VUMC Limited Submission Opportunity

NSF Advanced Computing Systems & Services: Innovative Prototypes/Testbeds

Applications due August 5, 2024

VUMC: *These instructions are for VUMC investigators. VU investigators should apply through* [InfoReady](#) *and address any questions to* VU-LSO@vanderbilt.edu*.*

VUMC may submit **one application** to the [Advanced Computing Systems & Services: Adapting to the Rapid Evolution of Science and Engineering Research](#) program.

NSF requests proposals from organizations who are willing to serve as resource providers within the NSF *Advanced Computing Systems and Services* (ACSS) program. Resource providers would (1) provide advanced cyberinfrastructure (CI) resources in production operations to support the full range of computation, data-analysis, and AI research across all of science and engineering (S&E), and (2) enable democratized and equitable access to the proposed resources. The current solicitation is intended to complement previous NSF investments in advanced computational infrastructure by provisioning resources, broadly defined in this solicitation to include systems and services, in two categories:

- **Category I**, Capacity Resources: production computational resources maximizing the capacity provided to support the broad range of computation and data analytics needs in S&E research; and

- **Category II**, Innovative Prototypes/Testbeds: innovative forward-looking capabilities deploying novel technologies, architectures, usage modes, etc., and exploring new target applications, methods, and paradigms for S&E discoveries.

**This solicitation welcomes only Category I proposals.

Resource Providers supported via this solicitation will be incorporated into NSF's ACSS 2.0 program portfolio. This program complements investments in leadership-class computing and funds a federation of nationally available advanced computing resources that are technically diverse and intended to enable discoveries at a computational scale beyond the research of individual or regional academic institutions.

NSF anticipates that at least 90% of the provisioned resource will be available to the S&E community through an open peer-reviewed national allocation process and have resource users be supported by community and other support services. Such allocation and support services are expected to be coordinated through the NSF-funded [Advanced Cyberinfrastructure Coordination Ecosystem: Services & Support (ACCESS)](#), [the National AI Research Resource](#), or an NSF-approved alternative as may emerge.

Provisioning novel, diverse computational resources nationally at scale will require capability and capacity to support researchers who need assistance to use these resources. User support may be provided via various means, e.g., training sessions, documentation, direct engagement

in response to tickets created via the ACCESS program, or integration of novel, NSF-funded software tools.

Category I – Capacity Resources

Resources proposed in this category are intended to be operational deployments of production computational resources that will provide maximum capacity and throughput to support the broad range of computation, data analytics and AI needs in S&E research. The deployments are expected to adhere to a vision of an advanced computing ecosystem as a federated set of resources and services that are heterogeneous in architecture, resource type, and usage mode to collectively meet the Nation's foundational needs for world-leading computing capabilities.

The proposed resource must be clearly motivated by the current and future demand for simulation, data analysis, and AI use cases for the broad disciplinary and geographically diverse S&E research communities.

Proposers are encouraged to explore novel models for future dynamic national cyberinfrastructure federation including in compute resources, software, data, technical expertise, stakeholders, on-demand allocations, and resource provisioning mechanisms. The latter mechanisms can govern regional and/or campus supported resources, and/or commercial cloud services, enabling comprehensive and effective science-based response to a potential future national and/or international urgent need; or be available to fuel AI research and developments enabling advances towards safe, secure, and trustworthy development and use of artificial intelligence, as elements opening opportunities for the next breakthroughs in science, engineering, and technology. Competitive proposals in Category I must address the following themes in the Project Description (to be discussed in a specific subsection as described in Section V.A. Proposal Preparation Instructions, if noted):

- A clear plan for provisioning a resource that addresses the current and future demand for computational, data analytics, and AI use cases in the broad S&E computational research community;

- A description of how the resource will support S&E research communities that require a national-scale, on-demand, compute, data-analytics and AI resource with a flexible and accessible software environment

- A comprehensive set of system-level performance and reliability metrics, including minimization of carbon output and energy usage, that will be used by NSF for acceptance of the resource or service (to be discussed in the S&E Application Performance and Resource Reliability and Usability sections);

- A detailed risk-mitigated deployment plan to ensure that the proposed resource will be in production operations and available for allocation to the open S&E research community no later than 12 months from the time of award (to be discussed in the Project Management and Risk Mitigation section);

- A clear concept of operations for the project duration with a clear set of operational performance monitoring and science impact metrics to ensure the resource will be an asset for the nation's S&E research community, as informed by [the ACCESS Program's](#)

[Integration Roadmaps for new resource providers](#) (to be discussed in the Concept of Operations section);

- A persuasive articulation as to how the resource will support less traditional and/or underrepresented computational S&E communities if appropriate and how models of engagement with campus-supported CI will be explored (to be discussed in the Broader Impacts section).

Relevant parameters contributing to the comprehensive technical description of the proposed system may vary with the nature of the resource. However, organization of the proposal must closely adhere to the guidelines provided in section V.A. Proposal Preparation Instructions.

Category I awards shall be between $10,000,000 and $20,00,000 for up to 5 years of duration.

See [the solicitation](#) for more information.

Internal Application Process:

Anyone interested in being considered to submit VUMC's proposal must submit the following (in a single PDF) to LSO@vanderbilt.edu by **5 p.m. on August 5, 2024**:

- Brief project overview, proposed team, and expected annual budget (2-page max);
- Statement of support from department chair/center director;
- NIH Biosketch or up to 5-page CV

The nominee chosen to represent VUMC will submit a full application by October 29, 2024.

Any questions about this opportunity or the LSO process may be directed to LSO@vanderbilt.edu.