UNIVERSITY of SOUTH FLORIDA
Research Development Institute

Defense Advanced Research Projects Agency (DARPA)

February 2025

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Executive Summary

The Defense Advanced Research Projects Agency, or DARPA is a Department of Defense (DoD) agency focused on innovative, high-risk, high-reward research that contributes to US national security by keeping the nation technologically ahead of its adversaries. DARPA has six technical offices that fund a variety of research programs. Program managers have high levels of autonomy regarding program creation and what gets funded. Investigators interested in submitting to DARPA need to understand the agency's mission, be willing to engage program managers, and understand how proposals are reviewed and selected.

Background

DARPA was founded in 1958 as an agency within the Department of Defense with the mission "*to create technological surprise for U.S. national security*." DARPA does this by supporting transformative research that is considered high risk, high reward. DARPA-funded researchers have contributed to the development of technologies such as precision guided missiles, the internet, stealth technology, global positioning system (GPS), and unmanned aerial vehicles. The agency is often considered a model for innovation in sponsored research, and efforts have been made to duplicate its success in other areas of government, with agencies such as the Advanced Research Projects Agency – Energy (ARPA-E), Intelligence Advanced Research Projects Activity (IARPA) and most recently, the Advanced Research Projects Agency-Health (ARPA-H).

Organization

DARPA has a relatively flat structure. There is the Director's Office; six technical program offices (see below); and nine support offices. The agency has no internal research capabilities; all research is carried out through external entities via grants, cooperative agreements, or contracts.

Acting Director: Rob McHenry

Acting Deputy Director: Whitney Mason

Technical Offices (click on links to learn more about specific funding opportunities, programs, and program managers)

The six technical office support programs in a wide range of research areas.

Biological Technologies Office (BTO)	
BTO leverages biological properties and processes to revolutionize our ability to protect the nation's warfighters. BTO harnesses advances in artificial intelligence (AI) and machine learning (ML) to create new opportunities for transformative science across the biological spectrum.	**Thrusts**: • Data Factories • Combat Casualty Care • Logistics **Leadership** • Michael Koeris • Rob Saperstein • Ryann Glaccum

Defense Sciences Office (DSO)	
DSO develops and manages an aggressive and forward-leaning portfolio that expands the art of the possible across a broad set of technical areas. By pushing science toward fundamental operational limits, our programs create a strategic advantage for the DoD. Our work is global in scale, as we monitor and drive the technological landscape and potential impacts on our military and our nation.	**Thrusts**: • Novel Materials and Structures • Sensing and Measurement • Computation and Processing • Enabling Operations • Collective Intelligence • Emerging Threats **Leadership** • Bartlett Russell • Jim Gimlett • Scott Wenzel

Information Innovation Office (I2O)	
I2O creates groundbreaking science and delivers future capabilities in the informational and computational domains to surprise adversaries and maintain enduring advantage for national security.	**Thrusts**: • Proficient AI • Resilient & Secure Software Systems • Advantage in Cyber-operations • Confidence in the Information Domain **Leadership** • Kathleen Fisher • Matt Turek • Courtney Tomlinson

Microsystems Technology Office (MTO)	
MTO aims to ensure the U.S.'s continued technological dominance, both militarily and economically. MTO pushes today's boundaries in foundational science to create transformational impact. This involves going beyond incremental improvements and seeking fundamental scientific breakthroughs that can create new capabilities and reshape entire industries.	**Thrusts**: • Circuit Development to Enable Next-Generation Microsystems • Microsystems Manufacturing Ecosystem • Dual Use by Design **Leadership** • Whitney Mason • Mike Geertsen • Wendy Smith

Strategic Technology Office (STO)	
STO develops technology to give national security leaders trusted, disruptive capabilities to win in all physical domains—air, space, sea, and land. Our work spans the spectrum of competition, from deterrence to high-end combat. STO leverages advancements in microelectronics, computing capacity, applied machine learning/artificial intelligence, and other technologies to create advantages for U.S. forces and blunt adversarial strengths. We empower the nation to assert dominance in realms of diplomacy, information, military, economy, finance, intelligence, environment, and technology.	**Thrusts**: • Advanced Active and Passive Sensing • Effects • Command, Control, and Communications • New Paradigm of Systems Warfare • Critical Capabilities to Promote National Resilience **Leadership** • Phil Root • Matthew Higgins • Jessica Marsh

Tactical Technology Office (TTO)	
The mission of the Tactical Technology Office (TTO) is to reimagine every aspect of military hardware design, development, test, manufacture, and sustainment – with a focus on rapid, affordable, and scalable deployment – in order to create and prevent technological surprise. TTO demonstrates compelling hardware at the smallest scale that traces to disruptive capability, with designs that reduce risk and cost by managing complexity and can be manufactured responsively and affordably.	**Thrusts**: • Platform Innovation • Missioned Autonomy • Managing Complexity • Freedom's Forge 2.0 • Disruptive Emergent Technology **Leadership** • Ken Plaks • John Main • Melissa Pfau • Victor Stichnot

Program Managers

DARPA employs approximately 100 program managers (PMs), who serve for a limited term of three to five years. PMs come from academia, industry, and government, and have a high level of autonomy over their portfolios, and unlike most federal agencies, they are expected to create new programs themselves. Thus, the research performed takes on a distinct flavor which changes frequently as PMs rotate in and out. Developing good relationships with PMs is critical when working with DARPA. It's important when considering submitting a proposal to a DARPA program to read the funding announcement to find details regarding how and when to contact program managers. Some opportunities hold proposer days or other events where interested researchers may interact with PMs and other investigators.

If you have an idea but don't see a specific funding opportunity that fits, consider contacting a research area-appropriate PM to see if they are interested in your idea, or can suggest an opportunity to you.

Proposal review

Depending on the specific opportunity, it may require a pre-proposal step or go straight to full proposal. If a pre-proposal is submitted, typically the PM will examine and provide feedback, and possibly an invitation to submit a full proposal. At the full proposal stage, they may use a review panel, or the PM may review the submissions themselves. While they will have criteria such as overall scientific and technical merit, potential contribution/relevance to the agency's mission, and cost realism, they will also use a rubric unique to DARPA: the Heilmeier catechism.

Heilmeier Catechism (see https://www.darpa.mil/about/heilmeier-catechism)

This set of questions is the basis for how DARPA evaluates submissions. It was devised by George Heilmeier, DARPA's director from 1975-1977. Investigators should use these questions to examine their own proposal prior to submitting them to DARPA.

1. What are you trying to do? Articulate your objectives using absolutely no jargon.
2. How is it done today, and what are the limits of current practice?
3. What is new in your approach and why do you think it will be successful?
4. Who cares? If you are successful, what difference will it make?
5. What are the risks?
6. How much will it cost?
7. How long will it take?
8. What are the mid-term and final "exams" to check for success?

For Early Career Faculty

DARPA Young Faculty Award (YFA)

The Young Faculty Award (YFA) program specifically seeks researchers in junior faculty positions to expose them to DoD needs and DARPA's program development process.

All six technical offices participate in the YFA, and each year multiple topic areas are announced.

The competition is open to tenure-track assistant/associate professors, or tenured faculty within three years of their tenure date.

The award provides $500K in funding over two years. Each YFA awardee receives a program manager mentor who is aligned with their research interests. There is an annual YFA meeting that offers networking opportunities and features presentations from DARPA and DoD personnel. YFA awardees participate in program reviews, presenting their work and engaging with others. Mentors can nominate YFA awardees for the Director's Fellowship Award, which provides an additional $500K in funding for one year.

For more information, click here.