

RA S201209

FCRP Research Announcement

Point of Contact: fcrp-s201209info@src.org

PROGRAM OBJECTIVES AND DESCRIPTION

The Focus Center Research Program (“FCRP”), a consortium of industrial participants and the Defense Advanced Research Projects Agency (“DARPA”), (the “Consortium”), solicits white papers from U.S. universities for collaborative, multidisciplinary, multi-university research in selected areas of principal interest.

The goal of this collaborative effort between the Department of Defense and the industrial participants is to increase substantially the unprecedented multi-decade record of uninterrupted performance improvement in information processing power and storage capacity of integrated circuits and related systems. This historical advance in IC and related systems technologies resulted from research and development efforts that benefitted both the military and industrial sectors. It has provided the Department of Defense with an unmatched technological edge in advanced weaponry and provided the U.S. economy with the productivity enhancements critical to U.S. economic growth.

The Consortium seeks to address emerging challenges in semiconductor and systems technologies by concentrating resources on high-risk, high-payoff, long-range innovative research to accelerate the productivity growth and performance enhancement of semiconductor integrated circuits and multi-scale systems. To this end, the FCRP is focused on exploratory research beyond the horizons of the International Technology Roadmap for Semiconductors (ITRS), and seeks to undertake off-Roadmap opportunities.

A two phase selection process will be used:

1. First, a "Proposers' Conference" will be held to review this solicitation with interested university teams. A white paper is then requested to outline a university team's proposal for a Center. These white papers will be reviewed by the Consortium, and the most promising will be selected to invite full proposals. The university teams selected to submit full proposals may be given feedback by the Consortium on ways they could strengthen their proposal to meet the research goals, i.e., there will be an opportunity for these teams to discuss potential collaborations to create combined Centers.
2. Second, full proposals for multi-university Centers will then be submitted for final selection for award by the FCRP Governing Council of the Consortium. The selection timeline is given below:

Research Announcement Release	April 23, 2012
Bidders' Workshop	May 14
White Papers Due:	June 15
Response to White Papers	July 9
Full Proposals Due	September 14
Proposals Selected for Award:	October 15
Contracts Completed	January 15, 2013
Launch Centers	January 15

This FCRP will be administered on behalf of the Consortium by the Microelectronics Advanced Research Corporation (“MARCO”). MARCO is a not-for-profit, special purpose entity established to support the Consortium participants. It operates under the direction of the FCRP Governing Council and in support of the FCRP Science Advisory Board. The Consortium participants will evaluate all proposals submitted in accordance with this Research Announcement and the associated Proposer Information Pamphlet (<http://www.src.org/compete/s201209/>). Selection of proposals for award shall be made by the Governing Council of the Consortium.

This solicitation is open to all U.S. universities and shall be conducted on a competitive basis. Universities are encouraged to join together to achieve the depth and scope needed to address the technical content of this Research Announcement. Proposed collaboration among PIs and universities, in the form of Centers or otherwise, should identify a lead university and lead PI for purposes of an award and consummation of a sponsored research agreement with the Consortium.

As a participating member of the Consortium, DARPA is bringing the FCRP Research Announcement to the attention of U.S. universities and is utilizing its own website (www.DARPA.mil) and the official federal acquisition opportunities website (www.FedBizOpps.gov) for this purpose. In addition, this Research Announcement has been posted at <http://www.src.org/compete/s201209/>.

This Research Announcement represents a new phase in the continuing FCRP. The Consortium intends to continue with the solicitation, contracting and reporting requirements that it has used in earlier program phases.

Cross-sharing between universities is strongly encouraged, but only U.S. institutions of higher education or their associated research institutions will be considered for funding.

The Consortium seeks proposals addressing one or more of the following seven focus technology areas which are organized into two major thrusts:

NEXT: Highly Complex Systems

Technology Areas for NEXT – The mission of the NEXT thrust area is to enable highly complex systems with capabilities well beyond those available today, i.e., to augment beyond the “sum of the parts.”

- 1. High performance analog devices for high speed wireless, THz electronics for imaging, sensing, novel power devices:** New analog and mixed signal circuit architectures and techniques are needed that enable the efficient transmission (generation), reception (sensing), manipulation and processing of analog signals (information) as well as conversion of analog signals to the digital domain.
- 2. Vehicle and Distributed Sensor Networks:** Designs and implementation of integrated modular architecture (IMA) communication networks (i.e. distributed systems) are needed, including methodology and tools to support the choice of synchronous/asynchronous communication systems and the co-design of functionality and implementation platforms.
- 3. Computing System Architectures based on CMOS technology:** Research is needed on highly parallel computing including data and interconnection architecture for nonconventional computing systems based on CMOS.
- 4. Tools and methods for design, verification, and predictive modeling, including physical modeling:** Research is needed that explores and develops the tools that will enable realization of new systems, components, and technologies that will be developed in the 10 year timeframe.

ACCEL: Semiconductor Technologies beyond CMOS

Technology Areas for ACCEL – The mission of the ACCEL thrust area is to identify and accelerate progress for new mainstream technologies beyond digital CMOS

- 1. Nonconventional material systems:** Research is needed for improved and novel materials that enable three basic technologies: analog, memory and logic devices.
- 2. Quantum engineered devices and new sensors and transducers:** Next generation technologies based on exploiting quantum level physics to provide capabilities well beyond state-of-the-art. Efforts should accelerate the integration of new material systems and quantum phenomena as the basis for the era beyond CMOS based devices. Preference will be given to ideas that have a clear path towards stable use in applications, e.g., at room temperature and with minimal shielding. Research is needed to identify new devices and sensors that can move the integrated circuit for computation and analog processing into the era of Beyond CMOS circuits.

- 3. Integrated circuits and computing architectures based on novel devices including both digital and analog:** This research topic is chartered to find a new energy efficient architecture to replace the Von Neumann Computer Architecture and to optimize the overall performance and energy usage by optimally partitioning the computational system between signal processing in the analog domain at an I/O interface, and computation in the digital domain.

Each of these areas is of equal technical importance for proposal purposes. Offerors may propose innovative research in one or more areas. Additional information on these technology areas is provided in the Areas of Interest section of the *RA S201209 FCRP Proposer Information Pamphlet* referenced above.

Additionally, a separate solicitation may be offered at a later date for exploratory, individual project proposals in areas related to these thrusts.

PROGRAM SCOPE

Following proposal selection, awards pursuant to sponsored research agreements with the Consortium will be made as appropriate, for base periods of up to five years, to accommodate student education and provide adequate time for discovery and progress in new areas. The research is expected to start in **January 2013**. There will be a checkpoint at 2.5 years to allow for re-direction as needed within the Centers; this will not be a re-competition. Overall program funding may reach a level of \$40M per annum, depending on research progress and availability of funds. The funds may not be equally divided among Awardees. The technical point-of-contact for this effort is the Director, FCRP (fcrp-s201209info@src.org).

GENERAL INFORMATION

Proposers should review the document entitled “RA S201209 FCRP Proposer Information Pamphlet”, which provides further information on areas of interest, the submission, evaluations, funding processes, proposal formats, and other general information. This pamphlet may be obtained from the web site at <http://www.src.org/compete/s201209/pip-S201209.pdf>, by electronic mail (fcrp-s201209info@src.org), or by U.S. mail request to the administrative contact address given below. White papers and subsequent proposals not meeting the format described in the pamphlet may not be reviewed. Offerors must submit all white papers and proposals as a single pdf document via the SRC FCRP Web Site.

This notice, in conjunction with the *RA S201209 FCRP Proposer Information Pamphlet* (<http://www.src.org/compete/s201209/pip-S201209.pdf>), constitutes the total Research Announcement. No additional information is available, nor will a formal Request for Proposals (RFP) or other solicitation regarding this announcement be issued. Requests for the same will be disregarded. The Consortium reserves the right to select for award all, some, or none of the proposals received. All responsible sources capable of satisfying the FCRP needs may submit a proposal, which shall be considered by the Consortium. Historically Black Colleges and Universities (HBCU) and Minority Institutions (MI) are encouraged to submit proposals and join others in submitting proposals; however, no portion of this RA will be set aside for HBCU and MI participation.

Any objections to the terms of this Research Announcement or the *RA S20129 FCRP Proposer Information Pamphlet* must be presented in writing within fifteen (15) calendar days of the online

publication of this RA. Any objections to the conduct of receipt, evaluation or award of contract must be presented in writing within the ten (10) calendar days of the date the objector knows or should have known the basis for its objection. Objections must be provided in letter format, clearly stating that it is an objection or protest to this RA or to the conduct of evaluation or award of a contract, and providing a clearly detailed factual statement of the basis for objection. Objections must be received at the address stated above for delivery of proposals within the times indicated in order to be considered. Other administrative correspondence and questions related to this solicitation, including requests for information on how to submit a proposal, should be directed to: fcrcp-s201209info@src.org.

EVALUATION CRITERIA

Evaluation of white papers and later proposals will be accomplished through a technical review of each white paper and proposal using the following criteria, which are listed in descending order of relative importance:

1. Overall scientific and technical merit
2. Ingenuity, novelty, and impact of overall Center and new frontier projects
3. Impact of proposed research (potential contributions to the Consortium missions)
4. Capabilities of proposed investigators
5. Cost effectiveness, realism

Cost realism will be significant only for white papers and proposals that have seriously over- or underestimated the cost to complete.