University-Led High Performance Computing (ULHPC) Research Program
The Universities Space Research Association (USRA) is pleased to invite proposals for University-Led High Performance Computing (ULHPC) Research Projects, to be conducted in collaboration with the NASA Advanced Supercomputing (NAS) Center at NASA's Ames Research Center (see nas.nasa.gov). This call is open to all accredited universities and colleges in the U.S. acting on behalf of their faculty members.

This call for proposals is being conducted in two stages with the following due dates:
- June 15, 2021 for Statements of Interest (Required)
- July 21, 2021 for Full Proposals

Objectives
The objectives of this HPC Research Program are to identify, develop, and (where appropriate) demonstrate advanced supercomputing capabilities that would have practical value for enhancing NAS Services in a two- to five-year timeframe. NAS Services include high-end computing, storage, networking, and associated capabilities. In addition, NAS also provides support in the areas of application performance, visualization, and data analytics including machine learning to enable scientists and engineers supporting NASA missions in space exploration, scientific discovery, and aeronautics research. Those proposals that can achieve deliverable outcomes that are of immediate value but also scalable for future expansion will be given priority.

Program Description
Proposals are sought for research in a variety of topics including but not limited to:

- Hardware enhancement for pathfinding systems
- Performance prediction models
- Benchmarks for new architectures
- Hardware infrastructure, file system technologies and/or application enhancements for optimized I/O
- Mixed/variable precision computing and machine learning/AI for scientific computation
- AI/ML algorithms to exploit traditional hardware architectures
- Optimized techniques/tools for visualization, data analytics, artificial intelligence and machine learning
- Programming approaches for accelerated and non-accelerated architectures
- Efficient math libraries
- Software packaging technology, such as containers
- Algorithms to exploit new hardware enhancements
- Lossy compression for scientific datasets
- Methodologies and tools for application performance optimization
- Frameworks for distributed data depositories
- Science data processing pipeline frameworks
- Frameworks for hybrid cloud/on-prem scientific workflows

Projects that build upon investments from the National Science Foundation (NSF) and/or the Department of Energy (DOE), as well as open source and open data projects are highly encouraged. We strongly encourage proposals that involve participation with minority serving institutions.

Requirements for the use of NAS facilities should be described in the proposal, with associated costs for use of NAS facilities excluded from proposals to this call. Plan for publication of research results, and release of data and software should be described in the proposal.

Reporting Requirements
Projects will be required to provide a monthly progress report, that includes the following sections: 1) Summary description of the project, 2) Accomplishments, 3) Issues and solutions, and 4) Activities planned for the next reporting period.

Projects will also be required to provide a final report that outlines project accomplishments and deliverables, list of publications and presentations. Proposals that plan to release the developed code as open sourced and also to publish academic articles will be scored higher (Non-GPL open-source license).

Programmatic Considerations:
The proposal process will involve two stages.

Stage 1: Statement of Interest

Statements of interest, outlining interest in the program, describing research outcomes, and describing the project plan at a high level are due on May 31, 2021. Statements of interest shall be no more than three (3) pages long, single spaced, Arial 12 point font. They shall provide an overview of the research objectives and significance in the context of the RFP objectives; as well as a summary of the project plan, including key milestones and deliverables. The statement of interest should also identify key personnel including collaborators and any synergies with NASA, universities, industry, or other government agencies. It will be beneficial to highlight in this section involvement of minority serving institutions. Finally, the statements of interest shall include an overview of the planned budget, including allocations for labor and other (e.g., procurements, travel, conference/publication expense).   Note that due to contractual constraints, student tuition cannot be included in budgets as a direct cost.

Statements of Interest will receive feedback describing whether the proposal is responsive or not and may be invited to submit a full proposal. Non-responsive proposals are those that do not address the program research topics. Other reasons that a proposal may not be invited to propose include a in sufficient technical merit or cost reasonableness. Those not invited to submit a full proposal are not prohibited from submitting a full proposal, however, proposals deemed non-responsive or not invited to submit for other reasons should be understood to be at high risk of not being funded and likely requiring significant revision to be ranked highly enough to be selected.

Stage 2: Full Proposal

Complete details for full proposals will be provided upon invitation to submit a full proposal. Full proposals shall include the following:

- Project Summary: A project summary of the research objectives and technical approach, and the significance in the context of the RFP objectives.
- Project Plan: A project plan that provides a detailed statement of the work to be undertaken, including milestones and deliverables. The description should include reference to the present state of knowledge in the field, relation to any previous work done on the project, and to related work in progress elsewhere. The best proposals present project risks, including mitigation strategies.
- Budget: A budget with monthly time-phasing, including labor and other costs (e.g., procurements, travel, conference/publication expense). Note that due to contractual constraints, student tuition cannot be included in budgets as a direct cost.
- Personnel: An appendix with list of all personnel who will need access to NAS resources for the project, including name, email, citizenship status and institution of each collaborator.

Period of Performance (9 month base period plus 3 month option): Full proposals shall be written with a base period of performance from September 1, 2021 through May 31, 2022, with option for the summer months (June through August, 2022) to have a full 12-month period of performance. Proposals that include an optional second year may also be submitted.

The evaluation criteria for proposal will be based on relevance to program objectives, technical merit, and cost reasonableness. The failure of a proposal to be rated highly in any one of these elements is sufficient to cause the proposal not to be selected.

Key Dates:
- Statement of Interest Due: June 15, 2021
- Statement of Interest feedback provided by USRA: June 21, 2021 (No later than)
- Full Proposal Due: July 21, 2021
- Selection Notification provided by USRA: August 21, 2021 (No later than)
- Period of Performance: September 1, 2021 through May 31, 2022 with possible extension for June 2022 through August 2022.

The call for proposals will remain open after the due date, and applications received after the due date will also be considered, in USRA's sole discretion. Stage 1 Statements of Interest will be required prior to submitting a full Stage 2 proposal. Note that funding and details associated with this call are subject to change, depending on requirements from the government.

Award Information
        Anticipated Type of Award: FAR-Based Subcontract

Estimated Number of Awards: 10
Anticipated Total Funding Amount (for the first year): $750,000

Subject to the availability of funds and the number and quality of submitted proposals.

Eligibility Information:

Who May Submit Proposals:
Proposals may only be submitted by the following: Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members.

Who May Serve as PI:
There are no restrictions or limits.

Limit on Number of Proposals per Organization:
There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI:
There are no restrictions or limits.

For detailed information and application instructions, download the following:
riacs.usra.edu/hpc

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