NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314

NSF 23-082

Dear Colleague Letter: Interdisciplinary REU Sites at the Intersection of Computing and Communication Foundations and Mathematics and Statistics

Encourages the submission of interdisciplinary REU Sites proposals on topics at the intersection of Computing and Communication Foundations and Mathematics and Statistics.

April 4, 2023

Dear Colleagues:

The National Science Foundation's (NSF) Research Experiences for Undergraduates (REU) Sites and Supplements program supports active research participation by undergraduate students in any of the areas of research funded by the National Science Foundation. REU projects involve students in meaningful ways in ongoing research programs or in research projects specifically designed for the REU program. The REU Sites program aims to provide appropriate and valuable educational experiences for undergraduate students through participation in research. REU projects feature high-quality interaction of students with faculty and/or other research mentors and access to appropriate facilities and professional development opportunities. REU projects offer an opportunity to tap the nation's diverse student talent pool and broaden participation in science and engineering.

REU Sites may be based in a single discipline or academic department or may offer interdisciplinary or multi-department research opportunities with a coherent intellectual theme. Interdisciplinary REU sites offer the opportunity to bring together researchers and students from different disciplines to enable cross-fertilization and initiate new research directions. Interdisciplinary REU sites can also help to grow a new generation of students with unique skills to tackle important research problems of interest to both disciplines.

The purpose of this Dear Colleague Letter (DCL) is to invite the submission of interdisciplinary REU Sites proposals that explore high impact topics at the intersection of Computing and Communication Foundations and Mathematics and Statistics to the REU program. Please be advised that the REU solicitation is currently

being updated and we anticipate issuing a new solicitation later this year.

A number of areas could benefit from deeper research collaborations at all levels between computing and communication foundations and mathematics and statistics. A non-exhaustive list of possible research topics includes:

- Using theorem provers, such as Coq and Lean, to build verified mathematical libraries (e,g., analysis, category theory, measure theory, topology);
- The use of principled mathematical- and logic-based approaches, known as *formal methods*, for specifying, developing, and verifying computing programs in multiple domains (numerical algorithms, probabilistic programs, hybrid and dynamical systems, etc);
- Theoretical foundations of data science focused on core algorithmic, mathematical, and statistical principles;
- Mathematical foundations of cryptography, including post quantum cryptography;
- Differential privacy and statistics; and
- Information theory and coding theory.

Interested proposers should prepare and submit proposals in accordance with the instructions in the Research Experiences for Undergraduates Sites and Supplements program solicitation and the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG). Additionally, to call attention to responsiveness to this DCL, the Project Title should include "CCF-DMS-REU-DCL" after the required prefix "REU Site".

Questions should be directed to: Anindya Banerjee (CISE/CCF), Jill Denner (CISE/CNS), Jeff Forbes (CISE/CNS), Pavithra Prabhakar (CISE/CCF), Andy Pollington (MPS/DMS), Phil Regalia (CISE/CCF), Adriana Salerno (MPS/DMS), and Stacey Levine (MPS/DMS).

Sincerely,

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