Request for Information (RFI)
Special Notice DARPA-SN-26-96

Advancing Autonomous Science for Biological Applications

Defense Advanced Research Projects Agency (DARPA)
Biological Technology Office (BTO)

Posting Date: June 23, 2026
Responses Due: July 22, 2026, at 5:00 p.m. Eastern Time (ET)
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RFI DESCRIPTION:

The Defense Advanced Research Projects Agency (DARPA) Biological Technology Office (BTO) seeks input from the scientific and technical community regarding the current state of autonomous science, particularly in biological domains, and on opportunities for investment to advance the field in service to national security and public benefit.

Responses to this RFI may be used to inform future program development.

BACKGROUND:

Autonomous science—the integration of artificial intelligence, robotics, and automation into scientific discovery and experimentation—is undergoing rapid transformation. The field has evolved from small-scale, bespoke systems to large, flexible facilities capable of addressing complex experimental challenges at scale. It has begun to realize its potential for more intelligent data collection for uses from optimizing experimental designs to powering the data factories that will train next-generation AI models for the life sciences. Significant investments and a proliferation of new ideas and research directions promote this growth, though many approaches remain in early stages of maturity.

Recent advances in AI, including the development of foundation models and agentic AI for scientific reasoning, have enabled more adaptive and efficient scientific workflows. These technologies help to address longstanding challenges to effective autonomous science, such as the substantial effort required to develop new autonomous workflows or bring new instruments online. In parallel, robotics technologies for autonomous science drive a shift from task-specific automation to general-purpose platforms and versatile robots that can interface with a wide range of laboratory equipment, including legacy systems not designed for autonomous operation. These shifts all aim to reduce the time and resources needed to integrate new instruments and establish new workflows.

The increasing complexity and scale of autonomous science also drives advances in optimization algorithms, simulation tools, verification systems, and digital twins. These

approaches allow for *in silico* testing, more effective experimental design, and the ability to evaluate laboratory effectiveness, efficiency, and safety before physical experiments are conducted. As a result, autonomous science is becoming competent to tackle more complex systems, with particularly promise for new biomedical applications.

At the same time, the field faces significant challenges. There is a need for standards—both for data and physical interfaces—to enable interoperability, portable workflows, and streamlined integration of new technologies. There are ongoing difficulties of developing and debugging new automated workflows efficiently and allowing them to work most productively with human operators. Progress in the field remains dependent on foundational advances in enabling technologies in artificial intelligence, robotics, and bioengineering. Additionally, the field is still searching for transformative applications that clearly demonstrate the unique advantages of autonomous science to tackle new scientific domains and to realize its potential to accomplish tasks unachievable by more conventional approaches.

REQUESTED INFORMATION:
Given these trends, DARPA seeks innovative insights into (1) the current state of the art of autonomous biomedical science, (2) the major challenges and opportunities of the discipline, and (3) where targeted investment could have the greatest impact in advancing autonomous science in service to the national interest. Responses are welcome from all capable sources including, but not limited to, private or public companies, individuals, universities, university-affiliated research centers, not-for-profit research institutions, and U.S. Government-sponsored labs. Note that DARPA assumes that feedback through standard scientific discourse, including direct communication with the corresponding authors or through additional manuscripts, will proceed as usual and views this RFI as a means to supplement that discourse.

Responses should address Informatics Technologies, Physical Technologies, or Both Informatics and Physical Technologies for autonomous science. In each case, a response must address at least one of the following research areas:

1. Current state of the art of autonomous science and transformational enabling technologies to advance that state of the art.
    a. Key existing enabling technologies broadly transferrable across scientific workflows.
    b. Technologies in development that will be transformational in enabling autonomous science.
    c. Metrics of success for judging the current state-of-the-art and emerging technologies to surpass it (e.g. throughput, reproducibility, power usage, continuous runtime, cost per assay, etc.)
2. Key technical, organizational, or operational bottlenecks in deploying autonomous science at scale or in new domains.

   a. Challenges to enabling rapid development and exchange of new autonomous workflows including equipment or assays that provide unique challenges to automation.
   b. Challenges to interoperability between labs and exchange of data and protocols.
   c. Measures of success in promoting more efficient, effective, and portable workflow development.
3. Application areas in which new investments could have the greatest impact and best demonstrate the unique advantages of autonomous science to solve problems not amenable to conventional approaches.
   a. Problems of national interest where autonomous science can achieve results infeasible via conventional science, including specific applications for national security.
   b. Enabling technologies available or emerging to achieve those results.
   c. Metrics for establishing improvement over conventional approaches.
   d. Current commercialization strategies/businesses cases for future development of autonomous science.
4. Safety and security considerations in the operation of highly automated labs and ways these might be addressed, for example via simulation and/or AI digital twins or via formal verification.
   a. Risks to safety and security in the operation of autonomous labs.
   b. Current safeguards, system-level security, traceability, and other approaches to biosecurity.
   c. Enabling technologies to resolve these risks.
   d. Measures of success for safe operation.
5. New technologies, opportunities, and challenges for maximizing productive interaction between human operators and autonomous agents in hybrid human-AI workflows.
   a. Applications of national interest that can be achieved only by humans augmented by autonomous scientific facilities.
   b. Key barriers to productive interaction of human scientists and autonomous laboratories or their AI agents
   c. Enabling technologies to overcome these barriers.
   d. Metrics of success by which to demonstrate the advance of human-machine partnering over unassisted human or purely autonomous systems.

SUBMISSION INSTRUCTIONS:
Responses to this RFI should be submitted no later than 5:00 p.m. ET on July 22, 2026. Deliver submissions electronically in PDF format to AutoSci-RFI@darpa.mil.

Respondents are encouraged to submit non-proprietary information. If proprietary information is included, respondents are responsible for clearly identifying both text and graphics containing proprietary information with labels such as “Proprietary” or “Company Proprietary”. Do not use “CONFIDENTIAL” as this is a classification for national security information. DO NOT INCLUDE CLASSIFIED INFORMATION IN THE RFI RESPONSE.

Responses to the RFI should be concise. Respondents should submit a single integrated response addressing the areas described above. DARPA will only review responses submitted as an unprotected Microsoft Word document or PDF file. Each response is limited to no more than 7 pages using 12-point font and 1-inch margins on 8.5-inch by 11-inch page size. Effective responses that can be provided in fewer than 7 pages are encouraged. Any submitted material in excess of these limits will not be reviewed.

Responses should adhere to the following formatting instructions:

1. Cover page (1 page)
    a. Title
    b. Organization(s)
    c. Respondent’s technical and administrative points of contact (names, addresses, phone and fax numbers, and email addresses)
    d. Whether the response covers Informatics Technologies, Physical Technologies, or Both Informatics and Physical Technologies
    e. Listing of which of the five research areas it addresses.
2. Technical areas (3 pages maximum)
    a. Discussion of the capabilities/challenges addressed (from your perspective)
    b. Proposed solution
    c. Development strategy, especially versus requested metrics
    d. Identify current data (if any)
    e. Estimated time to availability and risk assessment (technical and other)
3. References (1 page)
    a. All references to previously published work should be contained within this space.
4. OPTIONAL: Summary slides (1 summary slide and 1 technical description slide)
    a. Responses are encouraged to include slides that summarize the main idea and development strategy. The purpose of these slides is to visually and succinctly indicate the new insights, main objectives, underlying technical mechanisms, fundamental assumptions and limitations, key innovations, expected impact, and/or other unique aspects of the response.

DARPACONNECT:
Entities who have not worked with DARPA before are encouraged to learn more about DARPAConnect, an initiative established to facilitate collaboration between DARPA and potential performers. The DARPAConnect team offers customized support, resources, and guidance on how to prepare your ideas for high-impact conversations with DARPA program managers. Please visit DARPAConnect.us to access a digital hub of online resources, including a curriculum for self-paced learning, personalized support, and in-person and virtual events. In addition to the self-paced online materials, the DARPAConnect team is able to schedule one-on-one conversations to discuss your specific ideas, questions, and paths to DARPA. You can use the contact form at DARPAConnect.us or email the DARPAConnect team directly at darpaconnect@darpa.mil to request assistance.

ADMINISTRATIVE:
This announcement contains all information required to submit a response. No additional forms, kits, or other materials are needed. All administrative and technical questions should be directed to AutoSci-RFI@darpa.mil. Please refer to the Special Notice number (DARPA-SN-26-96) in the subject line of the email and in the body of all correspondence.

This RFI is issued solely for information and program planning purposes and does not constitute a formal solicitation for proposals or proposal abstracts; any so sent will be disregarded. In accordance with FAR 15.201(e), responses to this notice are not offers and cannot be accepted by the Government to form a binding contract. Submission of a response is strictly voluntary and is not required to propose to subsequent Announcements (if any) or Solicitations (if any) on this topic. DARPA will not provide reimbursement for costs incurred in responding to this RFI. Respondents are advised that DARPA is under no obligation to acknowledge receipt of the information received or provide feedback to respondents with respect to any information submitted under this RFI.