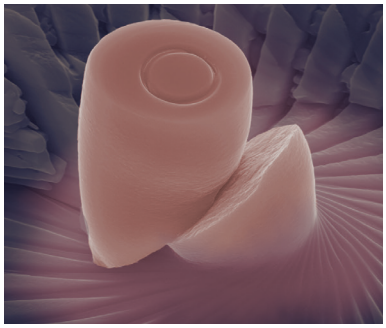
The Center for Integrated Nanotechnologies

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 (NSRC) operating as a national user facility devoted to establishing the scientific principles that govern the design, performance, and integration of nanoscale materials. Through its Core Facility in Albuquerque and Gateway to Los Alamos Facility, CINT provides open access to tools and expertise needed to explore the continuum from scientific discovery to the integration of nanostructures into the micro- and macro world.

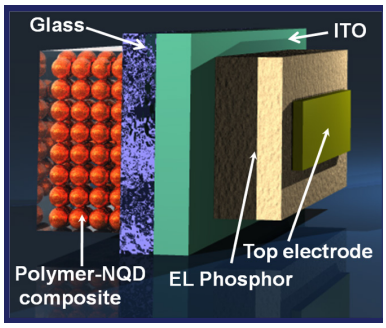
Science Thrusts

Integration is the key to exploiting the novel properties of nanoscale materials and subsequently creating new nanotechnologies to benefit society. Hence, the CINT scientific community is built around nanomaterials integration. The scientific staff and capabilities at CINT are organized into four interdisciplinary Science Thrusts:



Nanoscale Electronics & Mechanics

Control of electronic transport and wave functions, and mechanical coupling and properties using nanomaterials and integrated structures.

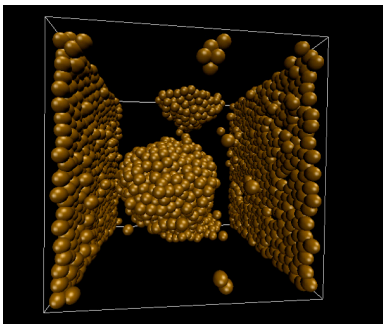


Nanophotonics & Optical Nanomaterials

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

Soft, Biological & Composite Nanomaterials

Solution-based materials synthesis and assembly of soft, composite and artificial bio-mimetic nanosystems.

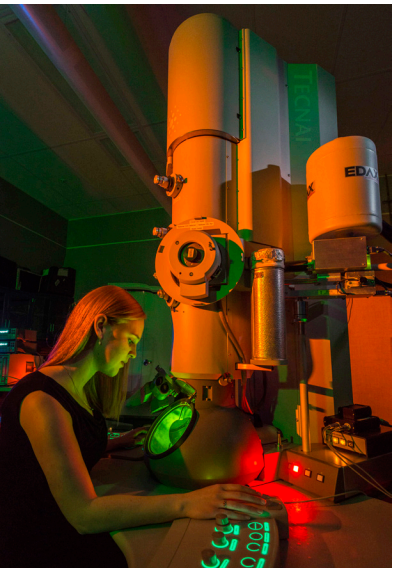


Theory & Simulation of Nanoscale Phenomena

Assembly, interfacial interactions, and emergent properties of nanoscale systems, including their electronic, magnetic, and optical properties.

User Program

CINT operates as a national user facility providing access to state-of-the-art facilities staffed by laboratory scientists, post-doctoral fellows and technical support personnel who are leaders in the CINT scientific thrust areas. Access is via peer-reviewed technical proposals, for independent or collaborative research, submitted in response to semi-annual Calls for User Proposals. Pre-competitve research that will be published in the open literature can be approved for no-fee access to CINT. Proprietary research may be conducted in accord with Federal regulations for full-cost recovery. CINT cannot provide funding to users.



Selected CINT Capabilities

Synthesis and 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 processing tools for fabrication

Characterization

- 3D tracking images
- Ultrafast optical spectroscopies
- In situ transmission electron microscopy
- Optomechanics
- Quantum transport
- Nanomechanics and nanomanipulator
- Discovery platforms
- Holographic optical trapping

Theory

- 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