NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314

NSF 19-036

Dear Colleague Letter: Developing and Testing New Methodologies for STEM Learning Research, Research Syntheses, and Evaluation

December 24, 2018

Dear Colleagues:

The National Science Foundation's (NSF's) Directorate for Education and Human Resources (EHR) wishes to notify the community of its intention to support, through the EHR Core Research (ECR) program solicitation NSF 19-508, methodological research and synthesis projects that help grow the community's collective capacity to conduct rigorous research and evaluation on science, technology, engineering and mathematics (STEM) learning and learning environments, workforce development, and broadening participation.

With this Dear Colleague Letter (DCL), ECR invites proposals on the development, application, and extension of formal models and methodologies for STEM learning research, research synthesis (including meta-analysis and meta-synthesis), and evaluation. Submissions might propose: fundamental research to develop and test new methodologies that support valid inferences in STEM learning; research on methods for improving statistical modeling, qualitative modeling, measurement, replication, and learning analytics; or research on methodological aspects of new or existing procedures for data collection, curation, and inference in STEM learning.

Proposers must demonstrate how advances in the methodology will support important theoretical insights in STEM learning and education research, knowledge synthesis and diffusion, or evaluation. Examples of areas for research include, but are not limited to:

- Computational methodologies include advances in Bayesian or computational modeling of STEM education data, computational methodologies for the analysis of video data, machine learning and learning analytics, as well as scientometrics and citation analysis;
- Qualitative methodologies include advances in qualitative research design, the study of validity, meta-synthesis, and the study of linguistic analysis applied to STEM education; and

- Quantitative methodologies include advances in experimental design in field settings, the study of validity (internal, external and measurement validities), the measurement and study of growth, mediation and moderation of treatment effects, meta-analysis, network analysis, and the replication of research results.

In addition, NSF is interested in supporting synthesis projects, meta-analyses, conference proposals, and Early Concept Grants for Exploratory Research (EAGER) proposals that help grow the community's collective capacity to conduct rigorous research and evaluation on STEM learning and learning environments, workforce development, and broadening participation.

- **Synthesis** proposals seek support for the synthesis and/or meta-analysis of existing knowledge on a topic of critical importance to STEM learning and/or education, or for the diffusion of research-based knowledge. Investigators are permitted to propose conferences and other meetings as one of the means of completing the syntheses and diffusing the research-based knowledge that is developed. Additional emphasis will be placed on the proposed dissemination plan.
- **Conference** proposals seek support to conduct well-focused conferences related to the goals of the program. Investigators are strongly encouraged to contact a program officer prior to submission to discuss their ideas.
- The **EAGER** funding mechanism may be used to support exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches. This work may be considered especially "high risk-high payoff" in the sense that it, for example, involves radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives. Potential investigators must contact an NSF program officer whose expertise is most germane to the proposal topic prior to submission of an EAGER proposal.

The deadlines for submission of proposals to NSF 19-508 are January 24, 2019, October 3, 2019, and the first Thursday in October annually thereafter. Conference and EAGER proposals may be submitted throughout the year. When responding to this DCL, please begin your proposal title with "ECR Methods DCL:". Submissions should follow the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) and the guidelines in ECR solicitation NSF 19-508.

NSF strongly encourages early career faculty to submit proposals. Principal investigators interested in submitting proposals (or with other questions pertaining to this DCL) may contact the ECR program (ECR@nsf.gov) or:

- Finbarr Sloane, Program Director, fsloane@nsf.gov
- Andrea Nixon, Program Director, anixon@nsf.gov

Sincerely,

Karen Marrongelle
Assistant Director, EHR