



NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314

NSF 22-126

Dear Colleague Letter: Building Investigators' Capacity to Leverage Emerging Technologies to Improve STEM Education Research

September 26, 2022

Dear Colleagues:

The EHR Core Research: Building Capacity in STEM Education Research (ECR: BC SER) program of the National Science Foundation's (NSF) Directorate for Education and Human Resources (EHR) announces a partnership with the Bill & Melinda Gates Foundation, Schmidt Futures, and the Walton Family Foundation to support and develop investigators' capacity to leverage emerging technologies such as data science to generate foundational knowledge for equitable STEM education, with particular interest at the K-12 level. This partnership will support institutes to build the skills of diverse cohorts of researchers as well as professional development activities for individual researchers.

With this Dear Colleague Letter (DCL), we invite proposals to the ECR: BC SER program solicitation [NSF 22-548](#) that request support to build investigators' capacity to conduct high-quality and equitable STEM education research that leverages promising methodological advances supported by emerging technologies. Research methods that employ these advances have the potential to transform STEM education research and to enable research that will reduce barriers to STEM learning success for historically marginalized groups. Examples include the use of artificial intelligence, machine learning, learning analytics, natural language processing, sensor technology, and tools for more efficient and secure analysis of educational datamining sets and other data that could come from digital learning platforms.

Proposals advancing methods to support the integration and sharing of multiple heterogenous datasets are also encouraged. It is important for investigators to understand and use such research methods in equitable ways. Institutes should include training on and foster deep understanding about how the use of advanced research methods requires highly developed considerations of equity, the reduction of bias in AI algorithms and machine

learning processes, data privacy, and data security. Proposals that leverage emerging technologies in any area of STEM education research are welcome, particularly those with a mathematics focus. We also encourage submissions that advance knowledge and practice of diversity, equity, inclusion, and accessibility in STEM education. While there is particular interest in projects that focus on the K-12 level, connections to postsecondary education and/or informal STEM education are welcome.

The [ECR: BCSER program](#) supports projects that build investigators' capacity to carry out high-quality STEM education research that will enhance the nation's STEM education enterprise. In addition, ECR: BCSER seeks to broaden the pool of researchers who can advance knowledge regarding STEM learning and learning environments, broadening participation in STEM fields, and STEM workforce development. ECR: BCSER supports activities that enable researchers to expand their areas of expertise and acquire the requisite knowledge and skills to conduct rigorous research in STEM education. This capacity building may be accomplished through:

- Design and implementation of institutes focused on building researchers' skills in emerging technologies to advance STEM education research via Institutes for Methods and Practices proposals with maximum budgets of \$1,000,000 for up to 3 years; and
- Investigator-initiated professional development and research projects via Individual Investigator Development (IID) proposals with maximum budgets of \$350,000 for up to 3 years.

The deadline for submission of ECR: BCSER proposals is February 23, 2024. When responding to this DCL, please begin your proposal title with "BCSER DCL:". Submissions should follow the [NSF Proposal & Award Policies & Procedures Guide](#) (PAPPG) and the guidelines in ECR: BCSER program solicitation [NSF 22-548](#).

Principal investigators with questions pertaining to this DCL may contact:

- Institutes for Methods & Practices: Jessaca Spybrook, Program Director, jspybroo@nsf.gov
- Individual Investigator Development: Rob Ochsendorf, Program Director, rochsend@nsf.gov

Proposals received by NSF will be evaluated according to the standard NSF merit review criteria of intellectual merit and broader impacts. Relevant information about the proposals that are under consideration for funding, along with the corresponding unattributed review and/or panel summaries, may be shared with representatives from the Bill & Melinda Gates Foundation, Schmidt Futures, and the Walton Family Foundation as appropriate.

Sincerely,

James L. Moore III
Assistant Director, EHR