THE UNIVERSITY OF NEW MEXICO

To: Distribution List

From: Faculty Research Development Office (FRDO)
Office of the Vice President for Research

Subject: Limited Competition: DOE, Accelerated Research-Quantum Computing (DE-FOA-0003265)

Date: 2/16/2024

Dear UNM Researchers,

The DOE SC program in Advanced Scientific Computing Research (ASCR) announces its interest in receiving applications that advance the field of quantum computing by developing enabling end-to-end software infrastructures. This opportunity solicits applications from large cross-disciplinary teams that will advance computer science toward a software stack that is ready to leverage multiple quantum technologies, or will develop mathematical foundations, algorithms, and software tools toward quantum utility demonstration for applications within the DOE mission. Proposed projects must primarily focus on addressing one of the following two topics:

Topic 1 – Modular Software Stack: The diversity of quantum computing architectures and hardware technologies is expected to persist into the foreseeable future; this is an important consideration that guides the advancement of computer science sought in this topic. The development of an integrated computational ecosystem requires a general-purpose quantum software stack that is adaptable to, and takes advantage of, multiple kinds of quantum hardware.

We seek basic research in computer science and applied mathematics that:
• Addresses practical and fundamental bottlenecks that hinder modularity and potential synergy among selected hardware technologies;
• Pursues general approaches to integration that may remain relevant for future technologies;
• Devises ways to embed quantum processors in parallel and distributed computing models; and
• Integrates error management across the software stack.

Topic 2 – Quantum Utility: This topic aims to advance the research towards achievement and demonstration of quantum utility [1] by developing new algorithms and fine-tuning all levels of the software stack for a selected portfolio of promising problems within the ASCR mission.

Applications should:
• Choose generalizable application-inspired target problems;
• Develop algorithms for optimized math kernels & math primitives for selected current (NISQ) and future quantum systems that significantly advance state-of-the-art performance for the target problems;
• Adapt, if needed, any level of the software stack for the specific target problems; and
• Estimate quantum resources by using important complementary metrics, including energy-to-solution.
Full details can be found at grants.gov/search-results-detail/352234. The deadline for submitting full proposals to the agency is **May 8, 2024**.

This is a limited competition. **Each institution is limited to THREE pre-applications as lead**. If you are interested in applying to this program, please submit a statement of interest with a tentative project title and a brief description (200 words) by **NOON on February 23, 2024** via UNM's **InfoReady**

Review portal. **Because there is not time for a committee review, if we receive more than three SOIs for any given program area, we will randomly select the two that will be able to submit to that program area. Only SOIs received by the deadline will be included in the drawing.** No late applications will be considered.

Pre-applications are required and must be submitted by 3pm (MT) on March 13th, 2024.

They must include the following information at the top of the cover page:

Title of Pre-application
Choice of Topic 1 or Topic 2
Principal Investigator Name, Job Title
University of New Mexico
PI Phone Number, PI Email Address
DE-FOA-0003265
PI Names and Job Titles at the Collaborating Institutions

The cover page should include a list of names & institutional affiliations of all participating investigators, including collaborators & consultants, and will not count toward the pre-application's **4-page limit**. The cover page must be followed by a clear and concise description of the objectives and technical approach of the proposed research, as well as how the proposed research addresses the ARQC research topic.

The pre-application may not exceed 4 pages (1-inch margins, fonts no smaller than 11-point). Figures and references, if included, must fit within the 4-page limit. The pre-application must also include a listing of senior/key personnel and a listing of individuals who should not serve as merit reviewers of a subsequent application. See Section VIII for detailed instructions on how to craft the required listings. This listing will not count toward the page limit. The list of individuals must be included as an "Additional Attachment" to your pre-application in PAMS.

Provide the following information on a separate page; it will not count toward the page limit.
• List all institutions by name with each institution's PI on the same line.
• Indicate lead PI who will be the point of contact and coordinator for the combined research activity.
• Include a table modeled on the following chart with summary budget information from all institutions. Provide the total costs of the budget request in each year for each institution and totals for all rows and columns.

Multi-Institutional Team Information							
Names	**Institution**	**Year 1 Budget**	**Year 2 Budget**	**Year 3 Budget**	**Year 4 Budget**	**Year 5 Budget**	**Total Budget**
Lead PI							
Co-PI							
Co-PI							
Co-PI							

Should you have any questions please feel free to contact us at limited@unm.edu.

If you are affiliated with HSC, please contact HSC Limited Competition at HSC-LimitedComps@salud.unm.edu for more information.