



The DOE Center for Integrated Nanotechnologies (CINT)

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Sandia is a Multiprogram Laboratory Operated by Sandia Corporation,
a Lockheed Martin Company, for the United States Department of Energy
Under Contract DE-ACO4-94AL85000.



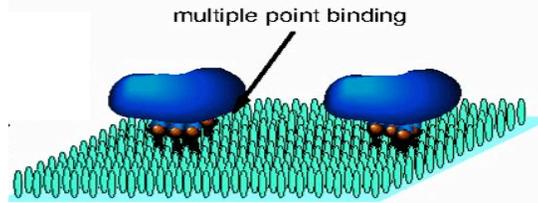


Nanoscience discoveries will have impact via integrated nanotechnologies

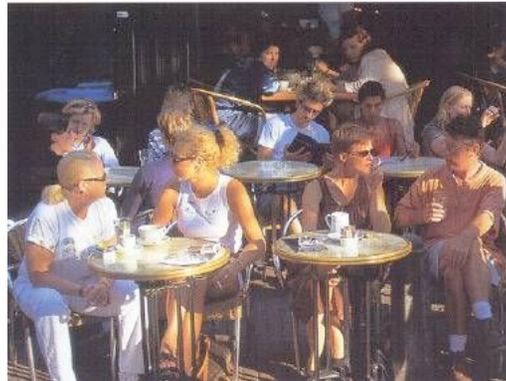
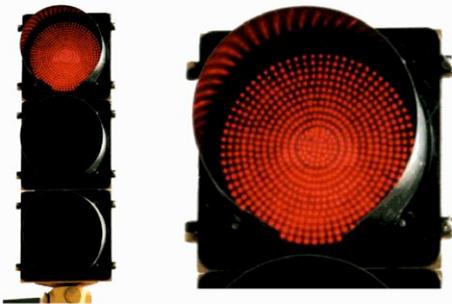
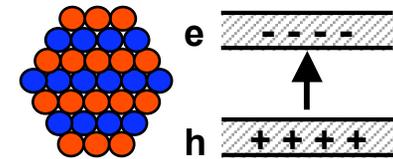
Energy



Bio/Medical



Environment



Connecting scientific disciplines and length-scales is key to success

Center for Integrated Nanotechnologies

Sandia National Laboratories • Los Alamos National Laboratory



- Highly collaborative U.S. Dept. of Energy User Facility
- Focused on nanoscience integration
- Access to tools and expertise
- Pre-competitive and proprietary research options

“One scientific community focused on nanoscience integration”

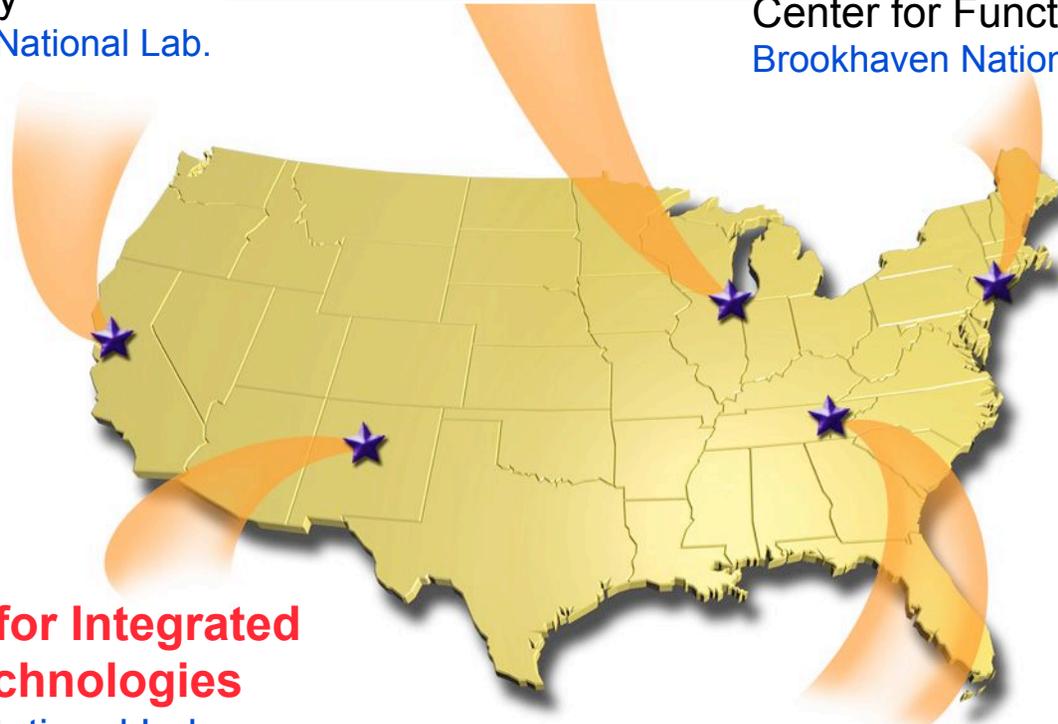


CINT is one of five U.S. Dept. of Energy Nanoscience Centers

Center for Nanoscale Materials
Argonne National Lab.

Molecular Foundry
Lawrence Berkeley National Lab.

Center for Functional Nanomaterials
Brookhaven National Lab.



**Center for Integrated
Nanotechnologies**
Sandia National Labs.
Los Alamos National Lab.

Center for Nanophase Materials Sciences
Oak Ridge National Lab.



Two Laboratories creating one community focused on nanoscience integration

Microsystems Engineering & Science Applications Complex



Users

National High Magnetic Field Lab



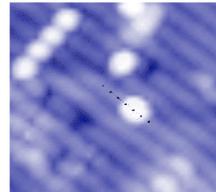
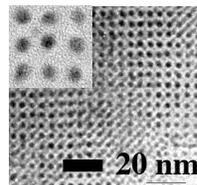
CINT
Core Facility

Lujan Neutron Scattering Center



Gateway to SNL

Gateway to LANL



CINT: Synthesis, Characterization, Theory & Simulation



CINT Core and Gateway Facilities are open for business



Core Facility (Albuquerque)



**CINT Gateway to Los Alamos
*Nanomaterials / Biosciences***



**CINT Gateway to Sandia
*Nanomaterials / Microfabrication***

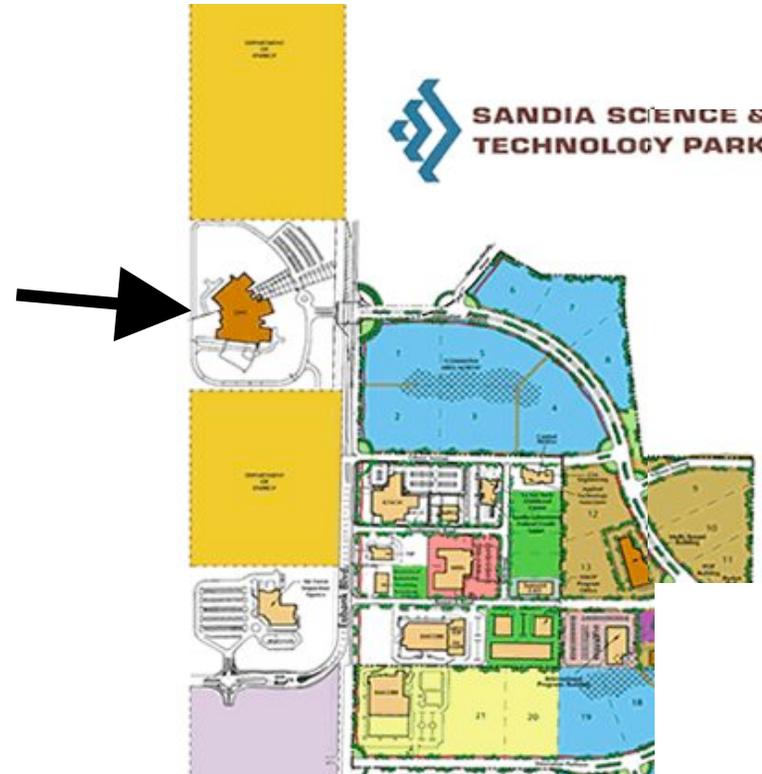


Core Facility is located adjacent to the Sandia Science & Technology Park



18.04.2007

- **Chemical/biological synthesis labs**
- **Characterization labs**
- **Class 1000 clean room**
- **96,000 GSF**





CINT laboratories are supported by state-of-art equipment

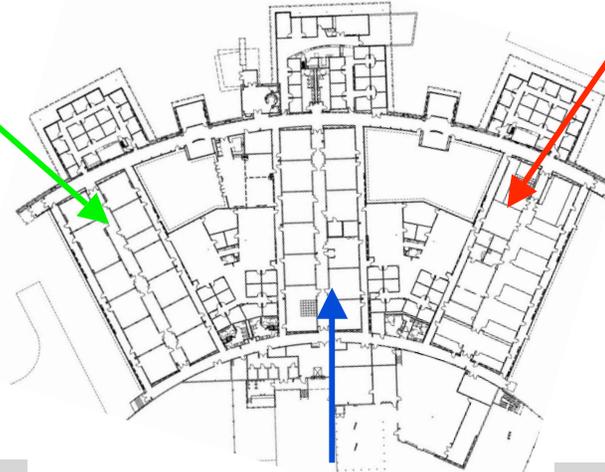
Characterization Wing

- TEM
- Atom tracking STM
- FTIR, UV-VIS
- Nano-indenter, AFM
- Low Temp Transport
- Ultra-fast Laser Spec.

Gateway to Sandia

- Interfacial Force Microscopy
- Low Energy Electron Microscopy

Core Facility



Synthesis Wing

- MBE
- Wet Chemistry
- Bio labs
- Molecular films

Integration Lab

- E-beam lithography
- Photolithography
- Thin Film Deposition
- Reactive Ion Etch
- Plasma Etch
- Dual beam SEM

Gateway to Los Alamos

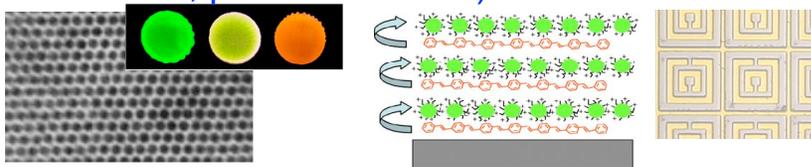
- NSOM, AFM
- Environmental SEM
- Nano-indenter
- Pulsed Laser Dep.
- Ultra-fast Laser
- Computer Cluster



Science Thrusts provide relevant expertise

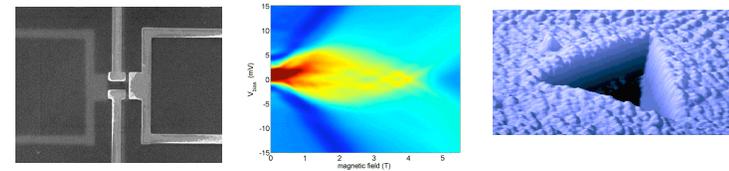
Nanophotonics & Optical Nanomaterials

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



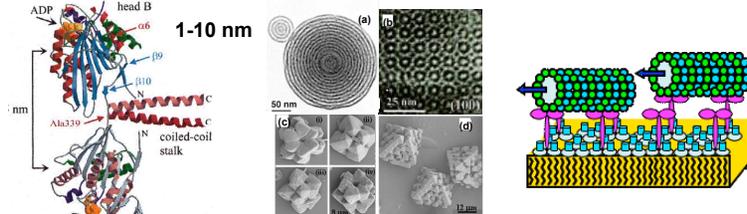
Nanoscale Electronics, Mechanics & Systems

Control of electronic transport and wavefunctions, and mechanical coupling and properties using nanomaterials and integrated nanosystems



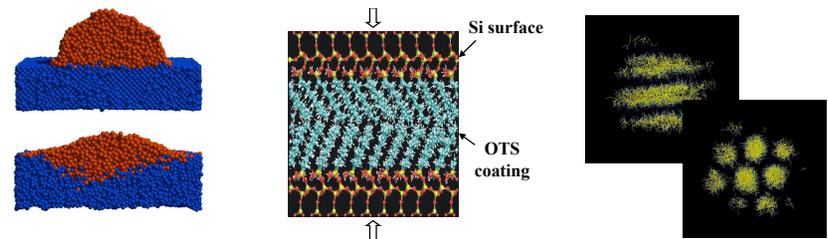
Soft, Biological, & Composite Nanomaterials

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





CINT Grand Challenges in Nanoscience Integration

Goals

- Focus CINT on central science issues underlying nanotechnology integration
- Use science-based innovation to drive center synergy spanning multiple science thrusts
- Have long term impact on areas of major significance to national missions

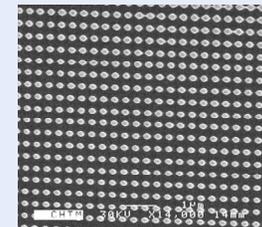
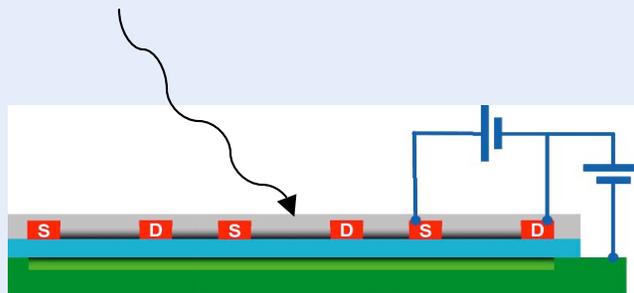
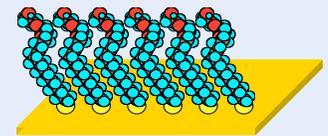
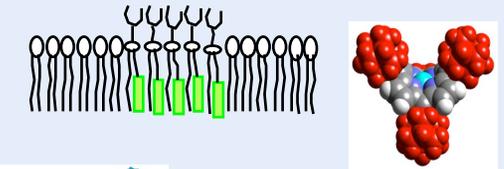
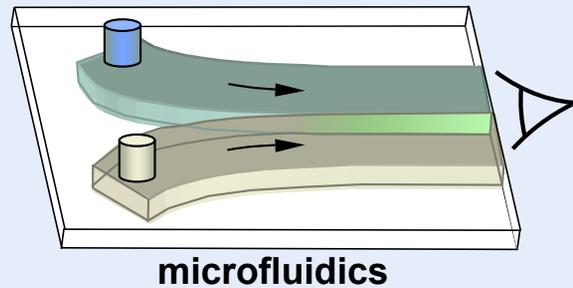
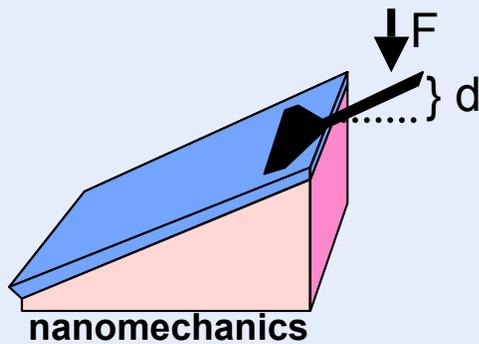
**Energy Transfer
Emergent Properties**



CINT Discovery Platforms™: ***micro-labs for nanoscience exploration***

Stimulate, interrogate and exploit
nanoscale materials in a microsystem environment

CINT provides platforms... for user-inspired problems

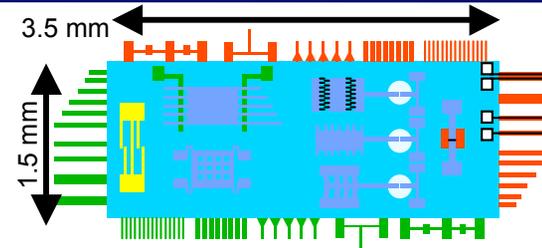




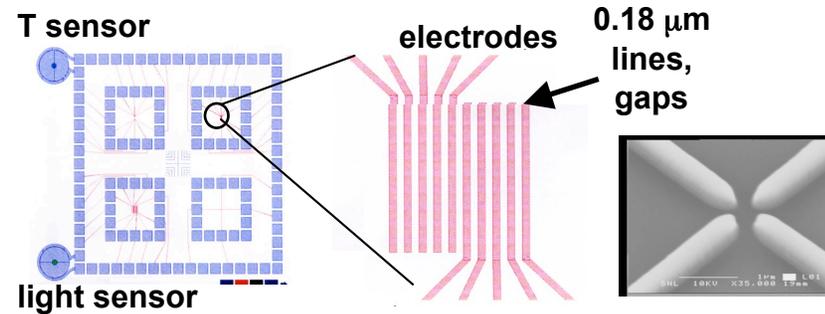
CINT Discovery Platforms™

The first platforms have been fabricated and are undergoing in-house testing, characterization and integration

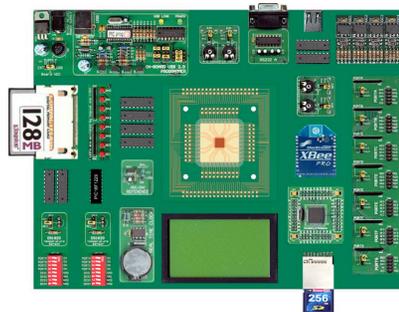
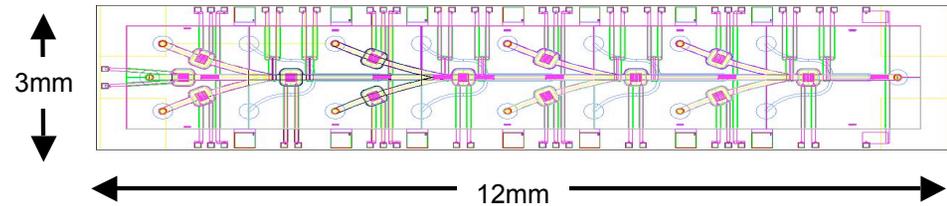
Cantilever Array Platform



Electrical Transport & Optical Spectroscopy Platform



Microfluidic Synthesis Platform



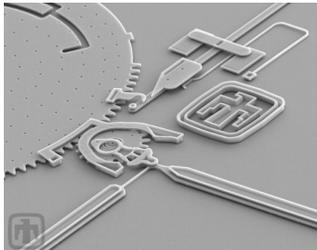
NEW! Hybrid Discovery module

Drop-in user-friendly modules for connecting chips to the real world

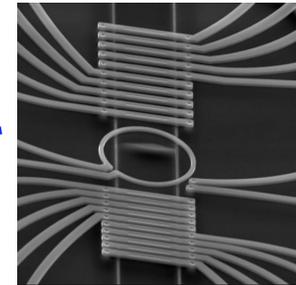


Future vision: Discovery Platforms™ as sophisticated sample holders

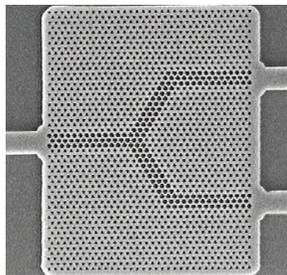
Mechanics



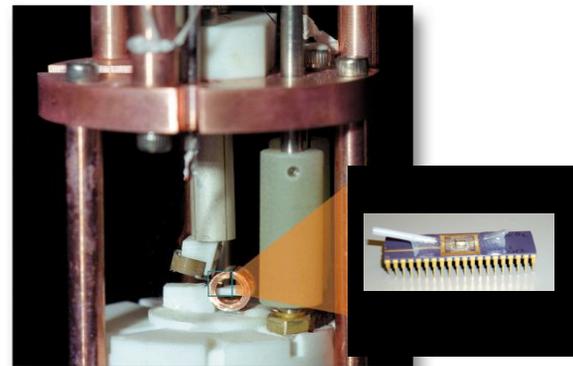
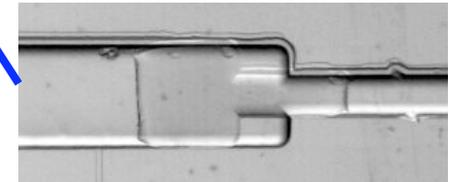
Electronics



Optics



Fluidics



Discovery Platform™ measurements within a scanning probe, TEM, SEM, laser system...



Researchers access CINT via the User Program

- **Universities**
 - Postdocs, students and visiting faculty researchers.
- **Industry**
 - Pre-competitive and propriety research mechanisms.
- **Other Laboratories**
 - Other Federal agencies.
- **International Science Community**
 - Open to the international science community

Key Aspects of User Program

- **Open access to facilities based on user proposal quality**
- **Spectrum of user modes**
 - Access to equipment
 - Collaborative research
- **External user proposal review**
- **No-fee access for pre-competitive research**
- **Proprietary work with full cost recovery**



The CINT user community is growing

2006 Call for User Proposals

178 proposals (130 accepted, 73%)

32 States

10 Foreign Countries

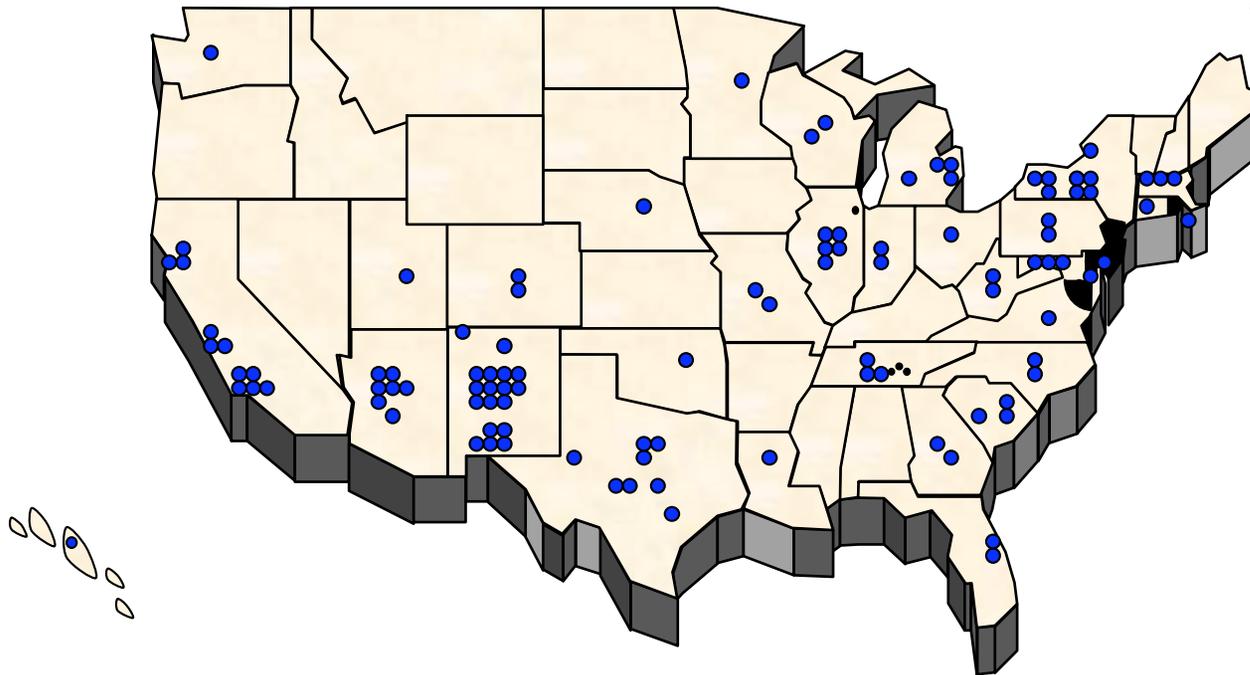
Jump Start Program:

Requests: 257

Approved: 36 (2003)

32 (2004)

21 (2005)



Next Call for User Proposals: Fall 2007



The nanotechnology future is taking shape in New Mexico!



Come visit us on the web!

<http://CINT.sandia.gov> or <http://CINT.lanl.gov>

