SAND2019-0365PE

Materials / Nanotechnology

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Center for Integrated Nanotechnologies (CINT)

A DOE Office of Science National User Facility for Nanoscience Research

"A DOE/SC user facility has unique world-class research capabilities and technologies which are available broadly to science community worldwide from universities, industry, private laboratories, and other Federal laboratories for work that will be published in the open literature."

The DOE/SC nanoscience centers are different from traditional user facilities

- Defined by a scientific field, not specific instrumentation.
- NSRC staff support user projects and conduct original research.
- Capabilities involve research expertise, hardware, and software.
- Users access Synthesis, Fabrication, Characterization, and Theory capabilities.

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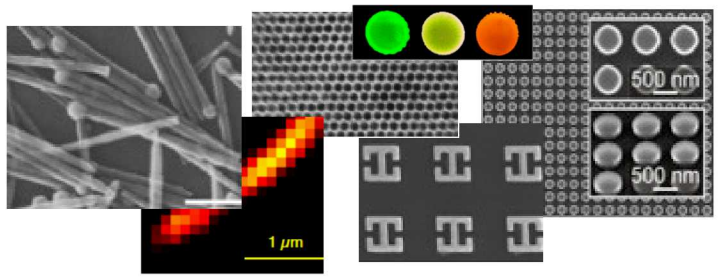
Research: Opportunities for Collaboration – 4 Thrusts

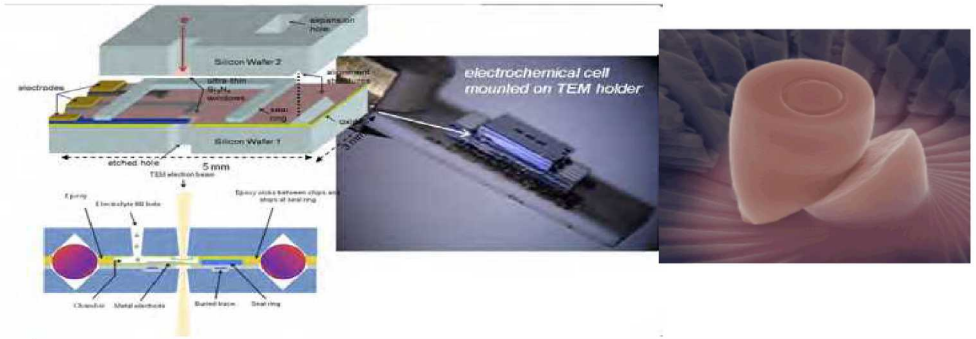
Nanophotonics & Optical Nanomaterials

Synthesis, excitation, and energy transformations of optically active nanomaterials



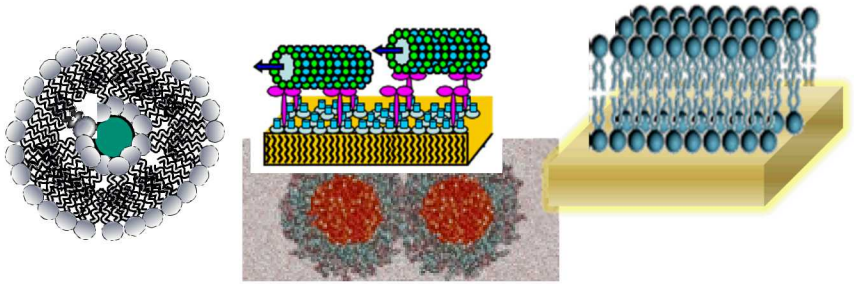
In-situ Characterization and Nanomechanics

Developing capabilities to study the dynamic response of materials and nanosystems to mechanical, electrical, or other stimuli



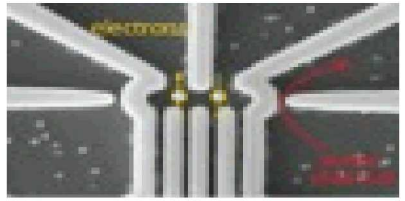
Soft, Biological, & Composite Nanomaterials

Solution-based nanomaterials synthesis and assembly of soft, composite, and artificial biomimetic nanosystems



Quantum Materials Systems

Understanding and designing nanomaterials to create new functionalities based on quantum effects that span multiple length scales (from nm to mm)



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Research: Opportunities for Collaboration

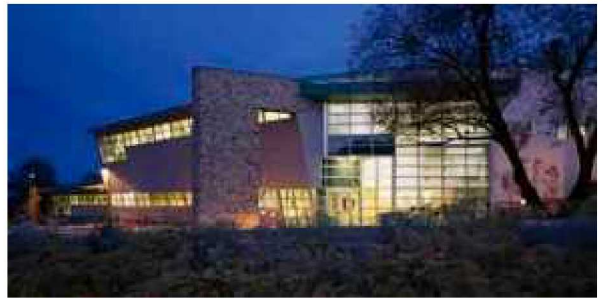
CINT is a LANL/SNL partnership to create a national resource for nanomaterials integration

CINT Today:

- 4 Science Thrusts, 1 leadership team
- 2 Facilities (total 130,000 sf)
- 51 scientists & technologists
- 32+ post-docs & students
- 500+ users engaged in 200+ projects
- 250+ publications annually
- Peer-reviewed user proposal process
- No-fee for pre-competitive research
- Full cost recovery for proprietary research

Core Facility - SNL

Gateway Facility - LANL



Existing/Recent Collaborations

Project Name	Georgia Tech PI	Sandia PI	Current Engagement Track Used (Academic Alliance LDRD, CINT, Summer Interns, Post-Doc)
Stability of nanoporous metal alloys under elevated temperatures	Antonia Antoniou	Nate Mara	CINT
In situ TEM liquid cell investigation of corrosion in Fe thin films	Joshua Kacher	Khalid Hattar	CINT
Quantitative in situ TEM investigation of grain boundary mediated deformation mechanisms in ultrafine-grained Au thin films	Olivier Pierron	Brad Boyce	CINT
Coherent transport in polymers: Establishing materials design criteria and predicting structure/property interrelations	Carlos Silva	Sergei Tretiak	CINT

Previous Collaborations

Delivery of nanomaterials across the blood-brain barrier: Three-dimensional tracking of transcytosis.	Christine Payne
Establishing the yield strength of polycrystalline nanoporous metals	Antonia Antoniou
Graphene based hall sensor for magnetic nano-sensing	Zhigang Jiang
Nonlinear optical properties of cyanine-type organic molecules	Thomas Koerzdoerfer
Structure property relationship of nanoporous metals	Antonia Antoniou
Quantum Dot - Fluorescent Protein FRET Biosensors	Gang Bao
In Situ TEM experiments of electrochemical lithiation and delithiation cycles of 1-D Si-C Nanomaterials	Gleb Yushin
Electrochemically Induced Degradation in Nanostructured Electrodes for Lithium Ion Batteries: In Situ TEM and Multiphysics Modeling	Ting Zhu
Mechanical behavior of hierarchical nanoporous metals	Antonia Antoniou
Utilizing giant-QDs for Highly Efficient Lasing Systems that Exhibit Novel Energy Transfer Phenomena	Vladimir Tsukruk
Evolution of nanoporous metal structure under applied temperature and stress	Antonia Antoniou
Heterogeneous three dimensional nanowire/nanoporous metal composites	Antonia Antoniou
Quantitative in situ TEM investigation of reverse plasticity in ultrafine-grained Au thin films	Olivier Pierron
In situ TEM liquid cell investigation of corrosion in PLD Fe thin films	Joshua Kacher