



NATIONAL SCIENCE FOUNDATION
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NSF 20-101

Dear Colleague Letter: Advancing Educational Innovations that Motivate and Prepare PreK-12 Learners for Computationally-Intensive Industries of the Future

June 24, 2020

Dear Colleagues:

The purpose of this Dear Colleague Letter (DCL) is to encourage proposals to the National Science Foundation's (NSF) [Computer Science for All \(CSforAll: Research and RPPs\)](#) and [Innovative Technology Experiences for Students and Teachers \(ITEST\)](#) programs that specifically investigate promising educational approaches to motivate and prepare preK-12 learners for computationally-intensive industries of the future.

BACKGROUND

Many innovations in industry are increasingly fueled by computational advances. Numerous industries now require a workforce that is proficient in computer science and computational thinking. Computer science and computational thinking are projected to become even more central to current and future industries, including current knowledge- and technology-intensive industries,^{1,2} and industries of the future that will rely on artificial intelligence and quantum information systems to make advances.³ In short, a workforce with strong computational skills is vital to the Nation's current and future prosperity, health, security, and competitiveness. Recent studies, however, have raised questions about the extent to which young people today are aware of industries of the future and are interested in pursuing career pathways that lead toward these industries.⁴

CALL FOR PROPOSALS

To address this issue, this DCL encourages proposals to [CS for All](#) and [ITEST](#) that develop educational approaches or pathways to support preK-12 learners' motivation to pursue and preparation toward industry-relevant computational thinking skills. These educational approaches should promote interest in and provide information about computationally-

intensive jobs of the future, while building the computational thinking skills that will be needed for these jobs. As appropriate, proposals may also address data science skills and practices, or other STEM (science, technology, engineering, and mathematics) skills and practices that are relevant to particular industries. Additionally, proposals may incorporate perspectives of stakeholders such as industry professionals, preK-12 educators in formal or informal settings, and other professionals or family members who advise youth in career planning.

In addition to developing promising educational approaches, each proposal should also use the development context to conduct rigorous and explanatory research, contributing to knowledge about key issues such as: development of interest in jobs of the future, teaching and learning of computational thinking, learning in job-related contexts, integration of computational thinking within STEM teaching.

It is imperative that industries of the future be founded in principles of inclusivity, to ensure equitable access. Thus, this DCL encourages educational approaches designed to broaden participation in careers and career pathways related to computer science. Proposals can build from the perspectives and strengths of groups that have historically been underrepresented in such fields - including women, African Americans, Hispanics, American Indians, Alaska Natives, Native Hawaiians, Native Pacific Islanders, and persons with disabilities.

This DCL also encourages Conference proposals to convene stakeholders with a range of relevant expertise and experience. These conferences may respond to pressing questions that would advance knowledge or practice; identify leverage points for addressing core issues; or set an agenda for future research and practice. Proposers are encouraged to contact a program officer prior to submitting a Conference proposal, and to follow the preparation and content requirements specified in NSF's [Proposal and Award Policies and Procedures Guide Chapter II.E.7](#).

Proposals submitted to either [CS for All](#) or [ITEST](#) must be responsive to requirements of that solicitation. The CSforAll program (the next deadline is currently February 10, 2021) aims to provide all US preK-12 students with opportunities to participate in rigorous computer science and computational thinking education in their schools through funding both research and research-practitioner partnerships. The ITEST program (the next deadline is currently August 14, 2020) is an applied research and development program designed to broaden participation in STEM and information and communication technology (ICT) careers and career pathways by providing preK-12 youth with technology-rich learning experiences in formal or informal settings.

Sincerely,

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REFERENCES

[1] National Science Board. (2020). Production and trade of knowledge - and technology-intensive industries. From: Science & Engineering Indicators. Alexandria, VA. Retrieved from: <https://nces.nsf.gov/pubs/nsb20205>

[2] Muro, M., Rothwell, J., Andes, S., Fikri, K., & Kulkarni, S. (2015). America's advanced industries: What they are, where they are, and why they matter. Washington, DC: Brookings Institution. Retrieved from: <https://www.brookings.edu/research/americas-advanced-industries-what-they-are-where-they-are-and-why-they-matter/>

[3] National Science Board. (2020). Vision 2030. Alexandria, VA. Retrieved from: <https://www.nsf.gov/nsb/publications/2020/nsb202015.pdf>

[4] Organization for Economic Cooperation and Development (2020). Dream jobs?: Teenagers' career aspirations and the future of work. Paris, France. Retrieved from: <https://www.oecd.org/education/dream-jobs-teenagers-career-aspirations-and-the-future-of-work.htm>