The Molecular Foundry (TMF)

Lawrence Berkeley National Laboratory

The Molecular Foundry (TMF) 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, "single digit" nanofabrication, and high-resolution electron scattering.

The Foundry's seven 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 Lawrence Berkeley National Laboratory, which includes the Advanced Light Source (ALS) and the National Energy Research Scientific Computing Center (NERSC).

foundry.lbl.gov



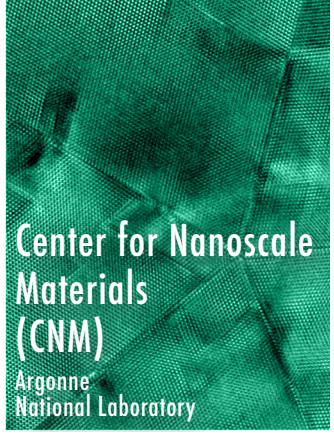
Center for Integrated Nanotechnologies (CINT)

Los Alamos and Sandia National Laboratories

CINT's vision is to become a world-leading resource for developing the scientific principles that govern the design, performance, and integration of nanostructured materials into the micro- and macro-scale worlds. This differentiating focus on nanomaterials integration involves the experimental and theoretical exploration of behavior over a range of length scales, the development of novel synthesis and processing approaches, and an understanding of emergent behavior and new performance regimes.

Expertise and advanced capabilities are available in: (I) Quantum materials systems; (II) *In situ* characterization and nanomechanics; (III) Nanophotonics and optical nanomaterials; and (IV) Soft, biological, and composite nanomaterials. This comprehensive portfolio of capabilities is complemented by CINT's Discovery Platforms™, which are customized microfabricated structures and devices used for nanoscience research.

cint.lanl.gov



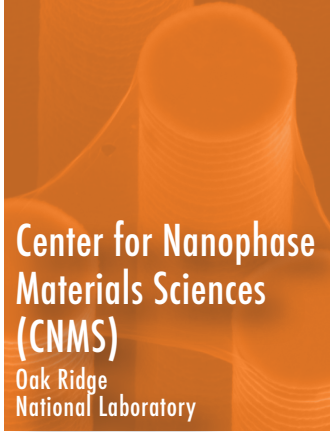
Center for Nanoscale Materials (CNM)

Argonne National Laboratory

The CNM's nanoscience and nanotechnology efforts focus on the discovery and integration of materials across different length scales, at the extremes of temporal, spatial, and energy resolutions, within three themes: (I) Quantum materials and phenomena; (II) Manipulating nanoscale interactions; and (III) Synthesis of nano-architectures for energy, information and functionality.

The CNM provides unique capabilities and expertise including optical spectroscopy from the ultraviolet to THz; synchrotron X-ray scanning tunneling microscopy (SX-STM) and the Hard X-ray Nanoprobe shared with the Advanced Photon Source; a full suite of variable temperature STM capabilities; cleanroom-based nanofabrication capabilities; and a supercomputing cluster for computational materials science including machine-learning methods. In addition, CNM is at the frontiers of quantum information sciences and combining electron microscopy with data science.

anl.gov/cnm



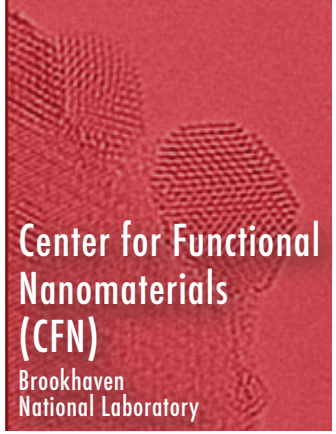
Center for Nanophase Materials Sciences (CNMS)

Oak Ridge National Laboratory

CNMS provides an international user community with access to forefront nanoscience research capabilities and expertise for diverse research topics including energy sciences, quantum materials, and quantum information sciences. CNMS is a gateway for the nanoscience community to Oak Ridge National Laboratory's neutron sources (Spallation Neutron Source and High Flux Isotope Reactor) as well as leadership in high performance computational resources.

Distinguishing CNMS capabilities include: atomic-scale manipulation and 3D nanofabrication; scanning transmission electron microscopy and spectroscopy; He+ and scanning probe microscopies; atom probe tomography; chemical imaging; and atom-precise soft matter synthesis and deuteration. Theory, modeling, simulation, and advanced data analytics approaches are directly integrated into all aspects of research and made available to the user community.

cnms.ornl.gov



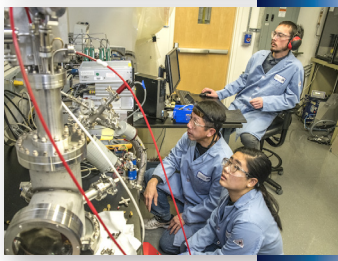
Center for Functional Nanomaterials (CFN)

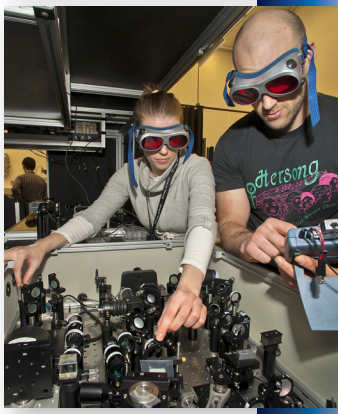
Brookhaven National Laboratory

The CFN offers users a supported research experience, with access to state-of-the-art capabilities and interactions with top-caliber scientists. The CFN provides leading facilities for material synthesis-by-assembly from nanoscale components and multiscale characterization, and conducts world-leading research using DNA-mediated and block copolymer approaches for design of multifunctional nanomaterials.

The CFN develops advanced capabilities for studying nanomaterials in operando conditions, with state-of-the-art surface science probes and electron microscopes providing atomic scale information in real-world, often harsh, environments. The strong partnership between CFN and the National Synchrotron Light Source-II provides unique opportunities for transformational nanoscience studies leveraging both facilities. CFN capabilities are well-suited to investigations of next-generation nanomaterials for quantum information science, especially through material synthesis by atom-scale assembly and *in situ* characterization of quantum properties.

bnl.gov/cfn

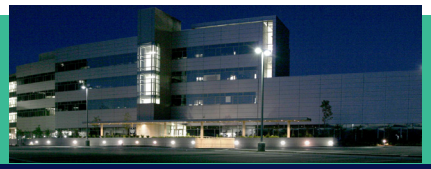




The Molecular Foundry, California

Center for Integrated Nanotechnologies, New Mexico

Center for Nanoscale Materials, Illinois



Center for Nanophase Materials Sciences, Tennessee

Center for Functional Nanomaterials, New York