



THE CENTER FOR INTEGRATED NANOTECHNOLOGIES

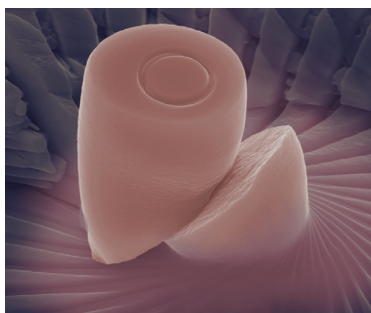


One Scientific Community Focused on Nanoscience Integration

The Center for Integrated Nanotechnologies (CINT) is a Department of Energy Office of Science Nanoscale Science Research Center. CINT offers world-leading scientific expertise and specialized capabilities to create, characterize, and integrate nanostructured materials at a range of length scales, from the nano- to meso-scale. It is jointly operated by Los Alamos and Sandia national laboratories and leverages the unmatched scientific and engineering expertise of the host labs.

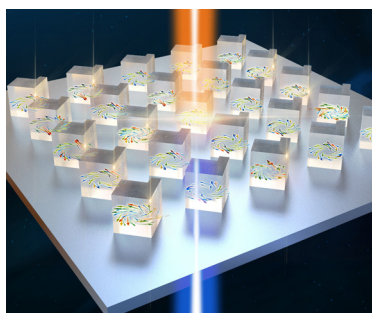
Science Thrusts

Integration is the key to exploiting the novel properties of nanoscale materials and creating new technologies. CINT's scientific staff and capabilities are organized around four interdisciplinary science thrusts which address different challenges in nanoscience integration.



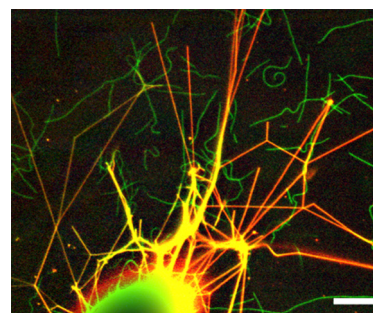
In-Situ Characterization and Nanomechanics

Developing and implementing world-leading capabilities to study the dynamic response of materials and nanosystems to mechanical, electrical, or other stimuli.



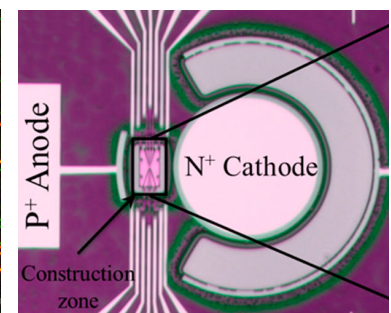
Nanophotonics & Optical Nanomaterials

Synthesis, excitation, and energy transformations of optically active nanomaterials and collective or emergent electromagnetic phenomena (plasmonics, metamaterials, photonic lattices).



Soft, Biological & Composite Nanomaterials

Synthesis, assembly, and characterization of soft, biomolecular, and composite nanomaterials that display emergent functionality.



Quantum Materials Systems

Understanding and controlling quantum effects of nanoscale materials and their integration into systems spanning multiple length scales.

User Program

CINT is an Office of Science national user facility. CINT helps the international research community perform cutting-edge research in the areas of nanoscience and nanotechnology, and is available free of charge for open science. As a user facility, CINT has the structure and mission to collaborate widely across academia, industry, and within DOE labs. Access is via peer-reviewed technical proposals. Proprietary research may be conducted in accordance with Federal regulations for full-cost recovery. CINT cannot provide funding to users.

Selected CINT Capabilities

Synthesis & Fabrication

- Quantum dots, nanoparticles
- Biomolecular composites
- Semiconductor nanowires
- Metamaterials and plasmonic nanomaterials
- Semiconductor molecular beam epitaxy
- Epitaxial nanocomposite films pulsed laser deposition, laser molecular beam epitaxy
- CVD for 2D nanostructured films
- Dip-pen nanolithography
- Integration Lab: A suite of micro- and nano-processing tools for fabrication

Characterization

- 3D tracking microscopy
- Ultrafast optical spectroscopies
- In-situ transmission electron microscopy
- Optomechanics
- Quantum transport
- Nanomechanics and nanomanipulator
- Discovery platforms
- Holographic optical trapping
- Near-field and single nano-element optical and magneto optical spectroscopy

Theory & Simulation

- Molecular dynamics and Monte Carlo simulations
- Classical and quantum density functional theory
- First-principles density-functional theory + dynamical mean-field theory for strongly correlated electronic systems
- Exact-diagonalization approach
- Quantum dynamics and pump-probe spectroscopy in coupled and strongly correlated electronic systems
- Non-adiabatic excited state molecular dynamics in molecules

