



NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314

NSF 19-025

Dear Colleague Letter: STEM Workforce Development Utilizing Flexible Personal Learning Environments

December 4, 2018

Dear Colleagues:

The National Science Foundation (NSF) seeks new proposals and supplemental funding requests to existing awards that support flexible personalized learning to prepare the science, technology, engineering and mathematics (STEM) workforce of the future. NSF envisions projects that collectively apply to all learners, from young children to those already in the workforce. In particular, we would like to support research that complements an anticipated future funding opportunity made possible by a gift from the Boeing Corporation, which was announced on September 24, 2018 (https://www.nsf.gov/news/news_summ.jsp?cntn_id=296700).

The Boeing gift established a partnership between NSF and Boeing to accelerate training in crucial skill areas for the future U.S. workforce. It will be used to support design, development, implementation, and analysis of online courses in model-based engineering, model-based systems engineering, mechatronics, robotics, data science and sensor analytics, program management, and artificial intelligence. These courses will use personalized learning systems to maximize their effectiveness for diverse learners.

There will be two parallel funding opportunities to support STEM workforce preparation. One will be made possible by the Boeing gift and the other involves the efforts funded in response to this Dear Colleague Letter (DCL). For the opportunities in response to this DCL, NSF seeks proposals that will broadly inform development of personalized learning systems or generalize the research results generated during the deployment of online courses. This could be accomplished either by using the data generated by those systems or by studying the systems themselves. NSF encourages innovative educational research and development proposals that will help the nation educate the STEM workforce of the future.

NSF invites proposals to existing programs listed below and requests for supplemental funding to existing awards that engage a convergent science approach

(https://www.nsf.gov/news/special_reports/big_ideas/convergent.jsp). Such an approach often benefits from interdisciplinary teams representing multiple fields. Such teams can make learning a convergent experience and accomplish learning goals that are not otherwise achievable.

The outcomes of successful proposals responding to this DCL will advance evidence-based understanding of STEM workforce development at any level. Successful proposals will include a well-developed research plan that specifies how the project will strengthen the research base that informs investments in STEM workforce preparation and development. For example, proposals may address topics including, but not limited to:

- effective design of personalized learning systems for STEM education at any level;
- factors that increase persistence, motivation, self-efficacy, and retention of learners;
- the influence of public/private partnerships on workforce preparation;
- the design of educational interventions that meet workplace expectations for knowledge and competencies; and
- measuring the effectiveness of these interventions for different audiences.

Proposers are encouraged to leverage current and anticipated future NSF investments (e.g., interdisciplinary research centers, large facilities, funded workforce development projects) as research bases. NSF anticipates that coordinated synergistic efforts are likely to be more fruitful than fragmented individual contributions.

RESPONDING TO THIS DCL

Proposals responding to this DCL should be made through one of the existing NSF programs listed below. Supplemental funding requests responding to this DCL for existing awards in the programs listed below are also welcome. To determine whether a research topic is within the scope of this DCL, principal investigators are strongly encouraged to contact the managing NSF Program Officer(s) of the participating program(s) to which they plan to submit their proposal. These programs include:

- EHR Core Research (ECR), https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504924
- Cyberlearning for Work at the Human-Technology Frontier (Cyberlearning-WHTF), https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504984
- Discovery Research PreK-12 (DRK-12), https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=500047
- Improving Undergraduate STEM Education (IUSE) - Exploration and Design Tier, https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505082
- Improving Undergraduate STEM Education: Hispanic-Serving Institutions (HSI), https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505512

- Secure and Trustworthy Cyberspace (SaTC) - EDU Projects, https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504709

For new proposals to ensure proper consideration, principal investigators must refer to this DCL in the overview statement of the Project Summary and in the Project Description. Requests for supplemental funding to existing awards must also include a reference to this DCL. The Project Description or supplemental funding request should also include a brief description about how the project supports flexible personalized learning, thus complementing the work funded by the Boeing gift.

In summary, proposals responding to this DCL:

- a. could be high-risk, but have the potential for high reward;
- b. should include multidisciplinary leadership teams;
- c. will advance evidence-based understanding of STEM workforce development at any level (K-12 through workplace);
- d. must inform development of personalized learning systems or generalize the research results generated during the deployment of those systems;
- e. must include a research plan that will contribute new knowledge about STEM workforce preparation and development;
- f. must be submitted to one of the programs listed in this DCL; and
- g. must comply with the relevant program/solicitation-specific requirements.

CONTACTS

For questions about any of the programs listed above, please contact one of the programs officers listed in the respective solicitation. General questions about this Dear Colleague Letter may be addressed to:

- R. Steven Turley, rturley@nsf.gov, (703) 292-2207
- John C. Cherniavsky, jchernia@nsf.gov, (703) 292-5136
- David Haury, dhaury@nsf.gov, (703) 292-5102
- Ann Rivet, arivet@nsf.gov, (703) 292-4764
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Sincerely,

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