NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314

NSF 19-033

Dear Colleague Letter: Research to Improve STEM Teaching and Learning, and Workforce Development for Persons with Disabilities

December 20, 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 fundamental research on science, technology, engineering and mathematics (STEM) learning for persons with disabilities, such as dyslexia or autism. NSF intends to foster the development of fundamental knowledge in STEM teaching and learning for persons with disabilities, in both formal and informal contexts, from the earliest developmental stages of life through participation in the workforce. This notification identifies opportunities for such research and development through the following programs:

- EHR Core Research (ECR): STEM Learning and Learning Environments, Broadening Participation, and Workforce Development (NSF 19-508)
- Discovery Research preK-12 (NSF 17-584)
- Improving Undergraduate STEM Education: Education and Human Resources (NSF 17-590)
- Faculty Early Career Development Program (CAREER) (NSF 17-537)

NSF invites proposals focused explicitly on advancing knowledge about STEM teaching, learning, and workforce development for individuals with disabilities. Research in disabilities education includes fundamental research about learners (of all ages) with disabilities, with a particular focus on efforts to understand and address disability-based differences in STEM teaching and learning and workforce preparation and participation. Proposers are encouraged to explore a wide range of fundamental and applied research and development projects that may address, but are not limited to, such areas as:

- The cognitive and neurological underpinnings of learning disabilities (such as attention,

working memory, spatial reasoning, or executive function) in the context of STEM education and/or employment;

- Theoretical constructs about self-regulated learning (such as metacognition, strategic action, learning motivation, and self-efficacy) in the STEM disciplines involving students with disabilities;
- Computer and on-line training programs for improving mathematics learning and performance for students with dyslexia and other specific learning disabilities;
- Developmental trajectories of persons with specific learning disabilities, or other types of specific learning disabilities, in STEM education and professional disciplines over time;
- The development and efficacy of STEM instructional strategies for persons with disabilities at early ages through undergraduates;
- Instructional practices for young students with disabilities who are not responsive to typical mathematics and/or science classroom instruction;
- The auditory processing and learning mechanisms employed by students with visual impairments, and/or visual processing and learning mechanisms by students who are deaf or hard of hearing, in the context of learning in the STEM disciplines;
- The development of measures in the STEM disciplines that support valid and reliable observations (e.g., progress monitoring tools or dynamic assessments) for students with disabilities;
- Effective professional development for teachers of students with disabilities;
- The stereotype and identity threat that persons with disabilities experience in STEM classrooms, research settings, and workplaces
- The societal and organizational characteristics that influence STEM learning, educational, and career pathways for students with specific types of disabilities;
- How to improve STEM outcomes for individuals with specific learning disabilities, including dyslexia.

As described in the above-referenced NSF programs, a wide range of research activities may be supported, including work on specific learning disabilities such as dyslexia, as identified by Public Law (P.L.) 114-124, the Research Excellence and Advancements for Dyslexia Act. Fundamental research may involve the collection of new data and/or secondary analyses that leverage extant state, national, international or other databases.

In addition, NSF is interested in supporting proposals focused on building capacity for research on STEM education for persons with disabilities through synthesis projects and conferences related to advancing research and understanding of individuals with disabilities.

- **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. Examples of syntheses in this area could include the clarification of the current status of research relative to cognition and

mathematics learning disabilities or clarifying identification and screening procedures for mathematics learning disabilities.
- **Conference** proposals seek support to conduct well-focused conferences related to the research goals of the program. Investigators are strongly encouraged to contact a program officer prior to submission to discuss their ideas.

Proposals responding to this DCL should be submitted by the due date (if any) of the relevant NSF program. When responding to this DCL, please begin your proposal title with "Disability DCL: ". Submissions should follow the *NSF Proposal & Award Policies & Procedures Guide (PAPPG)* and the guidelines in the relevant solicitation.

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:

- Rob Ochsendorf, Program Director, rochsend@nsf.gov
- Ellen Carpenter, Program Director, elcarpen@nsf.gov
- Finbarr Sloane, Program Director, fsloane@nsf.gov

Sincerely,

Karen Marrongelle
Assistant Director, EHR