National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230

Title: NSF-NRI Graduate Student and Postdoctoral Fellow Supplements to NSF Centers in Nanoelectronics (NSF 09-016)

Submission Deadline: February 20, 2009.

Dear Colleague:

Since 2005,[1] the National Science Foundation (NSF) has undertaken a cooperative effort with the Semiconductor Research Corporation (SRC) through the semiconductor industry's Nanoelectronics Research Initiative (NRI), a consortium of six participating Semiconductor Industry Association (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.

NRI is encouraging 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 for a fourth year. The research topics eligible for supplemental funding must be consistent with the goals of the NSF centers. The research topics must also align with the goals of NRI to find a novel, non-FET based logic switch as a successor to CMOS technology. NRI is focused primarily on research on devices utilizing new computational state variables beyond electronic charge. NRI is also interested in non-charge based interconnect technologies and novel circuits and architectures, including non-equilibrium systems, for exploiting

[1] NSF 05-598; NSF 06-051; NSF 07-051
[2] NRI is administered by the Nanoelectronics Research Corporation (NERC), a subsidiary of the 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.

these devices, as well as improved nanoscale phonon management and novel materials and fabrication methods for these structures and circuits.

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 five or six NSF centers to receive supplemental funding, 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 supplemental funding.

For newly competing NSF centers, the supplemental funding 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 attach, as a Supplementary Document, 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 prior to the submission deadline. NERC will 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 supplemental funding 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, Chapter I.E.4, and be submitted electronically via FastLane. (See: http://www.nsf.gov/pubs/policydocs/pappguide/nsf08_1/aag_1.jsp#IE4). The length of the supplemental funding request summary of proposed work should not exceed six text pages. Following submission of the supplemental funding request to FastLane, **please email confirmation** to NSF-NRIsupplement@nsf.gov giving the supplement number assigned by FastLane, the name of the PI, the name of the NSF center, and the title of the supplement. This will assure that we accurately track all submissions. The deadline for submission of supplemental funding requests via FastLane is 5 pm local time, February 20, 2009. Proposers should contact NERC at least one month prior to this deadline in order to secure a letter of support in time.

Supplemental funding requests will be reviewed internally by NSF program officers from the participating directorates. Funding decisions will be made jointly by NSF and NERC

[3] See NSF web site at: http://www.nsf.gov/nano/ for listing of supplement awards from FY2006-2008.

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 supplement awards. Annual progress reports on work conducted under the supplement 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
  - Thomas Rieker, E-mail: trieker@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,

Michael M. Reischman
Acting 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