



Introduction to NSF X-Labs Funding Opportunity

Quantum Systems: Interconnects and Integrated Photonics

NSF Directorate for Technology, Innovation and
Partnerships (TIP)

June 4, 2026

XLabs@nsf.gov



NSF X-Labs



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Documents on [SAM.gov](https://www.sam.gov)



National Science Foundation
Directorate for Technology, Innovation and Partnerships



Agenda

1. Opening Remarks

Erwin Gianchandani, NSF Assistant Director for TIP

2. Introduction to NSF X-Labs

- a) Rationale & Strategic Objectives
- b) Programmatic Structure
- c) OT Contracts
- d) X-Lab Teams
- e) Milestones
- f) Phase 0 Selection

3. Topic Overview: Quantum Systems: Interconnects and Integrated Photonics

4. Live Q&A

We recommend waiting to ask your question until after the presentation



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Opening Remarks

Erwin Gianchandani

NSF Assistant Director for TIP

The NSF Team

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Documents available on SAM.gov

[Other Transaction Agreement Solutions Offering \(OTASO\)](#)



[Topic Announcement](#)



U.S. National Science Foundation (NSF) X-Labs Initiative			Opportunity
Notice ID NSF-OTASO-FY26-XLabsInitiative	Contract Opportunity Type Solicitation	Inactive Dates May 29, 2028	Date Offers Due May 14, 2028 3:00 PM EDT
Related Notice (blank)	Contract Line Item Number (blank)	Inactive Policy 15 days after date of-fers due	Published Date May 14, 2026 2:44 PM EDT

NSF X-Labs Initiative - Quantum Systems: Interconnects and Integrated Photonics			Opportunity
Notice ID NSF-Topic1-FY26-XLabsQuantumSystems	Contract Opportunity Type Solicitation	Inactive Dates Aug 08, 2026	Date Offers Due Jul 24, 2026 5:00 PM EDT
Related Notice (blank)	Contract Line Item Number (blank)	Inactive Policy 15 days after date of-fers due	Published Date May 14, 2026 2:47 PM EDT

Summary

Objective

Provide the structure, resources, and flexibility necessary to develop innovative platform technologies that will accelerate breakthroughs and unlock new economic sectors

Key Features

- **Independent R&D teams** with the ability to adapt quickly to evolving technology
- **Operational autonomy** – flexible use of subawards and independent hiring
- **Other Transaction (OT) contracts** with milestone-based funding
- **Cross-sector collaboration** across academia, industry, and non-profits

Programmatic Structure

Phase 0

≤ \$1.5M
9 Months

Phase 1

\$10-50 M per year
24-36 Months

Phase 2

\$10-50 M per year
24-36 Months



Introduction to NSF X-Labs

Rationale & Strategic Objectives

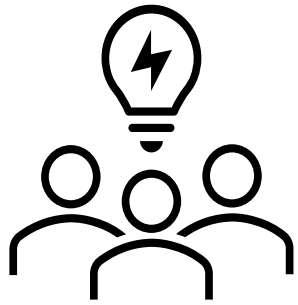


NSF X-Labs



Rationale & Background

NSF X-Labs addresses the national priority of sustaining U.S. leadership in critical science and technology fields by advancing early-stage research towards practical impact.



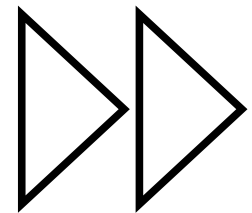
Accelerating Research to Impact

Global competition in S&T is fierce. A focused effort is needed to accelerate the translation of ideas into tangible impact.

There is a need for creative and flexible funding mechanisms with less administrative burden.

Driving Change... and Fast!

TIP is ready to rigorously test new ways to move ideas beyond the lab and create opportunities for U.S. talent to launch breakthrough platforms that can shape the next generation of science and technology.



Strategic Objectives

Build Sector-Defining Platforms

Develop novel platform technologies that foster the transformation of scientific breakthroughs beyond traditional outputs like publications

What are Platform Technologies?

- Serve as the foundation for future innovations, novel engineering solutions, and scientific breakthroughs
- Enable entirely new lines scientific inquiries and sectors of the economy

Examples – Polymerase Chain Reaction (PCR), Light-Emitting Diodes, AI models for protein structure prediction, Very Large Scale Integration (VLSI)

Strategic Objectives

Build Sector-Defining Platforms

Develop novel platform technologies that foster the transformation of scientific breakthroughs beyond traditional outputs like publications

Develop New Organizational Research Structures

Foster independent R&D organizations with the structure, resources, and flexibility necessary to tackle large-scale scientific advancements

NSF's Experimental Hypothesis

Independent teams of full-time, interdisciplinary experts, operating with flexibility and autonomy, will cultivate breakthrough technologies faster



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Programmatic Structure



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Topics & Missions

Topics

Announced by NSF

- Focus areas where breakthroughs could create or reshape entire scientific fields and technology sectors where U.S. competitiveness is a priority

Missions

Proposed by Teams

- Tackles key challenge(s), gap(s), or bottleneck(s) within the Topic
- Motivated by practical use considerations that the proposing team is uniquely suited to tackle and that is currently unmet by existing funding

Desired Outcomes from NSF X-Labs Teams

Significant R&D Breakthroughs

- Development of technologies that enable significant downstream breakthroughs
- Solving a specific technological challenge that creates or reshapes entire fields
- Early-stage prototypes not incentivized for private sector funding

Not within Scope

- Advancement of multiple research arms of a technology sector without a clear Mission
- Incremental advancement of the state of the art
- Advancement of technologies that already demonstrate substantial private investment
- Development of testbeds or data centers as the primary focus of the proposal
- Missions where the sole challenges to be addressed are non-technical

Programmatic Structure & Funding

Phase 0
Selection

Phase 1 Go/No Go
Selection

Phase 2 Go/No Go
Selection

Phase 0
≤ \$1.5M
9 Months

Phase 1
\$10-50 M per
year
24-36 Months

Phase 2
\$10-50 M per
year
24-36 Months



Introduction to NSF X-Labs

Funding Mechanism



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Other Transaction (OT) Contracts

NSF TIP's OT Authority

- Other Transaction Authority (OTA) is NSF TIP's newest obligation authority.
- Provided to NSF in the CHIPS and Science Act of 2022.
- Other Transactions (OTs) are:
 - **Not** Grants, Cooperative Agreements, or FAR-Based Contracts.
 - **Not** subject to restrictions on or regulations implementing these other instrument types.

Learn more about NSF's contracting authority here: [Contracting With NSF - About NSF | NSF - U.S. National Science Foundation](#)

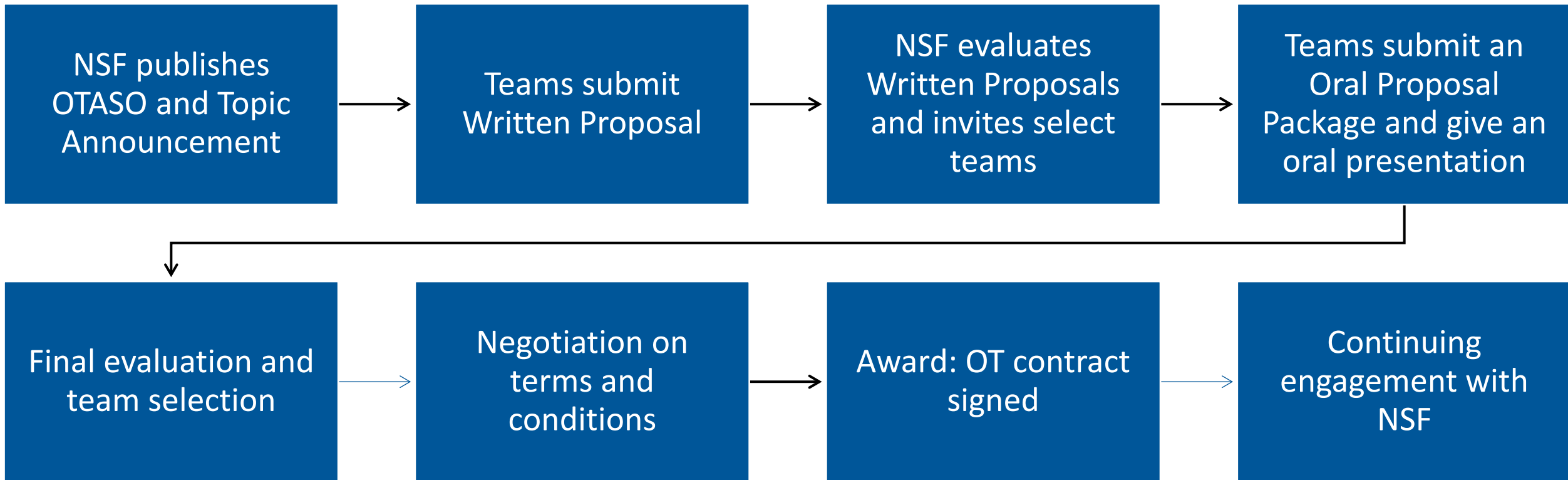
What is an OT Contract?

- A flexible funding mechanism available to TIP and NSF that allows for tailored terms and payment schedules
- OT Contracts can have a variety of payment types. NSF X-Labs will use milestone-based contracts
- Often well-suited for “relational contracting”, allowing for joint exploration and a common understanding of complex long-term goals at the outset

Comparison of Instrument Types

Grants <i>(Financial Assistance)</i>	Cooperative Agreements <i>(Financial Assistance)</i>	Contracts	Other Transactions (OT)
<p>Legal instrument of <u>financial assistance</u> between federal agency and a non-federal entity.</p> <p>Transfer of anything of value to <u>carry out a public purpose</u>. Not to acquire property or services for the awarding agency's direct benefit or use</p> <p><u>Does not</u> provide for substantial involvement of awarding agency</p>	<p>Legal instrument of <u>financial assistance</u> between federal agency and a non-federal entity.</p> <p>Transfer of anything of value to <u>carry out a public purpose</u>. Not to acquire property or services for the awarding agency's direct benefit or use</p> <p>Provides for substantial involvement of awarding agency</p>	<p><i>Procurement Contract:</i> An instrument to <u>acquire property or services</u> for the direct benefit of the US Government.</p> <p><i>R&D Program Contract:</i> <u>advances scientific and technical knowledge</u> to achieve goals. Typically directed towards objectives for which the work or method are difficult to know in advance</p>	<p><i>Other Transactions</i> are a unique type of instrument that may be used for a <u>variety of scientific and engineering activities</u>. For NSF, use of OTs <u>requires a nexus to the activities of the TIP directorate</u>.</p> <p><u>Intended to allow creation of win-win partnerships for all parties</u></p>

NSF X-Labs Flowchart for OT Award





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X-Lab Teams



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Team Structure

NSF will Bet on Nontraditional, Independent Teams

- Support for full-time, independent teams outside of traditional academia and industry settings
 - Teams are expected to operate as an autonomous entity by Phase 1
- Teams must demonstrate a clear mission, leadership, and innovative approach

Lead Organizations and Subcontractors

- One lead organization per NSF X-Lab team will sign an OT contract with NSF
- The lead organization may subcontract with partnering organizations. NSF X-Labs may subcontract with new organizations during the period of performance beyond those originally proposed

Team Independence & Autonomy

Eligible teams will meet all requirements of an **Autonomy Factor Test**

- Teams must demonstrate a leadership structure that allow decisions to be made quickly, efficiently, and independent of another organization.
- Teams must have full internal control of:
 - How funding is allocated
 - Research directions and partnership agreements
 - Intellectual Property (IP) produced by the X-Lab, including for licensing agreements
 - Hiring, salary negotiation, and contracting

Senior/Key Personnel Eligibility

Senior/Key Personnel are individuals who contribute in a substantive, meaningful way to the development and execution of the NSF X-Lab

- All Senior/Key Personnel are expected to be dedicated full time to the X-Lab team by the beginning of Phase 1
 - Teams may still hire part-time employees, vendors, advisors, subcontractors, research labs, etc. These will not be Senior/Key Personnel
 - During Phase 0 only, X-Labs teams may support Senior/Key Personnel via subcontracts
- Senior/Key Personnel may be listed on only one proposal per Topic Announcement
- Senior/Key Personnel may not be citizens of China, North Korea, Russia, or Iran, parties to a Malign Foreign Talent Recruitment Program, foreign entities of concern, or U.S. proscribed parties (*OTASO; Sect. 6.3*)

Example X-Lab Structure Models

Team Structure	Proposal	Phase 0	Phase 1
Lead org. <u>is</u> the NSF X-Lab team	A new or existing team proposes as the lead org. Some SKP are affiliated with a different org.	The lead org. signs an OT contract and sets up subcontracts to pay some SKP	All SKP transition to be full time on the X-Lab team. Some are employed by the lead org., others take leave from their home institution and are supported through a subcontract
Lead org. <u>hosts</u> the NSF X-Lab team through all phases	A team forms from staff/faculty of different orgs. One org. plans to host the X-Lab as the lead org.	Lead org. signs an OT contract and sets up subcontracts to pay some SKP. The X-Lab team and lead org. coordinate to establish the X-Lab as appropriately autonomous	The X-Lab team is established as autonomous and affiliated with the lead org. All SKP transition to full time. Some are lead org. employees; some are supported via subcontracts
Lead org. <u>temporarily hosts</u> the NSF X-Lab team during Phase 0	A team forms from staff/faculty of different orgs. One org. plans to host the X-Lab temporarily as lead org.	Lead org. signs an OT contract and sets up subcontracts to pay some SKP. During Phase 0, the X-Lab creates its own governance structure separate from the lead org.	The X-Lab spins out from the Phase 0 host. NSF novates the OT contract so that the X-Lab becomes the new lead org. All SKP transition to full time. Many are employees of the new lead org; some are supported via subcontracts.

SKP = Senior/Key Personnel

This list is **not comprehensive**. Teams should think outside the box when it comes to structuring their X-Lab.



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Milestones



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Milestones & Milestone-Based Payments

Milestones are discrete, predefined performance checkpoints specified in an OT contract that an awardee must satisfy and document to NSF before payment is released

- Payment after demonstration of progress
- Allows NSF X-Labs to be **outcomes driven**, not just activity driven
- Should have a measurable exit criteria

Collaborative Development

- Developed collaboratively between teams and NSF during proposal and negotiations
- Can be renegotiated to support rapid innovation

High-risk, High-reward Focus

- Teams are encouraged to propose ambitious, measurable milestones. NSF will reward significant, transformative progress even if not all milestones are achieved

Creating a Milestone Plan

- Teams will propose milestones for each phase, specifying each milestone's task, deliverable and payment.
- Milestones plans and payment schedules will be negotiated before the OT contract is signed (Phase 0) or amended (Phase 1 & 2)

Milestone Proposal Timeline



Phase 0 Milestones

- Phase 0 Milestones will be proposed by teams invited to submit an Oral Proposal Package
 - No need to propose specific milestones in the Written Proposal
- During Phase 0, teams will produce planning documents for their Phase 1 proposal
- Teams will receive guidance during Phase 0 to develop appropriate Phase 1 Milestones

PHASE 0 MILESTONE AND DELIVERABLES TABLE TEMPLATE

Milestone #	Milestone Name	Brief Milestone Summary	Deliverable	Expected Delivery Date [Month(s) after award]	NSF Payment	Expected Invoice Date [Month(s) after award]
1	Team Kickoff Meeting	A virtual briefing on the plan for Phase 0 to include the team structure, milestone schedule and path to prepare for Phase 1 proposal material	Kickoff Meeting Slide deck	1	\$	1
2	Data Management and Privacy Plan	Teams will describe their plans for data-sharing across their team, with NSF, and with the <u>general public</u> . Plans will describe how the team will create, protect and disseminate research results during the period of performance.	Data Management and Privacy Plan	1	\$	1
3	IP Management Plan	The IP Management Plan describes how IP controlled by the team and/or generated during the period of performance will be identified, protected.	IP Management Plan	≤7	\$	≤7



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Phase 0 Selection



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The Two-Step Evaluation Process

Written Proposal

- Maximum 8-page proposal describing the proposed team's Mission, Technology landscape, desired outcomes, qualifications of Senior/Key Personnel, and Team capabilities.

Oral Proposal

- Only invited teams advance to an oral proposal and submit an oral proposal package
- Package includes more details – budget, Milestone plan, Senior/Key Personnel disclosures, etc.
- Additional guidance will be provided to invited teams.



Topic Overview

Quantum Systems: Interconnects and Integrated Photonics



Tech Labs



Rationale & Background

Quantum information science is reaching a transformational inflection point

- Future quantum computers will accelerate scientific discovery and push beyond the capabilities of classical computing.

Quantum interconnects – Essential for transferring quantum information between distinct subsystems and enabling modular and heterogeneous system architectures

Integrated Quantum Photonics – Promises dense on-chip integration of key optical components to enable practical quantum computers

Topic Objectives

- Advance use-inspired, application-oriented quantum systems
- Develop prototypes of scalable, integratable, and interoperable quantum components
- Accelerate breakthroughs for effective quantum information transfer

Topic Scope

What technologies are in scope?

- Next-generation **quantum interconnects, integrated quantum photonics** and/or their supporting technologies
- Systems that are not currently commercializable and require early-stage R&D investment

High-Risk Novelty: Does your team's technology expand the frontier of quantum systems beyond an incremental improvement of the state of the art?

Ambition: Does your team's technology accelerate breakthrough R&D and have the potential to create or reshape new lines of research and new sectors of the economy?

Timeline & Submission

JUNE 30, 2026 | Q&A Webinar for Quantum Systems: Interconnects and Integrated Photonics

JULY 24, 2026 | Written Proposal Submission

Deadline for receipt of Phase 0 Written Proposals

AUG 31 – SEP 4, 2026 | Oral Presentations

Teams present live before a review panel

DECEMBER 2026 | Beginning of Phase 0

Kickoff of 9-month Phase 0. Project planning, refinement, and team organization begin.

JULY 2027 | Beginning of Phase 1 Go/No Go Selection

NSF evaluation of Phase 0 progress to determine which teams transition to Phase 1

SEPTEMBER 2027 | Beginning of Phase 1

Full-time teams work with urgency and purpose to realize their Mission



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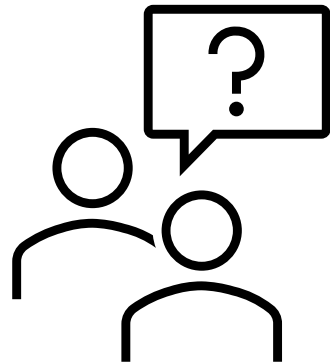
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Q&A Guidance

Click the Q&A button to type and submit questions for response during the webinar.



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