Preparing a DOE Phase I Pitch

Randy Simpson

COO

TechOpp, Inc.

08/20/2026

www.TechOpp.com | 540-627-5129

Outline

Purpose is to help small businesses prepare and adapt

- Background
- Changes to the DOE SBIR/STTR Program
- New Phase I application process
- Strategy to Maximize Phase I invitation
- Resources from TechOpp
- Appendices
  - *Executive Order 14363*
  - *DE-FOA-0003612 Alignment*
  - *Transcript of Aug 5 Office Hours for each topic and Gap Analysis*
  - *Some Page Layout Ideas*

Background

Background

Long-Standing Federal Funding Program

1977
- Roland Tibbets NSF program

1982
- Small Business Development Act
- Created SBIR program

1992
- Reauthorized
- Small Business Research and Development Enhancements Act
- Commercialization emphasis

2000
- Reauthorized
- Small Business Innovation Research Program Reauthorization Act of 2000

2011
- 2012 Defense Authorization Act

2016
- SBIR/STTR
- 2017 National Defense Authorization Act

2022
- SBIR and STTR Extension Act of 2022
- Included 6 pilot programs

2026
- Here we are again
- RAMP Act

- SBIR and STTR Reauthorization Act of 2026
- The Research Advancing to Market Production (RAMP) for Innovators Act

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Congress and Agency Responsibilities

Legislation to Directives to Policy

Congressional Reauthorization Act

- Establishes congressional direction
- Prescribes funding

Small Business Act

- Actual legislation
- Edit to incorporate Act

SBA: SBIR/STTR Policy Directive

- Single directive by SBA
- Advises all Agencies

Agency-Specific: Regulations & Procedures

- Specific implementation for each Agency
- Inconsistent

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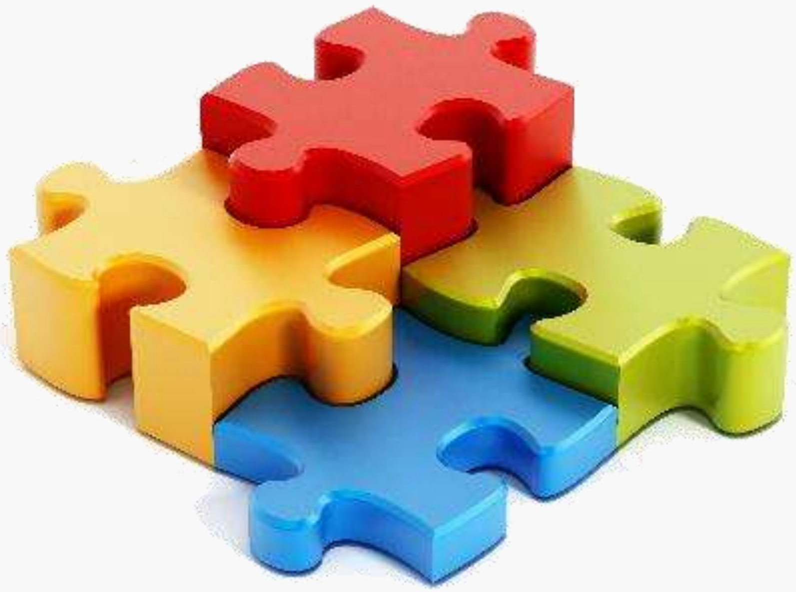
Genesis Program Stakeholders

Lots of “Cooks in the Kitchen”



- White House
  - *Executive Order 14363*
- Department of Energy
  - *Office of Undersecretary for Science*
- FOA-0003612 awardees (278)
- Connectwerx/ATI
- Genesis Mission Consortium
- SBIR/STTR proposers

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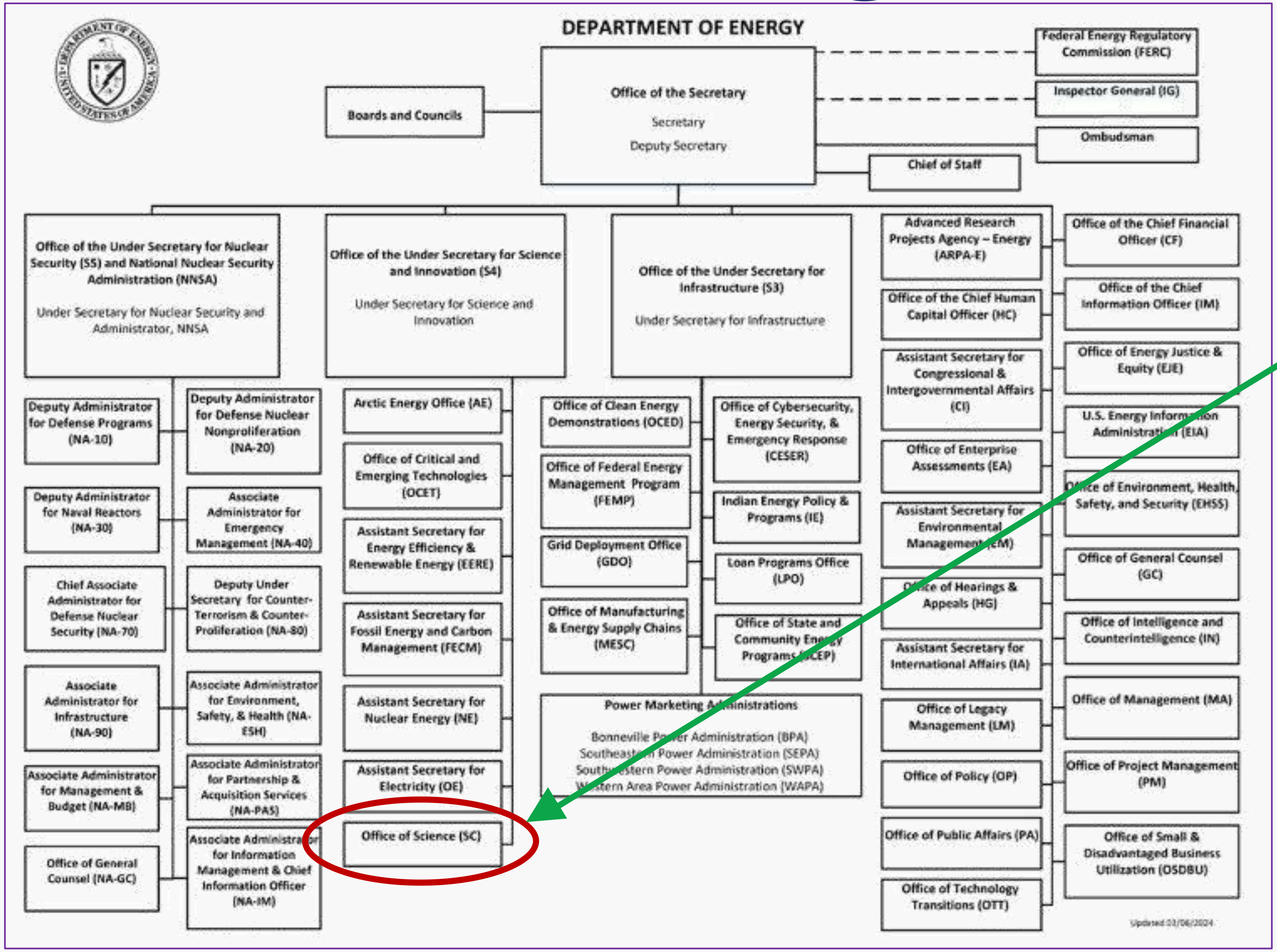
Changes to the DOE SBIR/STTR Program

Previous Organization

March 2024



SBIR/STTR Program resides in the Office of Science

Chart is hot linked to source document

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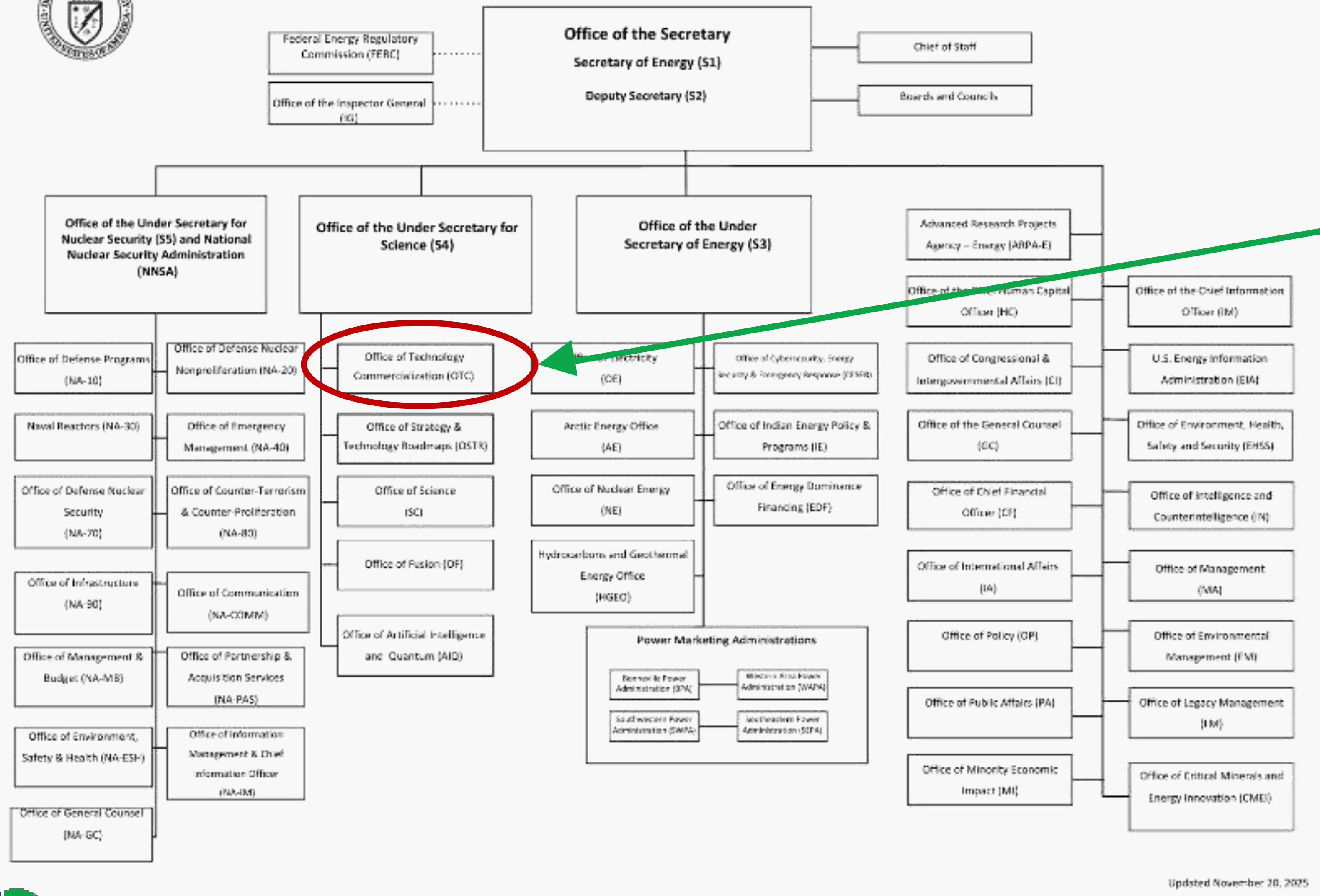
Revised Organization

November 2025

DEPARTMENT OF ENERGY



SBIR/STTR Program resides in the Office of Technology Commercialization

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New Phase I Application Process

New Phase I Process

Quite different that previous process

Due Sept 10, 2026, at 2 PM ET

Submit Pitch
- Short elevator pirch
- Up to 3 per company

DOE Screen
- Pass/Fail for Phase I proposal invite

Full Application
- Details on Phase I application TBD

Phase I Award
- Proof of concept
- Typically, 6-12 months

Go/No-Go Phase II
- DOE Assesses:
  - Technical Progress
  - Commercial Potential

Pitch Template from DOE: https://sbir-sttr.connectwerx.org/wp-content/uploads/2026/07/Pitch-Stage-Key-Questions.docx

- An entirely new application, a new proposal process to apply for Phase II.
- Move between phases via a go/no-go decision point.
- At that point, there will still be some evaluation requirements. So think like a Phase II plan or a commercialization pitch.
- Go/no-go, decision point based on those materials that we will receive.

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FY26 Phase I SBIR/STTR Launch

Genesis Mission

~40	$10M	Sep 10	Fall 2026	2:00 PM ET
anticipated awards	Phase I opportunity	pitch deadline	broader Phase I expected	

Biotechnology	Scaling the Biotechnology Revolution
Quantum + AI	AI for Quantum Computing and Networking
Materials	Designing Materials with Predictable Functionality
Autonomous Labs	AI-Driven Autonomous Laboratories

Note: this is an initial release; DOE states additional Phase I topics are expected later this year.

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Specifics to Consider

Get started early

Registrations and portal setup are now part of early readiness.

1. Request AMP access

DOE applications are managed through the DOE SBIR/STTR Application Hub / AMP, hosted with ConnectWerx.

Portal is not active as of this presentation

2. Start registrations

SAM registration can take weeks; SBA Company Registry requires the UEI from SAM.

3. Draft pitch offline

Strict word counts; Phase I pitch uses four open-text questions and can be refined before submission.

Key guardrails

Up to 3 pitches
per company across topic areas

No pitch = no full app
declined or missed pitch cannot proceed

Topic
between pitch and full application

Confirmation by email
ConnectWerx confirms accepted submission

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https://sbir-sttr.connectwerx.org/eligibility-criteria/

Eligibility Criteria

Small Business Set-Aside

- Qualify as a Small Business Concern (SBC) as defined by the Small Business Administration
  - *General requirements*
    - Organized for profit
    - Independently owned and operated
    - Not dominant in its field
    - Not Venture Capital funded
    - Located and operated in USA
  - *Industry-Specific Size Standard*
    - Generally, 500 or fewer employees

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Sector 54 – Professional, Scientific and Technical Services

NAICS Codes	NAICS Industry Description	Size standards in millions of dollars	Size standards in number of employees
541110	Offices of Lawyers	$15.5	
541191	Title Abstract and Settlement Offices	$19.5	
541199	All Other Legal Services	$20.5	
541211	Offices of Certified Public Accountants	$26.5	
541213	Tax Preparation Services	$25.0	
541214	Payroll Services	$39.0	
541219	Other Accounting Services	$25.0	
541310	Architectural Services	$12.5	
541320	Landscape Architectural Services	$9.0	
541330	Engineering Services	$25.5	
541330 (Exception 1)	Military and Aerospace Equipment and Military Weapons	$47.0	
541330 (Exception 2)	Contracts and Subcontracts for Engineering Services Awarded Under the National Energy Policy Act of 1992	$47.0	
541330 (Exception 3)	Marine Engineering and Naval Architecture	$47.0	
541340	Drafting Services	$9.0	
541350	Building Inspection Services	$11.5	
541360	Geophysical Surveying and Mapping Services	$28.5	
541370	Surveying and Mapping (except Geophysical) Services	$19.0	
541380	Testing Laboratories and Services	$19.0	
541410	Interior Design Services	$9.0	
541420	Industrial Design Services	$17.0	
541430	Graphic Design Services	$9.0	

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DOE Phase I SBIR/STTR Specific Requirements

Additional to Eligibility Requirements

Requirement	SBIR	Notes	STTR	Notes
Primary employment of Principal Investigator	With SBC at time of award and for the duration of the project	PI must spend more than 50% of total employment hours with SBC	Either SBC or Research Institution (RI)	Same as for SBIR
Performance of Work	SBC performs 2/3 of the research or analytic effort	Up to 1/3 can be contracted	SBC performs at least 40% RI performs at least 30%	Remaining 30% can be performed by either party or subcontracted
Research Partner	Not required but allowed	Within constraints noted above	Mandatory to partner with single, US-based, non-profit RI	Colleges or Universities, Scientific/ Research organizations, FFRDCs

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Post Phase I Funding Path

Changes are significant

New entrants apply through Phase I; later phases are tied to DOE approval and performance criteria.

Phase I
6–12 mo
up to $250k
Feasibility + proof of concept

→

Phase II
1–2 yrs
up to $2M
Prototype + demonstration

→

Phase II.2
Sequential Phase II
Continued development; prior IIA/IIB crosswalk

→

Strategic Breakthrough
Up to 4 yrs
up to $30M
High-performing companies with strategic alignment

→

Phase III
Non-SBIR/STTR funds
Commercialization / mission use

Important: DOE currently does not offer a Direct-to-Phase-II path; new participants enter through Phase I.

Compliance has expanded

Carefully consider

Applicants should prepare for risk review alongside merit review.

Foreign relationships

DOE reviews foreign ownership, affiliations, investment, licensing, JVs and business relationships tied to countries of concern.

Cybersecurity

Phase II applicants face cybersecurity self-assessment; Phase I awardees are encouraged to prepare early.

Restricted-party checks

Applicants may be assessed against sanctions and restricted-party lists named in statute and policy.

AI review consent

DOE / Partnership Intermediary may use AI to review application information, with confidentiality protections.

Recommendation: build a disclosure pack early — ownership, investors, foreign collaborations, key-personnel affiliations, current/pending support, and cybersecurity posture.

How to Adjust

Specific Next-Steps

Treat the pitch as a gate and the award as a milestone-driven commercialization path.

1	**Near-term**	Request AMP access; start SAM/UEI + SBA registration; choose topic fit; draft pitch offline.
2	**Pitch narrative**	Lead with DOE mission fit, technical novelty, feasibility evidence, commercial pull, and credible team.
3	**Team build**	Lock PI, research partner/subcontractors, facility access and letters of support early.
4	**Compliance readiness**	Prepare foreign-risk disclosures, covered-individual materials, current/pending support and cyber self-assessment prep.
5	**Post-award plan**	Map Phase I milestones to Go/No-Go evidence and a credible Phase II / Phase II.2 roadmap.

Bottom line: the new Phase I program rewards concise screening evidence first — then milestone discipline after award.

Strategy to Maximize Phase I invitation

Phase I Pitch Stage

Maximize your chances

SBIR · STTR | OTC Office of Technology Commercialization

Key Questions at the Pitch Stage

1. **Summary, Topic, and Mission Alignment (100 words or less):** Provide a brief layperson overview of the project. Describe how your project aligns with your chosen topic area as well as U.S. Department of Energy's mission and priorities.

2. **Technical Promise (200 words or less):** Provide an overview of the scientific and technical foundation of your project. Briefly address its ***Significance*** – the importance and urgency of the challenge being addressed, ***Innovation*** – the novelty of the proposed solution to help provide a viable product or service, and ***Feasibility*** – the ability to successfully prove the concept within the proposed timeline and budget. Please avoid deep technical jargon and focus on what matters to non-technical evaluators.

3. **Commercialization Potential (200 words or less):** Describe how your technology addresses a market need and outline your pathway to customers and revenue. Briefly address your ***Value Proposition*** – the technology's ability to meet identified customer needs, ***Competitive Advantage*** – a realistic assessment of the competitive landscape, and your ***Go-to-Market Strategy*** – the pathway to market, including supply chain planning, target customers, and sales channels.

4. **Team Qualifications (200 words or less):** Outline how your team possesses the technical expertise, commercialization experience, and strategic partnerships necessary to successfully execute the project. Briefly address your ***Company*** – the relevant experience of the team, ***Partnerships*** – the strength and relevance of external partners (or plans to secure partners) who will enhance the likelihood of the project's success, and ***Financials*** – a credible plan for securing follow-on funding.

- This is DOE's Pitch Development Guide Template
  - *Word count restriction*
  - *No font or spacing restrictions*
- "May" upload Bibliography and References Cited Document
  - *Advantage or Disadvantage?*
  - *Will this be read?*
- Consider the Evaluator

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Pitch Evaluation Criteria

Same as for Phase I proposal

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How to Propose a Project

Pick a project with higher potential

- You can submit a Project Pitch aligning with a topic in your interest area
- However, some work has already been awarded under a prior FOA
  - *Don't duplicate existing projects*
  - *Do your research and propose projects that fill a gap*
    - Look at DE-FOA-0003612 Awards—study them carefully
    - Assess gaps and propose a project that fills the gaps
- Maximizing your p-win begins with Project content selection

Oval is hot linked to source document

Pitch Content

Summary, Topic, and Mission Alignment

Element 1 of Pitch

100 words or less

- Provide a brief layperson overview of the project. Describe how your project aligns with your chosen topic area as well as U.S. Department of Energy's mission and priorities.
  - *Note topic area alignment*
  - *"Fast forward" to specific Use Case(s) applications---real world examples*

- Possible Evaluation Criteria alignment
  - *Policy Factors*
    - Alignment with DOE and Administration's policy priorities
    - Complement other DOE-funded initiatives
    - Includes partnership with National Laboratory

Executive Order and DE-FOA-0003612

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Technical Promise

Element 2 of Pitch

200 words or less

- Provide an overview of the scientific and technical foundation of your project. Briefly address its
  - *Significance – the importance and urgency of the challenge being addressed,*
  - *Innovation – the novelty of the proposed solution to help provide a viable product or service, and*
  - *Feasibility – the ability to successfully prove the concept within the proposed timeline and budget. Please avoid deep technical jargon and focus on what matters to non-technical evaluators.*

- Significance of the Problem
  - *Relate to real world problem or state of the art "ceiling".*
  - *Who cares about this issue and stands to benefit from successful R&D*
- Meaningful advancement or breakthrough
  - *What State of the Art is being advanced?*
- Realistic Work Plan
  - *Outline Work Plan very briefly*
    - Include budget and overall schedule
    - Emphasize practicality of the Work Plan
  - *Follow good Systems Engineering practices, i.e., SE "V"*

Pitch Content

Commercialization Potential

Element 3 of Pitch

200 words or less

- Describe how your technology addresses a market need and outline your pathway to customers and revenue.
  - *Briefly address your Value Proposition – the technology's ability to meet identified customer needs,*
  - *Competitive Advantage – a realistic assessment of the competitive landscape, and your*
  - *Go-to-Market Strategy – the pathway to market, including supply chain planning, target customers, and sales channels.*

- Value Proposition for Customr
  - *Must ID End User and Use Case*
  - *What are the operational Key Performance Criteria important to the End User—talk to an End User*
- Differentiation from existing solutions
  - *Perform "freedom to operate"*
  - *List competitive solutions and assert your advantage: market and technology*
- Go-to-Market
  - *What is your business model?*
    - May want to ID several to be refined
  - *Specify market(s) size and growth*
  - *Note you will be requesting TABA for Phase I: bring an expert on the team to plan and execute the Commercialization Strategy*

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Pitch Content

Team Qualifications

Element 4 of Pitch

200 words or less

- Outline how your team possesses the technical expertise, commercialization experience, and strategic partnerships necessary to successfully execute the project.
  - *Briefly address your Company – the relevant experience of the team,*
  - *Partnerships – the strength and relevance of external partners (or plans to secure partners) who will enhance the likelihood of the project's success, and*
  - *Financials – a credible plan for securing follow-on funding.*

- Expertise and Resources
  - *Summarize relevant technical expertise*
  - *Discuss commercialization success stories---and the process used*
- Strategic Alliances
  - *Bring commercialization expert on your team—TechOpp qualifies*
  - *Technology Transition Partners are critical---get a Letter of Support now ("available upon request")*
  - *Either an End User or Existing Producer of product*
    - Where will you fit in their Supply Chain?
- Revenue Growth Model
  - *Note DOE Phase II and Phase II.2 as funding sources*
  - *Add other R&D or investment options*

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Topics to DOE Organization Map

Who is sponsoring each topic?

Topic	Potential Organizational Alignment	Notes	FOA Awards Relevance (see Appendix)
1. Scaling the Biotechnology Revolution: AI for biotechnology	Office of the Under Secretary for Science (S4) → Office of Science (SC) → Biological and Environmental Research (BE[illegible])		20 FOA awards potentially aligned. These are good teaming partners
2. Realizing Quantum Systems for Discovery: AI for Quantum Computing and Networking	Office of t[illegible] Secr[illegible] Sci[illegible] → Office of Sc[illegible] S[illegible]	[illegible] A-	Potential alignment with FOA Topic 7 and 8D. Subset of awardees aligned as potential teaming partners
3. Designing Materials with Predictable Functionality	DOE Offic[illegible] Sci[illegible] (BES), w[illegible] Energy Innovatio[illegible] lat[illegible] and Manufactu[illegible]ng Techn[illegible]s Office (CMEI-AMMTO)	[illegible]ing Scie[illegible]d Energy wi[illegible]I	DOE has an entire Topic 12 called “Designing Materials with Predictable Functionality.
4. Achieving AI-Driven Autonomous Laboratories	Office of the Under Secretary for Science → Office of Science → Advanced Scientific Computing Research (ASCR)		Topic 11, “Achieving AI-Driven Autonomous Laboratories.”

This is TechOpp preliminary research—not DOE information. Use with appropriate discretion

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Topics to Executive Order and Prior DE-FOA-0003612

Connect the dots for context

Executive Order/Prior FOA	Challenge Area	SBIR/STTR Topic Reference
Biotechnology	2 - Scaling the Biotechnology Revolution	Scaling the Biotechnology ...olution
Critical Materials	3 – Securing America... Minerals Supply 12 - Designi... Predictable Functi...	
Quantum Information Science	7 - Discovering Q... Algorithms with AI 8 - Realizing Quantum Sys... for Discovery	...ery ... Quan... ...puting a... ...working
Autonomous Laboratories	11 - Achieving AI-Driven Autonomous Laboratories	Achieving AI-Driven Autonomous Laboratories

This is TechOpp preliminary research—not DOE information. Use with appropriate discretion

- Read to understand context and specifics
  - *Executive Order*
  - *DE-FOA-0003612*
- Make your submission align with these foundational documents
  - *Use their language*

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Genesis Mission Consortium

Pertinent information to provide context

- Consortium members intend to contribute computing power, AI tokens, technical expertise, or in-kind support, to advance the Genesis Mission goals and build the community
- The consortium will provide support to identify and cultivate high-value collaboration among consortium members to pursue Genesis Mission funding and collaboration opportunities
- “Future funding calls”
- Working Groups
  - *AI Model Development & Validation*
  - *Data Integration & Standards*
  - *High-Performance Computing & Cloud Infrastructure*
  - *Robotics & Automation*
  - *Workforce Development & Training*
- Is joining or partnering with a Member beneficial to improve your p-win?

Graphic is hot linked to Consortia website

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Resources from TechOpp

Topic Selection & Pitch Review

Get some Expert Advice

- TechOpp has done considerable topic content research for the existing Genesis project
  - *And how projects align with SBIR/STTR topics*
- We have this data for each of the topics
  - *For example,*
    - SBIR/STTR Topic #4 — Achieving AI-Driven Autonomous Laboratories: the commercialization-oriented version of Genesis Mission Topic 11
    - Five buckets of SBIR/STTR research

SBIR Topic # 4 Portfolio Map

Partial representation

KEY ● = primary fit; ○ = meaningful secondary fit

	SBIR/STTR Topic Areas				
Selected Genesis Mission project	A Robotics	B AIOps / networks	C Autonomous experiments	D Diagnostics / remote handling	E Neuromorphic / edge AI
Ceder / LBNL — A-WILD: AI-driven Workflows for Intelligent Lab Discovery	○		●	○	
Chen / Duke — Neuromorphic Circuit Primitives for Robotic Embodied Physical AI	●		○		●
Darve / Stanford — ORACLE: Reasoning, Anomaly Detection, and Causal Learning in Experiments			●	●	
Date / ORNL — Spiking Transformers for Neuromorphic AI			○		●
Gopalaswamy / Rochester — Autonomous Implosion Design and Experimental Co-piloting via Physics-Grounded Agentic AI	○		●	○	
Herman / Carnegie Mellon — Scalable AI stack for multiple heterogeneous autonomous labs / massively parallel experiments	○	○	●	○	
Isler / UT Austin — SAFE-BOLT: Safety-Assured Force-aware Execution for Bimanual Operations on Lab Tools	●		○	○	
Karthein / Texas A&M — Scalable Agentic Digital Twins for Autonomous Precision Facilities	○	○	●	●	
Kiran / ORNL — Science-Aware Network Operations for Research Networks (SciNet)		●	○		

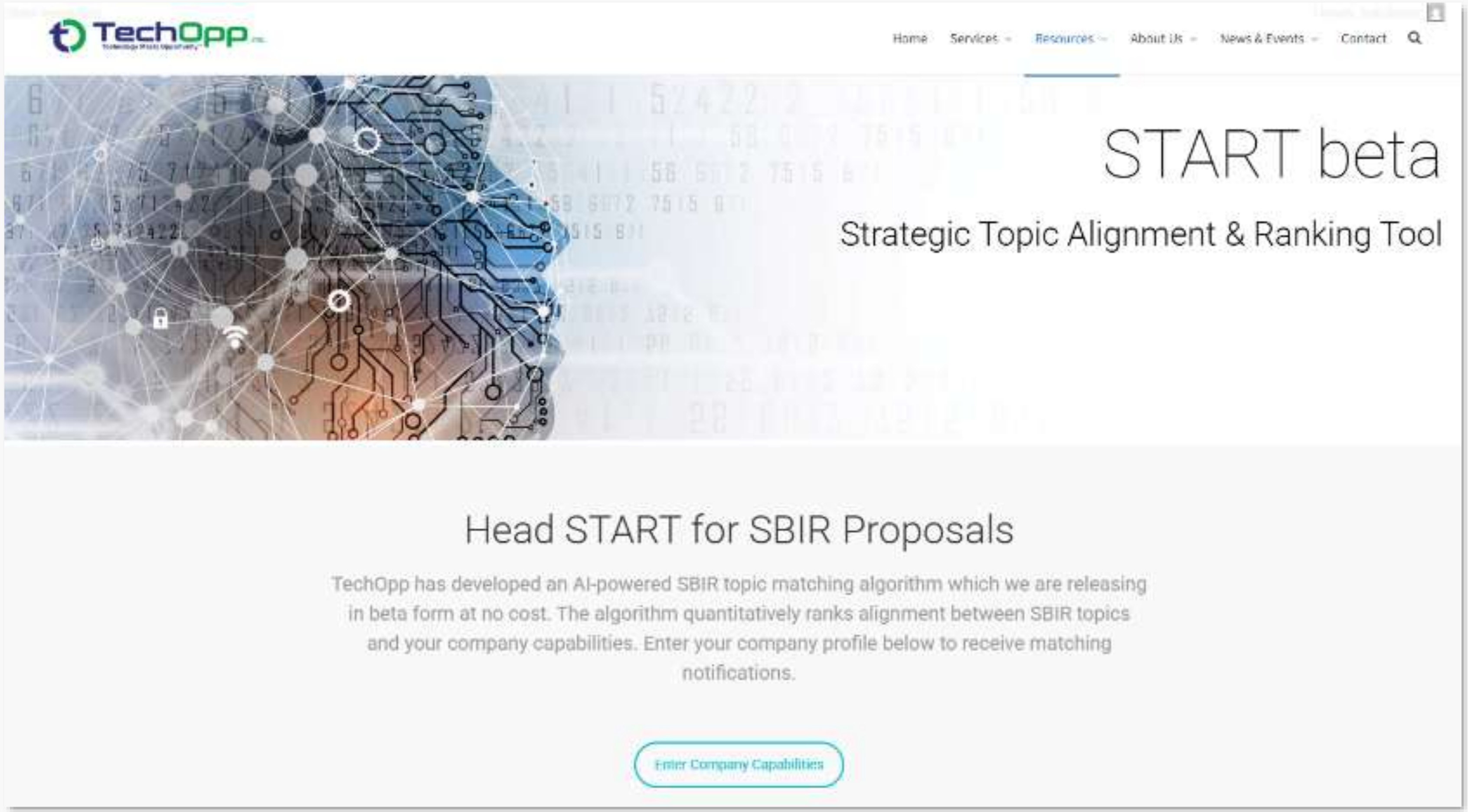
TechOpp Offerings

Specific DOE-Focused Assistance

- Current SBIR Round
  - *Consultation for topic/project selection and scope of work*
  - *Review Pitch prior to submission*
- Identify Specific Individuals within DOE Offices and Create Business Relationships
- Coach Phase I Proposal Team to improve p-win
- Identify and Capture non-SBIR/STTR Federal Funding

SBIR Topic Search Tool

Enter capabilities, receive early notification of topics



Location: https://techopp.com/resources/sbir-topic-search-tool/

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Direct Support

How we can help

PROPOSAL DEVELOPMENT
Our proposal management process includes coaching, writing, editing, and assistance with proposal submission.

TECHNICAL AND BUSINESS ASSISTANCE (TABA)
Our hands-on TABA support leverages federal funding to support technology transition and commercialization.

TRAINING
We leverage our hands-on experience to provide actionable SBIR training for state agencies and small businesses.

STRATEGIC MARKETING
Our marketing services focus on increasing brand visibility and driving customer engagement.

Appendix

Genesis Mission

Genesis Mission predates these topics

Aligned with topics

U.S. DEPARTMENT *of* ENERGY

Office of Science (SC), Office of Critical Minerals and Energy Innovation (CMEI), Office of Environmental Management (EM), Office of Electricity (OE), Hydrocarbons and Geothermal Energy Office (HGEO), and Office of Nuclear Energy (NE)

Genesis Mission

The Genesis Mission: Transforming Science and Energy with AI

Notice of Request for Application (RFA) Number: DE-FOA-0003612

RFA Type: Amendment 000003
Assistance Listings: 81.049

RFA Issue Date:	March 17, 2026
Submission Deadline for FY26 Phase I Applications:	May 1, 2026, at 11:59 PM Eastern
Submission Deadline for FY26 Phase II Letters of Intent:	May 1, 2026, at 5 PM Eastern
Submission Deadline for FY26 Phase II Applications:	May 19, 2026, at 11:59 PM Eastern
Submission Deadline for Phase II Applications resulting from FY26 Phase I Awards:	December 17, 2026, at 11:59 PM Eastern

- Eligible Applicants
  - *All types of domestic applicants*
    - DOE/NNSA National Laboratories
    - FFRDC's
    - Other Federal Agencies
  - *Teaming Requirements*
    - Teams must include two of: National Lab or Scientific User Facility, Industry, Institute of Higher Education/Non-Profit
- Awards have been made and follow in this Appendix—what can we learn from this?
  - *278 awards: 87 led by DOE and National Nuclear Security Administration (NNSA) National Laboratories, 168 led by universities, 19 led by companies, and 4 led by nonprofit organizations.*
  - *342 participating institutions: 16 DOE and NNSA National Laboratories, 142 universities, 157 companies, 13 nonprofit organizations, and 14 other institutions.*

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Genesis of the Genesis Mission

Executive Order 14363

Text is hot linked to source document

- ID National Science and Technology Challenges
  - *Advanced Manufacturing*
  - *Biotechnology*
  - *Critical Materials*
  - *Microelectronics*
  - *Nuclear Fission and Fusion Energy*
  - *Quantum Information Science*
- Alignment with FY26 Phase I SBIR/STTR
  - *Scaling the Biotechnology Revolution*
  - *Realizing Quantum Systems for Discovery: AI for Quantum Computing and Networking*
  - *Designing Materials with Predictable Functionality*
  - *Achieving AI-Driven Autonomous Laboratories*

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Executive Order 14363

November 2025

PRESIDENTIAL ACTIONS

LAUNCHING THE GENESIS MISSION

Executive Orders | November 24, 2025

EXECUTIVE ORDER 14363

By the authority vested in me as President by the Constitution and the laws of the United States of America, it is hereby ordered:

Section 1. Purpose. From the founding of our Republic, scientific discovery and technological innovation have driven American progress and prosperity. Today, America is in a race for global technology dominance in the development of artificial intelligence (AI), an important frontier of scientific discovery and economic growth. To that end, my Administration has taken a number of actions to win that race, including issuing multiple Executive Orders and implementing America's AI Action Plan, which recognizes the need to invest in AI-enabled science to accelerate scientific advancement. In this pivotal moment, the challenges we face require a historic national effort, comparable in urgency and ambition to the Manhattan Project that was instrumental to our victory in World War II and was a critical basis for the foundation of the Department of Energy (DOE) and its national laboratories.

- A national effort to accelerate the application of AI for transformative scientific discovery focused on pressing national challenges.
  - *A dedicated, coordinated national effort to unleash a new age of AI-accelerated innovation and discovery that can solve the most challenging problems of this century*
  - *Build an integrated AI platform to harness Federal scientific datasets*
  - *Achieve dramatic acceleration in AI development and utilization*
- The Secretary of Energy (Secretary) shall be responsible for implementing the Mission within DOE

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SBIR Topic 1. Scaling the Biotechnology Revolution: AI for biotechnology—Crosswalk to FOA Awards
Kati Perez, DOE

PI	Institution	Selected project
Mark Mba-Wright	Iowa State University	*A Universal AI-Enabled Framework for the Accelerated Design, Scale-Up, and Integration of Heterogeneous Bioprocesses*
Ember Morrissey	West Virginia University	*IMAGINE-AI: Integrated Microbiome Analytic Generator of Interaction Network Evolution*
Michelle O'Malley	UC Santa Barbara	*Precision Microbiome Engineering in Anaerobic Communities: from Deconstruction to Bioproduction*
Paul Opgenorth	Invizyne Technologies	*Digital twins for cell free enzymatic cascades*
Victoria Orphan	Caltech	*AI-driven prediction of emerging microbial phenotypes in electrogenic consortia across scales*
Ameet Pinto	Georgia Tech	*AI-Enabled Single Cell Phenotyping to Advance Biomanufacturing*
Caroline Ajo-Franklin	Rice University	*Predictive AI to Map Point Mutation Effects on Protein Function: Measurement and Biosynthesis of Isoprenoids*

PI	Institution	Selected project
Joshua Atkinson	Princeton University	*MOBILE-PATH: Machine-learning Optimization of Biological Interfaces for Lateral Gene Exchange Pathways*
Kyle Bishop	Columbia University	*AI-Enabled Physical Operating System for Bio-programmable Matter*
Jennifer Brophy	Stanford University	*AI-Driven Design of Gene Expression Programs in Plants Using Foundation Models and High-Throughput DNA Synthesis*
James Fraser	UC San Francisco	*Structural Dynamics Enable Enzyme Design for Useful Biotechnology*
Farren Isaacs	Yale University	*Generative AI for Genome Design: Toward Predictable Synthetic Genomes*
Yongqin Jiao	Lawrence Livermore National Laboratory	*BIND: Biophysics-Informed Learning of Coordination for Metalloprotein Design*
Haonan Ling	University of Central Florida	*Sensor-enabled AI digital twin for autonomous biomanufacturing: Real-time control and predictive scale-up via inline FEW-IR spectroscopy*

PI	Institution	Selected project
Maria Salas-Fernandez	Iowa State University	*AI-enabled multiscale discovery of genotype-to-phenotype control points for lodging-resistant bioenergy sorghum*
Travis Wheeler	University of Arizona	*Agentic AI-Driven Discovery of Enzyme Conformational Dynamics in Microbial Systems*
Yinyin Ye	University at Buffalo	*PHOCUS: PHage-host interaction programming for anaerobic microbiome Control Using AI-guided Design*
Huimin Zhao	University of Illinois Urbana-Champaign	*Foundation Models for Metabolic Engineering*
Roseanna Zia	University of Missouri	*Toward a U.S. Institute for Cell Design: AI-Driven Computer-Ready Synthetic Cells with Quantum Integration*
Jeremy Zucker	Pacific Northwest National Laboratory	*AI-4-Algae: Unleashing Domestic Production of Algal Biomass through Physics-Informed Machine Learning Bioreactors*

Coverage by Focus Area

What is already covered?

Focus area	Coverage	Assessment
Biomolecular design	~8	Well covered
Genotype → phenotype	~11	Well covered, but uneven
Predictive microbiome engineering	~9	Well covered
Biomanufacturing / bioreactors	~12	Very well covered
Genome engineering / Bio Design	~11	Well covered, but substantial white space remains

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Possible Gaps/Potential Topics

Focus areas for SBIR/STTR projects

- AI-designed genome-engineering tools, rather than another genome-design model.
- Genotype → phenotype prediction that generalizes into real field/environmental conditions with sparse data.
- Metagenomic dark-matter + microbiome gene-expression foundation models, especially across organisms and conditions.
- Cross-scale biomanufacturing AI that transfers from laboratory → pilot → commercial reactor rather than merely optimizing one reactor.
- Mechanistic bioreactor AI for mass transfer, mixing, viability and batch variability, particularly models that are transferable across reactor designs.

DOE Office Hour Examples

August 5 Transcript

Kari Perez

- An example of a relevant technology could be using AI to integrate microbial enzyme structure and omit data to predict function of that enzyme.
- An example could be using AI to predict gene expression, behavior, and interactions to accelerate bioengineering of microbes.
- An example could be using AI to predict the outcomes of feedstock crops in field production and settings.
- An example could be establishing a digital twin to predict scale-up of engineered microbes.
- For all of these areas of interest, examples of relevant metrics include but are not limited to prediction accuracy, product yield, decrease variability, resource efficiency, and adaptability to new conditions or products.

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2. Realizing Quantum Systems for Discovery: AI for Quantum Computing and Networking—Crosswalk to FOA Awards

David Rabson, COE

PI / Institution	Genesis project	Assessment re: SBIR Topic #2
Vincent Russo — Unitary Fund	*AutoQEC: AI-Driven Discovery and Optimization of Quantum Error Correction Codes*	Almost exact match to AI/QEC requirement
Charles Cao — Virginia Tech	*AI-enabled co-design of fault-tolerant logical interface in quantum LDPC codes*	Fault tolerance, QEC and architecture co-design
Daniel Wong — UC Riverside	*Learning to Decode at Hardware Speed: Distilled Intelligence for Quantum Error Correction*	AI decoding / real-time QEC
Isaac Kim — UC Davis	*AI-Driven Discovery of Early Fault-Tolerant Quantum Computation Primitives*	Fault-tolerant software/primitives
Loren Alegria — LLNL	*PRISM-Q: Physics-Reinforced Intelligence for Superconducting Microsystems and Quantum Control*	AI-driven quantum hardware/control
Grant Biedermann — University of Oklahoma	*AI-Driven Control and Optimization of QuDit Platforms in Rydberg Arrays*	AI QPU control/calibration
Eric Ma — UC Berkeley	*AI-Driven Inverse Design of Next-Generation 3D Quantum Processors*	Processor design/scaling
Andrei Vrajitoarea — NYU	*AI-driven Pulse-level Optimal Control of Many-body Quantum Eigensolvers*	Low-level QPU control
Youtao Zhang — University of Pittsburgh	*Accelerating Measurement-Based Quantum Simulation Software Design with Artificial Intelligence*	AI-assisted quantum software/toolchain
Kristan Temme — IBM TJ Watson	*AI-Assisted Application Search and Algorithmic-Level Optimization for Quantum Algorithms*	Algorithm selection/optimization
Pooja Siwach — University of Arizona	*ORAQL: Orchestration of AI for Quantum Leadership*	Potentially highly relevant to hybrid workflow orchestration

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Coverage by Focus Area

What is already covered?

SBIR technology area	Current DOE funding signal	Assessment
Decoherence / noise mitigation	Moderate	Funded, but not crowded
Quantum error correction	Very strong	Crowded
QPU control	Strong	Well covered
Quantum-network control	Weak	Major gap
Resource estimation	Weak–moderate	Significant gap
Verification & validation	Weak	Major gap
Problem description ⟶ executable program	Moderate	Some coverage, still open
HPC + AI + quantum workflow management	Moderate	Good white space
Cross-architecture interoperability	Weak	Major gap
Processor scalability	Strong	Well funded
Quantum-network scalability	Very weak	Major gap

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Possible Gaps

Focus Areas for SBIR/STTR Projects

- Cross-architecture quantum resource estimation and optimization. DOE explicitly asks for it, while no award title appears primarily dedicated to resource estimation.
- Scalable quantum performance verification and validation. This is one of the least visibly funded requirements, and “verification” does not appear in the award titles.
- Quantum-network AI control and orchestration. DOE has substantial QPU-control work but very little visible funding for the equivalent network-control layer.
- Vendor-neutral HPC + AI + quantum workflow orchestration. Siwach provides some precedent, but a production-grade multi-vendor platform remains much less crowded than QEC.
- High-level scientific intent ⟶ portable executable quantum workflow. Particularly valuable if coupled with automated hardware selection, resource estimation, compilation, execution, and validation.

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DOE Office Hour Examples

August 5 Transcript

David Rabson

- The new focus is moving into fault tolerance.
- And soon we hope a fully error corrected quantum computing.
- [We] Are really trying to bridge that gap and get us to the next era. Oh, so, from the hardware side, those could include, better ideas for qubits.
- The control apparatus needed to deal with and implement quantum error correction. More on the software side that includes error-correcting codes.
- We're very interested in algorithms for scientific applications. That will run on fault tolerant quantum computers and eventually fully error corrected quantum computers.
- And we want a quantum network that connects them where we would be more interested in practical applications where you have One type of quantum computer that has, for instance, the longer decoherence time and another and therefore greater circuit depth.
- And another kind of quantum computer that has more qubits. And the kind of local quantum networking that would connect those 2.

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3. Designing Materials with Predictable Functionality—Crosswalk to FOA Awards
Adam Kinney, DOE

PI / Institution	Selected Genesis project	Likely alignment
Sergey Barabash — Exabyte Inc.	*AlphaFilm: Closed-Loop AI for Thin-Film Materials*	Materials AI / closed-loop design
Gaurav Arya — Duke	*AI-Driven Inverse Design of Patchy DNA Origami for Assembly of Programmable Superlattices*	**Direct inverse-design match**
Ashley Bucsek — University of Michigan	*AI-enabled real-time reconstructions and interpretation for rapid 3D X-ray diffraction and imaging of materials under stress and extreme environments*	Structural materials / characterization
Laurent Capolungo — LANL	*AI-Guided Creep-Fatigue Life Prediction for Fusion Structural Materials*	Structural/extreme-environment materials
Felipe Jornada — Stanford	*AI-Driven Transport Optimization of Metallic and Interfacial Quantum Materials (ATOMIQ)*	Functional/quantum materials
Roland Kawakami — Ohio State	*A.I. for Orbital Electronics Materials and Manufacturing*	Functional/electronic materials
Uwe Kortshagen — University of Minnesota	*AI-driven rapid discovery of plasma deposition for novel materials for next-generation semiconductor devices*	Discovery + semiconductor materials
Stephanie Law — Penn State	*AI-Orchestrated Multimodal Platforms for Accelerated Discovery, Scale-Up, and Deployment of 2D Materials*	**Very strong Topic 12 match**
Steven Louie — LBNL	*High-Fidelity AI-Ready Excited-State Materials Datasets and AI Models for Accelerated Discovery*	Foundation/data models for functional materials
Jie Lian — RPI	*AI-Guided Manufacturing of High-Performance Heavy Rare-Earth-Free Magnets for Critical Materials Security*	Functional materials / manufacturing
Reza Molaei — Auburn	*A Material Agnostic Physics-Aware, Interpretable AI Framework for Fatigue Life Prediction in TPMS Structures*	Structural materials / physics-aware AI
Lorenz Olbrich — LiftOFF Technology	*Closed-Loop ML-Guided Electrode Development for High Energy Density Batteries*	Energy-storage materials
Bradley Olsen — MIT	*Multi-agent Inverse Design of Block Polypeptoids Into Hierarchical Nanomaterials*	**Direct inverse-design match**
Stephanie Ribet — LBNL	*Closing the Loop: AI-Accelerated Interstitial Engineering of Complex Concentrated Alloys*	Closed-loop alloy/material design
Chad Risko — University of Kentucky	*From Edisonian Optimization to Predictive Molecular Design: AI-Driven Discovery and Engineering of Advanced Semiconductor Interfaces*	**Predictive/inverse materials design**
Andrew Rowberg — LLNL	*AI-Advantage for Defect-property prediction in non-von Neumann computing Materials (A2D-Mat)*	Structure/property prediction
Douglas Spearot — University of Florida	*Closed-Loop, Feedback-Driven Design of Metastable Metallic Alloys with Predictable Strength-Toughness via a Scalable, Agentic Multimodal Diffraction-Chemistry Framework*	**Extremely close to SBIR objective**
Jianwei Sun — Tulane	*Physics-Enhanced AI Framework for Discovering New Classes of Unconventional Superconductors*	Functional/quantum materials

Coverage by Focus Area

What is already covered?

Technology area	DOE funding signal	Assessment
Functional / quantum / electronic materials	Very strong	Crowded
Structural materials	Strong	Well covered
Biomolecular materials	Moderate	Significant room
Plasma-facing / fusion materials	Strong	Application-specific but well covered
AI materials discovery	Very strong	Crowded
Closed-loop discovery / synthesis	Strong	Well covered
Materials scale-up / qualification	Moderate–strong	Important white space remains
Electrochemical catalysts	Moderate	Still open
Inverse design	Strong	Generic inverse-design pitch is crowded
Multi-property inverse design	Moderate	Good white space
Manufacturability-aware inverse design	Limited explicit coverage	High-value gap

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Possible Gaps

Focus Areas for SBIR/STTR Projects

- **Manufacturability-aware inverse design.** Which material has the desired properties and can be manufactured reproducibly, at scale and acceptable cost? That bridges BES-style inverse design with AMMTO-style deployment; substantially less duplication there.
- **Multi-objective, material-agnostic inverse design.** DOE has funded many domain-specific inverse-design systems. A platform capable of simultaneously optimizing physical performance, reliability, cost, supply-chain constraints and manufacturing across material families remains much more open.
- **AI for materials qualification and certification.** Use AI to reduce years of testing required to qualify a new material for energy, aerospace, fusion or manufacturing applications. This is explicitly aligned with 12.F and looks commercially attractive.
- **Biomolecular / bio-derived functional materials.** Compared with metals, semiconductors and quantum materials, the portfolio is sparse. DOE has funded DNA origami and polypeptoid inverse design, but this remains a relatively uncongested part of Topic 12.
- **Scale-aware materials development.** Create AI capable of transferring learning from: simulation → lab sample → pilot process → production material while predicting how processing changes microstructure and therefore final properties. That "translation across scale" problem appears considerably less saturated than initial materials discovery.

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DOE Office Hour Examples

August 5 Transcript

Adam Kinney

- But just to give some context of things we might care about. These could include the development and utilization.
- Physics aware AI frameworks and foundation models to orchestrate high through per computation, high fidelity simulations, and automated synthesis and characterization thereby enable the design of materials with predictable properties.
- Special emphasis on the fundamental understanding and control of underlying mechanisms on the atomistic and electronic level to predict and realize specific physical properties for a wide range of different applications.
- We'd be interested in things like self-improving close to the Potentic frameworks, ones that have rigorous uncertainty estimation, ultimately to be able to enable inverse design of materials and proposals that package advanced scientific capabilities into reusable tools like for example, a company that has developed a robust, Bayesian in inference engine, the physics and form circuit model or a multimodal data fusion framework.
- It really is about accelerating discovery of new materials with specific properties that help the Department.

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4. Achieving AI-Driven Autonomous Laboratories—Crosswalk to FOA Awards
Adam Kinney, DOE

PI / Institution	Genesis selected project	Topic #4 relevance
Whitney Armstrong — Argonne National Laboratory	*Superconducting Polychronous Computation Near Criticality*	Neuromorphic/emerging computation
David Smith — University of Wisconsin-Madison	*High-throughput edge AI for real-time, multi-task inference on high-bandwidth plasma fluctuation diagnostics*	**Diagnostics + edge AI**
Cristina Rea	*CATALYST Core Accelerated Trajectories with Augmented Learning bY Sim-to-experiment Transfer*	AI/experiment closed loop
Haonan Ling — University of Central Florida	*Sensor-enabled AI digital twin for autonomous biomanufacturing: Real-time control and predictive scale-up via inline FEW-IR spectroscopy*	Autonomous experimentation + sensors
Douglas Spearot — University of Florida	*Closed-Loop, Feedback-Driven Design of Metastable Metallic Alloys…*	**Closed-loop autonomous science**
Sergey Barabash — Exabyte	*AlphaFilm: Closed-Loop AI for Thin-Film Materials*	AI-driven experimental/material loop
Stephanie Ribet — LBNL	*Closing the Loop: AI-Accelerated Interstitial Engineering of Complex Concentrated Alloys*	Closed-loop experimentation
Stephanie Law — Penn State	*AI-Orchestrated Multimodal Platforms for Accelerated Discovery, Scale-Up, and Deployment of 2D Materials*	AI orchestration + experimentation
Phillip Sprunger — LSU	*AI for NSLS-II/IIU and CAMD: from early design to high-performance operations*	AI-enabled scientific facilities
Sam Posen — Fermilab	*AI/ML Resonance control for high-reliability, low-cost accelerator operations*	Autonomous control/diagnostics

Coverage by Focus Area

What is already covered?

Technology area	DOE funding signal	Assessment
Autonomous experiment orchestration	Very strong	Crowded
Agentic scientific reasoning	Strong	Well covered
Closed-loop experimentation	Strong	Well covered
General laboratory robotics	Moderate	Meaningful white space
Dexterous manipulation / lab-tool handling	Moderate	Good white space
Multi-lab orchestration	Moderate	Still open
Scientific AIOps / research networking	Limited explicit coverage	High-value gap
Diagnostics / real-time inference	Moderate–strong	Some room
Remote handling in hazardous environments	Limited explicit coverage	High-value gap
Edge AI for instruments	Moderate	Good white space
Neuromorphic circuit primitives	Strong signal	Specialized but funded
Neuromorphic robotics integration	Moderate	Still open
Experiment repeatability / provenance	Limited explicit coverage	Major gap
Cross-vendor instrument interoperability	Limited explicit coverage	Major gap

DOE Office Hour Examples

August 5 Transcript

David Rabson

- Laboratory automation for life sciences..
- Warehouses full of hundreds of instruments. Wet labs in the case of life sciences. And instead of having people. In a traditional wet lab walking from instrumental instrument carrying beakers and vials and putting the in and noting what the measurements are, that they have that done all robotically.
- Another example is the DOE scientific laboratories. Want, user facilities like synchronous neutron scattering facilities and so on.
- Want to be able to automate their workflows. so that You can make changes during the run. Based on the data and the data and it isn't even the student or the professor who makes those changes. The laboratory through AI makes those changes itself in order to optimize the outcome of the experiment.
- We're interested in. Integration of AI, machine learning. With high-performance computing to enable this. Which includes the link between edge computing well. Sensors, edge computing, and then the high-performance computing that might be remote.
- Let's say to one light source. If the methods that you're developing can be used in a light source or in cry of electron microscopy or at a neutron scattering facility, etc, etc. The more generalizable it is, the greater the chances are for commercialization and for general utility and events in the field.

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Possible Gaps

Focus Areas for SBIR/STTR Projects

- **Vendor-neutral autonomous-lab interoperability and orchestration.** DOE has funded individual autonomous labs and even multi-lab concepts, but a reusable commercial control/API layer across heterogeneous instruments and robots remains a large opportunity.
- **AI-enabled remote handling for hazardous scientific environments.** This is explicitly requested in the SBIR language but has relatively little obvious representation in the published Genesis titles.
- **Scientific AIOps for autonomous facilities.** ORNL's SciNet validates the need, but the field appears much less crowded than autonomous experiment planning.
- **Repeatability, provenance, and autonomous experiment quality assurance.** DOE explicitly wants better repeatability, yet this is not heavily represented in the award titles.
- **Edge/embodied AI that connects sensing directly to robotic action.** There is significant neuromorphic investment, but less visible funding for the complete sensor → inference → robot-control product.

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Page Layout

Subtle "hints"

Make your submission stand out

- Font is a big deal and there is no requirement
  - *Some fonts are boxy or hard to read*
    - The quick brown fox jumps over the lazy dog—Franklin Gothic
    - The quick brown fox jumps over the lazy dog—Times New Roman
    - The quick brown fox jumps over the lazy dog--Arial
    - The quick brown fox jumps over the lazy dog—Georgia
    - The quick brown fox jumps over the lazy dog--Century
  - *Make your text easy to read and "different"*
- Paragraph Style matters too
  - *Avoid justified text—difficult for brain to deal with cadence*
  - *Adding some space to the line spacing increases readability: 1.05 or 1.15*

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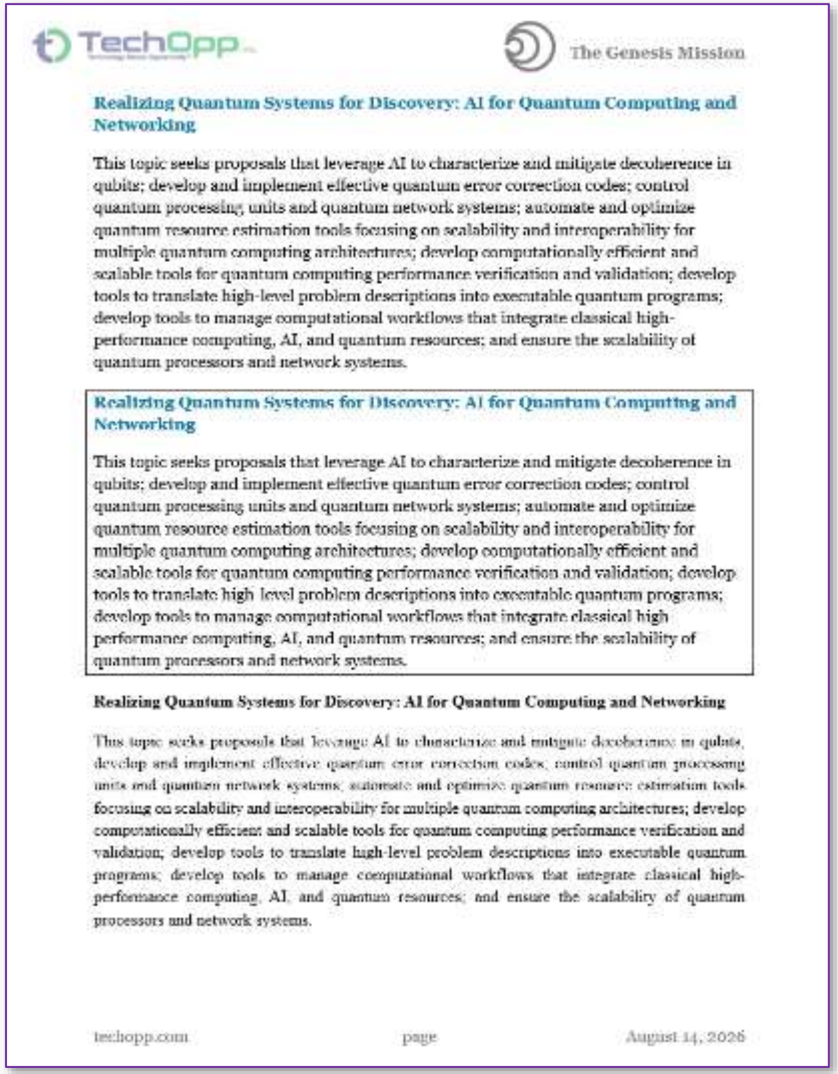
Layout/Format Ideas

Make your submission subtly appealing



TechOpp The Genesis Mission

Realizing Quantum Systems for Discovery: AI for Quantum Computing and Networking

This topic seeks proposals that leverage AI to characterize and mitigate decoherence in qubits; develop and implement effective quantum error correction codes; control quantum processing units and quantum network systems; automate and optimize quantum resource estimation tools focusing on scalability and interoperability for multiple quantum computing architectures; develop computationally efficient and scalable tools for quantum computing performance verification and validation; develop tools to translate high-level problem descriptions into executable quantum programs; develop tools to manage computational workflows that integrate classical high-performance computing, AI, and quantum resources; and ensure the scalability of quantum processors and network systems.

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techopp.com page August 14, 2026

- Formatting has subtle impressions
  - *See top section without border*
  - *Compare to same section with border*
  - *Compare to Times New Roman justified section at the bottom*
- Take the time to “design” for ease or readability
  - *We offer consulting in this area—do your research*
  - *Take advantage of every potential benefit for your submission*
  - *When all else is equal, the “feel” could be the difference*

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Thank You

Randy Simpson, COO

Randy.Simpson@TechOpp.com | 540-744-5854

TechOpp, Inc.

Blacksburg, VA 24060