



The National Institute for Nano-Engineering

A Discovery Science & Engineering Innovation Institute

A new DOE – University – Industry partnership for science & engineering workforce development and innovation partnerships



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NINE is a nationwide network of partners...

... who are joining together to support innovation, workforce development and economic competitiveness in Nano-Engineering.



The world has changed!

Important trends have increased the urgency for a new approach

Narrowing lead across all categories



R&D deg Patents Publicat. Researc. BS deg Doc

Foreign government, university, industry partnerships are addressing strategic technical areas



59% of engineering Ph.D.s from US universities earned by foreign nationals!

Industrial research labs no longer carry the innovation burden for the U.S.



Bell Laboratories

EXXON

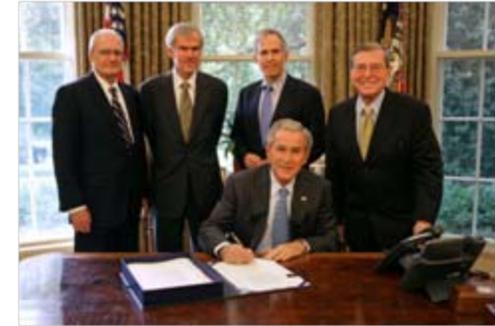
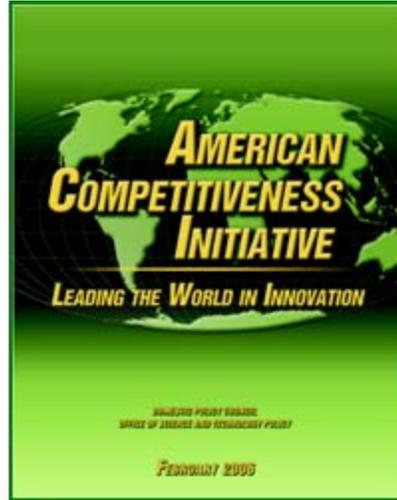
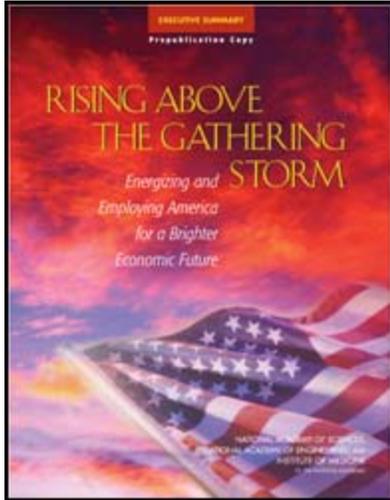


DU PONT

The miracles of science™



Preparing the U.S. for the Future



America COMPETES Act
enacted 8/9/2007

Assuring U.S. innovation leadership in a time of increasing global competition:

- Reduce the cycle time for innovation - partnerships
- Develop future talent – depth & breadth, diversity, rich experiences
- Fully capitalize on existing investments
- Address critical national issues

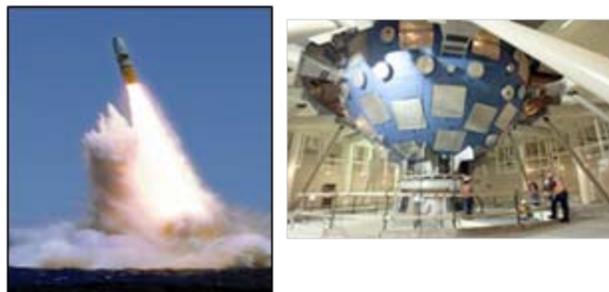


DOE is in a position to “Change the Game”

Assuring a sustainable energy future



Ensuring National Security



Nurturing the nation's S&T base



- Important national missions
- Unique national facilities around the country
- >21,000 DOE scientists & engineers
- The largest supporter of physical science research



A vision for the next decade: Partnering for workforce development & innovation

Discovery Science & Engineering Innovation Institutes

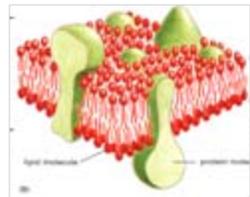
Young, diverse talent



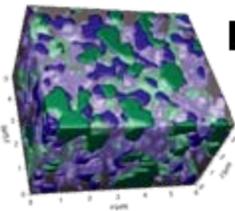
Transformed education



Broad collaborations



Compelling national research



State-of-the-art facilities



Lab & industry mentoring

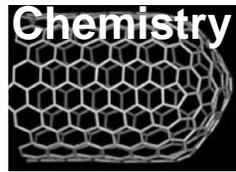
OUTCOMES

- Future science & engineering leaders
- New breakthroughs
- Outreach & expanded partnerships
- Enhanced lab vitality
- Enhanced economic competitiveness



Prototyping the Innovation Institute Concept: *National Institute for Nano-Engineering*

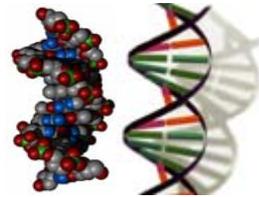
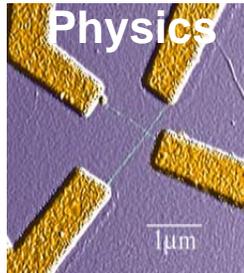
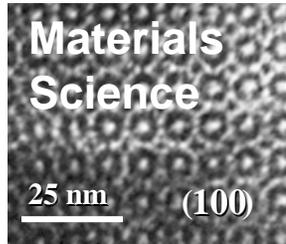
Nano-engineering will be a critical competitive hinge for the U.S.



Theory & Modeling



- New electronics
- Sensors
- Catalysts
- High-performance materials
- Energy storage
- Optics
-



NINE Mission: Help develop the next generation of engineering leaders needed to drive future innovations in micro- and nano-technology





NINE is designed to meet each partner's needs

■ Sandia, DOE, and the nation

- Innovative solutions to difficult national security problems, including defense, energy, workforce, economic security

■ Universities, their students and faculty

- Exciting large scale research opportunities for students and faculty, access to top facilities and Intellectual Property ownership

■ U.S. industry

- Financial leverage for innovative pre-competitive research, IP in areas key to future markets and access to top new hires





Sandia seed funding has been used to initiate NINE

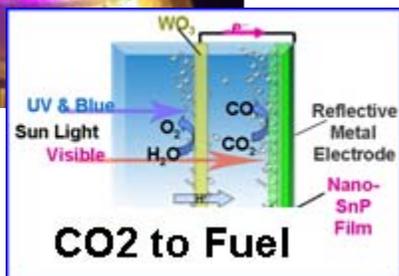
- \$7.5M seed funding
- 15 projects
- ~40 students, ~18 faculty
- Six industry partners
- Twelve University Partners



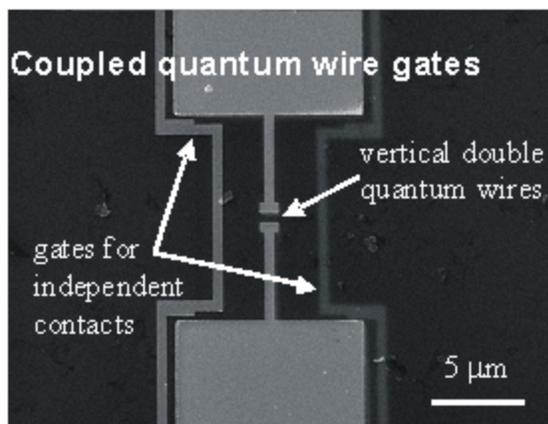
NINE 2007 summer class

Three theme areas have been initiated with the NINE partners

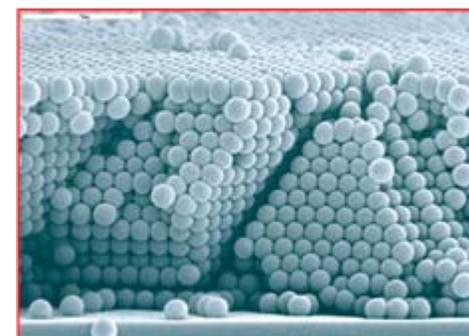
Nano-based energy technologies



Next-generation Nanoelectronics



Nanomaterial processing & manufacturing



NINE builds on Sandia's strong science & technology infrastructure

Workforce Development & Innovation Partnerships



“Sandia’s facilities are unique in combination and provide the ability to produce prototype nano-micro technology systems involving multiple facilities and capabilities, a difficult opportunity for universities to provide their students.” – David Duquette, RPI and Kevin Jones, Univ.of Florida.

Center for Integrated Nanotechnologies



Discovery science & user support

High performance computing



Platforms & codes

Microsystems & Engineering Sciences Applications



Technology development & product realization



Office of Basic Energy Sciences



Next Steps for NINE



- Complete formation of the NINE consortium
- Hold Technical Workshops to determine pre-competitive R&D priorities, certify mission relevance, and select specific projects
- Collect funds from government and industry to support projects
- Fund \$1M/yr, multi-year nano-engineering projects with teams of researchers and students from Sandia, universities, industry

With approval by DOE, the NINE DSEII can begin operation in early FY09.



NINE's Mission

Create the next generation of Nano-Engineering innovators and enable the nation to benefit from their innovations ...



Students

Mentors

Facilities

Technical Depth

Leadership

Breadth

Multi-disciplinary Teams

**Global
Innovation
Leaders**

**A new GUI
approach!**



MESA



CINT

A new result!

... through work on nationally important projects with Sandia facilities and mentors, University participation and Industry support and guidance.

