



The DOE Center for Integrated Nanotechnologies

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Albuquerque Economic Development
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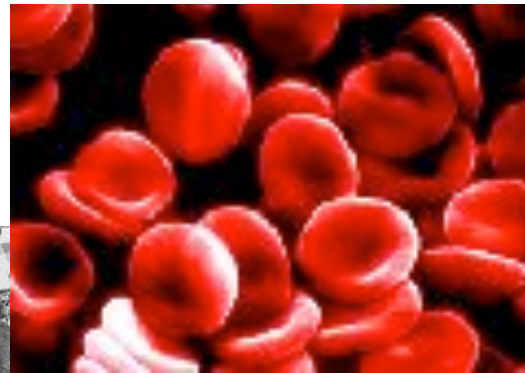
Sandia is a Multiprogram Laboratory Operated by Sandia Corporation,
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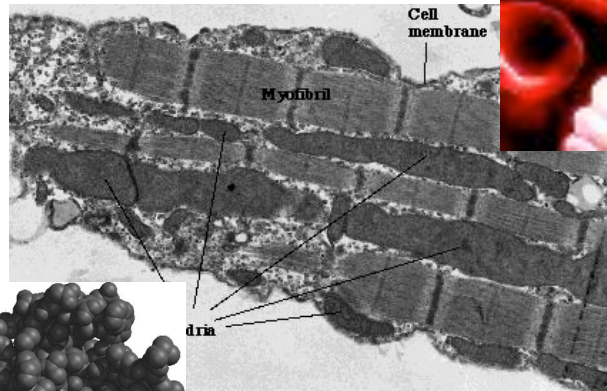


Living systems integrate nanotechnology

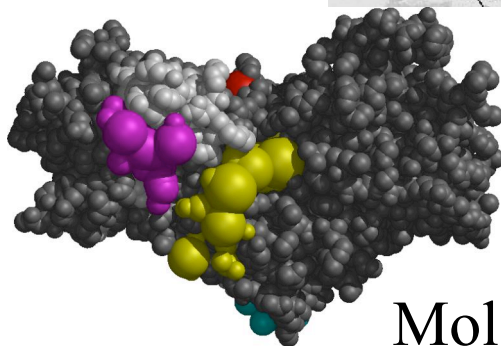
*Nanoscale “machines”
are coupled into the
micro and macro world.*



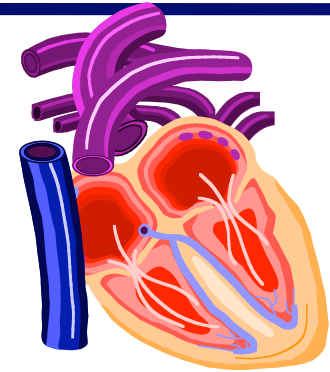
Cells



Sub-cellular mechanical structure



Molecules and Chemical Pathways

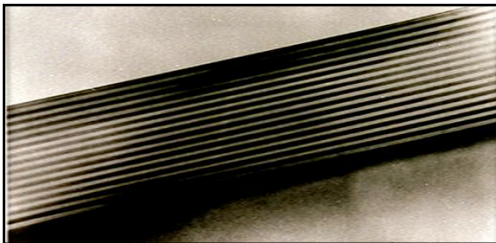


Organs and
Tissues

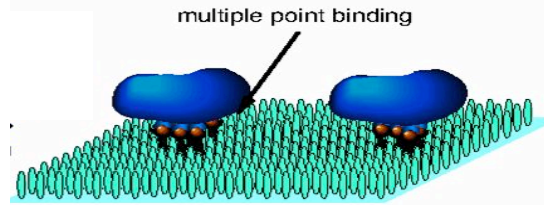


Integrated Nanotechnology will impact our world

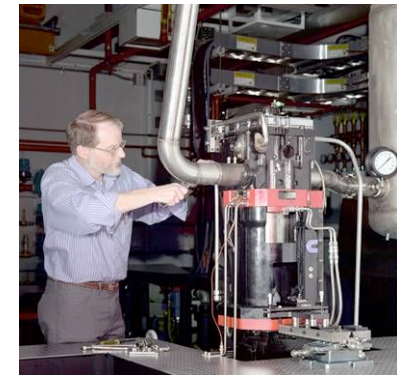
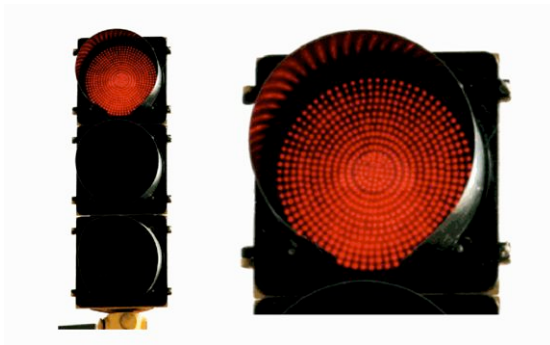
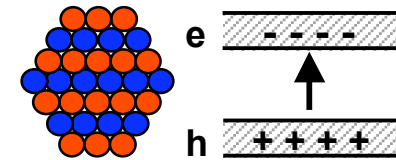
Energy



Health Care



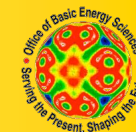
Environment



Future products will have “*nanotech inside.*”

Center for Integrated Nanotechnologies

Sandia National Laboratories • Los Alamos National Laboratory



- Highly collaborative
DOE National User Facility
- Focused on nanoscience and its integration across scientific disciplines and multiple length scales.
- Open access to tools and expertise to explore the continuum from scientific discovery to the integration of nanostructures into the micro and macro worlds.

“One scientific community focused on nanoscience integration”

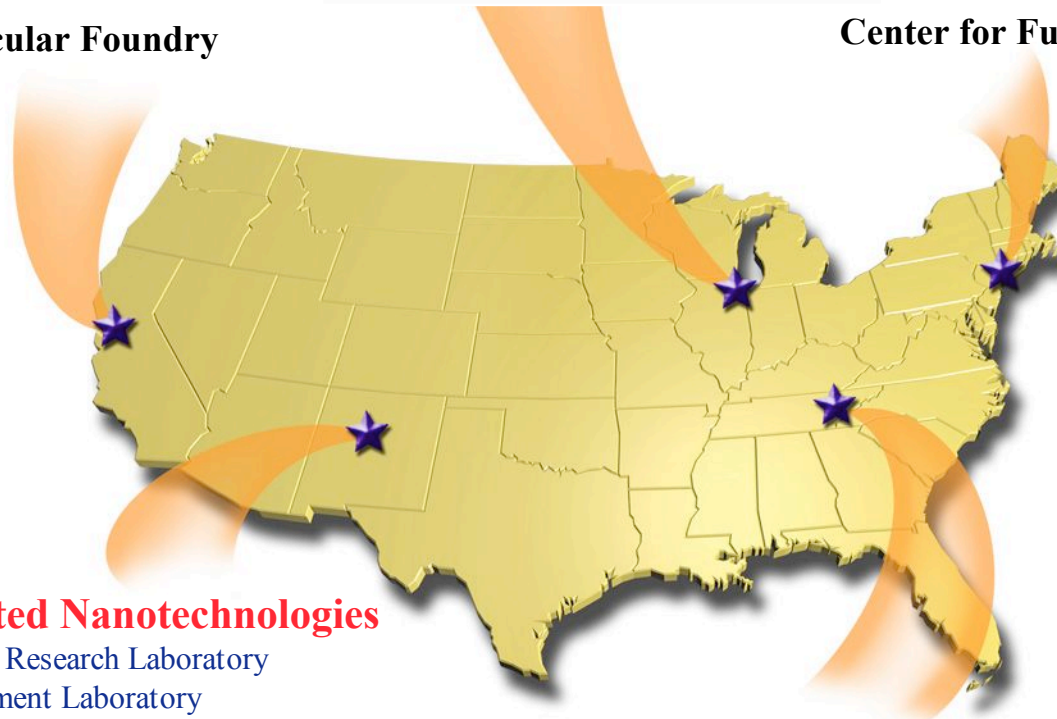


CINT is one of five Department of Energy Nanoscience Centers

Center for Nanoscale Materials

Molecular Foundry

Center for Functional Nanomaterials



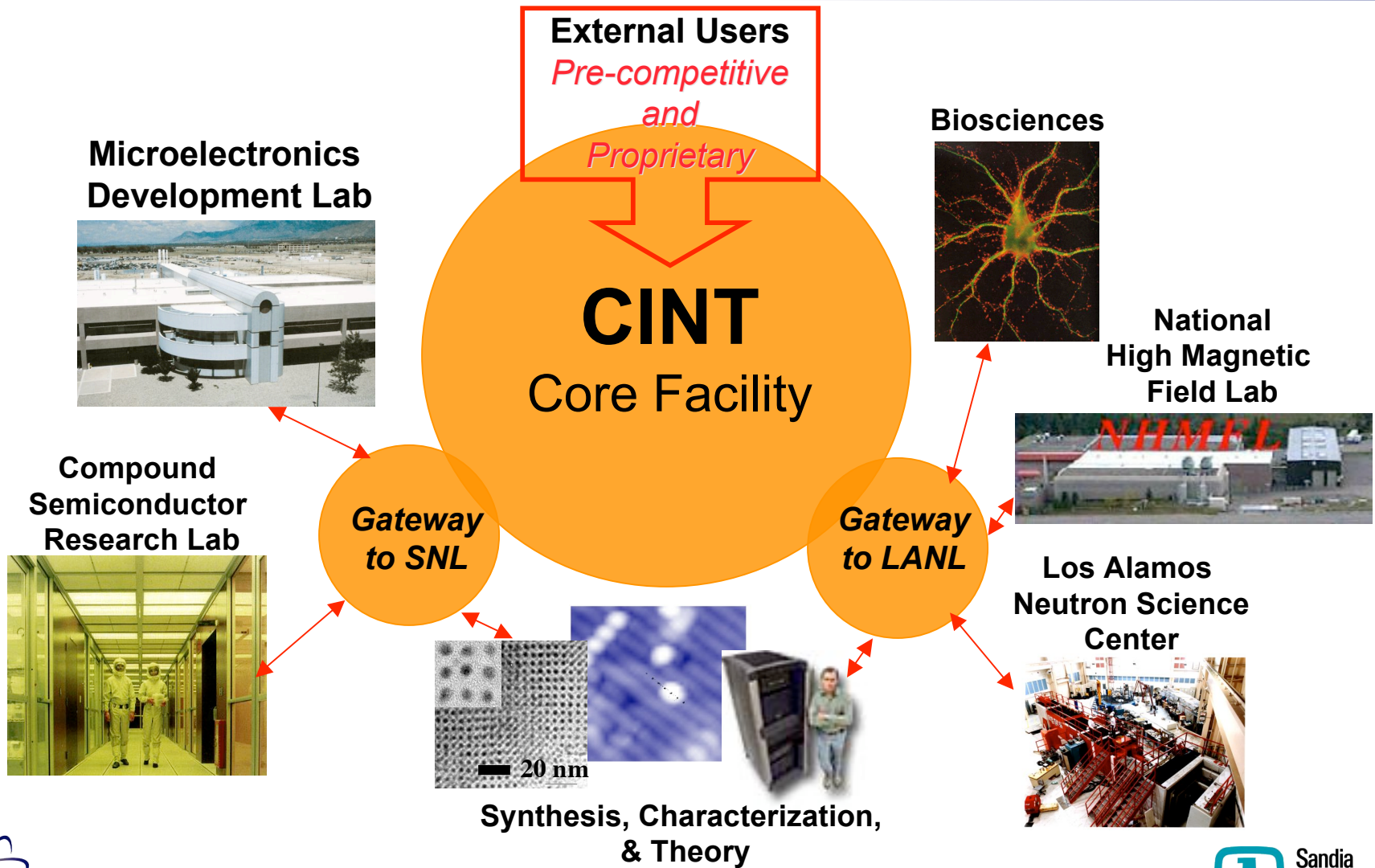
Center for Integrated Nanotechnologies

Compound Semiconductor Research Laboratory
Microelectronics Development Laboratory
Combustion Research Facility
Los Alamos Neutron Science Center
National High Magnetic Field Laboratory

Center for Nanophase Materials Sciences



One scientific community that spans two National Laboratories





The CINT Core/Gateway model embodied with physical user facilities

Core Facility in Albuquerque



CINT Gateway to Sandia
Nanomaterials/Microfabrication



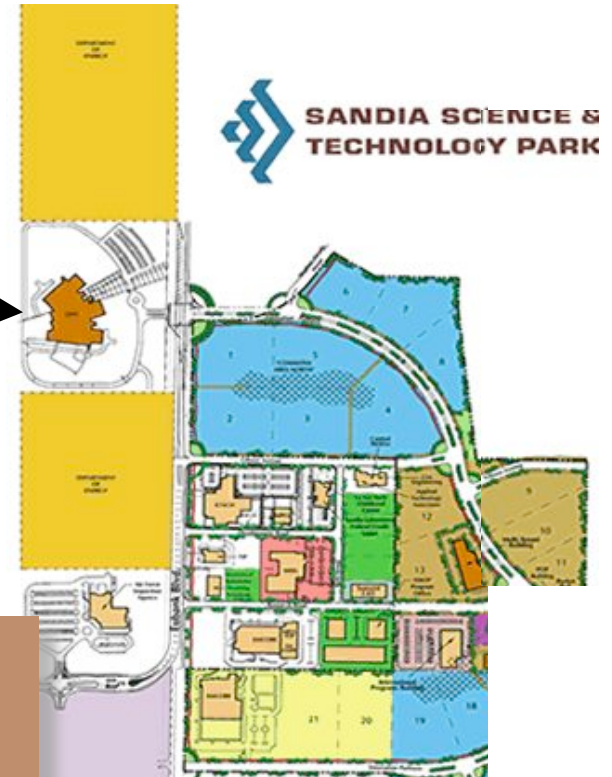
CINT Gateway to Los Alamos
Nanomaterials/Biosciences

**Buildings Complete
Begin Operations
Construction Complete**

**November 2005
April 2006
June 2007**



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



- Low vibration for characterization
- Chemical/biological synthesis
- Clean space for Integration
- Interaction areas
- Visitor office space
- High-speed communications
- 93,000 GSF; Complete November 2005



Construction Status: Core Facility





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)



Microfabrication/MESA

Nanomaterials

Theory & Computing

Visitor Space



Construction Status: LANL Gateway





New techniques will be developed and made available to user community

- **Innovative Instrumentation**

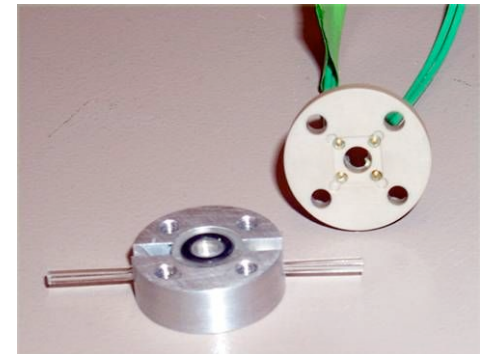
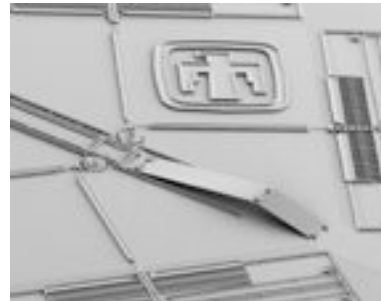
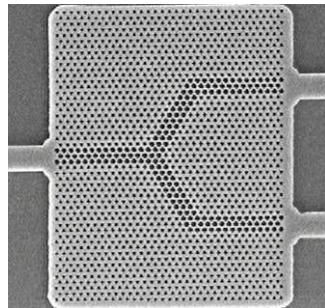
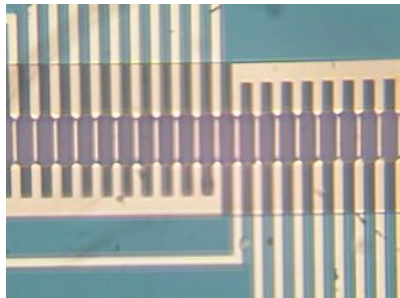
 - Atom Tracking STM

 - Magnetic Force Microscope

 - Interfacial Force Microscope

- **Theory and Simulation**

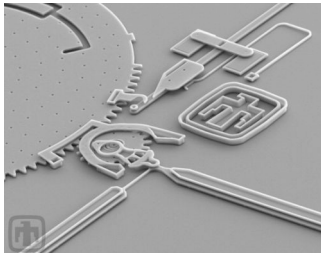
- **Discovery Platforms™**



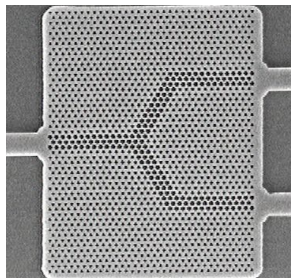


CINT Discovery Platforms™ are micro-labs for nanoscience exploration

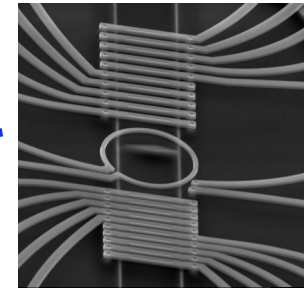
Mechanics



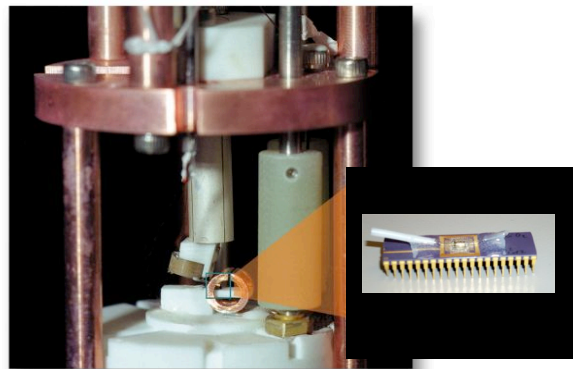
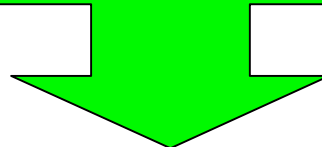
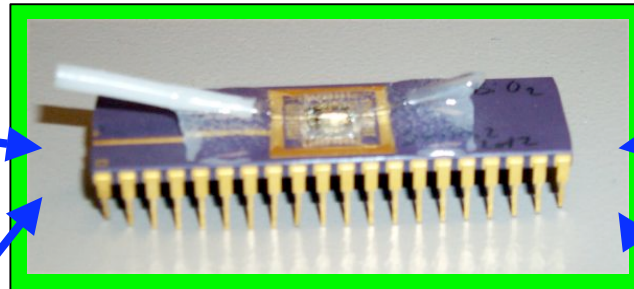
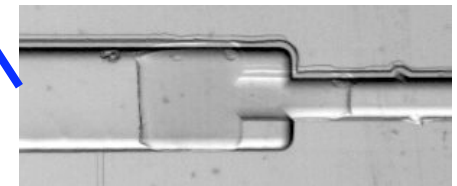
Optics



Electronics



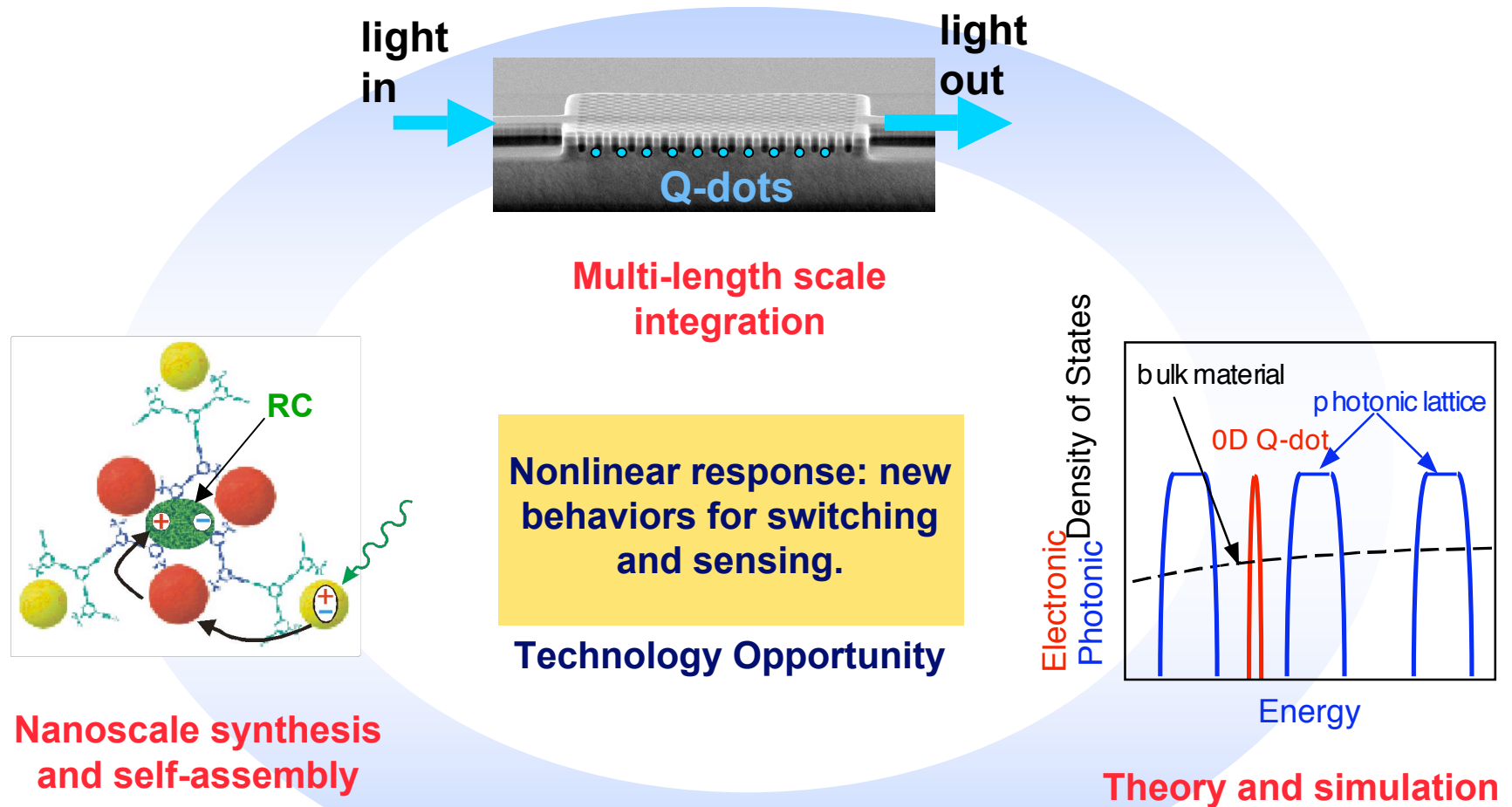
Fluidics



***Discovery Platforms™ will be compatible
with characterization instruments***



Understanding energy transfer will enable new communications technologies

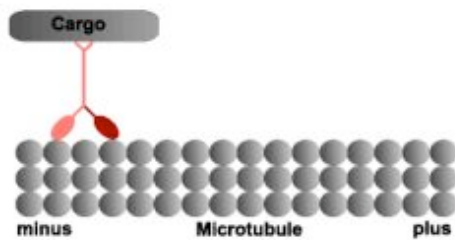




Exploiting natural processes to create smarter materials



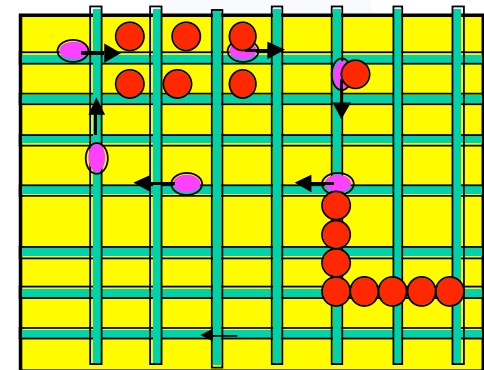
New Materials



Active Assembly

**Active assembly, healing,
repair, reconfiguration,
adaptation**

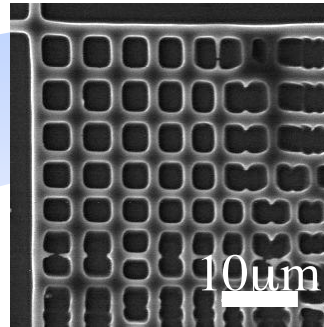
Technology Opportunity



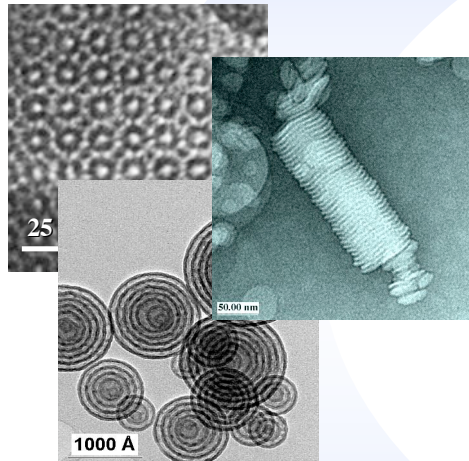
**Thermodynamic/Kinetic
Models**



Combining top-down and bottom-up approaches in manufacturing



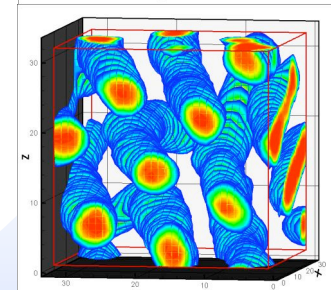
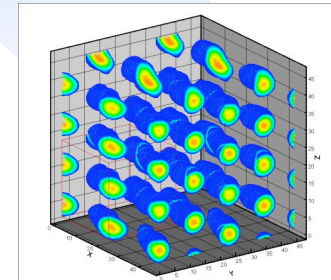
Microscale Templates



Molecular Assembly

**New functions from
complex and hierarchical
materials/devices**

Technology Opportunity



**Directed Assembly
and ordering**



Researchers access CINT via the User Program

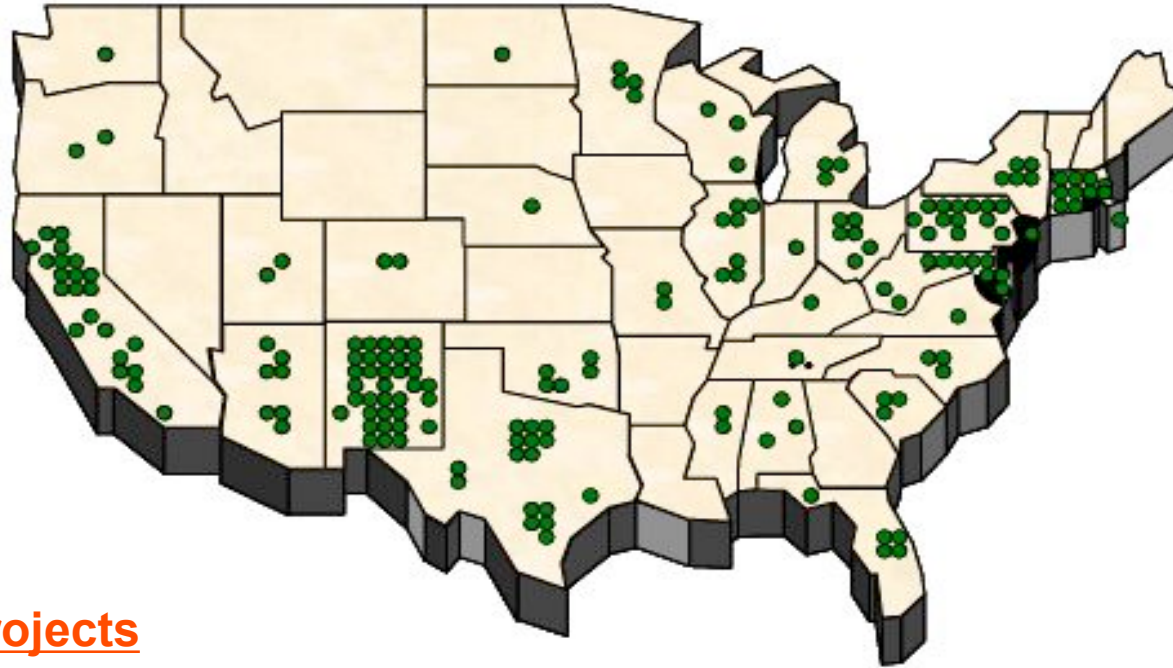
- **Universities**
 - Postdocs, students and visiting faculty researchers.
- **Industry**
 - Pre-competitive and propriety research mechanisms.
- **Other Laboratories**
 - Other Federal agencies.
- **International Science Community**
 - Open to the international science community

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 evaluation of proposals**
- **Mechanisms for proprietary work**
- **User program “jump-started” in FY03**
- **Normal operations start April 2006**



External users are already working at CINT



Jump-start Projects

Two rounds (2003 & 2004)

188 proposals submitted

68 projects approved

40 institutions (incl. 3 companies)

23 states, 3 foreign countries

3rd Jump-start Round (2005)

~70 Proposals received

Approved projects will start
in August



Private sector participation in CINT

- **Industrial representation on the CINT Governance Board**
Herb Goronkin, *President, Technology Acceleration Assoc.*
(VP, Motorola, retired)
- **Pre-competitive jump-start user proposals from industry**
(e.g., IBM, ACREO, Lake Shore Cryogenics)
- **New DOE User Agreement for joint ownership of intellectual property from CINT collaborations**
- **CINT Discovery Platforms™ -- Bringing CINT capabilities to you!**



CINT begins normal operations in April 2006

- **New CINT Facilities with full-time staff to support users**
- **CINT Scientists to advance the state-of-the-art in nanoscience integration research**
- **Initial Discovery Platforms™ available to users**
- **User Proposals for proprietary research (full cost recovery)**
- **Short-term and multi-year user proposals**
- **Continuing access to capabilities and expertise at both Los Alamos and Sandia National Laboratories.**



Clean rooms
Synthesis
Characterization

Access to National Laboratories

Microfabrication
Biosciences
Computing
Nanomaterials

No Cost Access

Peer reviewed proposals
University/Industry/Gov. Lab.
Publication required

Proprietary Access

Full cost recovery