# Informational Webinar:

# Robotics & Automation Testbeds for Autonomous Scientific Discovery

## DOE National Laboratory Program Announcement: LAB 26-3601

Presented by Dr. Ravinder Kapoor
Moderated by Dr. Pavel Lougovski
May 26, 2026

| | |
|---|---|
| Announcement Issue Date | May 14, 2026 |
| Letter of Intent (LOI) Deadline | May 28, 2026 at 5 PM Eastern Time |
| LOI Response Date | June 22, 2026 at 11:59 PM Eastern Time |
| Proposal Deadline | July 24, 2026 at 5 PM Eastern Time |
| A Letter of Intent is required | |

U.S. DEPARTMENT of ENERGY

**Disclaimer**: This presentation summarizes the contents of the Lab Call. Nothing in this webinar is intended to add to, take away from, or contradict any of the requirements of the Lab Call. If there are any inconsistencies between the Lab Call and this presentation or statements from DOE personnel, the Lab Call is the controlling document.

# Today's Webinar

- Overview of the opportunity
- Program purpose and vision
- What types of testbeds are in scope
- Eligibility and teaming expectations
- Funding, key dates, and submission process
- Q&A

# Opportunity at a Glance

- DOE Office of Science, ASCR/ACT lab call for **robotics and automation testbeds**
- Focused on **autonomous scientific discovery** in laboratory environments
- DOE anticipates **2–3 awards**
- Expected award size: **$3M–$5M per year**
- Project period: **3 years**
- Total anticipated funding: **$30M**, subject to appropriations

This is a DOE National Laboratory-led opportunity.
Only DOE/NNSA National Laboratories may lead proposals.

# Advanced Computing Technology Mission

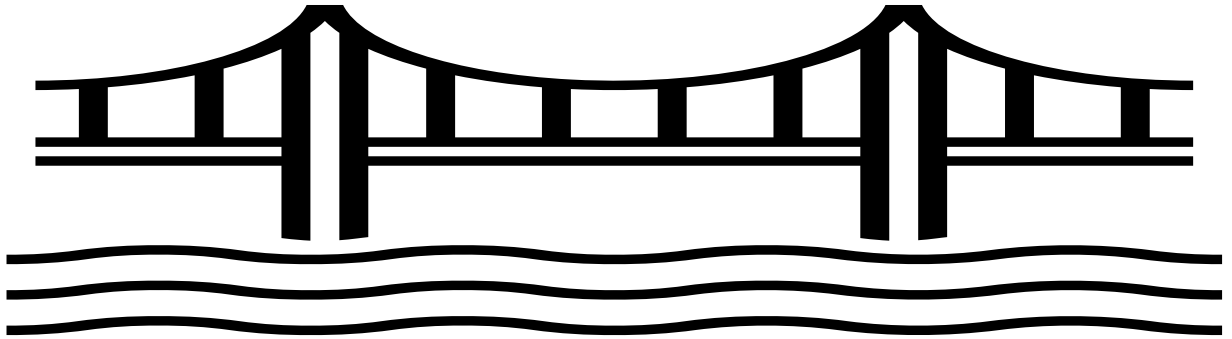
LAB 26-3601

**ASCR Research**
New computing approaches & ideas

**Pathfinding Testbeds**
Rapid technology evaluation for suitability, performance, scaling

**Advanced Prototypes**
Developing and testing of technology prototypes ready for scaling

**Technology Scaling Testbeds**
Bringing the advanced prototypes to facilities scale for evaluation



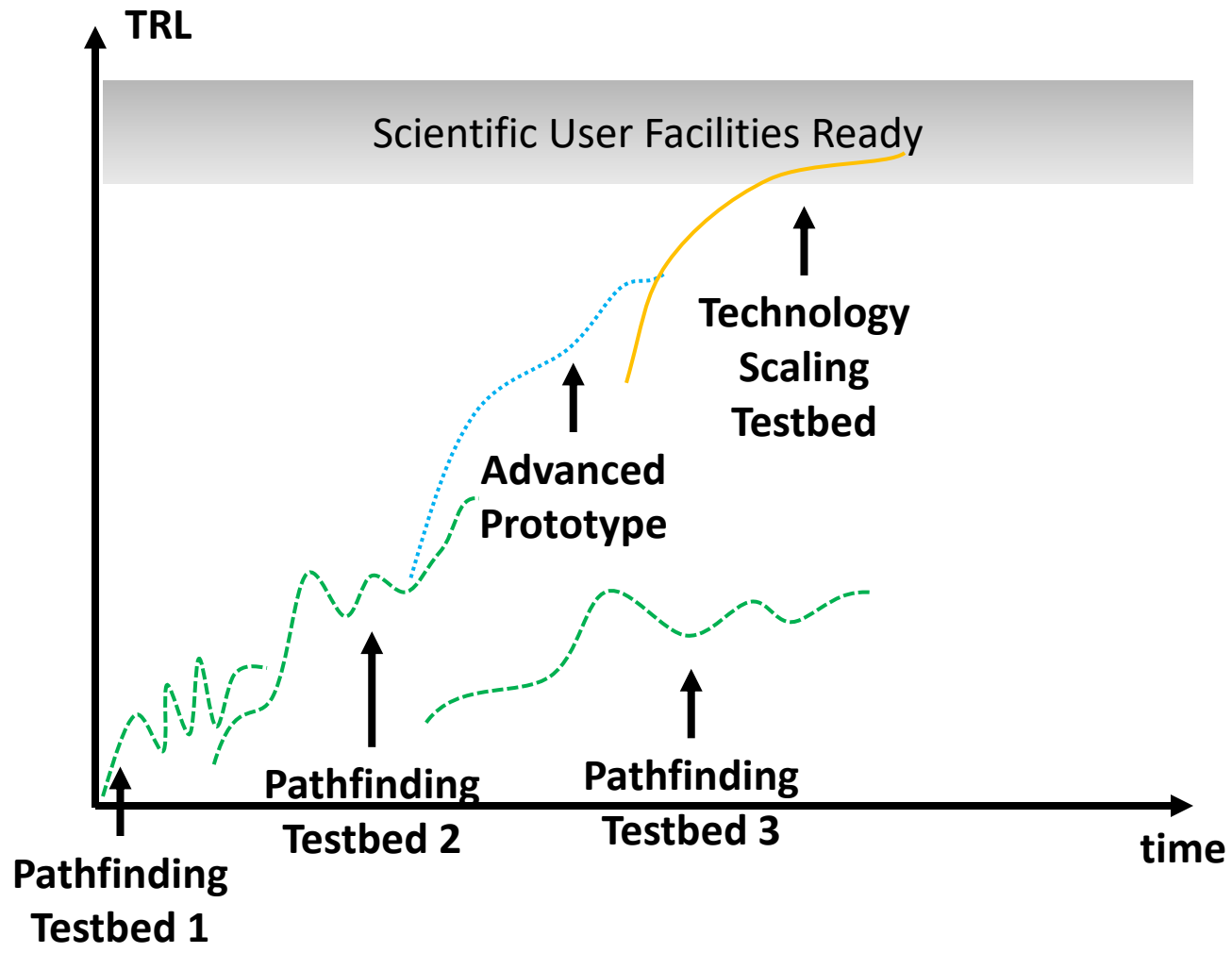
**ASCR Facilities**
Computing technology solutions ready for use in production

# Hierarchy of ACT Testbeds

**Pathfinding Testbeds**
Rapid technology exploration with **industry & academic partners**, seeding multiple approaches, agile development

**Advanced Prototypes Development**
Evolve hardware & software to scaling-ready solutions, **leverage and de-risk industry innovation**

**Technology Scaling Testbeds**
Scaling up advanced prototypes to the user facilities deployment level, **create national advanced computing innovation ecosystem**



# ACT Tenets

1. **ACT is technology agnostic**. Quantum, photonics, microelectronics, robotics, neuromorphic, analog, thermodynamic, dynamical, advanced wireless, networking, etc. are all in scope. We work backwards from problems that are critical to DOE's mission to research, identify, explore, and invest in the most efficient potential solutions.

2. **ACT is here to accelerate the development of computing technologies and scale up their Technology Readiness Level (TRL) beyond experimental prototypes.** We build testbeds for researchers to thoroughly evaluate the functionality, performance, efficiency, capabilities, and robustness of advanced computering hardware and software in a controlled environment that mimics the real-world conditions in which the software/hardware will be used. We build technology demonstrators showing how advanced computing technologies can scale up to solve the most pressing problems for DOE and the nation.

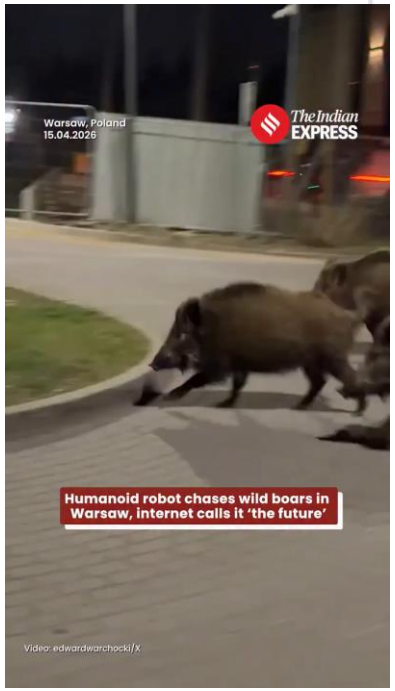
3. **ACT balances investments between basic, applied research, and hardware development**. If to solve a problem new technology is needed we invest into basic research. When a technology is ready for prototyping, we invest into developing prototypes. When prototypes are ready for scaling and real-world testing we invest into infrastructure to achieve this.

4. **ACT seeks to lower technology adoption barriers and democratize access to DOE hardware and software resources.** We support the development of Science Cloud – a connected hardware and software infrastructure – that enables science automation, autonomous experimentation, and leverages DOE resources for novel scientific applications.

5. **ACT works closely with the research and facilities communities** to ensure we provide the best possible testbed to efficiently graduate the TRL from research to operations and to assist in the accelerating scientific discovery.

6. **ACT supports and develops partnerships with national labs, academia, and the private sector to advance scientific discovery by preparing, improving, and scaling our testbeds to eventually become centers of excellence.**

# Why This Opportunity



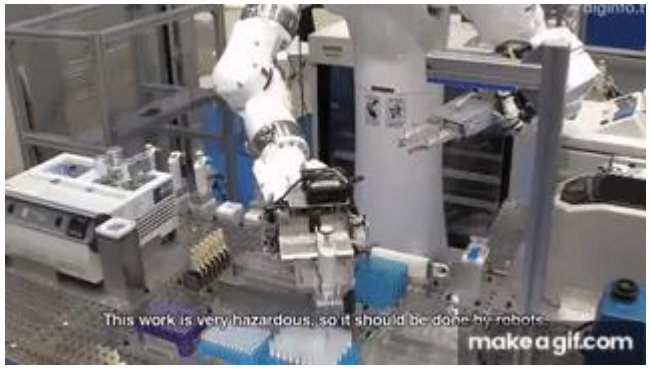


Feature

Humanoid robots developed by the US company Figure use OpenAI programming for language and vision.

THE AI REVOLUTION IS COMING TO ROBOTS: HOW WILL IT CHANGE THEM?

The melding of artificial intelligence and robotics could catapult both fields to new heights. By Elizabeth Gibney




- Scientific discovery is often limited by experimental bottlenecks in physical workflows
- Robotics and automation can improve:
  - reproducibility and transferability
  - execution of repetitive and contact-rich tasks
  - extended or continuous, closed-loop operation
  - use of existing facilities and legacy equipment.
- ASCR's role is the computing layer: orchestration, edge↔HPC integration, AI/ML, digital twins, benchmarking, provenance, and more.
- Robotics will help make experiments scalable, programmable, and measurable.
- **Vision:** Accelerate scientific discovery by transforming laboratory environments with intelligent systems leveraging embodied AI, advanced automation, and robotics.
- **Goal:** Develop and integrate technologies for autonomous execution of complex, iterative, scientific workflows, thereby significantly increasing experimental throughput and efficiency, and mitigating limitations in variability and safety risks.

# DOE SC Scientific User Facilities

Delivering scientific discoveries and major scientific tools to transform our understanding of nature and advance the energy, economic, and national security of the United States

FY25

**28** scientific user facilities
**~43,000** users























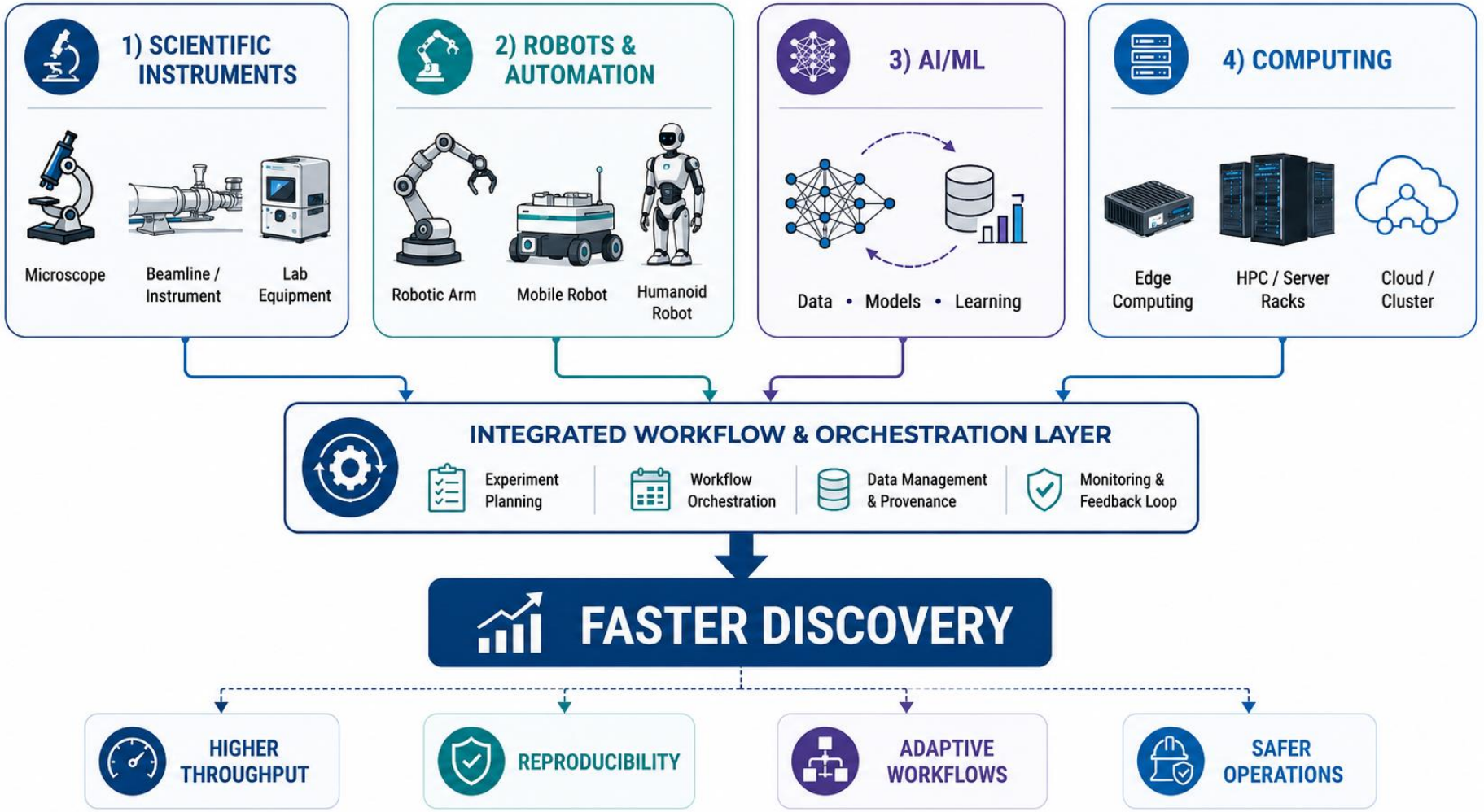






U.S. DEPARTMENT OF ENERGY
Office of Science

# Why This Opportunity



# What ASCR Is Seeking

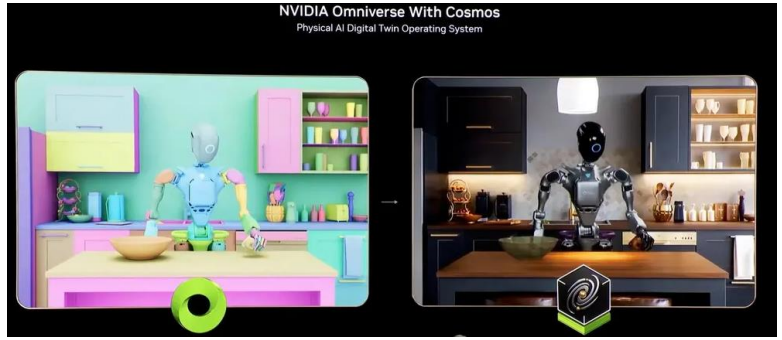
DOE seeks lab-led portfolios that:

- **Develop modular, interoperable robotics and automation testbeds** for laboratory environments
- Integrate **sensing, control, perception, AI/ML, and edge-to-HPC computing**
- Support **AI-driven experiment execution, monitoring, and adaptive decision-making**
- Enable **rigorous evaluation and benchmarking**
- Deliver **reusable infrastructure and methods** that generalize across workflows and sites

The emphasis is on enabling infrastructure for the broader community, not one-off demonstrations

# Embodied Operational Intelligence (EOI)

- A central motivation is to enable robots to acquire and refine laboratory skills through:
  - structured task design
  - human demonstration and supervisory operation
  - data-driven adaptation
- Proposed efforts may, for example, explore:
  - vision-language-action or related foundation models
  - few-shot or small-data learning
  - imitation learning
  - other data-efficient approaches





*(Zhejiang Daily Press)*

**Teams should choose the technical approach most appropriate for their environment and constraints**

# Examples of Responsive Testbed Areas

Responsive proposals may address one or more of the following:

- modular, interoperable testbed architectures
- digital twin and simulation-enabled testbeds
- multimodal perception and data pipelines
- safety, compliance, and hazard emulation capabilities
- benchmarking and standards development
- training and workforce enablement for robotics and embodied AI

Testbeds may be physical and/or simulated and may interface with scientific instruments, automation modules, digital twins, and/or edge-to-HPC resources.

# Responsive Proposals

Competitive proposals should:

- provide **reusable infrastructure** rather than a single bespoke workflow
- culminate in **integrated demonstrations** in realistic or high-fidelity representative settings
- include a plan for **quantitative performance measurement**, such as:
  - time-to-result
  - mean time between human interventions
  - reproducibility/provenance
  - task success rate
  - generalization across tasks or sites

Demonstrations should show what the testbed enables, not just isolated task execution.

# Teaming, Eligibility, and Participation

- **Only DOE/NNSA National Laboratories may lead** proposals under this announcement
- Each DOE/NNSA National Laboratory is limited to **one LOI and one proposal as lead**
- Each proposed thrust/testbed must include **at least one external collaborator from outside the DOE laboratory complex**
- Each proposed thrust must include **specific industry participation** as a collaborator or advisor, funded or unfunded.
- **Universities and other external organizations may participate** as collaborators or sub-awardees, but they must partner with a DOE/NNSA National Laboratory-led team.
- This is an opportunity for **all eligible DOE/NNSA National Laboratories**, including laboratories that may already be funded for related work, subject to the lead submission limitation in this Announcement.

# Out of Scope

- Examples of out-of-scope efforts include:
  - proposals focused on a single scientific application without broader testbed reuse value
  - efforts without a substantive robotics/automation testbed component
  - biomedical, agricultural, warehouse, or consumer robotics use cases that do not translate to DOE laboratory science missions
  - software-only AI/ML not evaluated on or co-designed with physical robotic systems
  - pure teleoperation with no pathway toward scalable embodied autonomy
  - efforts centered on cybersecurity, networking, or facility management without an experiment-centric robotics/autonomy objective

# Submission Process and Key Dates

- **Letter of Intent required**
- LOI deadline: **May 28, 2026 at 5 PM Eastern Time**
- LOI response date: **June 22, 2026 at 11:59 PM Eastern Time** Proposal deadline: **July 24, 2026 at 5 PM Eastern Time**
- Proposals must be submitted through **PAMS**
  - Encourage you to register in all systems early and to submit LOIs and proposals well before the deadlines.

# Proposal Structure

- See Announcement for full proposal instructions!
- High level structure of proposal:
  - a **laboratory vision and management plan**
  - up to **three distinct testbed thrusts**
  - technical approach and objectives
  - timetable of activities and responsibilities
  - measurable milestones and evaluation plan
  - budgets, budget justification, appendices, and required attachments as specified in the Announcement

Strong proposals will likely show:

- why the proposed capability matters across more than one laboratory workflow
- how the testbed supports **training, evaluation, and deployment**
- how teams will measure reliability, repeatability, and scientific value
- how the work can be **reused across DOE laboratory environments and Office of Science mission spaces**

# Resources and References + Q&A

- Lab Announcement: **LAB 26-3601** (Please refer to the announcement for requirements)
- Open Lab Announcements page: https://science.osti.gov/grants/Lab-Announcements/Open
- PAMS help desk:
  855-818-1846
  301-903-9610
  sc.pams-helpdesk@science.doe.gov
- Technical contact:
  Dr. Ravinder Kapoor
  ravinder.kapoor@science.doe.gov

- **Questions?**