

NANOELECTRONICS RESEARCH INITIATIVE: A Model Government-Industry Partnership Promoting Basic Research

A Global Race to Develop the Next Switch

Semiconductor technology advances have allowed ever more sophisticated electronics products for over six decades, but as key critical circuit layers shrink to a few atoms thick, further progress may be impossible. The country that is first to develop the new technology will lead the nanoelectronics era much as the U.S. has led the microelectronics era for the past 50 years, and many nations are supporting research programs to gain this advantage.

The **Nanoelectronics Research Initiative (NRI)**, managed through the Semiconductor Research Corporation (SRC), supports university research finding a replacement technology to allow faster, smaller, more energy efficient devices beyond the limits of today's semiconductor technology

Industry, Universities, & Government Partner on the Challenge

- Semiconductor industry leaders like GLOBALFOUNDRIES, IBM, Intel, Micron, and Texas Instruments contribute millions of dollars annually to this effort. Government and university support leverages these funds for a combined total of approximately \$20 million annually, supporting nearly 40 universities, 75 professors, and 150 students in 20 states.
- In addition to directly supporting the NRI centers, the **National Science Foundation (NSF)** accepts NRI funding for projects at the NSF Nanoscience Centers across the U.S., which not only leverages NSF's large investments to fuel basic science and support students, but also helps promote research in relevant areas for future nanoelectronics innovation.
- The **National Institute of Standards and Technology (NIST)**, which directly supports the four NRI multi-university centers and also lends its metrology expertise. Advancing nanoelectronics requires measuring structures with atomic accuracy, characterizing new materials and molecules, and even measuring the signals from individual electrons – if we can't measure it, we can't make it.
- State governments in California, Indiana, New York, and Texas and the City of South Bend are investing in the NRI in recognition of the significant employment benefits that will follow commercialization of nanoelectronic technology.

“NRI is a proven model based on SRC's 30 years of experience of funding this type of research. It leverages modest resources from the government, couples them with industry funding and university support, and sustains research that is absolutely critical to our Nation's economic prosperity.”

Dr. Jeff Welser, IBM,
director,
Nanoelectronics
Research Initiative

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Science Committee

Continuing NRI's Success: Action Requested

Since its inception in 2005, NRI has produced 600 technical publications and 19 patent disclosures. Still this basic research is just beginning and the initial efforts are small compared to the government's efforts in the 1940's and 1950's which led to the early semiconductor inventions. Nanoelectronics research must grow significantly over the next several years. Congress should continue to fund NSF and NIST budgets that support nanoelectronics research.

SRC NRI Funded Universities
Finding the Next Switch

