



# National Institute for Nano Engineering

The National Institute for Nano Engineering (NINE) is a government/university/industry collaboration formed to develop the next generation of innovation leaders for the U.S. by involving students in large scale multi-disciplinary research projects focused on developing nano-enabled solutions to important national problems. NINE addresses a growing national concern; that America's science and engineering education and innovation engine is in danger. The America COMPETES Act, signed in August 2007, provides a national strategy to address this concern.

In accord with this strategy, NINE was established as a national innovation hub in the exciting and rapidly developing field of nano-engineering. NINE is intended to be the model of a novel partnership between universities and companies throughout the nation and the Department of Energy (DOE), with Sandia National Laboratories (Albuquerque, NM) as the host lab for NINE.



## **Opportunities for University Students and Faculty**

NINE graduate and undergraduate students are involved in technical projects that develop nano-enabled solutions to important national problems ranging from national security to energy. These projects emphasize pre-competitive research in a highly collaborative environment combining students with Sandia and industry mentors and university faculty. They capitalize on DOE's extensive investment in micro/nano R&D equipment and facilities at Sandia together with facilities at partners' sites. NINE graduate students will have thesis projects that are part of the NINE research program and will work during summers at Sandia or at industry partner sites. NINE's technical projects are selected with input from partners to ensure high application and economic value.

Retaining and motivating top undergraduates to obtain advanced degrees is a NINE priority. To accomplish this, NINE supports the selection of promising undergraduates by NINE faculty to participate with graduate students in NINE projects at their university during the academic year. In addition, they have opportunities for summer industry or Sandia internships.

NINE also provides students novel exposure to other innovation-relevant topics including business, legal, communications, political, and social considerations through mentors, courses, seminars by world-leading experts, and real-world experiences. Access to outstanding distance learning opportunities provided by NINE universities will also be available.

Students can access the NINE program through NINE university faculty members.

## **Opportunities for NINE Partners**

NINE provides unique opportunities for its industry, university, and government partners based on its nationwide network of top researchers, students, facilities and on-going programs in nano-engineering.

### **Industry Partners**

Through NINE, U.S. industry partners have:

- access to a nationwide network of the best and brightest nano-science and engineering students and faculty from many top U.S. universities
- a voice in selecting focus areas and the specific pre-competitive nano-engineering research projects to be funded by NINE
- early access to technical project results
- financial leverage from DOE's co-funding of NINE's R&D program, project access to Sandia facilities, and co-funding by other industry partners

Industry partners are expected to participate in NINE activities, provide two summer internships for NINE students, and pay annual dues that will be used to co-fund NINE research projects selected by its members and to pay for patents resulting from NINE projects.



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For more information, visit [www.sandia.gov/NINE](http://www.sandia.gov/NINE)

## University Partners

NINE provides its university partners

- involvement in a nationwide network of top nano-engineering institutions including project guidance from industry partners
- support for innovative nano-engineering curriculum development and teacher outreach programs
- opportunities for involvement of selected graduate and undergraduate students and their faculty in large, multi-disciplinary NINE funded projects of national importance including work on-site at Sandia as well as at their home universities
- opportunities for students to learn about concepts and issues not usually part of a technical curriculum such as business, legal, political, and social issues related to nano-engineering as well as communications and teaming skills

University partners are expected to be nationally recognized leaders in nano-engineering research, participate in NINE activities, respond to NINE proposal calls, and provide predominantly U.S. citizen students and faculty to participate in NINE projects.

## Sandia National Laboratories and DOE

NINE involves Sandia organizations and mentors in projects that are strategic to its customers and synergistic with its strengths. Top students, faculty, and industry researchers come to Sandia, contribute to its knowledge base, and become partners in its work.

## Intellectual Property

NINE-sponsored inventions will be owned by the inventing organization(s). NINE will pay the costs of patenting selected inventions and of maintaining and licensing the patents to NINE members. Patented inventions created during NINE projects will be made available to all NINE members in good standing. Industry members receive a non-exclusive, paid up license to make, use, sell products, and practice methods covered by the patents. University members have the right to conduct further research and development on NINE inventions.

## Opportunities for Teachers

To address the long-term talent pipeline, NINE will sponsor an outreach program for K-12 teachers. This program will support teacher-led development of nano science and technology learning modules and demonstration kits to provide student of all levels the opportunity for hands-on learning. Teachers developing these modules will be supported by faculty, students, and Sandia mentors. The NINE program will also provide opportunities for teachers to participate in week-long Nano Science &

Engineering Expos during which teachers and students come to Sandia to experience leading-edge science and technology.



## NINE Status

This year NINE initiated 14 new projects supported by a \$7.5M Sandia investment. This summer it held its first Summer Student Program attended by 33 undergraduate and graduate students from 14 universities.

All NINE members have agreed to support and actively participate in bringing together the strong science and engineering capabilities of Sandia, leading universities, and companies who are among the world's technology leaders, to help develop the next generation of innovators and innovations and bring these to bear on the nation's most challenging problems. A near-term goal for NINE members is to support the creation of Discovery Science and Engineering Innovation Institutes (DSEII) by DOE and encourage the selection of NINE as one of these.

## Initial NINE Members

**Government:** Sandia National Laboratories

**Industrial Partners:** Corning, Exxon Mobil, Goodyear Tire and Rubber, Hewlett Packard, IBM, Intel, Lockheed Martin, Proctor & Gamble

**University Partners:** Harvard University, Harvey Mudd College, Notre Dame University, Rice University, Rensselaer Polytechnic Institute, University of California at Davis, University of Florida, University of Illinois, University of New Mexico, University of Wisconsin, University of Texas at Austin, Yale University

NINE expects to expand its membership in all categories once it is selected as a DSEII.

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