Research Funding Opportunities

Organization: NSF / Solicitation Name: The Science of Learning and Augmented Intelligence Program (SL) / 19-127Y / Due Date: January 15, 2020 / Summary: The Science of Learning and Augmented Intelligence Program (SL) supports potentially transformative research that develops basic theoretical insights and fundamental knowledge about principles, processes and mechanisms of learning, and about augmented intelligence - how human cognitive function can be augmented through interactions with others, contextual variations, and technological advances. The program also supports research on augmented intelligence that clearly articulates principled ways in which human approaches to learning and related processes, such as in design, complex decision-making and problem-solving, can be improved through interactions with others, and/or the use of artificial intelligence in technology. For both aspects of the program, there is special interest in collaborative and collective models of learning and/or intelligence that are supported by the unprecedented speed and scale of technological connectivity. Examples of general research questions within scope of the Science of Learning and Augmented Intelligence program include:

- What are the underlying mechanisms that support transfer of learning from one context to another or from one domain to another?
- How do human interactions with technologies, imbued with artificial intelligence, provide improved human task performance?
- How can we integrate research findings and insights across levels of analysis, relating understanding of cellular and molecular mechanisms of learning in the neurons to circuit and systems-level computations of learning in the brain, to cognitive, affective, social, and behavioral processes of learning?
- How can insights from biological learners contribute and derive new theoretic perspectives to artificial intelligence, neuromorphic engineering, materials science, and nanotechnology?


Organization: ARPA-E / Solicitation Name: Generating Electricity Managed by Intelligent Nuclear Assets (GEMINA) / DE-FOA-0002174 / Concept Paper Deadline: November 13, 2019 / Summary: The aim of this ARPA-E program is to make a transformational change to the current state-of-the-art and improve advanced reactor (AR) designs with operations and maintenance (O&M) in mind. Most analysts conclude that the low-carbon electricity grids of the future will be most easily and economically achieved by including firm low-carbon resources such as nuclear energy. However, existing light water nuclear power plants are facing the significant challenge of
having comparatively high fixed O&M costs and new builds of large light water reactors (LWRs) have historically been drastically over schedule and budget in the U.S. and Western Europe. Advanced reactors offer a compelling solution option as they can provide enhanced flexibility, a range of power generation outputs, lower capital costs and shorter construction schedules, high temperatures for industrial heating use, and strong safety cases. For a decarbonized future, we need to ensure that AR construction and operating costs are competitive and the plants are flexible to operate. To accomplish this goal, ARPA-E seeks interdisciplinary teams to develop digital twins (DTs), or a technology with similar capability, for an AR design as the foundation of the team’s O&M strategy. The digital twins (or equivalent) and associated O&M approaches the teams will develop will include diverse technologies that are driving efficiencies in other industries, such as AI, advanced control systems, predictive maintenance, and model-based fault detection. Link: [https://arpa-e-foa.energy.gov/](https://arpa-e-foa.energy.gov/)

**Organization:** NSF / **Solicitation Name:** EHR Core Research (ECR): Building Capacity in STEM Education Research (ECR: BCSER) / **19-565** / **Due Date:** June 7, 2020 / **Summary:** NSF’s Directorate for Education and Human Resources (EHR) seeks, through the EHR Core Research (ECR) and other programs, to support fundamental research that advances progress toward the strategic goals of (a) the Directorate with respect to STEM learning and learning environments, broadening participation in STEM, and STEM workforce development and (b) the Foundation as outlined in the NSF Strategic Plan, Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 - 2022.

**Relevant Capacity Building Foci:**

- Deep knowledge of subject-matter literature: Domain expertise (mastery of theories and findings) is critical to investigators’ ability to identify important scientific questions and articulate a compelling, theoretically derived and framed rationale for the project.
- Multidisciplinary perspectives: Theories, methodologies, analytical techniques, and findings that can have a catalytic effect when explored in the context of multiple fields.
- Expertise in study design, research methods, and data analysis techniques and familiarity with advances in computational, quantitative, qualitative and evaluative research methodologies.
- Research that advances educational innovation: Investigators should be able to incorporate new methods and techniques in their research that will improve education quality.
- Skill synthesizing study findings through meta-analysis, meta-synthesis, and other systematic review methodologies.
- Experience collecting, managing, documenting, and archiving data
- Experience building teams, establishing partnerships, leading collaborations, and mentoring junior collaborators.
- Research administration, including experience managing potentially complex multi-year projects and financial management.