Argonne NATIONAL LABORATORY | Center for Nanoscale Materials

Center for Nanoscale Materials

Argonne's nanoscience & nanotechnology center

The Center for Nanoscale Materials (CNM) at Argonne National Laboratory is a premier user facility providing expertise, instruments, and infrastructure for interdisciplinary nanoscience and nanotechnology research. Academic, industrial, and international researchers can access the center through its user program for both nonproprietary and proprietary research.

The center's goal is to support basic research and the development of advanced instrumentation that will help generate new scientific insights, create innovative materials with unique functionality and contribute significantly to energy-related research and development programs.

The Center for Nanoscale Materials is a premier user facility and operates as one of the five centers built across the nation as part of DOE's Nanoscale Science Research Center program under the Office of Basic Energy Sciences.

Areas of Expertise

Electronic & magnetic materials & devices

- Discovers, understands and uses new electron and spin-based materials and phenomena in constrained geometries. Potential benefits include reduced power dissipation, new medical imaging methods and therapies, improved efficiency of data storage by spin current and electrical field-assisted writing, and enhanced energy conversion in photovoltaic devices.

Nanobio interfaces

- Functionally integrated biomolecule-inorganic hybrid conjugates and their assemblies are developed, guided by nature's principles, for energy and information transduction, advanced medical therapies, biosensors and novel electronic devices.

Nanofabrication & devices

- Fabricates new nanostructured materials, nanodevices, and nanosystems by advancing the state-of-the-art techniques in nanopatterning that incorporate both top-down and bottom-up approaches.

Nanophotonics

- Controls optical energy and its conversion on the nanoscale by combining metal, organic, semiconducting, and dielectric materials properties and creating strongly coupled states of light and matter for chemical and catalytic reactivity, photonic circuits, sensors, and optical nonlinearities.

Theory & modeling

- Researches a number of specific, experimentally relevant areas such as nanocatalysis and nanophotonics. A larger plan involves establishment of an Advanced Computational Environment for Nanoscale Design (ACEND) to predict nanoscale materials and devices with user-defined properties. Key components of ACEND are theoretical and computational nanoscience research, software development and modeling capabilities.

X-ray microscopy

- Uses images of new materials and novel phenomena at the nanoscale, both static and dynamic, in real and reciprocal space with an emphasis on implementation of a hard X-ray nanoprobe beamline operated jointly with the Advanced Photon Source.

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