Special Notice

Joint University Microelectronics Program 2.0 (JUMP 2.0)
DARPA-SN-22-16
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Defense Advanced Research Projects Agency
Microsystems Technology Office
675 North Randolph Street
Arlington, VA 22203-2114

SPECIAL NOTICE DARPA-SN-22-16
Joint University Microelectronics Program 2.0
E-MAIL: JUMP2.0-Solicitation@src.org

Description

This Special Notice serves to inform the research community that the Semiconductor Research Corporation has posted a new solicitation for the Joint University Microelectronics Program 2.0 (JUMP 2.0) on their website at https://www.src.org/compete/.

Background

The Defense Advanced Research Projects Agency (DARPA) has a long history of supporting long-term, pathfinding university research through public-private partnerships that drive disruption in microelectronics. The Focus Center Research Program (FCRP) consortium was established in 1998 to maintain the historic productivity growth curve of semiconductor technology driven by Moore's Law. In 2013, the Semiconductor Technology Advanced Research Network (STARnet) program shifted the focus to beyond-CMOS technologies, seeking discoveries that would allow the industry to escape the evolutionary constraints of traditional semiconductor technology development. The most recent public-private partnership, the Joint University Microelectronics Program (JUMP), was formed in 2018 to continue the effort to keep the U.S. at the forefront of microelectronics technology.

JUMP was formulated when the International Technology Roadmap for Semiconductors (ITRS) remained influential. Inspired by the ITRS, the JUMP research centers focused on high performance, energy efficient, cost-effective, and secure microelectronics for end-to-end sensing and actuation, signal and information processing, communication, computing, and storage solutions. With the rapid changes occurring in the microelectronics landscape, however, there are new emerging grand challenges that are not being addressed by the current JUMP research centers. In response, DARPA, the Semiconductor Research Corporation (SRC), and a consortium of companies in the commercial semiconductor industry and the defense industrial base (DIB) collaborated to launch the Joint University Microelectronics Program 2.0 (JUMP 2.0) to support high-risk, high-payoff research that addresses existing and emerging challenges in information and communication technologies (ICT).

JUMP 2.0 Research Opportunity

JUMP 2.0 will address the technical grand challenges that confront our increasingly connected world as identified in the Decadal Plan for Semiconductors[1], including: the need for innovation in analog hardware, increasing demand for more memory and data storage, the imbalance between data generation and communication capacity, the emerging security vulnerabilities in highly-interconnected AI systems, and the unsustainable growth in energy demands for computing. The program will establish collaborative, multidisciplinary, multi-university research centers focused on overcoming these challenges and accelerating innovation in applications, supporting exploratory research with an eight to twelve-year time horizon for transition to defense and commercial opportunities in the 2030–2035 timeframe. The centers will undertake high-risk, high-payoff research that addresses existing and emerging challenges in information and communication technologies. Each center will define an overarching challenge and a set of specific technical goals by which the center will be evaluated.

Seven center research themes are included in the SRC solicitation; the final center themes will be chosen by DARPA and the industry consortium partners based on proposal technical merit, relevance, and

[1] Semiconductor Research Corporation, "Decadal Plan for Semiconductors: Full Report," 2021. [Online]. Available: https://www.src.org/about/decadal-plan/decadal-plan-full-report.pdf

potential impact. DARPA and the industry consortium partners seek strong proposals that address one of the following complementary research themes:

- **Cognition:** Next-generation AI systems and architectures
- **Communications and Connectivity:** Efficient communication technologies for ICT systems
- **Intelligent Sensing to Action:** Sensing capabilities and embedded intelligence to enable fast and efficient generation of actions
- **Systems and Architectures for Distributed Compute:** Distributed computing systems and architectures in an energy efficient compute and accelerator fabric
- **Intelligent Memory and Storage:** Emerging memory devices and storage arrays for intelligent memory systems
- **Advanced Monolithic and Heterogenous Integration:** Novel electric and photonic interconnect fabrics and advanced packaging
- **High-Performance Energy Efficient Devices:** Novel materials, devices, and interconnect technologies to enable next-generation digital and analog applications

The SRC JUMP 2.0 solicitation is open to all U.S. universities and is conducted on a competitive basis. Only U.S. institutions of higher education or their associated research institutions will be considered for funding. The SRC JUMP 2.0 Research Announcement contains more information on the program objectives and description, timetable and deadlines, center research themes, research needs, submission instructions, and evaluation criteria. Collaboration between universities is strongly encouraged to achieve the depth and scope needed to address the technical content and goals of broadening participation outlined in the solicitation, available on the SRC website at https://www.src.org/compete/.

Summary

The Joint University Microelectronics Program 2.0 (JUMP 2.0) will drive long-range innovations in information and communication technologies (ICT). The program will support collaborative, multidisciplinary, multi-university research centers focused on ICT grand challenges through a new public-private partnership (PPP), co-funded and co-led by DARPA, the commercial semiconductor industry, and the defense industrial base (DIB). The partnerships created across industry, academia, and the defense community through JUMP 2.0 will serve as one of several critical components advancing ERI 2.0 and its efforts to foster the environment needed for the next wave of U.S. semiconductor, information, and communication technologies' innovations.

Administrative

The JUMP 2.0 Research Announcement is available on the SRC website at https://www.src.org/compete/.

This DARPA Special Notice is issued solely for informational purposes. No responses to this DARPA Special Notice are being sought. The notice does not constitute a formal solicitation for proposals or proposal abstracts, and any so sent will be disregarded. Questions concerning the SRC JUMP 2.0 Research Announcement should be sent to JUMP2.0-Solicitation@src.org.