



# 2016 CINT Users Meeting

SAND2016-9032C

September 19-20, 2016  
La Fonda Hotel, Santa Fe, NM

<http://cint.lanl.gov>



CINT Core Facility



CINT Gateway Facility

*Wireless Network: La Fonda*

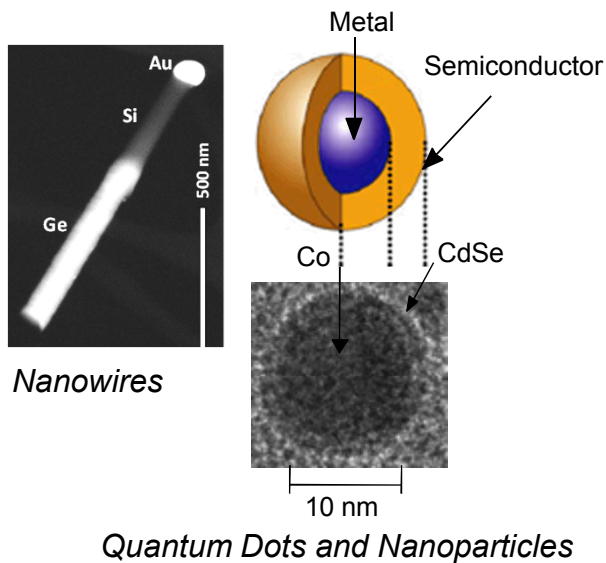
*Password: fall2016*

Sandia National Laboratories is a multi-mission laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration. With main facilities in Albuquerque, N.M., and Livermore, C.A., Sandia has major R&D responsibilities in national security, energy and environmental technologies, and economic competitiveness.

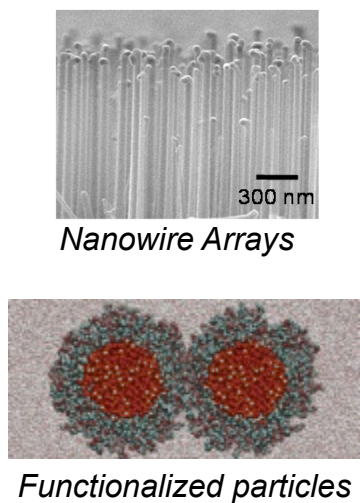


# Integrating nanomaterials for functionality

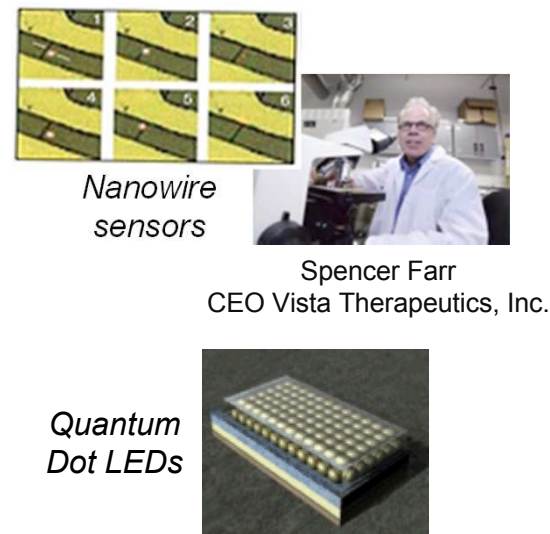
## Nanoscale building blocks



## Fabrication & assembly



## Functional systems





# CINT is a DOE Office of Science National User Facility

“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:

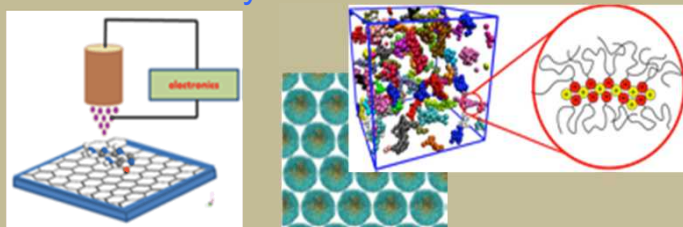
- Are defined by a scientific field, not specific instrumentation.
- NSRC staff support user projects and conduct original research.
- Capabilities involve expertise, hardware and software.
- Users access Synthesis, Fabrication, Characterization and Theory capabilities.



# CINT Thrusts

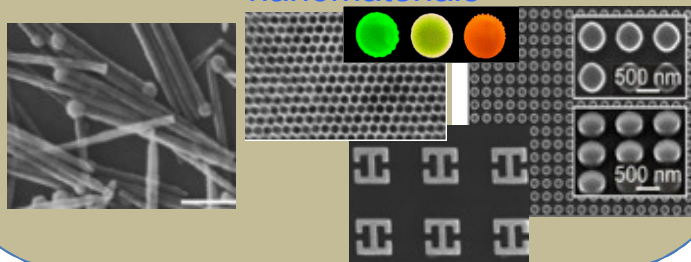
## Theory & Simulation of Nanoscale Phenomena (TSNP)

Assembly, interfacial interactions, and emergent properties of nanoscale systems



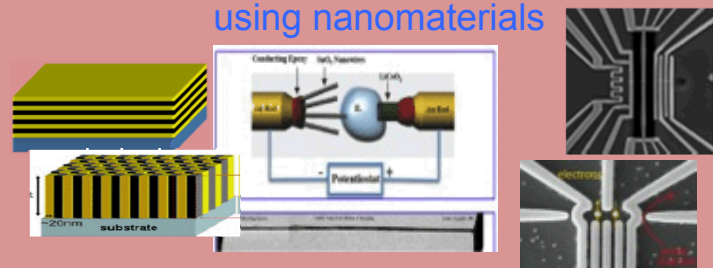
## Nanophotonics & Optical Nanomaterials (NPON)

Synthesis, excitation and energy transformations of optically active nanomaterials



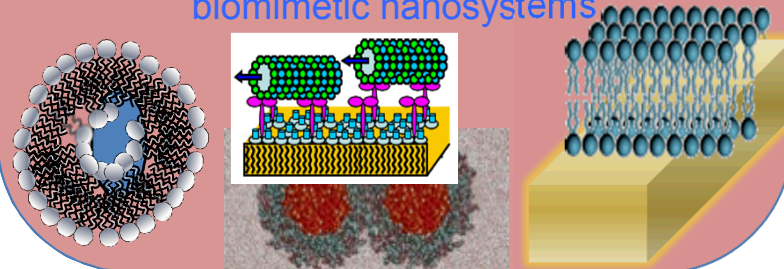
## Nanoscale Electronics & Mechanics (NEM)

Control of electronic transport, wavefunction, and mechanical coupling using nanomaterials



## Soft, Biological, & Composite Nanomaterials (SBCN)

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







# CINT Provides User Access to Significant Capabilities at both Host Institutions



Microsystems Engineering and Science Applications (MESA) Complex at SNL



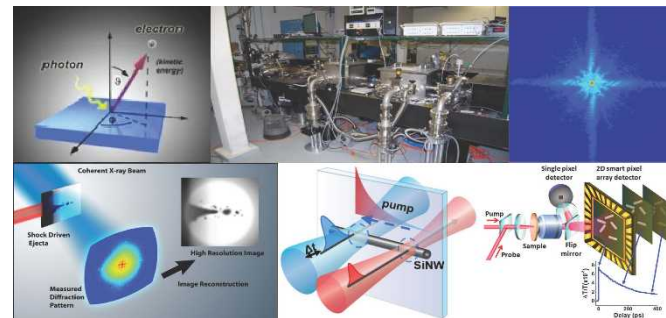
High Performance Computing at both SNL and LANL



Ion Beam Labs at both SNL and LANL



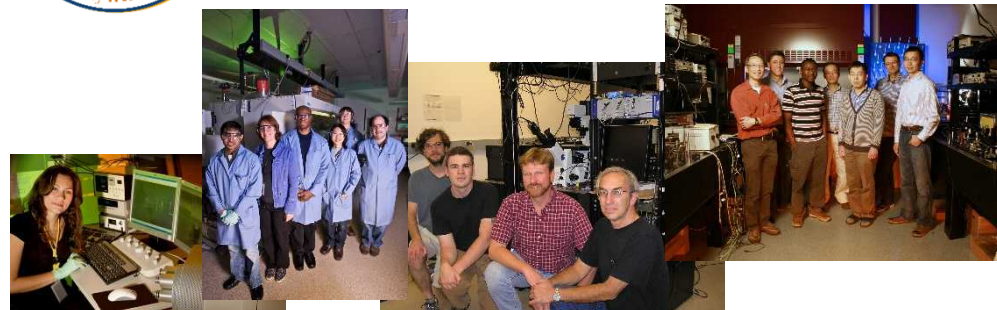
National High Magnetic Field Laboratory (NSF)



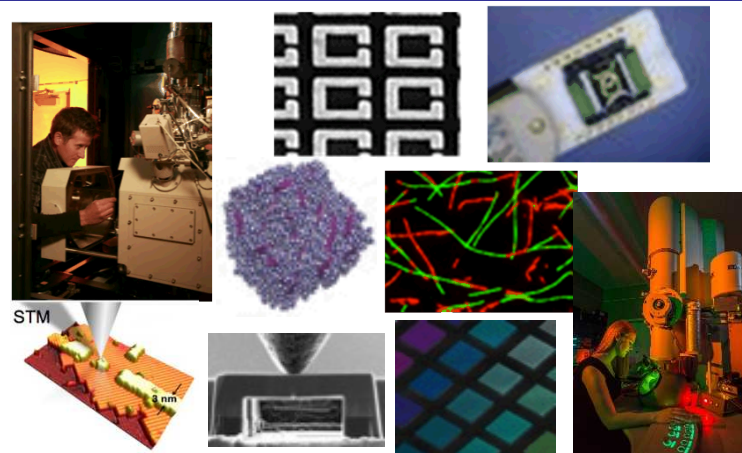
Laboratory for Ultrafast Materials & Optical Science (LUMOS) at LANL



# 10 Years of Innovation



**Supported over 3,000 users from around the globe**



**World leading capabilities & expertise**



**2,000+ journal publications**

**Award winning user projects**



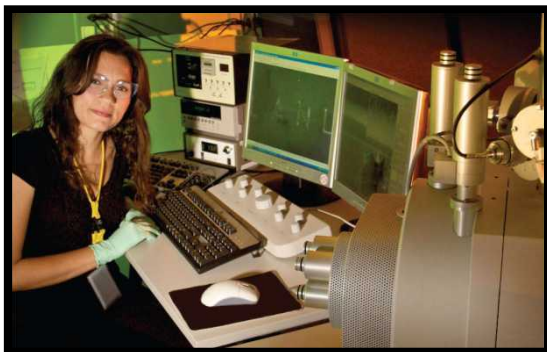


# Becoming a CINT User

Fall 2016 Call for Proposals Now Open

**Submission Deadline: September 30, 2016**

Proposal Submission & Additional Information  
available at: <http://cint.lanl.gov>





# CINT Transition Leadership Team

## Executive Management Team



**Mary Hockaday**

Associate Director, Experimental Physical Sciences, LANL

**Marianne Walck**

Vice President, Research & Development Science  
Energy & Climate, SNL

**Tanja Pietrass**

Division Leader, Materials Physics Applications, LANL

**Grant Heffelfinger**  
Acting Director

**Grant Heffelfinger**  
Director, Physical, Chemical, & Nano Sciences Center, SNL



**TBD**

Los Alamos Co-Director



**TBD**

Sandia Co-Director



**Heather Brown**

User Program Manager



**Cathy Jo Beecher**

Outreach Coordinator





# CINT Science Leadership Team

**Nanoscale  
Electronics  
& Mechanics**



**Brian Swartzentruber**

**Nanophotonics  
& Optical  
Nanomaterials**



**Steve Doorn**

**Soft, Biological  
& Composite  
Nanomaterials**



**Millie Firestone**

**Theory & Simulation  
of Nanoscale  
Phenomena**



**Gary Grest**

**Thrust  
Leaders**

**Partner  
Science  
Leaders**



**Nate Mara**



**Igal Brener**



**George Bachand**



**Jianxin Zhu**



# CINT User Executive Committee (UEC)



**Don Lucca, Chair**

Oklahoma State University



**Judith Driscoll**

University of Cambridge



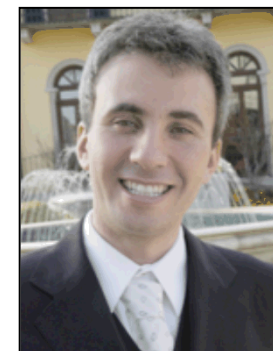
**John Grey**

University of New Mexico



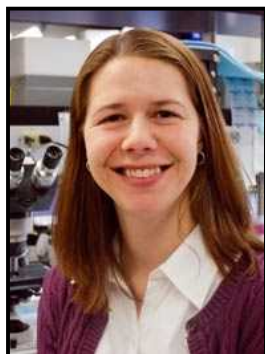
**Karen Winey**

University of Pennsylvania



**Tito Busani**

University of New Mexico



**Diane Lidke**

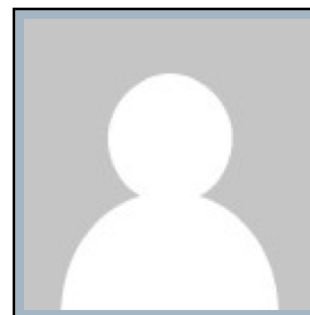
University of New Mexico



**Erika Vreeland**

Senior Scientific

**Industrial Advisor**



**TBD**

TBD

**Postdoc Representative**



**Eric Shaner**

Sandia National Laboratories

**Internal Lab Representative**

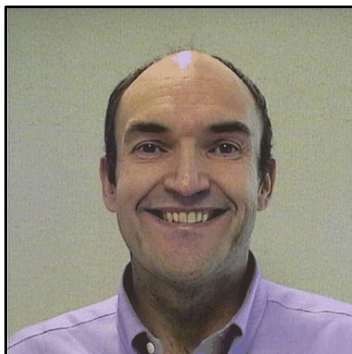
Dr. Don Lucca, CINT UEC Chair ([lucca@okstate.edu](mailto:lucca@okstate.edu)) Heather Brown, CINT User Program Manager ([hdbrown@sandia.gov](mailto:hdbrown@sandia.gov))



# CINT Line Management Team



**Alex Lacerda**  
Deputy Group Leader,  
MPA-CINT



**Bill Seng**  
Acting Sr. Manager,  
Integrated Nanotechnologies



**Sean J. Hearne**  
Manager,  
Nanosystems Synthesis  
& Analysis

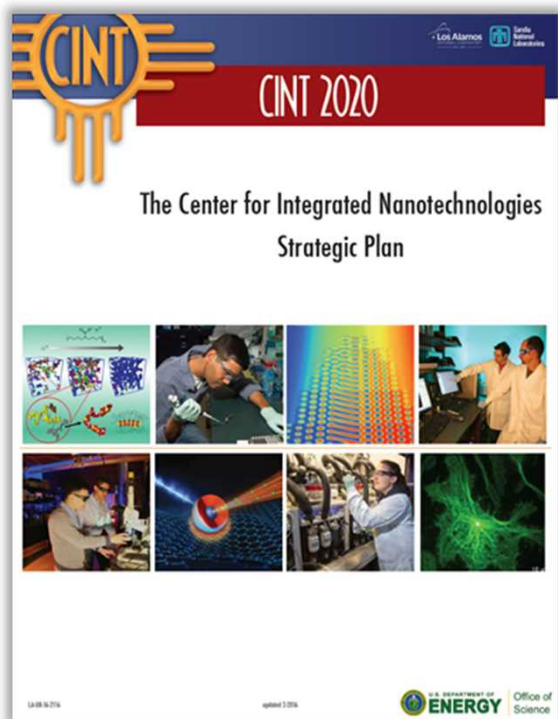


**Ryan Wixom**  
Manager,  
Nanostructure Physics





# Our Current CINT Strategy



CINT2020 with input from CINT, user community/UEC (2014 and 2015 CINT User meetings), SAC, and host institutions

## Selected challenges in nanomaterials integration

- ◆ Innovative nanofabrication, integration, and “up-scaling” methods to incorporate quantum-size nanostructures into arbitrary 2D and 3D architectures
- ◆ Hybrid material interactions for generation and manipulation of light
- ◆ Hierarchical structure & dynamics in soft matter

## These integration challenges serve to

- ❑ differentiate CINT from the scientific directions of other NSRCs
- ❑ enable us to identify and provide the capabilities that the nanoscience research community will need.



# User Meeting Agenda

---

## Plenary Speakers

**Dimitri Basov**, Columbia University

“Quantum materials: insights from infrared nano-optics”

**Thomas Mallouk**, Pennsylvania State University

“Assembly and Disassembly of Layered Solids”

**Juan de Pablo**, University of Chicago

“Nanoparticles in Liquid Crystals, and Liquid Crystals in Nanoparticles”



# User Meeting Agenda

## Symposia

### Quantum Materials Integration

Mike Lilly



Han Htoon



### Electrochemical Nanostructures: Mesoscale Architectures & Integration

Sang Bok Lee



Katherine Jungjohann



### From Molecules to Integrated Structures – Assembly and Fabrication across Length Scales

Dale Huber



Millie Firestone







# User Meeting Agenda

---

**Poster Session**



**COHERENT®**

**Millipore  
Sigma**

**CINT 10<sup>th</sup> Anniversary Dinner – Celebrating 10 Years of Innovation**

**Users Executive Committee Town Hall – all welcome**

**Closing Lunch**

**Nexus & NEES II Meeting**



# Old/backup

---



# CINT UEC – Your Voice

- The CINT Users Executive Committee (UEC) is an elected body of former and/or current CINT users.
- The UEC provides input from the greater CINT user community and advocates on behalf of facility users to the CINT program management team, regarding:
  - Operations
  - New capabilities
  - Strategic planning
  - Proposal reviewers
  - Quality of the user experience
- An online UEC election will be held in the Spring of 2017. If you are interested in serving on the committee, please provide your name and contact information on the meeting feedback form. If you would like to nominate a candidate for the committee, please contact the UEC Chair.
- For more information, please visit our website:

<http://cint.lanl.gov/becoming-user/users-association.php>





***Thank you*** to the user community from CINT!





# CINT Management Team *Transitions*

## September, 2015



**Neal Shinn**  
Director



**Quanxi Jia**  
Co-Director



**Antonya Sanders**  
Communications &  
Outreach Manager



**Heather Brown**  
User Program Manager