



National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230

NSF-SIA/NRI Graduate Student and Postdoctoral Fellow Supplements to NSF Centers in Nanoelectronics (NSF 07-051)

Submission Deadline: December 12, 2007.

Dear Colleague:

In 2005 and 2006,¹ the National Science Foundation (NSF) undertook a cooperative effort with the Semiconductor Industry Association (SIA) through the industry's Nanoelectronics Research Initiative (NRI), a consortium of six participating SIA member companies,² to provide supplemental funding opportunities to NSF centers involved in long-term nanoelectronics research. The supplemental funding supports additional graduate students and postdoctoral fellows to work in collaborative efforts with participating NRI company assignees on exploring new concepts beyond the scaling limits of CMOS (Complementary Metal Oxide Semiconductor) technology. Such efforts are intended to enhance nanoelectronics research and education, strengthen industry linkages with NSF centers, and develop future cadres of industry and faculty researchers to help drive the field.

The NRI's goal is to encourage exploratory nanoelectronics research at universities on topics with the potential for maintaining the historical scaling of both computational power and cost of information processing (<http://nri.src.org/>). NSF is leveraging its significant fundamental research investments in nanoelectronics that have been made through its National Nanotechnology Initiative investment and its core programs in nanoscale science and engineering (<http://www.nsf.gov/crssprgm/nano/>). These research investments contribute to the fundamental research base and the creation of new knowledge that are critical to sustaining the U.S. leadership and competitiveness in the global semiconductor industry.

NSF and NRI are continuing this cooperative supplement opportunity in 2007. The supplements

will support only research that is consistent with the mission of the NSF centers and has the potential to meet the needs of the NRI: (i) discovery of a novel non-charge based logical switch as a successor to CMOS technology; and (ii) novel architectures for efficient computation with post-CMOS devices. NSF and NRI will each provide \$1,000,000 in funds, for a total investment of \$2,000,000, subject to the availability of funds. This will allow approximately five NSF centers to receive supplemental awards, in the range of \$300,000 to \$500,000 total funding each, for duration of three years. All NSF centers and networks involved in nanoelectronics research are eligible to apply, including those that were awarded supplements in the previous competitions. They must, however, have an active award that extends for the duration of the supplement award.

For newly competing NSF centers, the supplement request should include: (1) summary of the center's current research in the area of nanoelectronics, and (2) description of the proposed new work on exploratory beyond-CMOS research in which the additional graduate students and/or postdoctoral fellows would be involved. The request must also include a letter of support from the NERC. Early contact with industry via NERC is necessary to secure this support letter, and applicants are strongly encouraged to contact the NERC director at least one month in advance of the submission deadline. NERC will assign an industry liaison to assist in the development of industry-relevant aspects of the proposed plan.

For NSF centers that were awarded supplements in the previous competitions,³ the supplement request should include: (1) summary of the center's current research in the area of nanoelectronics, (2) progress report for previous supplements including involvement of industry assignees, and (3) description of the proposed new work on exploratory beyond-CMOS research in which the additional graduate students and/or postdoctoral fellows would be involved. The proposed new work must differ significantly from previous supported supplement topics. The request must also include a letter of support from the NERC.

Supplemental funding requests must be prepared in accordance with the NSF Award and Administration Guide (http://www.nsf.gov/pubs/policydocs/papp/aag_1.jsp#IE4), Chapter I.E.4, and be submitted electronically via FastLane. The length of the supplement request discussion should not exceed six text pages. Following submission of the supplement to FastLane, please email confirmation to NSF-NRIsupplement@nsf.gov giving the supplement number assigned by FastLane, the name of the PI and of the NSF center, and the title of the supplement. This will assure that we accurately track all submissions. The deadline for submission of supplement requests via FastLane is 5 pm local time, December 12, 2007.

Supplement requests will be reviewed internally by NSF program officers from the participating directorates. Award decisions will be made jointly by NSF and NERC on topics of interest to NRI participants consistent with the mission of the respective NSF centers.

NSF and NERC will use their own award mechanisms in jointly funding these supplements.

NSF support will be provided up-front as supplemental funding to the existing awards. NRI funds will be awarded as unrestrictive gifts, with no overhead or intellectual property requirements. NSF and NERC will provide joint oversight for the supplemental awards. Annual progress reports on work conducted under the supplemental funding will be submitted to NSF and NERC, and participation in the NRI annual review is expected.

Please contact the following officials should you need additional information:

- Directorate for Engineering
 - Lawrence S. Goldberg, E-mail: lgoldber@nsf.gov
- Directorate for Mathematical and Physical Sciences
 - Ulrich Strom, E-mail: ustrom@nsf.gov
- Directorate for Computer and Information Science and Engineering
 - Sankar A. Basu, E-mail: sabasu@nsf.gov
- Nanoelectronics Research Corporation (NERC)
 - Jeffrey Welser, E-mail: jeff.welser@src.org

Sincerely,

Richard O. Buckius
Assistant Director for Engineering

Tony F. Chan
Assistant Director for Mathematical and Physical Sciences

Jeannette Wing
Assistant Director for Computer and Information Science and Engineering

¹ NSF 05-598 NSF 06-051

² NRI is administered by the Nanoelectronics Research Corporation (NERC), a subsidiary of the Semiconductor Research Corporation (SRC). Six SIA member companies are participating in NRI, and in this supplement opportunity: Advanced Micro Devices, Freescale Semiconductor, IBM, Intel, Micron Technology, and Texas Instruments.

³ 2005: NCN: Network for Computational Nanotechnology (Purdue); MRSEC: Center for Nanoscopic Materials Design (U Virginia, Notre Dame); NSEC: Center for Electronic

Transport in Molecular nanostructures (Columbia); Materials Research Science and Engineering Center (UC Santa Barbara); NSEC: Science of Nanoscale Systems and their Device Applications (Harvard); and MRSEC: Center for Semiconductor Physics in Nanostructures (U Oklahoma, U Arkansas).

2006: NSEC: Center for Nanoscale Systems in Information Technologies (Cornell); MRSEC: Center for Nanoscopic Materials Design (U Virginia, UC Santa Barbara, Notre Dame); NCN: Network for Computational Nanotechnology (Purdue); MRSEC: Quantum and Spin Phenomena in Nanomagnetic Structures (U Nebraska-Lincoln, U Nebraska-Omaha); MRSEC: Center for Research on Interface Structures and Phenomena (Yale); and Materials Research Science and Engineering Center (U Maryland, U Texas-Austin).