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Analog/Mixed-Signal Circuits, Systems, and Devices (AMS-CSD) Call for Research

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Overview

Semiconductor Research Corp. (SRC) Analog/Mixed-Signal Circuits, Systems, and Devices (AMS-CSD) member companies are pleased to solicit white papers for possible funding in 2023.

The call is open to all domestic and foreign universities and may be addressed by an individual investigator or a research team. Our selection process is divided into two stages. Interested parties are requested to submit a 1-page white paper, which should identify what can be done in a three-year period beginning January 1, 2024. A successfully selected white paper will result in an invitation to submit a full proposal. These proposals will be further down selected for SRC research contracts.

These projects will address existing and emerging challenges in information and communication technologies (ICT) and associated technologies, as outlined in the Decadal Plan for Semiconductors, and accelerating innovation in application. SRC and a consortium of industry experts have refined these seismic shifts into the Microelectronic and Advanced Packaging Technologies (MAPT) Roadmap. MAPT is a critical multidisciplinary field with the potential to transform the design and manufacture of future microchips. The interim report is now available (https://srcmapt.org/) and will be used as a guide for future research activities.

It is the intention of the members for selected projects to be reviewed and renewed annually, but we anticipate that a project will have a lifetime of 3 years which should help support a mix of research scholars. SRC projects typically

involve 1 or more research scholars doing a variety of doctoral dissertations, graduate research, undergraduate projects, and some post-doctoral work.

SRC expects to support each project up to **$105K (USD) per year**. The number and size of the contracts awarded will be determined by the availability of funds, the support of the research needs, and by the number of high-quality proposals. Proposals offering funding leverage (other funding resources related and beneficial to the proposed work) are encouraged and details should be described (ex. Fellowships, student support, fabrication support, etc.).

PLEASE NOTE:

- ***There will be 1 contract per proposal, and there will be no splitting of proposals into multiple contracts.***
- ***Projects are expected to invoice for at least 90% of the award amount by the time of annual renewal or subsequent years funding will be reduced by unspent amounts.***
- ***SRC will not approve no-cost extensions.***

Most, if not all, the research selected will be funded through TxACE, directed by Prof. Ken O at the University of Texas – Dallas.

Each researcher may be involved in no more than two white papers as either a principal investigator or co-principal investigator.

Research Needs

Our research needs are outlined in the Research Program needs document. Researchers should carefully review this document.

2030 Broadening Participation Pledge

As we unleash the next wave of semiconductor innovation and solve the enormous challenges facing our industry, driven by the aggressive agenda from the Decal Plan for Semiconductors, we must be equally committed to these important elements of that success – the people and communities we create and nourish (for example women and under-represented minorities). Hence, 2030 Broadening Participation Pledge is issued below.

Throughout the decade, as SRC defines, selects, and manages its research and education programs, we will look to grow our student base, establish a balanced mix of bachelor's, master's, and Ph.D.-level initiatives, and create a more diverse and inclusive community.

SRC's Commitment to Sustainability

With the expected growth of semiconductor chip manufacturing in the coming years, it is imperative that the chemicals, materials, and processes involved in their manufacturing are as sustainable as possible. Therefore,

research must take into consideration the environmental and human health impacts of new chemistries and focus on the development of more must be environmentally preferable materials and processes chemistries that are more efficient, more effective, and safer. In general, chemicals that are known to be persistent, bio-accumulative, or toxic will benefit from more environmentally benign substitutions. Two specific examples include, high global warning potential (GWP) gases used for etching and chamber clean and a diverse class of per- and poly-fluoroalkyl substances known collectively as PFAS.

Even with all the improvements that Moore's law has afforded to semiconductor hardware and the systems they power, our insatiable global appetite for ICT is yielding energy consumption levels that are creating a new headwind for the continued advancement of technology. This may limit the growth of our GDP or semiconductors as an industry if we don't invest in the discovery of new technologies with radically improved energy efficiency.

White Paper Guidelines

White Papers are limited to 1 page total, using a minimum of 10-point font size, and must be submitted via the OpenWater web application **by Friday, May 12, 2023, no later than 11:59 PM EDT.** Submissions not in compliance with all guidelines will be excluded from consideration.

Please include the following identifying information in your White Paper:

- Project title
- Investigator(s) and university.
- Principal investigator's contact information (telephone number, mailing address, and e-mail address).

Please address the following topics in your White Paper:

- **Targeted Need**: Emphasize area and problem to be addressed; match most relevant topic addressed in the research needs document. Projects can cover multiple research needs. Please identify each code covered in the white paper.
- **Approach**: Present your strategy for addressing the problem. Describe important findings from your research to date. Describe how your proposed research would advance the state of the art and be useful to SRC member companies.
- **Objective and Results**: What you plan to accomplish in a 3-year period. What are the anticipated outputs of a successful effort?
- **Broadening Participation:** How your task will enhance diversity in one or more of the following ways.
  - Smart growth of SRC's student population
  - Tie-ins to more BS and/or MS students and research/education initiatives
  - Increased diversity – getting more women, more under-represented minorities (URM) involved - globally
  - Getting more US students into graduate research while still advocating for the best students from across the world
  - Support new researchers and young faculty.

- **Funding Request and participants**: Plan for yearly budget should include overhead charges by your institution. Besides faculty, please also indicate the number of students supported and their degrees pursued. A detailed approved budget is not required at this time.
- **Funding Leverage**: Illustrate any leveraged funding which supports the goals and objectives of the proposed research. Additional collaborative funds identified for the project help expand the scope of the proposed research.
- **Background IP**: Identify any background intellectual property that either blocks the exercise of license rights or would be infringed by implementation of any of the expected results of this proposed research.

Contract Awardees will be expected to:

- Assign student(s) to work on the project at the start of the contract and encourage them to join the SRC Research Scholar program.
- Participation in SRC's annual student conference, TECHCON, is highly encouraged.
- Facilitate student interactions and hiring by Industry participants.
- Host regular calls with industry liaisons at least every 4-8 weeks.
- In-person participation in annual project reviews (PI(s) and student(s) are invited).
- Fill out Key Performance Indicator (KPI) Scorecards yearly associated with annual review.
- Submit reports for pre-defined deliverables in accordance with due dates set in proposal.
- Submit publications, posters, thesis, etc. resulting from sponsored research.
- Submit pre-publication drafts (conferences, journals, etc.) to SRC at least 60 days prior to anticipated publication date.
- File patents in promising areas of research with disclosures sent to SRC.
- Manage the budget with timely spending and regular invoicing to SRC.
- Send noteworthy events and announcements about you and your team to SRC.
- If open-source software is to be developed, SRC encourages the use of MIT licensing terms when made available https://opensource.org/licenses/MIT.
- Participate in TxACE activities, which highlight the importance, the need, and progress of research in the analog design space. (If the task is placed as part of TxACE).

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 proposed research
3. Broadening Participation
4. Support of SRC's Commitment to Sustainability

5. Capabilities of proposed investigators, Cost-effectiveness, realism

Timetable and Deadlines

Event	Deadline
Announcement of Call-for-White-Papers	Monday, April 10, 2023
Deadline to Submit White Papers	Friday, May 12, 2023, **11:59 PM EDT**
Invitation to Submit Full Proposals	Friday, June 30, 2023
Deadline to Submit Full Proposals	Tuesday, August 1, 2023, **11:59 PM EDT**
Winning Proposals Notified	Friday, September 8, 2023
New Programs Start	January 1, 2024

Please direct all technical questions to Marcus Pan, Research Program Director.
All other questions and responses should be directed to LaDonya Dooley, Research Program Coordinator.

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