SAND2006-2817P

The DOE Center for Integrated Nanotechnologies

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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.

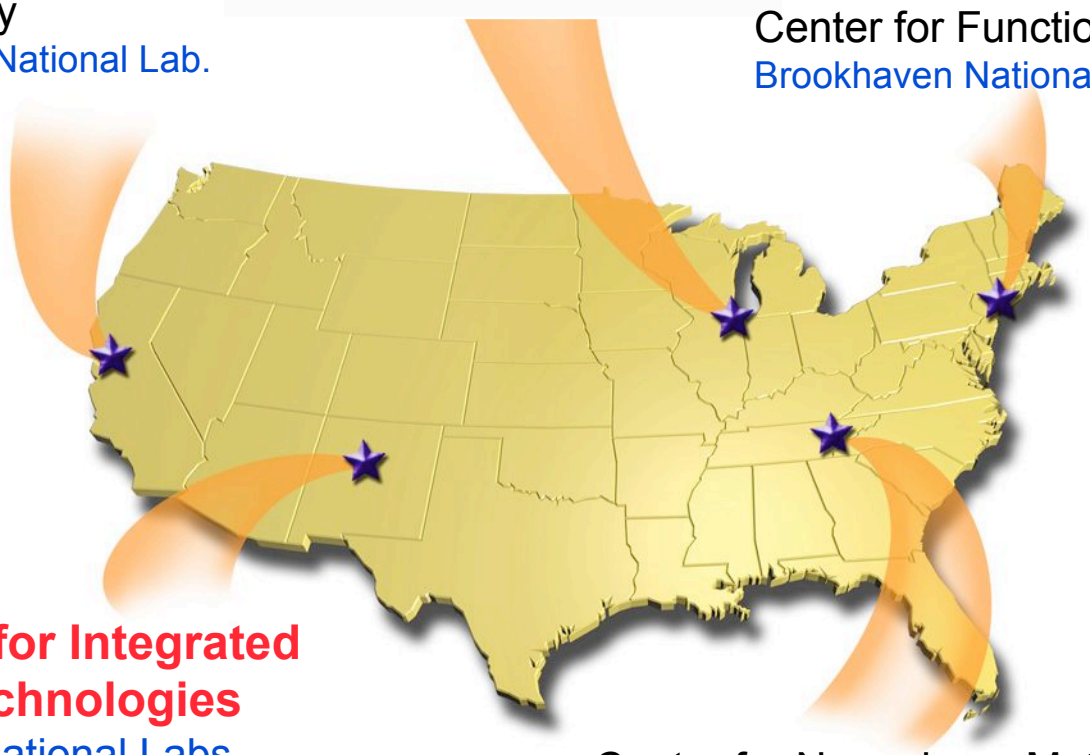
Sandia National Laboratories

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.

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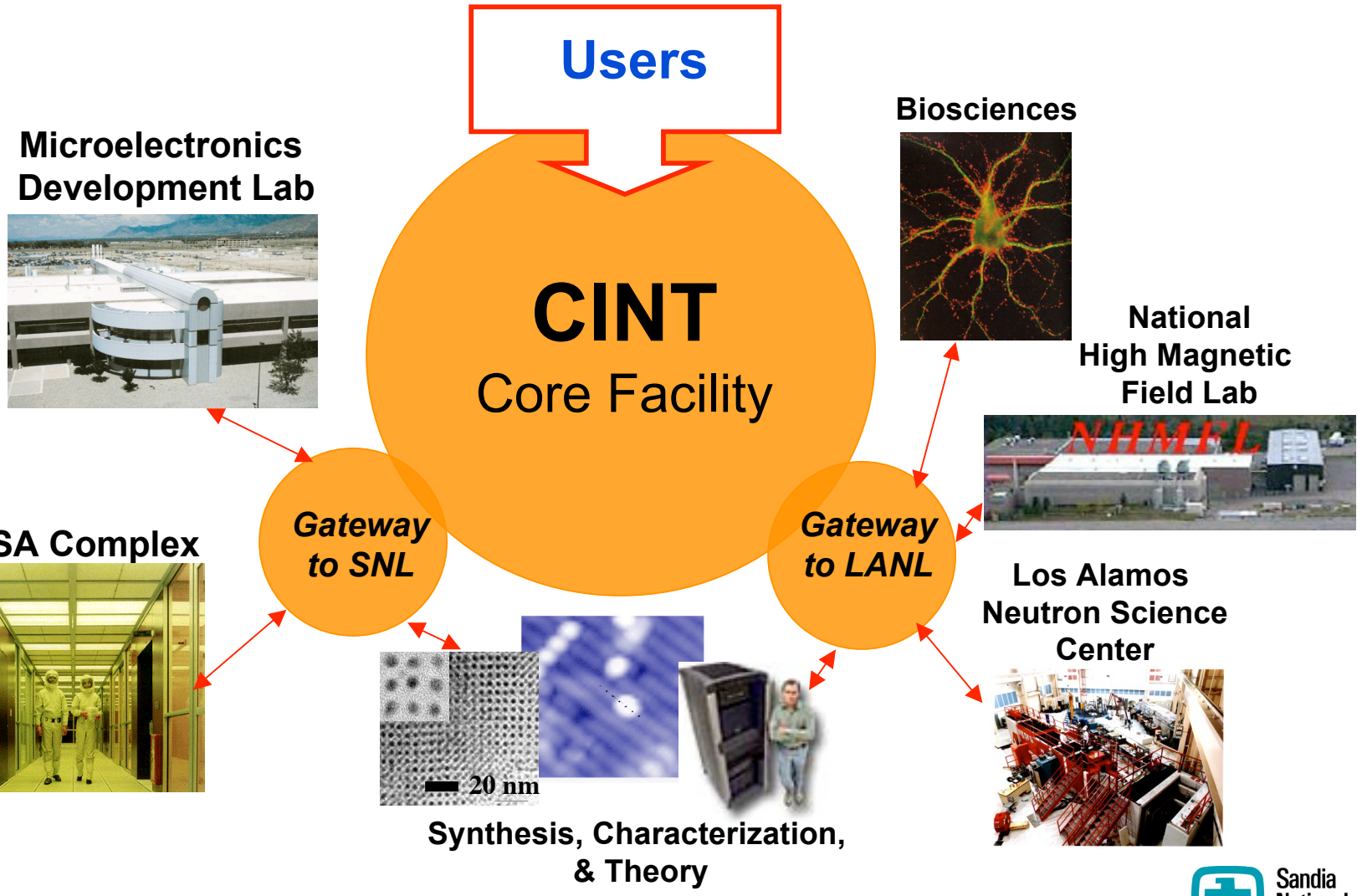
Sandia National Laboratories

Two Laboratories creating one community focused on nanoscience integration



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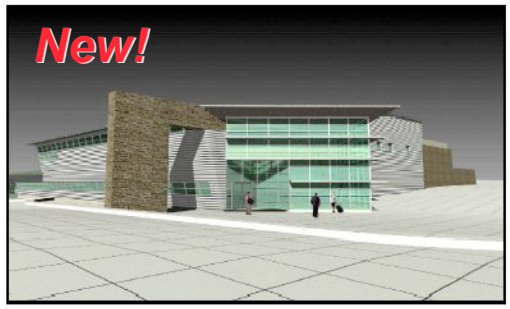
The CINT Core/Gateway model embodied with physical user facilities

Core Facility in Albuquerque

CINT Gateway to Sandia
Nanomaterials/Microfabrication



CINT Gateway to Los Alamos
Nanomaterials/Biosciences

Buildings Complete	**January 2005**
Begin Operations	**April 2006**
Fully Operational	**May 2007**

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Key laboratory assets will be available through Gateway Facilities

CINT Gateway to Los Alamos
(Nanomaterials/Biosciences)

Biosciences

Nanomaterials

Theory & Computing

Visitor Space

CINT Gateway to Sandia
(Nanomaterials/Microfabrication)

Microsystems - MESA

Nanomaterials

Theory & Computing

Visitor Space

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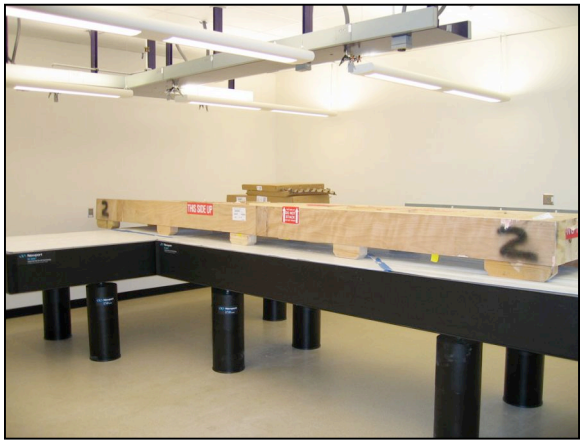
The Gateway to Los Alamos Facility



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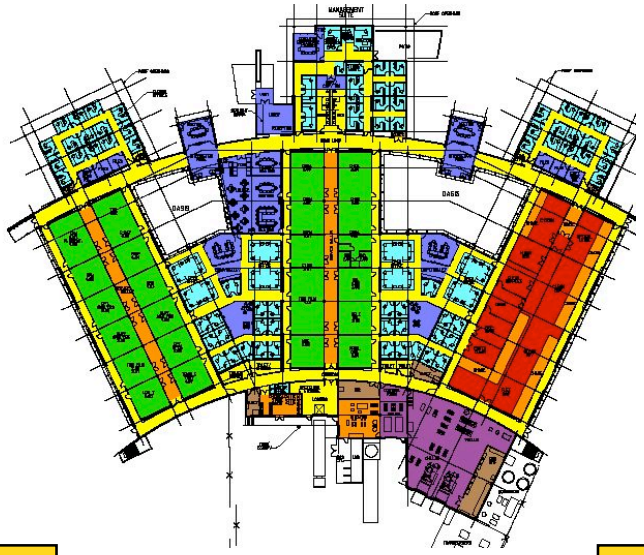
CINT laboratories are supported by state-of-art special equipment

Characterization

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



Integration

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

Gateway to Sandia

- AT-STM
- IFM
- Chemistry labs
- LB Film
- µ-fluidics

Synthesis

- MBE
- PLD
- Wet Chemistry
- Bio labs
- Molecular films

Gateway to Los Alamos

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

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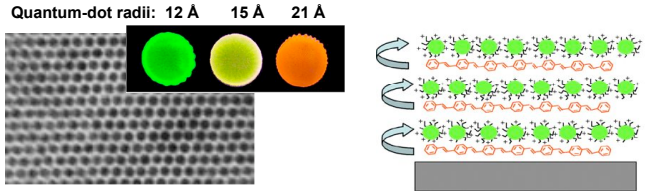
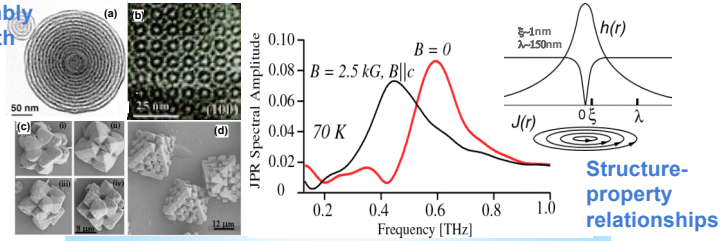
CINT Thrust Areas provide expertise for integration science challenges

Nanoelectronics & Nanophotonics:
Precise control of electronic and photonic wavefunctions



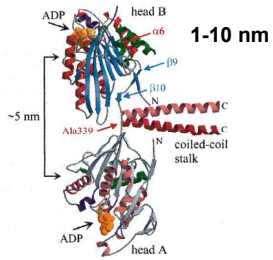
Complex FunctionalNanomaterials:
Relationships between synthesis, structure and complex and emergent properties

Self-assembly on all length scales

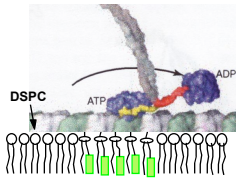


Structure-property relationships

Nano-Bio-Micro Interfaces:
Biological principles & functions imported into artificial bio-mimetic systems



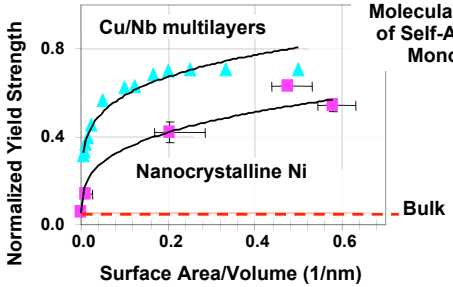
1-10 nm

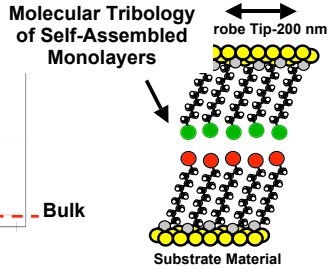


Aggregated receptors

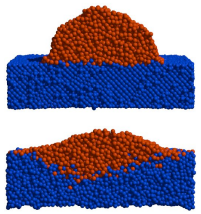
10 -100 nm

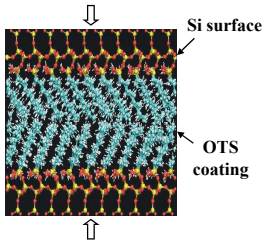
Nanomechanics:
Understanding the mechanical behavior of nanostructured materials

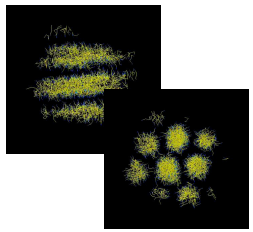




Theory & Simulation:
Theoretical, modeling and simulation techniques for multiple length and time scales and functionality







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CINT Nanoscience Integration Challenges

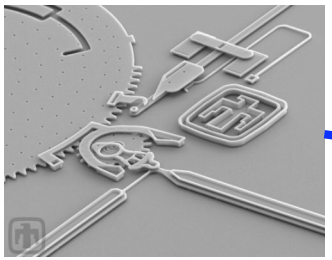
- Energy Transfer
  - fundamental limits and principles for the use and integration of nanoscale structures to detect, transfer, and harvest energy with extreme efficiency or sensitivity

- Transduction of Molecular Events
  - fundamental principles of transduction events in natural systems and how these may be incorporated into artificial nanosystems to convert single events into large scale responses

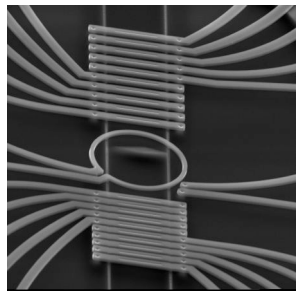
- Emergent Properties
  - understanding collective properties of composite nanoscale systems that cannot be predicted in terms of the individual constituents and using integration to design systems with desired behavior

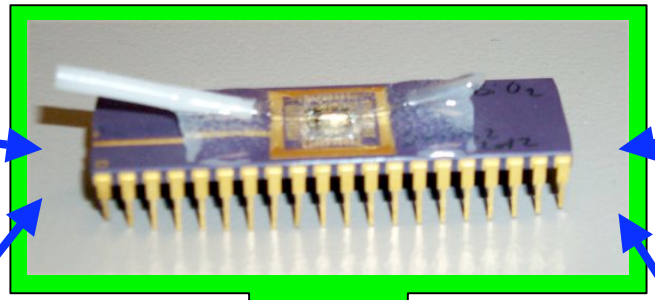
CINT Discovery Platforms™: micro-labs for nanoscience exploration

Mechanics

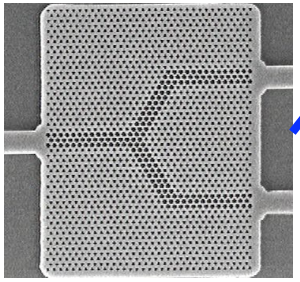


Electronics

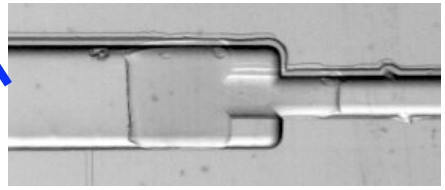


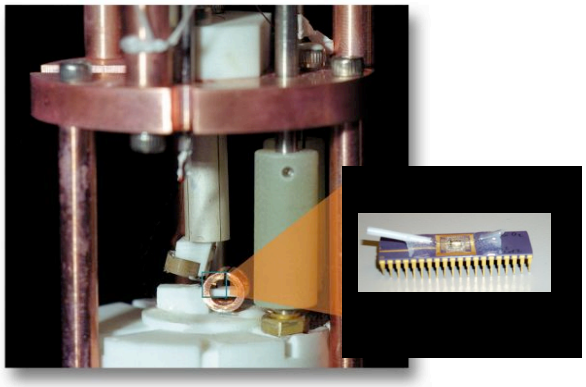


Optics



Fluidics





Discovery Platforms™ will be compatible with characterization instruments

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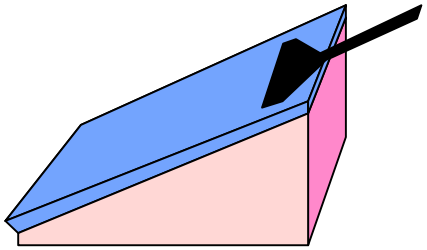
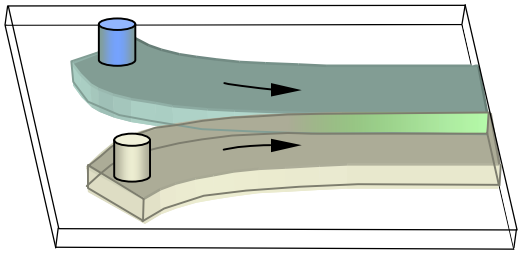
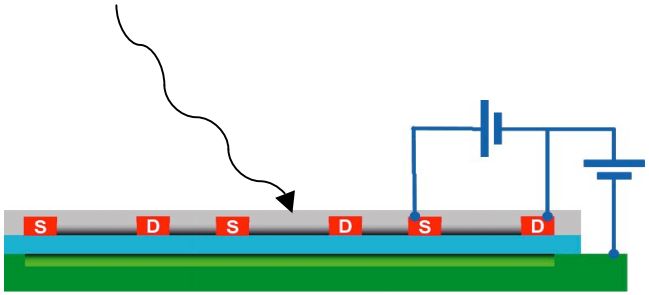
We are developing the first CINT Discovery Platforms™



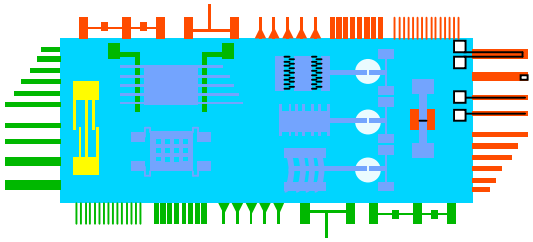
nanomechanics

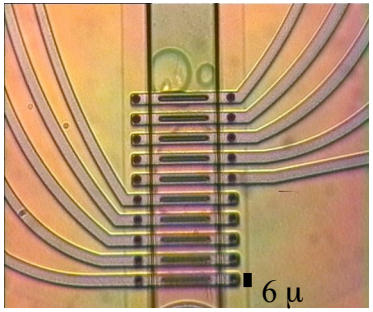


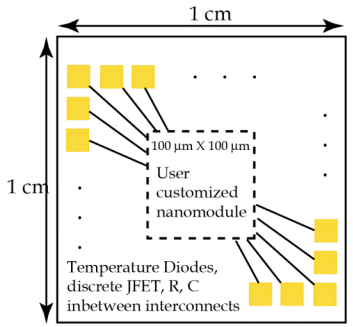
microfluidics



optical, transport







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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**
  - **Multi-year projects**
- **External proposal review**
- **Mechanisms for proprietary work**

http://CINT.sandia.gov* or *http://CINT.lanl.gov

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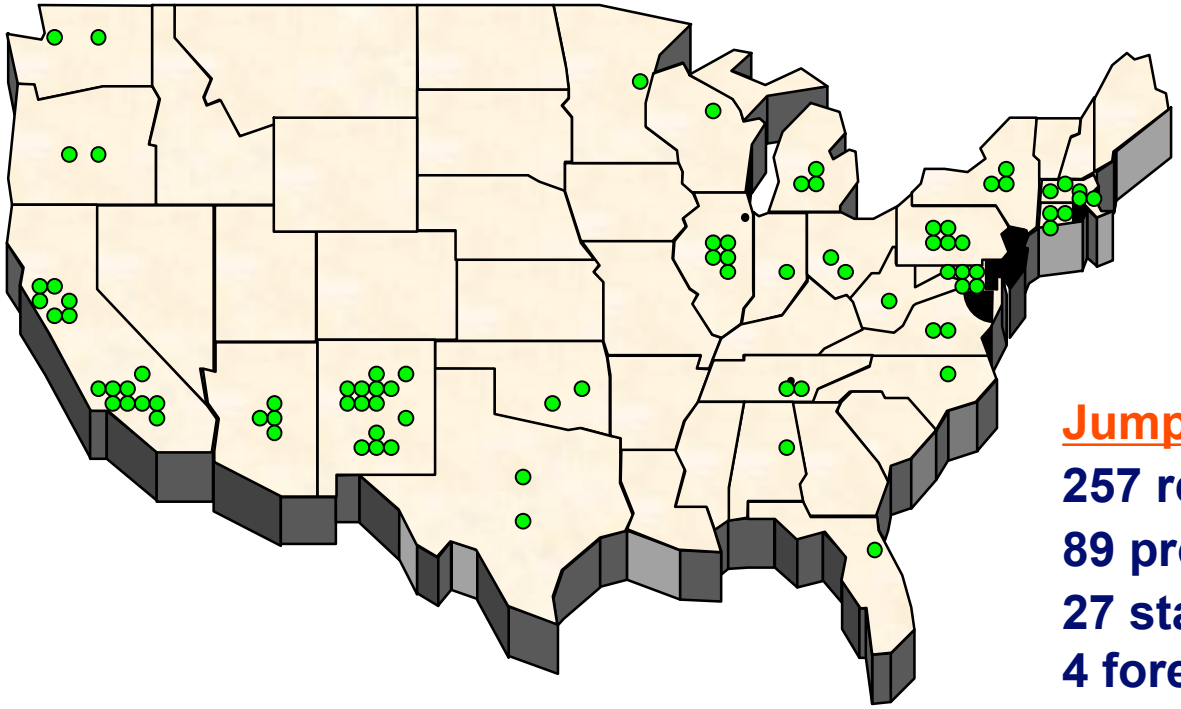
External users are already working at CINT



Jump-start User Projects

257 requests (2003-05)

89 projects approved

27 states

4 foreign countries

43 universities

5 private-sector

5 government labs

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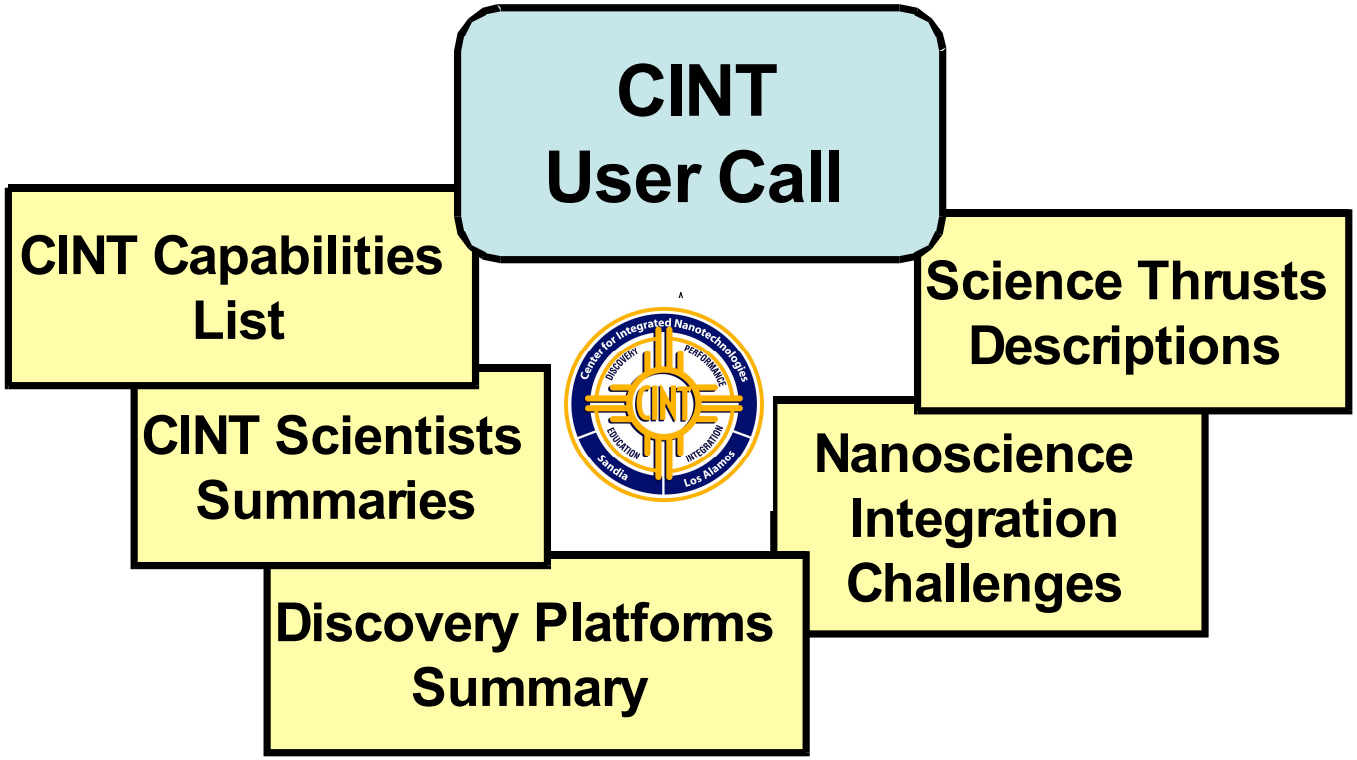
2006 Call for User Proposals open now



Proposal Submission via the Web only!
Deadline: March 15, 2006

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http://CINT.sandia.gov *or* http://CINT.lanl.gov

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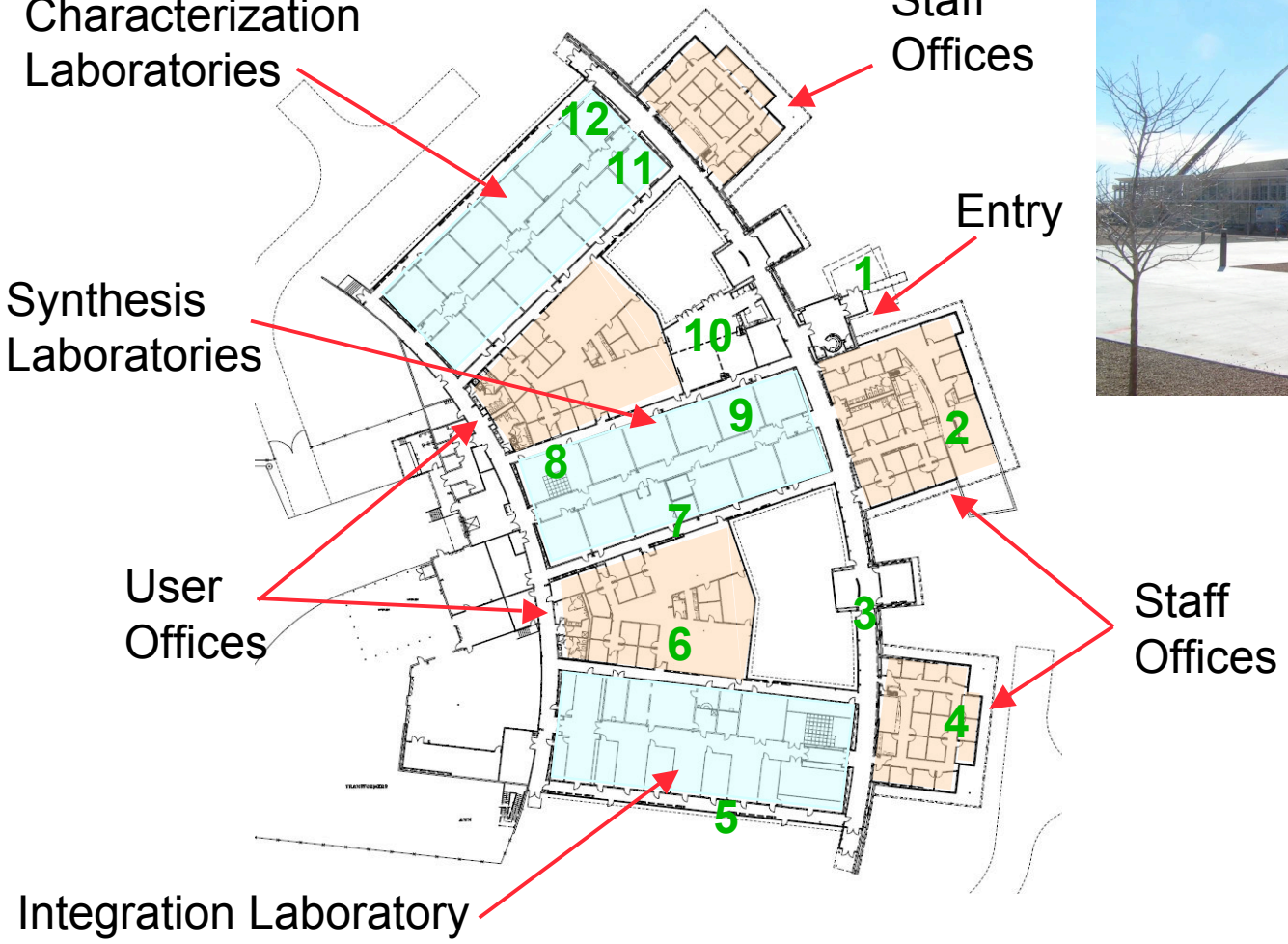
Center for Integrated Nanotechnologies
Core Facility Tour



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