Frequently Asked Questions (FAQs) for the
HARDWARE-AWARE ARTIFICIAL INTELLIGENCE FOR HIGH ENERGY PHYSICS
Lab Call 24-3305 and Research Review

How are AI and ML defined for this Opportunity?

Artificial Intelligence refers to computational systems that respond to data and take action, without human intervention, to achieve a goal and the development of those systems. It includes validation and interpretation work beyond dataset cultivation, training, and algorithm optimization to allow trustworthy autonomous action by the computational system. AI is the field of endeavor.

Machine Learning refers to computational algorithms that are not rigidly programmed but have parameters learned from data. This includes cultivation of datasets and selecting, tuning, and training models to achieve optimal performance. ML is a tool often used in AI research.

What is a Hardware system for this review?

An HEP specific detector or sensor technology deployed in HEP experiments and facilities or under development for future HEP applications including Application Specific Integrated Circuits (ASICs) and readout electronics that provide real-time operation of facilities, experiments, and observatories.

Widely available computational hardware and accelerators such as CPUs, GPUs, FPGAs, or Quantum Processors as well as emulations of those systems are not considered Hardware systems as defined for this call.

How is innovative defined for this Lab Call and Research Review?

Research that tries to address an existing gap or unresolved question in the AI or HEP literature is deemed innovative.

Who can submit applications?

DOE National Labs -- Office of Science or NNSA labs -- may apply. Applications may include multiple institutions proposed as subawards such as other DOE National Labs or FFRDCs, universities or colleges, or other eligible public or private institutions as identified in the Call. There is no restriction or requirement on the institute teaming arrangement. A single application is submitted representing the team, with one lead-PI from the lead-lab identified.

Other eligible institutions such as Universities and Colleges may apply for an award through the FOA-0003177. Applications may include other eligible institutions as subawards or through a collaborative proposal as described in the FOA.

What restrictions are there on DOE National Lab applications?

Each DOE National Lab may submit up to two (2) applications. This amounts to one but does not require one application to each topic area. A lab may submit its two applications to a single topic area if it chooses to do so.

The lead institution of a DOE National Lab application must have a lead-PI who is expected to charge at least 25% of their time to the award.

How many applications should my institution submit?

It is unlikely that more than a single award will be made to any institution. The review process is expected to be extremely competitive, and institutions should prioritize submitting high quality proposals.

What are you looking for in a multi-institution team?

Multi-institution teams should have the appropriate technical skill and level of effort to address all aspects of the multi-faceted research being proposed. A clear explanation of what each institution contributes and why it is necessary for the success of the project should be made clear to reviewers. Description of the management and coordination of multi-institution teams should be included to demonstrate that the team has thought through the communication needed for successful development, but also the risk mitigation necessary to respond to issues that may arise over the course of a multi-year research project and ensure the proposed research is carried out successfully. Explanations of these breakdowns are expected to be more thorough for the larger proposals.

What should the budget narrative include?

For all applications the budget narrative should go beyond stating the costs of the proposal and should provide an explanation and justification for the funding requests from **all participants**, including subawards to the non-lead institution, if relevant. This should include high level descriptions of the work being carried out and the level of effort needed to accomplish it at each institution in each year. Direct and indirect charges may be separated out for easier explanation. *It should be clear to reviewers why in each fiscal year the work being done requires the budget being requested.*

What are Letters of Collaboration and why might I need one?

Letters of Collaboration are statements that, should a project be supported, the letter writer and the collaboration they represent agree, in principle, to support the resulting product through routine maintenance and upkeep using external funding.

Applications targeting large collaborations may choose to include such letters to provide reviewers with a level of assurance that the proposed impact of the research will be realized. An example of when this might be appropriate could be the development of a detector independent charged particle tracking algorithm based on a neural net with proposed applications to ATLAS, CMS, DUNE, and LHCb. Letters of Collaboration from appropriate ATLAS, CMS, DUNE, and LHCb Managers stating an intention to take on the routine support and maintenance of this new algorithm in their software environment would assure reviewers that the proposed multi-experiment impact would be realized if successful.

What level of hardware support is expected?

This call seeks to support research activities. Purchases of hardware necessary to carry out research activities are allowed but expected to be at a modest level. As guidance, laptops for newly hired postdocs or grad students are viewed as modest, while an institution or research group specific GPU cluster is not. More substantial hardware investment may be appropriate if it would realize a fully developed system that would be operations ready. Support for fabricating prototypes is expected to be modest, and any request should make clear the specific questions a physical development system will answer that simulation alone cannot.

Is travel allowed?

Travel will be supported at a lower priority level, but modest requests are permissible to facilitate collaboration and disseminate scientific results.

There seems to be conflicting information between the Lab Call, FOA, and other sources, which is right?

If conflicting information is circulating, the Lab Call and FOA are correct. Please alert Jeremy Love to address the issue.