Engineering Research Transforming Our World

Research Funding Opportunities

**Organization:** DOE Office of Science, Solicitation Name: Nuclear Data Interagency Working Group / Research Program, DE-FOA-0002114, Closing Date: June 28, 2019

**Summary:** The DOE SC program in Nuclear Physics (NP), the NP Isotopes Program (IP), the DOE Office of Nuclear Energy (NE) and the DOE National Nuclear Security Administration (NNSA) Office of Defense Nuclear Nonproliferation Research and Development (NA-22) hereby announce their interest in receiving applications to the Nuclear Data Interagency Working Group / Research program for research projects intended to answer nuclear data questions of interest to the research communities supported by those programs and offices.

The range of nuclear physics has a broad range of uses in modern society. Notable examples include fundamental research in nuclear physics, which motivates the development of accelerator technology, high-speed electronics, and special materials for sensitive detectors and targets; nuclear reactors, which have applications including the generation of electrical power, the production of isotopes, and tests of the properties of materials using neutrons; national security and nonproliferation applications, such as safeguards, nuclear forensics, and the detection of special nuclear materials (SNM); nuclear medicine, and the associated production, testing, distribution and use of isotopes in medical diagnostics and treatment; and applications to more familiar industrial problems, such as the use of radioisotopes in geological resource surveys. This FOA seeks research applications that will enhance understanding of the basic characteristics of isotopes without respect to particular uses.

These applications require accurate quantitative information regarding the properties of nuclei and their interactions with matter and radiation. In reference to the applications cited above, without the appropriate nuclear data, the accurate simulation and design of experiments for fundamental research would not be possible, nuclear reactor design and operation would suffer from problematic uncertainties, it would not be possible to determine the correct dose levels in medical procedures involving nuclear isotopes, and one could not predict the sensitivity of novel remote sensing techniques.

Extensive databases dedicated to nuclear data do already exist, notably those developed and maintained by NP through the US Nuclear Data Program (USNDP) at Brookhaven National Laboratory (BNL). However, a critical examination of the existing nuclear data often finds that it is inadequate for current applications. This may be due for example to limits on the sensitivity of experiments that were carried out in previous decades, studies that accessed only a few experimental parameters (such as limited beam energies or angular coverage), or attempts to constrain a large number of parameters with limited
data. One may also require information about the nuclear properties of materials that simply did not exist previously, or that were never adequately studied under conditions that are now considered important.

Link: https://www.grants.gov/web/grants/view-opportunity.html?oppId=315048

Organization: DOE Office of Science, Solicitation Name: Scientific Machine Learning and Artificial Intelligence: Uncertainty Quantification DE-FOA-0002122
Closing Date: May 31, 2019
Summary: In support of the Executive Order on Maintaining American Leadership in Artificial Intelligence, the DOE Artificial Intelligence (AI) Program and DOE SC program in Advanced Scientific Computing Research (ASCR) hereby announce their interest in the co-design of learning systems and AI environments that significantly advance the field of AI for public benefit within DOE’s Congressionally-authorized mission-space.

The principal focus of this FOA is on Uncertainty Quantification (UQ) for AI validation and prediction. Foundational research is needed for strengthening the mathematical and statistical basis of validating machine learning and AI predictions from data generated by the Office of Science’s user facilities and scientific simulations. A critical open question for scientific machine learning (SciML) is: How do we make reliable predictions and uncertainty estimates from machine learning and AI models? Predictions can be greatly improved by including input uncertainties and insights from model discrepancies. Research advances will be needed in methods that incorporate mathematical, statistical, scientific, and engineering principles for uncertainty estimates in extrapolative predictions. Furthermore, extensive literature in statistics can be leveraged for improving the model validation process. Advances in UQ will greatly enhance the mathematical and scientific computing foundations for accelerated research insights from SciML and AI.

Link: https://science.energy.gov/ascr/funding-opportunities/

Organization: NSF Solicitation Name: Physics Frontiers Centers 19-578
Closing Date: January 30, 2020
Summary: The Physics Frontiers Centers (PFC) program supports university-based centers and institutes where the collective efforts of a larger group of individuals can enable transformational advances in the most promising research areas. The program is designed to foster major breakthroughs at the intellectual frontiers of physics by providing needed resources such as combinations of talents, skills, disciplines, and/or specialized infrastructure, not usually available to individual investigators or small groups, in an environment in which the collective efforts of the larger group can be shown to be seminal to promoting significant progress in the science and the education of students. Activities supported through the program are in all sub-fields of physics within the purview of the Division of Physics: atomic, molecular, optical, plasma, elementary particle, nuclear, particle astro-, gravitational, and biological physics. Interdisciplinary projects at the interface between these physics areas and other disciplines and physics sub-fields may also be considered, although the bulk of the effort must fall within one of those areas within the purview of the Division of Physics. The successful PFC activity will demonstrate: (1) the potential for a profound advance in physics; (2) creative, substantive activities aimed at enhancing education, diversity, and public outreach; (3) potential for broader impacts, e.g., impacts on other field(s) and benefits to society; (4) a synergy or value-added rationale that justifies a center- or institute-like approach.

Summary: The 2019 Buildings Energy Efficiency Frontiers and Innovation Technologies Funding Opportunity Announcement will invest up to 47 million dollars, to allow all interested parties (universities, corporations, non-profits, national labs) to research and develop innovative technologies that will improve energy productivity, improve flexibility, security and resiliency, as well as lower energy costs. With this Funding Opportunity Announcement, Building Technologies Office intends to fund high-impact, early-stage research in the following three topic areas: Topic Area 1 - Flexible Building Technologies; Topic Area 2 - Heating, Ventilation and Air Conditioning Technologies; and Topic Area 3 - Solid-State Lighting Technologies. Link: https://eere-exchange.energy.gov/