DOE's Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs

Manny Oliver
Director, DOE SBIR/STTR Programs Office
manny.oliver@science.doe.gov, (301) 903-0309

December 19, 2019

Federal SBIR/STTR Programs Overview

FEDERAL Extramural R&D

federal government

Extramural R&D
~$100B/year

businesses

federally funded laboratories

universities

SBIR/STTR
~$3.6B/year

small businesses

Program Goals

Small Business Innovation Research (SBIR) *est. 1982*

- Stimulate technological innovation
- Use small business to meet Federal R&D needs
- Foster and encourage participation by women and socially and economically disadvantaged persons in technological innovation
- Increase private-sector commercialization of innovations derived from Federal R&D

Small Business Technology Transfer (STTR) *est. 1992*

- Stimulate and foster scientific and technological innovation through cooperative research and development carried out between small business concerns and research institutions
- Foster technology transfer between small business concerns and research institutions

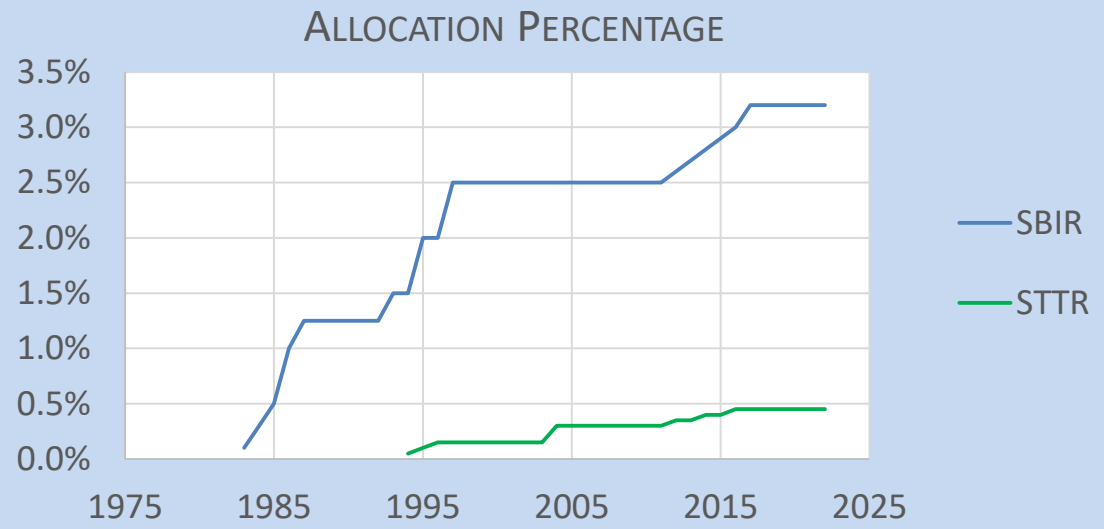
SBIR and STTR were reauthorized on December 23, 2016 (P.L. 114-840) through September 30, 2022

Major Differences between SBIR & STTR

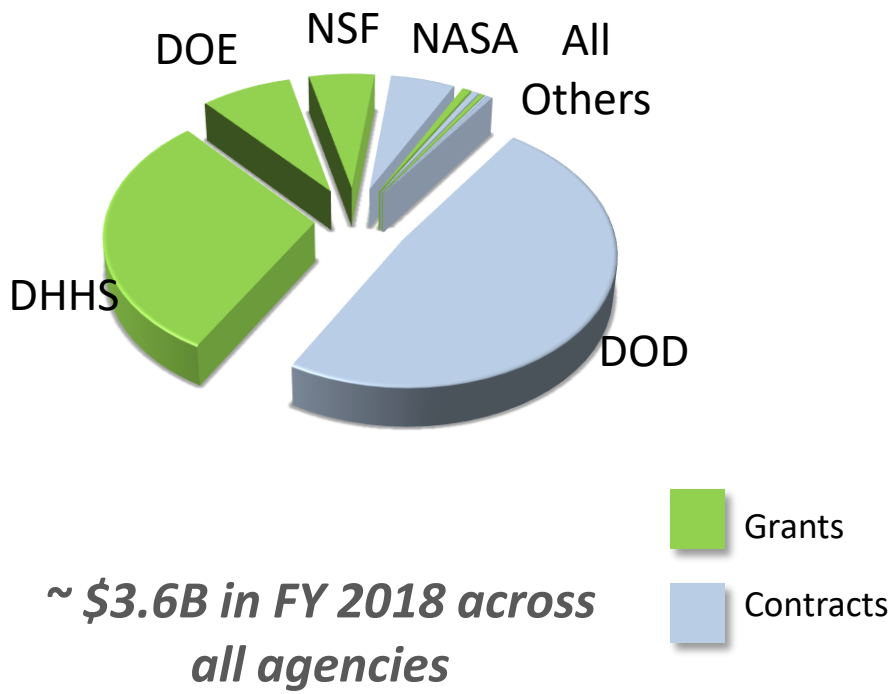
- STTR: Requires collaboration with a Research Institution
  - Research Institution
    - College, University, Federal R&D Laboratory, other non-profit research organization
- Principal Investigator primary employment
  - SBIR: employed by the small business
  - STTR: employed by the small business OR research institution
- Percentage of R/R&D conducted by the small business
  - SBIR
    - Phase I: minimum 2/3 by small business
    - Phase II: minimum 1/2 by small business
  - STTR:
    - Phase I & II: minimum 40% by small business; minimum 30% by research institution
  - Subcontracting is permitted provided the level of effort requirements above are met

SBIR & STTR Funding Levels

- Agencies allocate a percentage of their extramural R/R&D budgets for the SBIR & STTR programs
  - SBIR: 3.2% (FY 2020), for agencies with >$100M in extramural R/R&D
  - STTR: 0.45% (FY 2020), for agencies with >$1B in extramural R/R&D
- Congress has increased the allocation percentages since the programs were initiated



Estimated SBIR/STTR Budgets by Agency, FY 2018



~ $3.6B in FY 2018 across all agencies

AGENCIES WITH SBIR & STTR PROGRAMS	APPROX BUDGET
Department of Defense (DOD)	$ 1.750 B
Department of Health and Human Services (DHHS), including the National Institutes of Health (NIH)*	$1.088 B
Department of Energy (DOE), including Advanced Research Projects Agency – Energy (ARPA-E)	$280.0 M
National Science Foundation (NSF)	$ 202.4 M
National Aeronautics and Space Administration (NASA)	$198.0 M

AGENCIES WITH ONLY SBIR PROGRAMS	APPROX BUDGET
Department of Agriculture (USDA)	$27.0M
Department of Homeland Security (DHS): Science and Technology Directorate (S&T) & Countering Weapons of Mass Destruction Office (CWMD)	$20.8 M
Department of Commerce: National Oceanic and Atmospheric Administration (NOAA) & National Institute of Standards and Technology (NIST)	$14.2M
Department of Transportation (DOT)	$8.5 M
Department of Education (ED)	$7.5 M
Environmental Protection Agency (EPA)	$4.2 M

**DHHS also issues contracts*

Small Business Eligibility for SBIR & STTR

- For-profit U.S. business
- 500 employees or fewer, including affiliates
- Ownership *(applies to all agencies)*
  - Be a concern which is more than 50% directly owned and controlled by one or more individuals (who are citizens or permanent resident aliens of the United States), other small business concerns (each of which is more than 50% directly owned and controlled by individuals who are citizens or permanent resident aliens of the United States), or any combination of these
  - Joint ventures where the entities meet the requirements above
- Portfolio Companies *(some agencies)*
  - Be a concern which is more than 50% owned by multiple venture capital operating companies, hedge funds, private equity firms, or any combination of these. No single venture capital operating company, hedge fund, or private equity firm may own more than 50% of the concern.
- Performance of R&D
  - All R&D must be performed in the United States

3 Phases

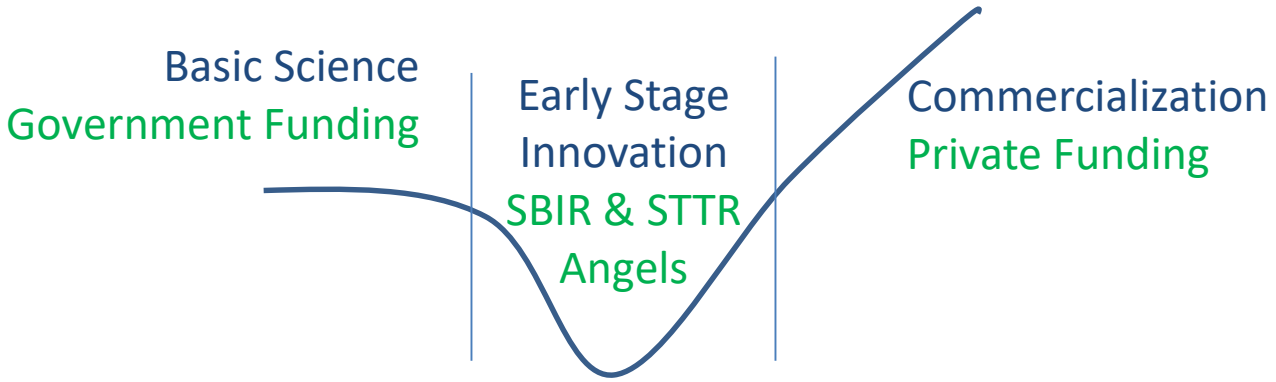
PHASE I: FEASIBILITY, PROOF OF CONCEPT
- Award Amount: $171,053 (guideline), $256,580 (max.)
- Project Duration: 6-12 months

PHASE II: CONTINUE R/R&D FOR PROTOTYPES OR PROCESSES
- Award Amount: $1,140,354 (guideline), $1,710,531 (max.)
- Project Duration: 2 years
- Additional Phase II awards can be made

PHASE III: COMMERCIALIZATION
- Federal or Private Funding (non-SBIR/STTR funds)
- No dollar or time limits

SBIR and STTR Awards

- Critical Early Stage R/R&D funding
  - The SBIR & STTR programs provide funding for innovative, early stage research
  - SBIR & STTR awards provide credibility when seeking investors or partners
- SBIR/STTR awards are executed as grants or contracts
  - No repayment
  - No dilution of company equity
  - No cost sharing is required for Phases I and II

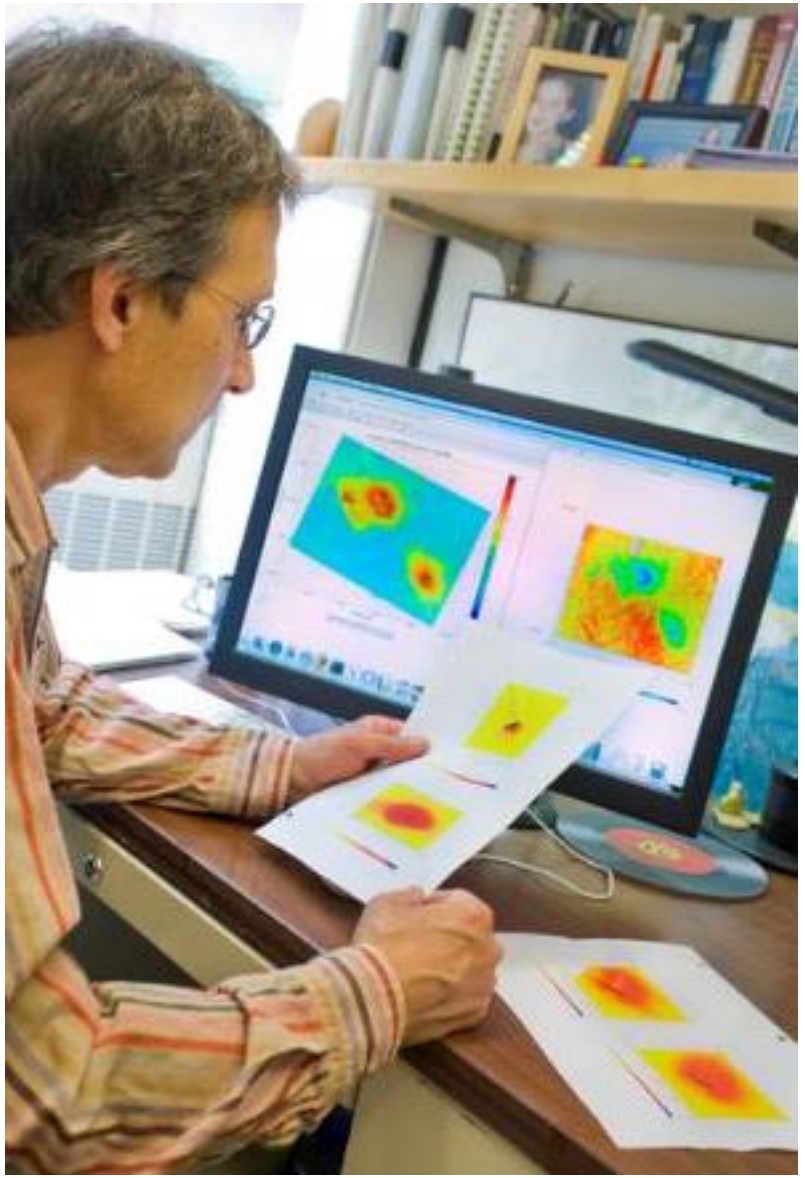


Intellectual Property

- Patent rights
  - Small business concerns normally retain the principal worldwide patent rights to any invention developed with Government support
- Government Use
  - The Federal Government receives a royalty-free license for Federal Government use

Data Protection

- Protection Period
  - Data generated from Phase I and II awards is protected from public disclosure for a minimum of **20 years** from the start of your award. ***New policy change implemented in 2019***
- Government Use
  - The Government retains a royalty-free license for Government use of any technical data delivered under an SBIR award, whether patented or not



Commercialization Assistance

- In addition to funding for research and development, funding is provided to assist small businesses commercialize their innovations
  - Phase I: $6,500
  - Phase II: $50,000
  - ***Funding levels increased in FY 2019***
- Companies can select their own vendors to provide assistance or use a vendor that is funded directly by DOE

DOE SBIR & STTR Programs: Technology Areas

U. S. Department of Energy Mission

- **DOE's Mission** is to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions.
  - **Goal 1:** Catalyze the timely, material, and efficient transformation of the nation's energy system and secure **U.S. leadership in energy technologies**.
  - **Goal 2:** Maintain a **vibrant U.S. effort in science and engineering** as a cornerstone of our economic prosperity, with clear leadership in strategic areas.
  - **Goal 3:** Enhance **nuclear security** through defense, nonproliferation, and environmental efforts.

Program Offices Participating in the DOE SBIR/STTR Programs

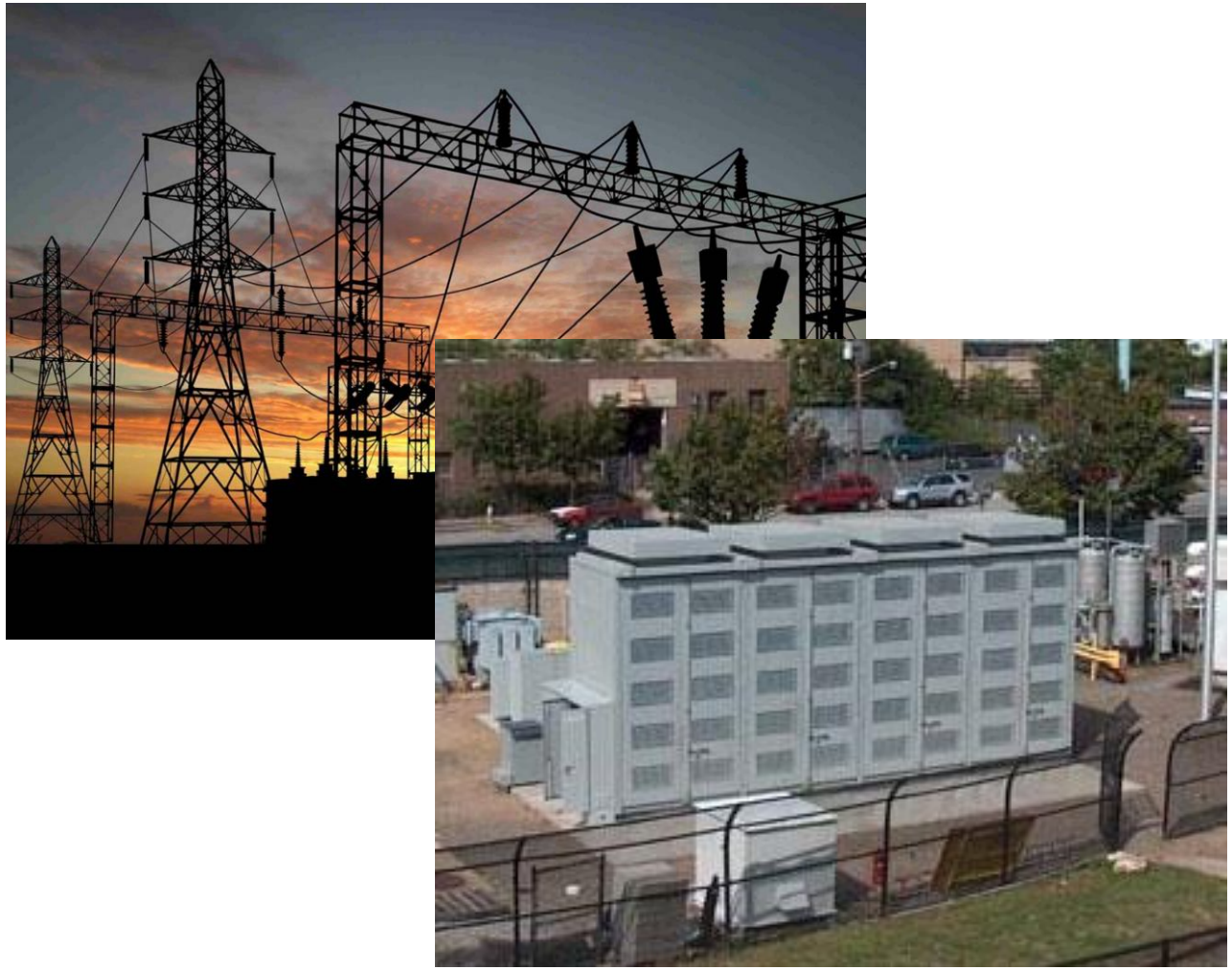
- Cyber Security, Energy Security & Emergency Response
- Electricity
- Energy Efficiency & Renewable Energy
- Fossil Energy
- Nuclear Energy
- Advanced Scientific Computing Research
- Basic Energy Sciences
- Biological & Environmental Research
- Fusion Energy Sciences
- High Energy Physics
- Nuclear Physics
- Defense Nuclear Nonproliferation
- Environmental Management

Office of Cyber Security, Energy Security & Emergency Response

- Website: [Office of Cybersecurity, Energy Security and Emergency Response]
- Research Areas
  - Cybersecurity
    - resilient energy delivery systems are designed, installed, operated, and maintained to survive a cyber-incident while sustaining critical functions
  - Energy Security
    - improve the ability of energy sector stakeholders to prevent, prepare for, and respond to threats, hazards, natural disasters, and other supply disruptions

Office of Electricity

- Website: Office of Electricity
- Research Areas
  - Smart Grid
  - Microgrids
  - Energy Storage



Office of Energy Efficiency and Renewable Energy

- Website: [Office of Energy Efficiency and Renewable Energy]
- Research Areas
  - Renewable Power
    - Solar
    - Geothermal
    - Wind
    - Water
  - Sustainable Transportation
    - Vehicles
    - Bioenergy
    - Hydrogen & Fuel Cells
  - Buildings & Manufacturing
    - Buildings
    - Advanced Manufacturing

Office of Fossil Energy

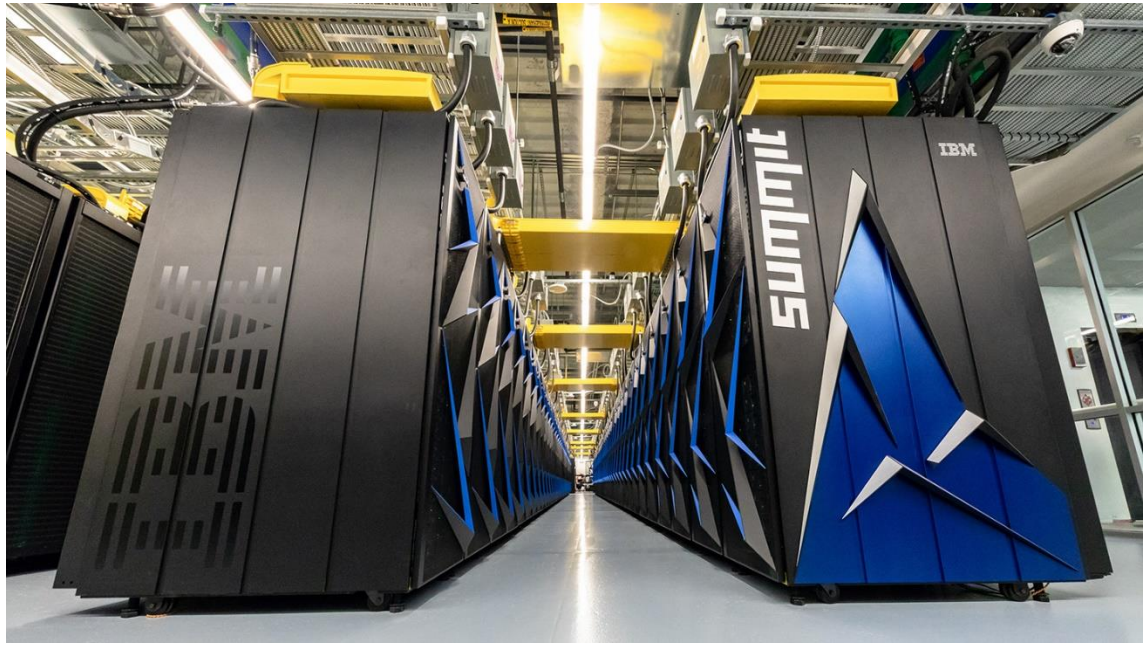
- Website: [Office of Fossil Energy]
- Research Areas
  - Advanced Power Generation
    - Advanced turbines
    - Supercritical CO_2 Power Cycles
    - Solid Oxide Fuel Cells
  - Carbon Capture, Utilization, and Storage Technologies

Office of Nuclear Energy

- Website: Office of Nuclear Energy
- Research Areas
  - Light Water Reactor Sustainability
  - Advanced Reactor Technologies
  - Advanced Technologies for Nuclear Waste

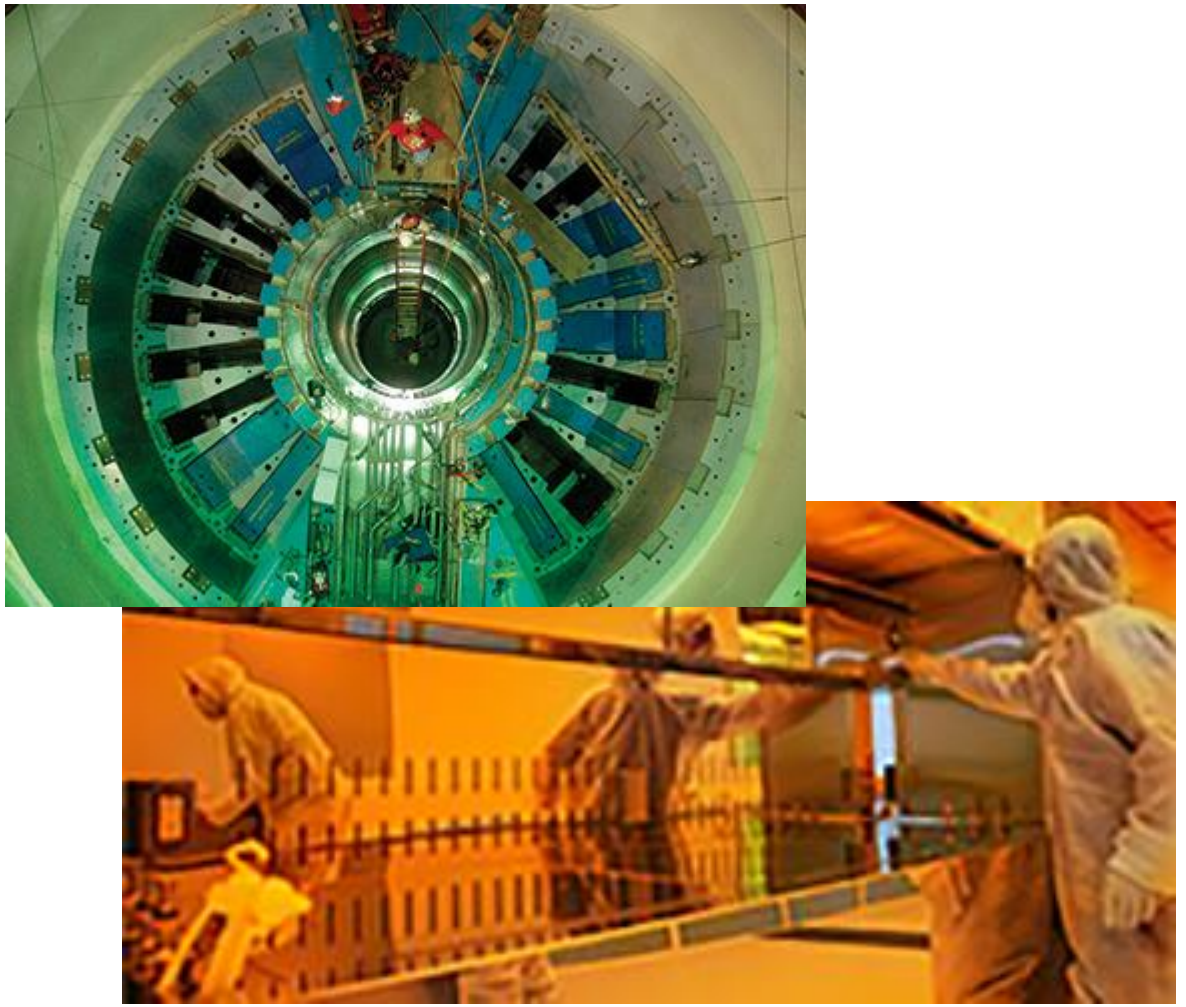
Office Advance Scientific Computing Research

- Website: [Advanced Scientific Computing Research]
- Research Areas
  - High Performance Computing
  - High Performance Networking
  - Edge Computing
  - Artificial Intelligence
  - Quantum Computing



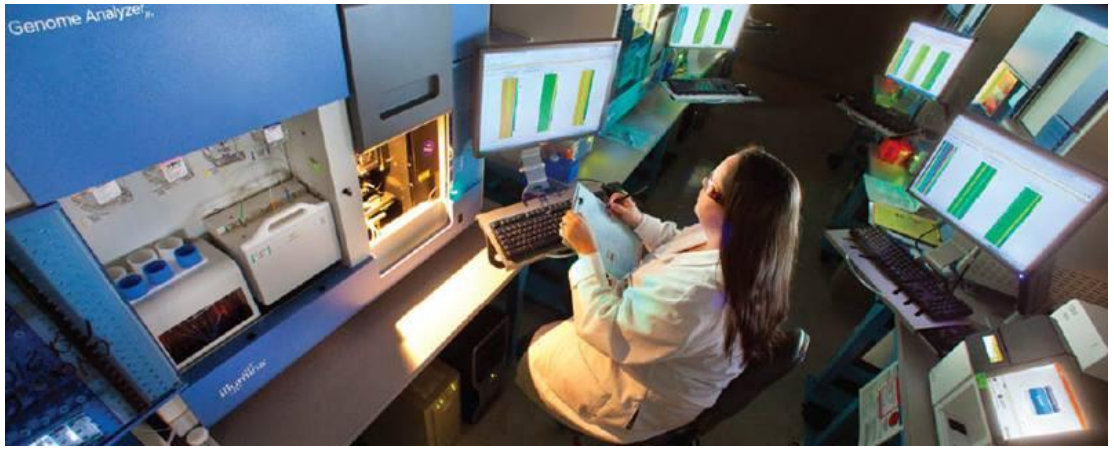
Office Basic Energy Sciences

- Website: [Basic Energy Sciences]
- Research Areas
  - Technologies to Support Advanced X-ray, Electron, and Neutron-based Scientific Instruments
  - Advanced Materials for Energy Systems



Office Biological and Environmental Research

- Website: [Biological and Environmental Research]
- Research Areas
  - Scientific Tools for Subsurface and Atmospheric Monitoring
  - Tools and Technologies for Biological Synthesis and Structural Biology Relating to Bioenergy

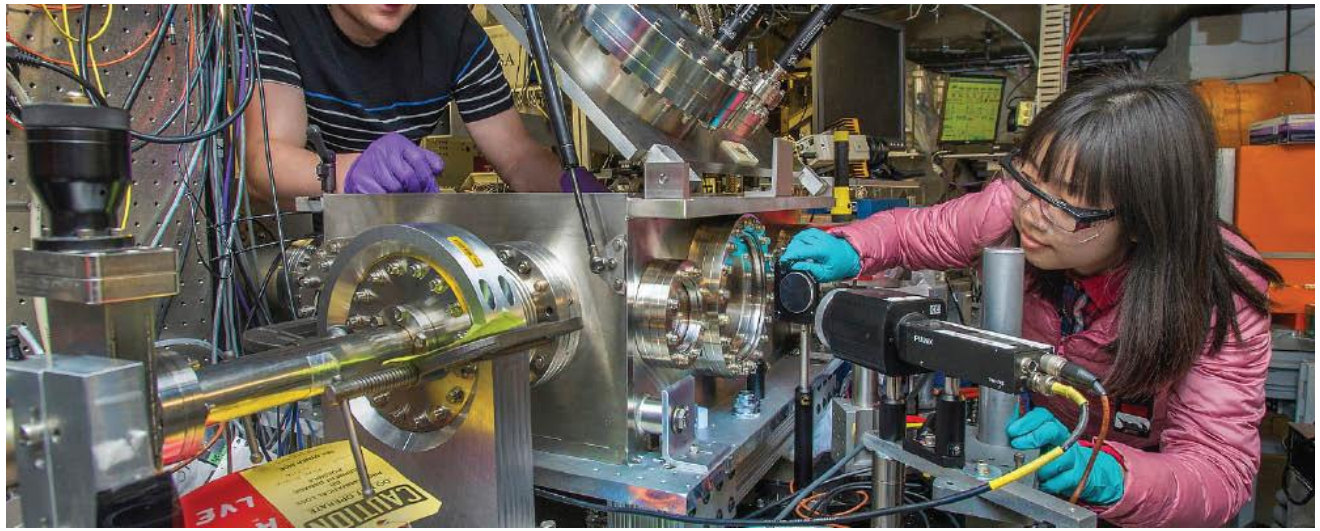


Office Fusion Energy Sciences

- Website: [Fusion Energy Sciences]
- Research Areas
  - Advanced Materials and Technologies to Support High Temperature and Inertial Fusion
  - Low Temperature Plasma Technologies

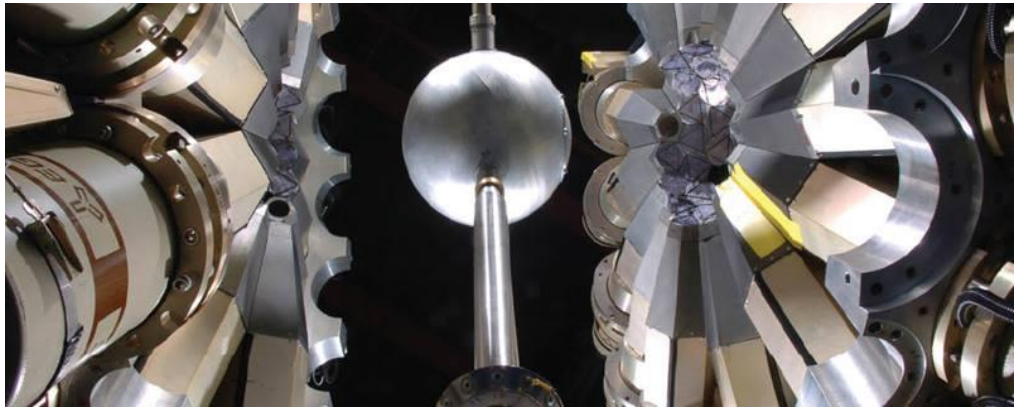
Office High Energy Physics

- Website: [High Energy Physics]
- Research Areas
  - Technologies to Support Advanced Accelerators (Detectors, Electronics, Lasers, Superconducting Materials)
  - Technologies Supporting Quantum Information Sciences



Office Nuclear Physics

- Website: [Nuclear Physics]
- Research Areas
  - Technologies to Support Advanced Accelerators
  - Nuclear Isotope Production

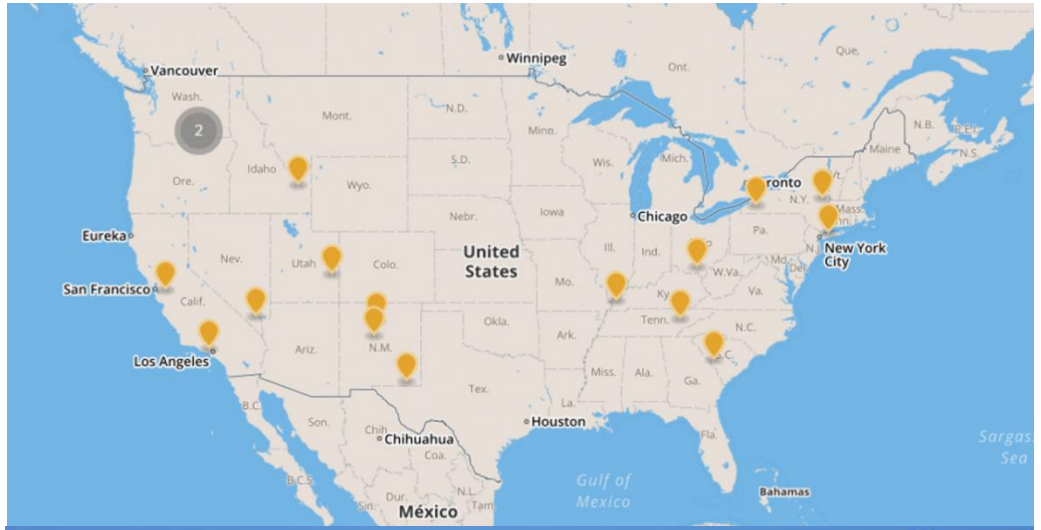


Office Defense Nuclear Nonproliferation

- Website: [Office of Defense Nuclear Nonproliferation]
- Research Areas
  - Radiation Detection
  - Remote Sensing
  - Nuclear Detonation Detection

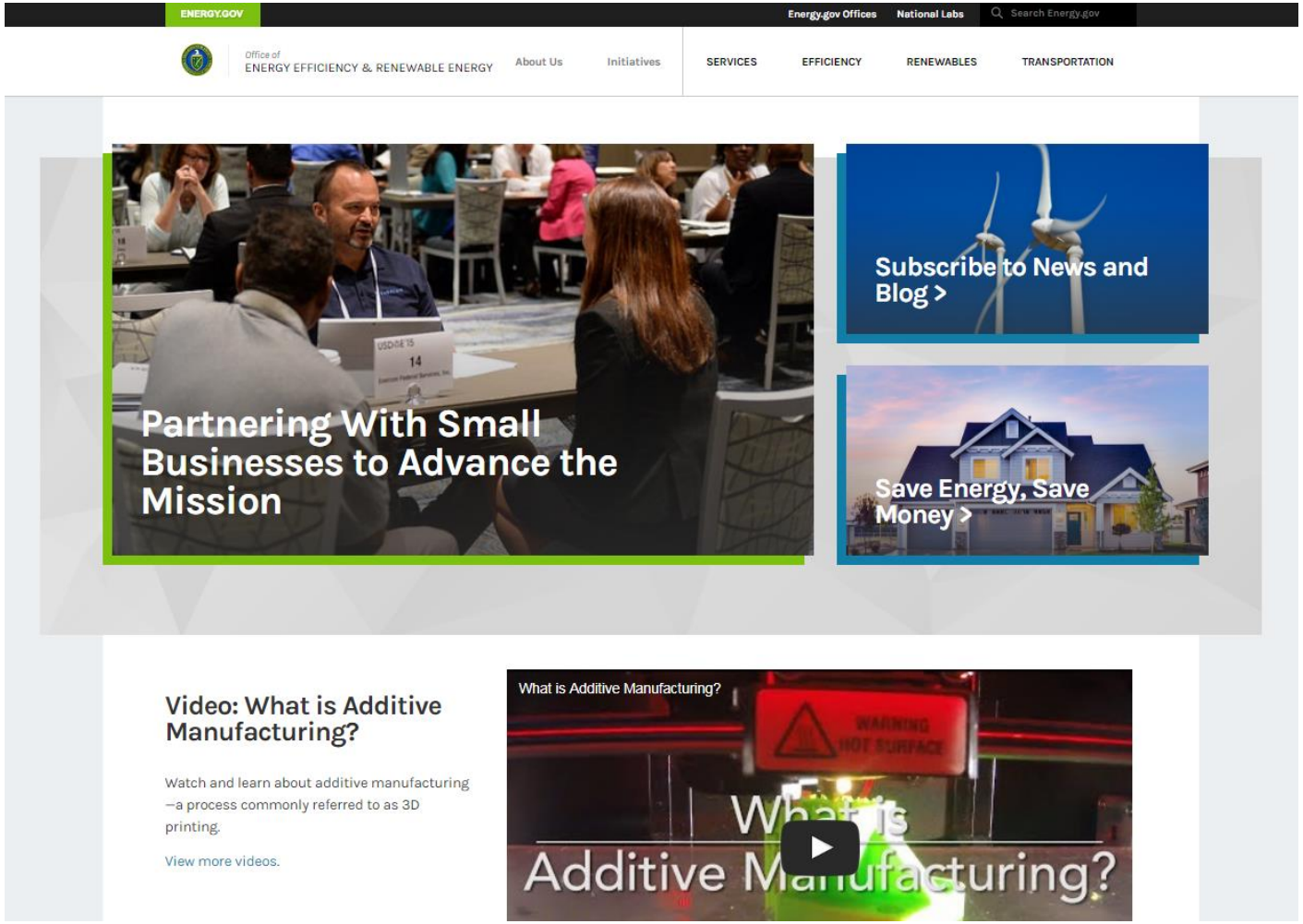
Office Environmental Management

- Website: [Office of Environmental Management]
- Research Areas
  - Technologies to Support Remediation and Decommissioning of Nuclear/Chemical sites



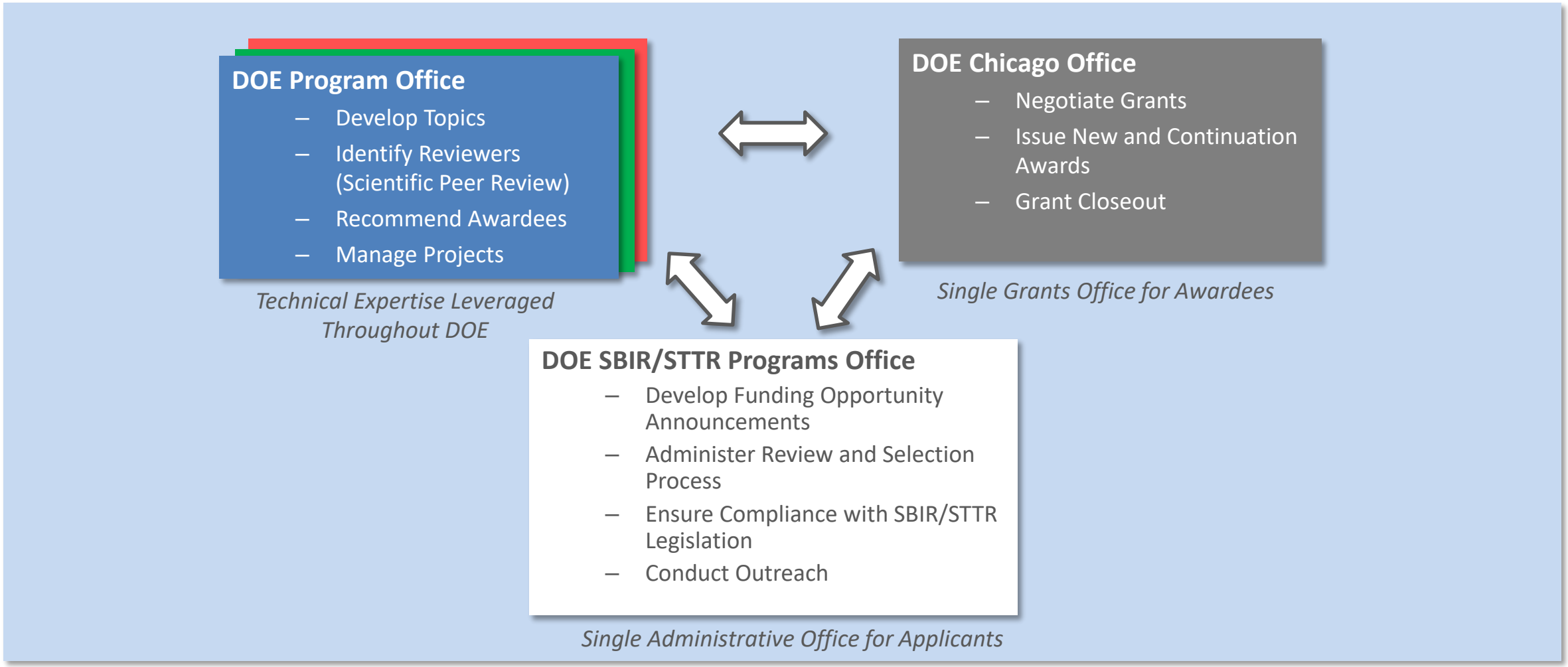
Information Available at DOE Program Office Websites

- Mission
- Funding Priorities and Announcements (non-SBIR)
- Technical Reference Data and Reports
- Workshop & Conference Proceedings
- Contact Information

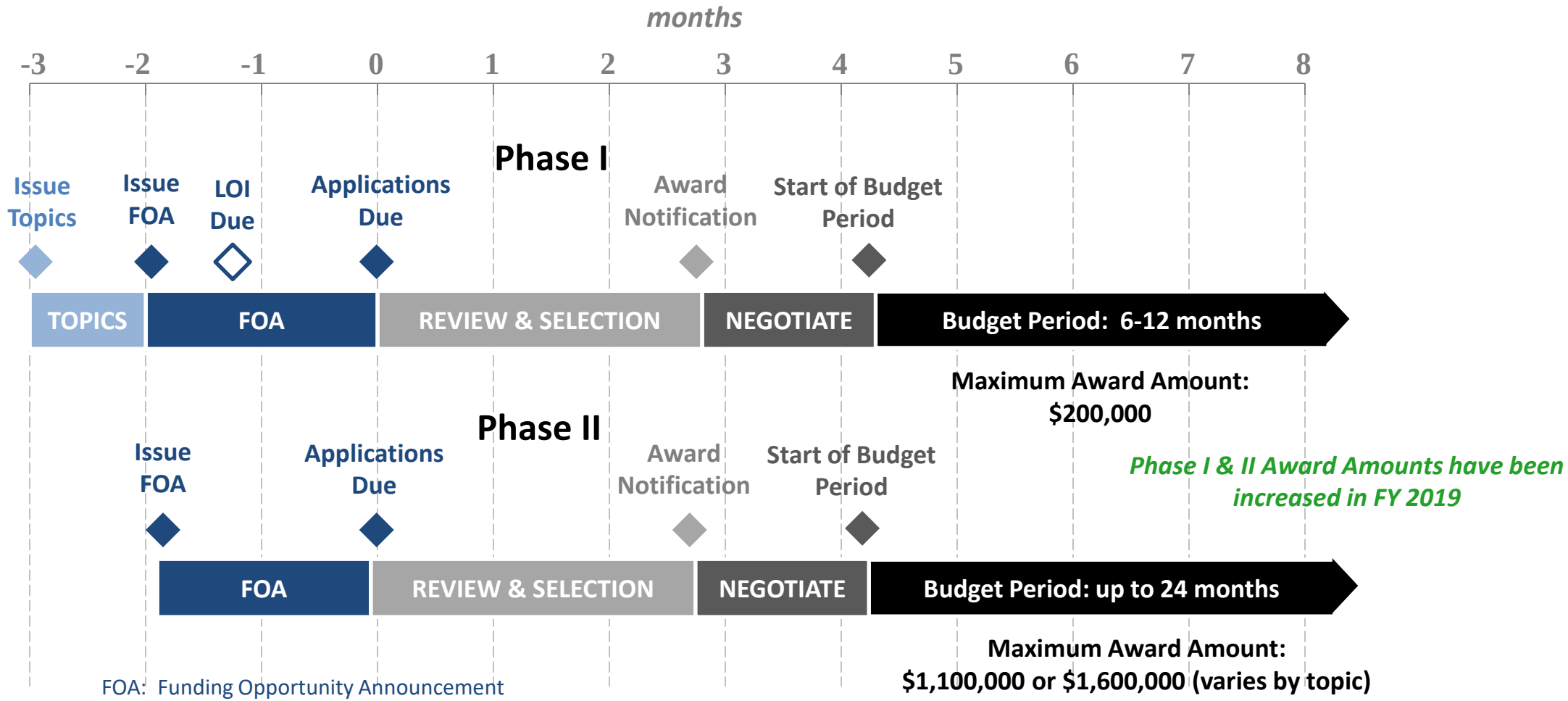


DOE SBIR & STTR Programs: Application & Award Process

Operation of the DOE SBIR and STTR Programs



Application & Award Timelines



Phase I & II Award Amounts have been increased in FY 2019

FOA: Funding Opportunity Announcement
LOI: Letter of Intent

FY 2020 SBIR/STTR Phase I Funding Opportunity Announcements

Phase I Release 1

- Office of Advanced Scientific Computing Research (ASCR)
- Office of Basic Energy Sciences (BES)
- Office of Biological and Environmental Research (BER)
- Office of Nuclear Physics (NP)

Phase I Release 2

- Office of Cyber Security, Energy Security, and Emergency Response CESER)
- Office of Defense Nuclear Nonproliferation (NA)
- Office of Electricity (OE)
- Office of Energy Efficiency and Renewable Energy (EERE)
- Office of Fossil Energy (FE)
- Office of Fusion Energy Sciences (FES)
- Office of High Energy Physics (HEP)
- Office of Nuclear Energy (NE)

Schedule: FY 2020 Phase I, Releases 1 & 2

Phase I FOA Schedule	Release 1	Release 2
Topics Issued	Monday, July 15, 2019	Tuesday, November 12, 2019
Webinar(s)	Week of July 22, 2019	Week of November 18, 2019
FOA Issued	Monday, August 12, 2019	Monday, December 16, 2019
Webinar(s)	Monday, August 19, 2019	Thursday, December 19, 2019
Letters of Intent (LOI) Due	Tuesday, September 03, 2019	Monday, January 6, 2020
Non-Responsive LOI Feedback Provided	Tuesday, September 24, 2019	Tuesday, January 27, 2020
Applications Due	Tuesday, October 15, 2019	Monday, February 24, 2020
Award Notification	Monday, January 06, 2020*	Monday, May 18, 2020*
Projected Grant Start Date	Tuesday, February 18, 2020	Monday, June 29, 2020

**preliminary dates subject to change*

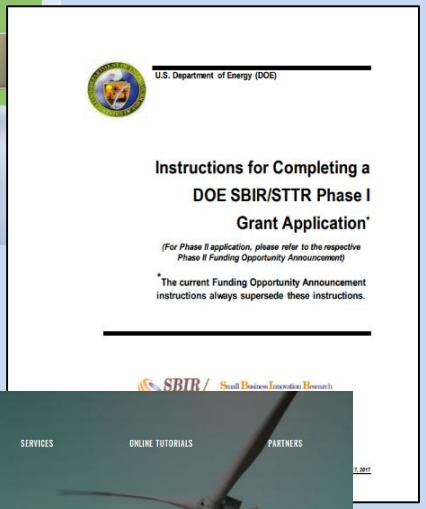
Schedule: FY 2020 Phase II, Releases 1 & 2

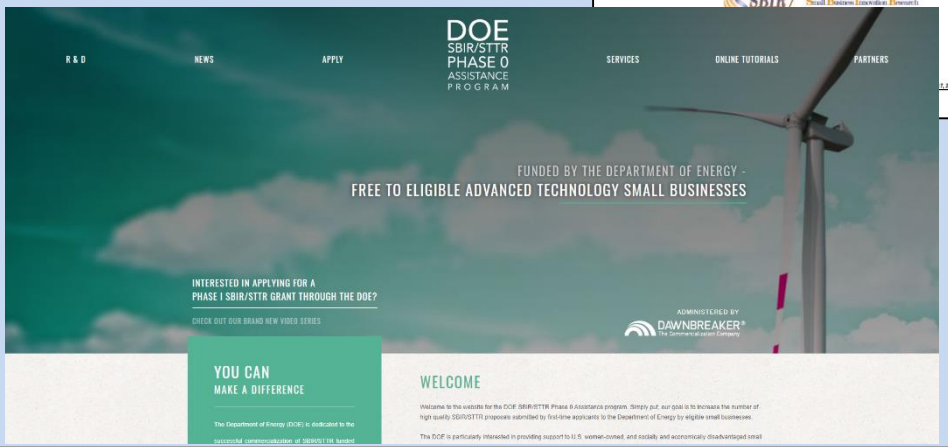
Phase II FOA Schedule	Release 1	Release 2
FOA Issued	Monday, October 22, 2019	Monday, March 02, 2020
Letters of Intent Due (Second or Third Phase II only)	Tuesday, November 12, 2019	Wednesday, April 01, 2020
Full Applications Due	Tuesday, December 10, 2019	Tuesday, April 21, 2020
Award Notification	Monday, February 24, 2020*	Monday, July 13, 2020*
Grant Start Date	Monday, April 6, 2020	Monday, August 24, 2020

**preliminary dates subject to change*

Assistance for the Application Process

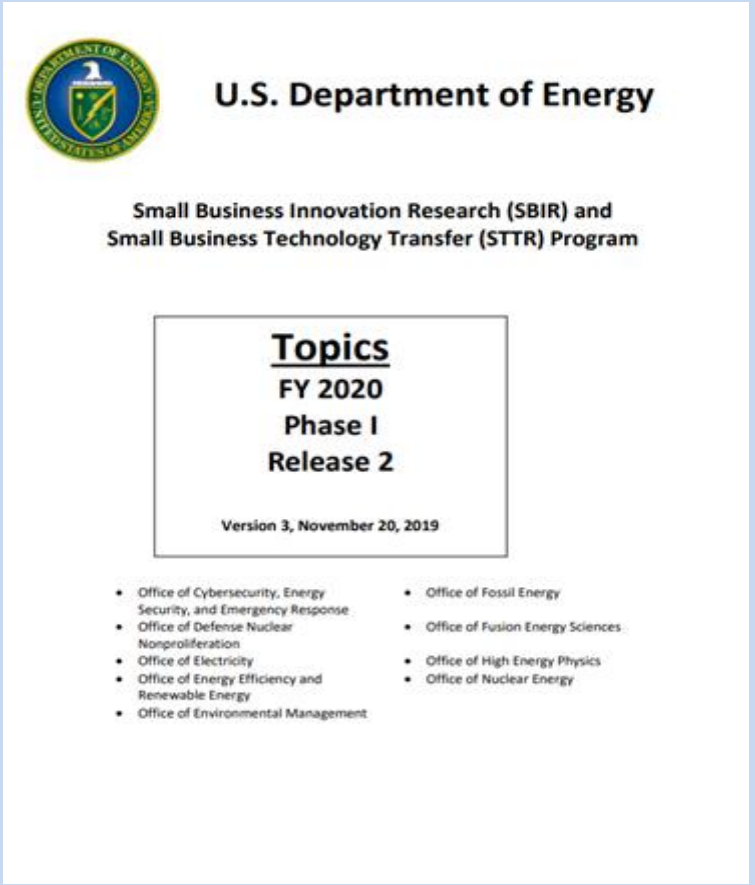
- Telephone (real people will answer the phone!)
  - (301) 903-5707, 8:30am – 5:00pm, M-F, ET
- Online
  - We have an online learning system to assist new applicants:
    - https://science.osti.gov/SBIRLearning
  - Additional resources can be found on our website including our Phase I application guide:
    - https://science.osti.gov/sbir/Applicant-Resources
- Personalized Application Assistance (it's free!)
  - Phase 0 Application Assistance Program
  - Created to assist first-time applicants from under-represented groups (socially and economically disadvantaged small businesses, women-owned small businesses, and small businesses from under-represented states) prepare high quality applications
  - Any first-time applicant is eligible to apply for assistance
  - http://www.dawnbreaker.com/doephase0/





Topics

- Topics Document
  - DOE primarily uses focused topics
  - Issued 4 weeks prior to the FOA
- Communication with DOE program managers
  - Open communication permitted about topic scope
- Webinar
  - DOE program managers discuss their topics
  - Applicants submit questions in advance or during the webinar
  - Webinars are recorded and available at our website



U.S. Department of Energy

Small Business Innovation Research (SBIR) and
Small Business Technology Transfer (STTR) Program

Topics
FY 2020
Phase I
Release 2

Version 3, November 20, 2019

- Office of Cybersecurity, Energy Security, and Emergency Response
- Office of Defense Nuclear Nonproliferation
- Office of Electricity
- Office of Energy Efficiency and Renewable Energy
- Office of Environmental Management
- Office of Fossil Energy
- Office of Fusion Energy Sciences
- Office of High Energy Physics
- Office of Nuclear Energy

Example Topic

- Topic & Subtopic
  - You must specify the topic and subtopic in your letter of intent and application
- Topic Header
  - Lists the maximum award amounts for Phase I & Phase II and whether SBIR & STTR applications are accepted
- Program Manager
  - Each subtopic lists the responsible DOE program manager
- Other Subtopic
- References

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11. SEMI-AUTONOMOUS INTELLIGENT CONTROL FOR SYNCHROTRON AND FEL X-RAY SOURCES

Maximum Phase I Award Amount: $200,000	Maximum Phase II Award Amount: $1,100,000
Accepting SBIR Applications: YES	Accepting STTR Applications: YES

This topic seeks development that targets small, secure, locally networked, audit-able, semi-autonomous "human-in-the-loop" control systems for synchrotron and Free-Electron Laser (FEL) facilities. The next generation of very high flux light and particle sources will require a matching innovation leap in current diagnostic and controls technology. Given the very high measurement rates (of order TeraByte/s) and the control complexity (100s of distributed and interrelated control parameters in e.g. FEL sources), these facilities present a microcosm on the future of semi-autonomous human-supervised control systems (Industry 4.0 standards) that use swarms of small form-factor commercial edge machine learning hardware for on-detector analysis and collaborative inference. Application should enable small, locally networked, semi-autonomous control systems. These systems are comprised of electron beam steering magnets, beam position monitors, undulator settings, real-time spectra and power measurements, etc. This collection of controls and diagnostics span up to many 100s of meters and so distributed devices must communicate via a local sub-network. Transactions should be authenticated via Transport Layer Security (TLS) handshake that enable moving encryption for the device-to-device data transactions needed for collaborative machine learning inference generation.

Grant applications are sought in the following subtopics:

a. **Development of "Human-in-the-Loop" Semi-autonomous Intelligent Control Systems for Real-time Synchrotron and FEL X-ray Tuning and Experimentation**
Grant applications are sought for systems that require minimal intermittent interaction with distant data centers. Each device should be capable of small adaptation to its machine learned models based on local input and use intermittent connections to remotely hosted data centers with High Performance Computing (HPC) for full model retraining. Furthermore, the ensemble of collaborating devices should maintain inter-device awareness via a data dissemination protocol such that inter-device communication is not only authenticated, but also the recent trust-state of an individual device is known to all potential receiving devices and accordingly corroborated by the ensemble. Indexing the human environment should use voice and/or facial recognition to identify the presence of specific individuals and encode that configuration into the decision chain record. Certain configurations of individuals should unlock certain machine controls that otherwise remain locked to human interaction.

Questions – Contact: Eliane Lessner, eliane.lessner@science.doe.gov

b. **Other**
In addition to the specific subtopic listed above, the Department invites grant applications in other areas that fall within the scope of the topic description above.

Questions – Contact: Eliane Lessner, eliane.lessner@science.doe.gov

References:

1. Grossetete, P., 2019, What does 5G Look Like for Industrial IoT, Cisco. https://blogs.cisco.com/internet-of-things/what-does-5g-look-like-for-industrial-iot

35

Technology Transfer Opportunities (TTOs)

- An opportunity to transfer inventions made by a DOE National Lab or university to your small business for commercialization
- Awardees receive
  - an SBIR/STTR grant and
  - an option to license the technology
- Please review TTO information section at the beginning of the topics document if you plan to submit an application to a TTO.

Example Technology Transfer Opportunity Topic

- Technology Transfer Opportunity
  - The topic or subtopic will be clearly labeled
- Research Organization
  - The DOE National Lab or university responsible for the TTO is listed along with contact information and other references
  - Please contact the Lab or university to obtain information about the TTO
- DOE Program Manager

25. TECHNOLOGY TRANSFER OPPORTUNITIES: BASIC ENERGY SCIENCES

Maximum Phase I Award Amount: $200,000	Maximum Phase II Award Amount: $1,100,000
Accepting SBIR Applications: YES	Accepting STTR Applications: YES

Applicants to TECHNOLOGY TRANSFER OPPORTUNITIES (TTO) should review the section describing these opportunities on page 7 of this document prior to submitting applications.

b. Technology Transfer Opportunity: NbTi High Performance Superconducting Undulator

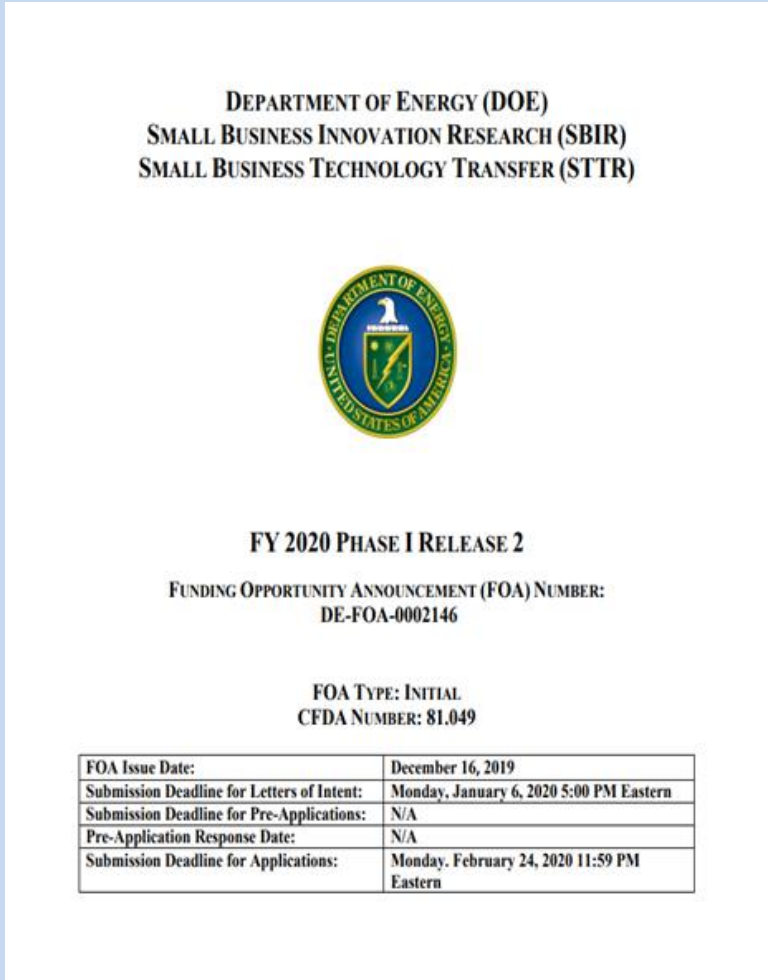
Argonne National Laboratory (ANL) researchers have developed a novel superconducting (SC) magnetic device called a superconducting undulator (SCU). Such a device, installed in the storage ring or undulator line of existing synchrotron or free-electron laser light sources, significantly enhances their performance. SCUs deliver higher magnetic fields at smaller undulator periods, resulting in performance superior to that of permanent magnet undulators. An SCU is a cryogenic device that consists of the cryostat; an SC magnet with a sign-alternating magnetic field; and sets of mechanical, electrical, and electronic control systems that permit this device to be operated as a component of large light sources. The SCU cryogenic system maintains the temperature of the undulator magnet close to that of liquid helium. A specially designed and precisely fabricated undulator magnet delivers the high-quality magnetic field that is critical for optimizing the performance of advanced light source facilities. Special auxiliary systems permit an SCU to be seamlessly incorporated into any type of light source. In addition to the SCU, ANL researchers have developed special tools to characterize an SCU prior to installation in the light source. Several SCUs, built at ANL, have demonstrated remarkable operational performance and a high level of reliability. ANL is looking for the industrial partner with the proven record of designing, building and delivering to customers SC magnets and cryogenic equipment, such as cryostats, to house these magnets. Industrially produced SCUs would find their way to numerous light sources around the world and significantly advance the performance of these sources.

Licensing Information:
Argonne National Laboratory
Contact: Gregory Halder, (halder@anl.gov, (630) 327-7059)
ANL Technology ID: PB-16-082
Patent Status: US Patent 10,062,486
Website: http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&p=1&u=/netahtml/PTO/srchnum.html&r=1&f=G&l=50&d=PALL&s1=10062486.PN.

Questions – Contact: Eliane Lessner, eliane.lessner@science.doe.gov

Funding Opportunity Announcement (FOA)

- FOA
  - Available at the DOE SBIR website or Grants.gov and includes information on
    - Anticipated number of awards and funding available
    - Eligibility
    - Application Requirements
    - Review Criteria
    - Award Administration
  - Open for approximately 9 weeks
- Communications with DOE program managers
  - Open communication permitted to clarify the scope of the topic and subtopic prior to submitting an application



DEPARTMENT OF ENERGY (DOE)
SMALL BUSINESS INNOVATION RESEARCH (SBIR)
SMALL BUSINESS TECHNOLOGY TRANSFER (STTR)

FY 2020 PHASE I RELEASE 2

FUNDING OPPORTUNITY ANNOUNCEMENT (FOA) NUMBER:
DE-FOA-0002146

FOA TYPE: INITIAL
CFDA NUMBER: 81.049

FOA Issue Date:	December 16, 2019
Submission Deadline for Letters of Intent:	Monday, January 6, 2020 5:00 PM Eastern
Submission Deadline for Pre-Applications:	N/A
Pre-Application Response Date:	N/A
Submission Deadline for Applications:	Monday. February 24, 2020 11:59 PM Eastern

Letters of Intent (LOI)

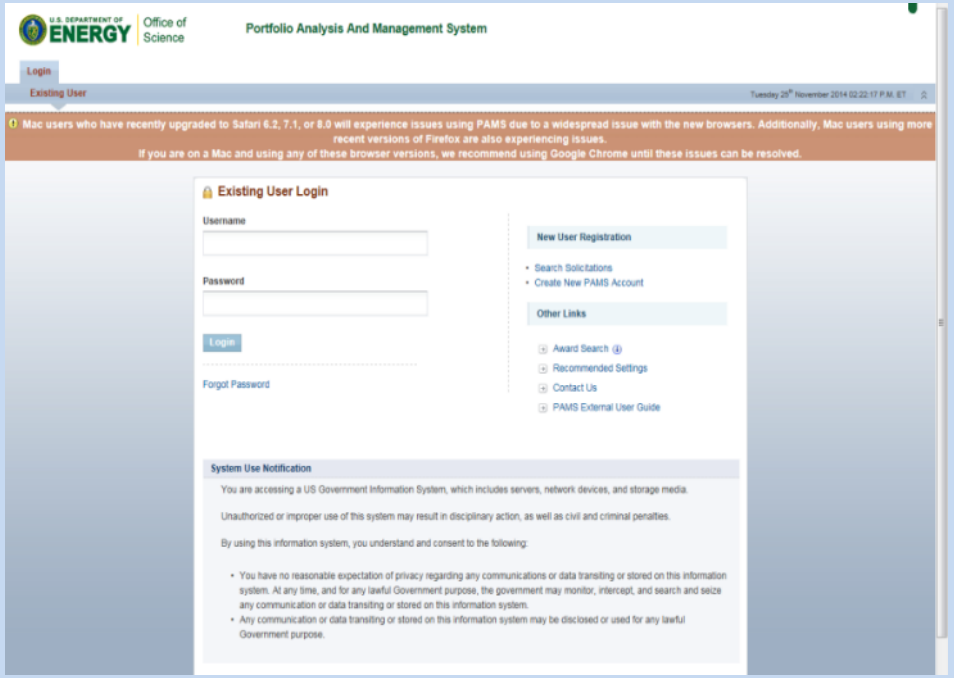
- Requirement
  - You must submit an LOI by the due date to be eligible to submit an application
- Primary purpose
  - begin reviewer assignment to reduce award selection time
  - due 3 weeks after FOA is issued
- Secondary purpose
  - provide email notification to applicants who appear to be non-responsive; you may submit an application if you receive this notification
  - Applicants whose LOI appears responsive will NOT receive a notification
- Limits
  - Small businesses may submit only 10 letters of intent (and 10 applications) per solicitation

Content of LOI

- Title
- Topic and Subtopic
- Abstract (<500 words)
  - ***Provide sufficient technical detail to enable reviewer assignment***
  - Non-proprietary
- List of Collaborators
- Small Business Information
  - Name, address
  - Business Official and contact information
  - Principal Investigator

Letter of Intent (LOI) Submission

- Submit LOI online directly to the DOE Portfolio Analysis and Management System (PAMS) website: https://pamspublic.science.energy.gov/
  - Select “Create New PAMS Account” (if you do not have an account)
  - Submit your abstract as a PDF file
  - Utilize the LOI instructions available at the DOE website to ensure that you submit all the required information
  - For additional details on the LOI submission process, see the FOA



Letter of Intent: Sample Abstract

ABC LLC will develop a new class of low cost battery separator materials for lithium ion batteries. It is anticipated that the cost of this separator will be 70% lower than separator materials available today and will be a critical factor in reaching the $150/kWh cost target specified in topic 4b for lithium ion batteries for electric vehicle applications.

Clearly explain why the proposed R&D is responsive to the subtopic

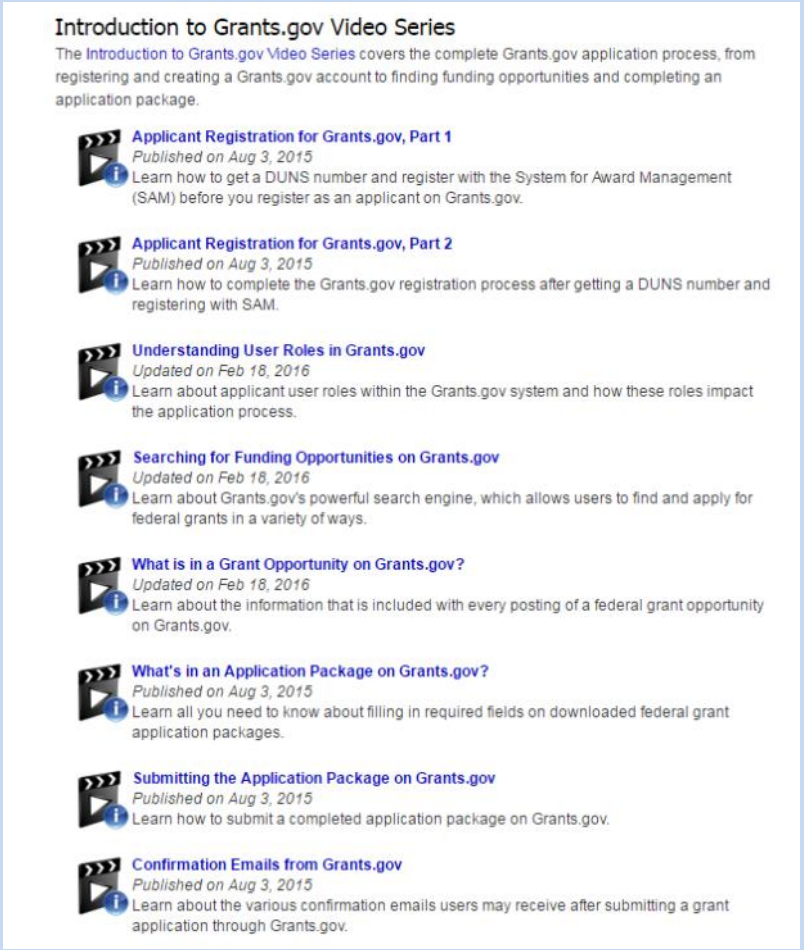
These separators will utilize a new optically-activated method of producing pores in nano-structured polyolefin films. This optical pore formation method results in a 10x increase in the speed of creating porous films. During Phase I, ABC LLC will (1) develop the compositions and methodology for formulating the dense nano-structured polyolefin films and (2) carry out preliminary feasibility studies to characterize the appropriate optical intensities and wavelengths to achieve uniform, high speed, pore formation. It is anticipated that multiple iterations will be required to optimize the composition and nanostructure of the precursor films to achieve the desired porosity and process speeds. All processing work will be carried out at ABC LLC but polymer characterization will leverage capabilities of the Polymer Lab at State University to evaluate the structure, porosity, tortuosity, and thermal properties of the polymer films. In addition we will be collaborating with Lion Battery Inc. who will do preliminary battery testing of our separator materials to identify any manufacturing or performance issues of the separators.

Provide sufficient technical detail about the R&D so that DOE program managers can select reviewers with appropriate technical expertise.

Do not include proprietary information in a letter of intent.

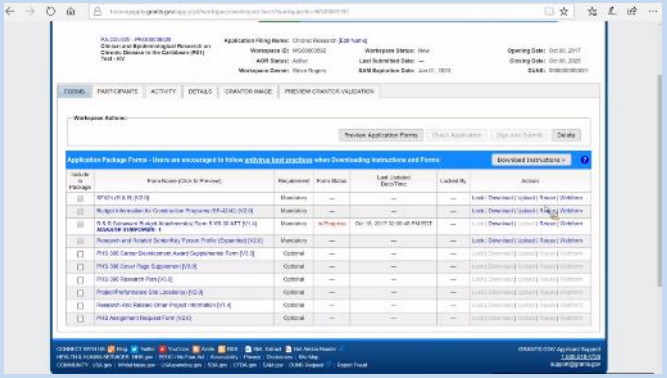
Application Process: Registrations

- Applications must be submitted through Grants.gov
- Registration at Grants.gov is a 3 step process
  1. Obtain a DUNS number
  2. Complete a SAM registration.
     - Must be updated annually
  3. Complete Grants.gov registration
     - Start this process as early as possible!
- See the Grants.gov website for instructions
- Small Business Administration (SBA) company registry
  - Small businesses must register at the SBA company registry (http://www.sbir.gov/registration) and submit a copy of their registration with their grants.gov application



Completing a Grants.gov Application

- Workspace
  - Online application completion and submission
  - Online tutorials are available
  - https://www.grants.gov/applicants/workspace-overview.html



Important Elements of Your Application

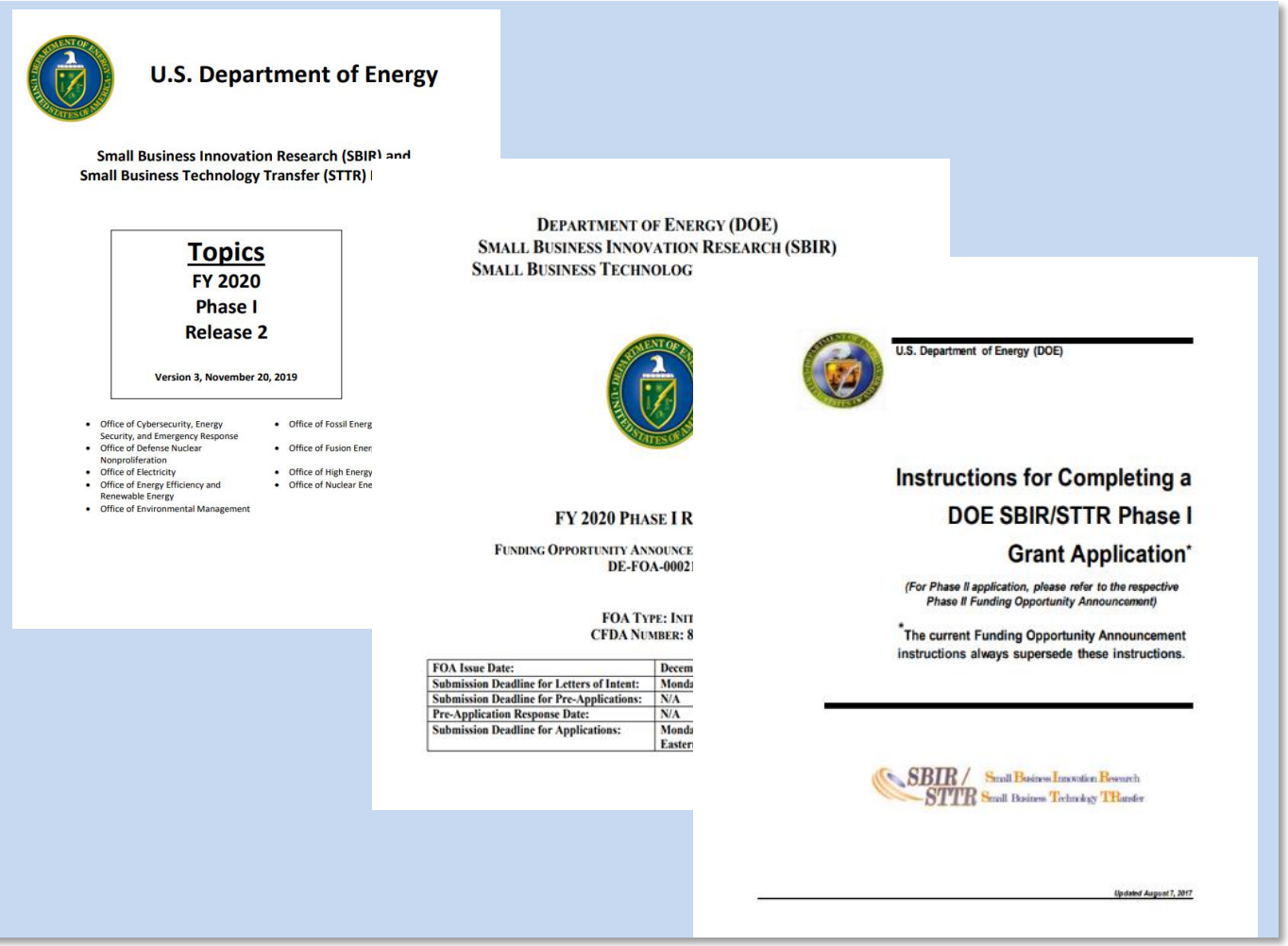
- Project Narrative
  - Page and word limits
    - Phase I: 15 pages, 7,500 words
    - Phase II: 20 pages, 10,000 words
- Budget & Budget Justification
- Key Personnel
- Commercialization Plans
  - Phase I commercialization plan
    - an example can be found here at https://science.osti.gov/sbir/Applicant-Resources/Grant-Application
  - Phase II commercialization plan
- SBIR/STTR Information form
- Data Management Plan

YOUR APPLICATION MUST INCLUDE THE FOLLOWING DOCUMENTS:

Name of Document	Format	Attach to
Application for Federal Assistance, SF 424 Form	PDF	
SF-LLL, Disclosure of Lobbying Activities, if applicable	PDF	Field 18
Research and Related: Budget Form	PDF	
Additional Senior Key Persons, if applicable	PDF	Field A. 9
Additional Equipment, if applicable	PDF	Field C. 11
Budget Justification	PDF	Field K
Research and Related: Senior/Key Person Profile Form	PDF	
Biographical Sketch for each person	PDF	Appropriate Block
Current & Pending Support for each person, if applicable	PDF	Appropriate Block
Research and Related: Other Project Information Form	PDF	
Project Summary/Abstract	PDF	Field 7
Project Narrative	PDF	Field 8
Bibliography and References Cited, if applicable	PDF	Include in Project Narrative
Facilities and Other Resources, if applicable	PDF	Include in Project Narrative
Equipment, if applicable	PDF	Include in Project Narrative
Other— Data Management Plan	PDF	Field 12
Other—Level of Effort Worksheet	PDF	Field 12
Other—Letter of Commitment for consultant, sub-award, or research institution, if applicable	PDF	Field 12
Other—Letters of Support, if applicable	PDF	Field 12

Completing an Application

- Important documents to assist you with completing the application package
  - Topics Document, Funding Opportunity Announcement, & Instructions are available at the DOE SBIR/STTR website
  - Online tutorials are available at http://www.doesbirlearning.com/



Data Management Plan

- Purpose – Disseminate, as widely as possible, data generated with public funding

- Requirement – All SBIR and STTR applications must select one of the two Data Management Plan (DMP) options below:
  - Option 1
    - The Option 1 DMP is: "It is anticipated that all generated digital data will be protected as SBIR/STTR data and therefore will not be publicly shared during the applicable SBIR/STTR data protection period." If any data generated under this award are published, an effort will be made to also release any related digital data that is not protected SBIR/STTR data."
    - *Please note that if you do not include a DMP with your application, Option 1 for the DMP will be assumed for your application. However, If* you plan to publicly disclose generated digital data, you must provide a DMP under Option 2.
  - Option 2
    - If you plan to publicly disclose technical data during the data protection period or, for data not expected to be asserted as protected SBIR/STTR rights data , please submit a DMP. Use the DMP requirements outlined in the FOA.

Top Application Errors

- Serious Errors (Applications Ineligible for Review or Administratively Declined)
  - ***Failed to update SAM registration early—unable to submit application to Grants.gov by deadline***
  - ***Failed to submit a Letter of Intent (LOI) by the LOI deadline***
    - A LOI needs to be submitted by the LOI deadline each application.
      - Please note: The project title and topic/subtopic designation included in the LOI need to match the application.
  - ***Failed to accurately calculate level of effort (for SBIR and/or STTR)***
    - Use Level-of-Effort worksheet to assist you with the calculation
  - ***Failed to meet Principal Investigator hours requirement***
    - Principal Investigator must devote at least 3 hours per week on average for the duration during Phase I project
      - Example: 12 month project: at least 156 hours (52 weeks x 3 hours/week), List the hours explicitly in your budget justification
- Other Errors (may limit funding eligibility or delay award processing, if recommended for award)
  - ***Failed to properly mark proprietary data***
    - See FOA for instructions
  - ***Failed to complete budget form(s) correctly***
    - Amounts in the budget form should be rounded to the nearest dollar and only include funds requested for the grant excluding any outside source funding.
    - Amounts listed on the budget form should match the amounts listed on the budget justification (unless explicitly labeled as other funding from outside sources).
    - Include a completed subaward budget form for each subaward included in the application. (Subaward budget form(s) total should match the amount for subaward listed in the small business budget form.)
  - ***Failed to include Letter(s) of Commitment***
    - Submit a Letter of Commitment for each Consultant and Subaward in Field 12 of the Research & Related: Other Project Information Form

SBIR vs. STTR

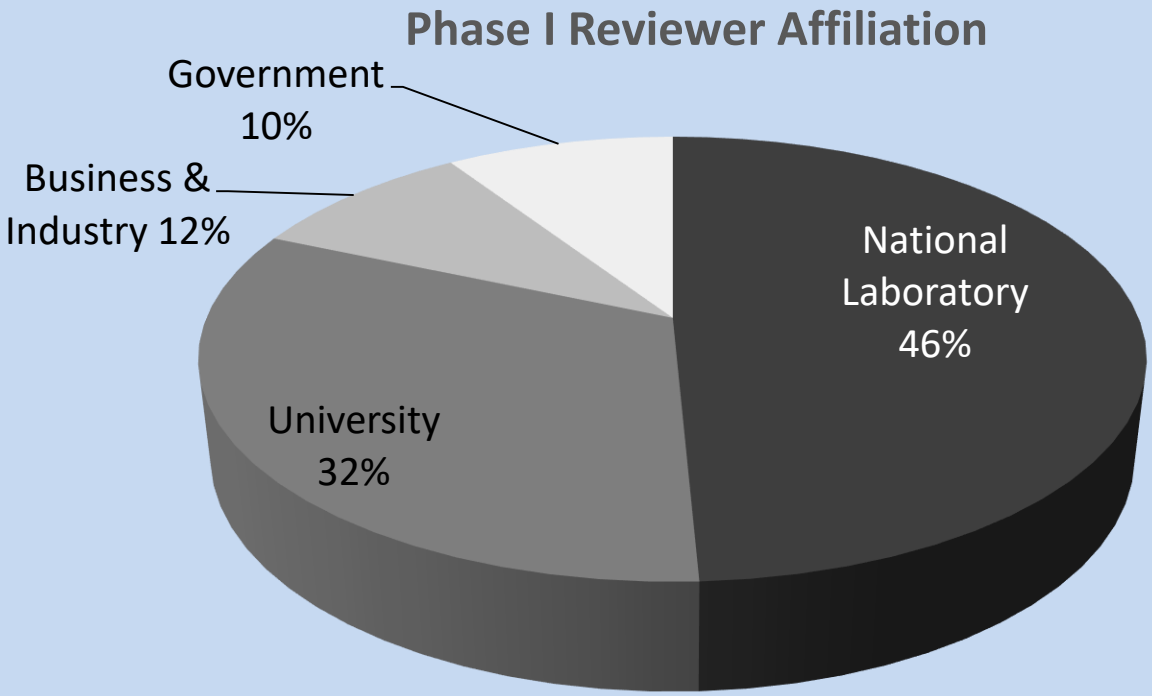
- DOE uses the same topics for SBIR & STTR
  - All topics accept SBIR applications; some topics may not accept STTR applications so please check the topic header prior to submission
- Applicants can apply to either or both SBIR & STTR programs with a single application
  - If you apply to both programs, you must meet the requirements for both

Review and Selection of Applications

- DOE primarily uses external peer review to evaluate your applications
  - Typically at least 3 technical reviewers
  - 1 reviewer for the Phase II commercialization plan
- Review Criteria (equally weighted)
  - Strength of the Scientific/Technical Approach
  - Ability to Carry Out the Project
  - Impact

- Selection
  - DOE ranks the most meritorious applications—award selections are made based on available funding
- You will be notified of the decision on your application within 90 days of the application deadline
  - Reviewer comments will be made available to you through PAMS. Use this feedback constructively to improve future applications

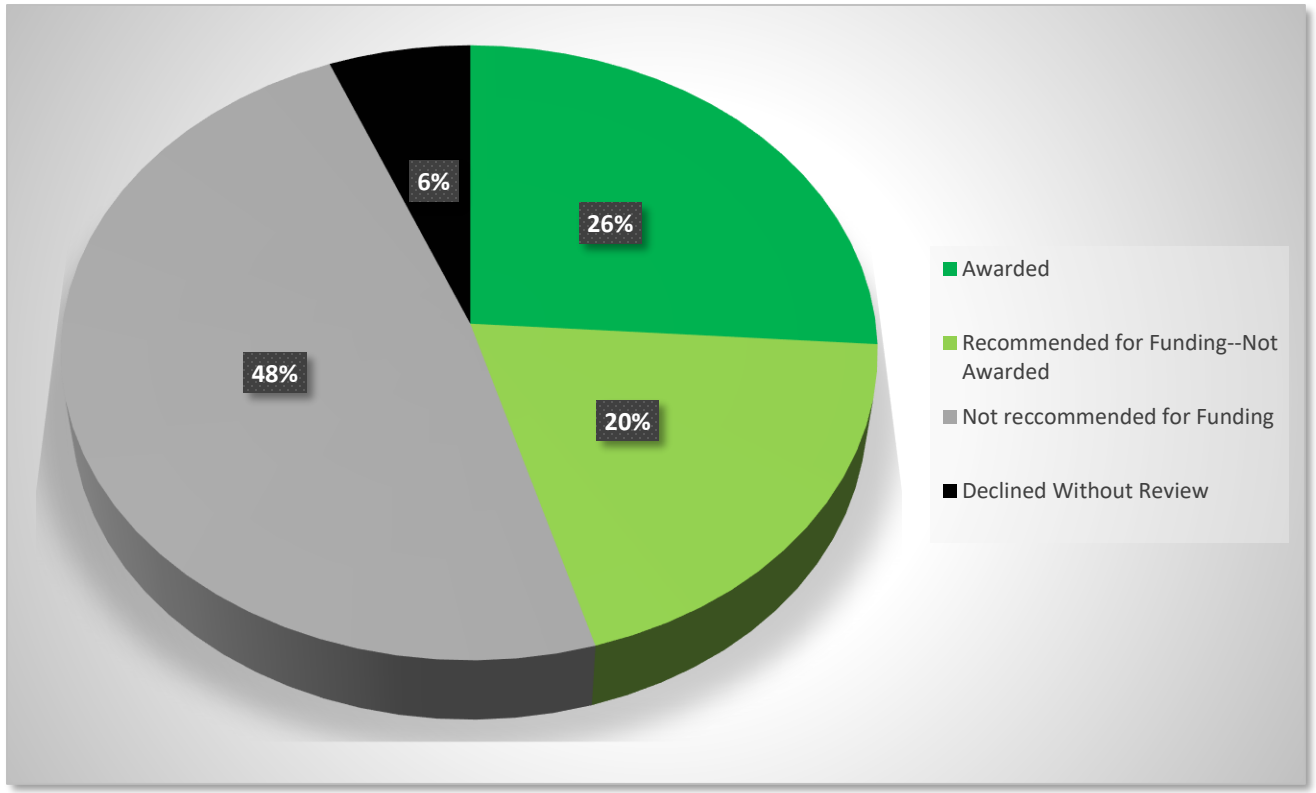
Technical Reviewer Affiliation



- Reviewers agree that (1) they will keep application information confidential and (2) they do not have a conflict of interest in reviewing the application.

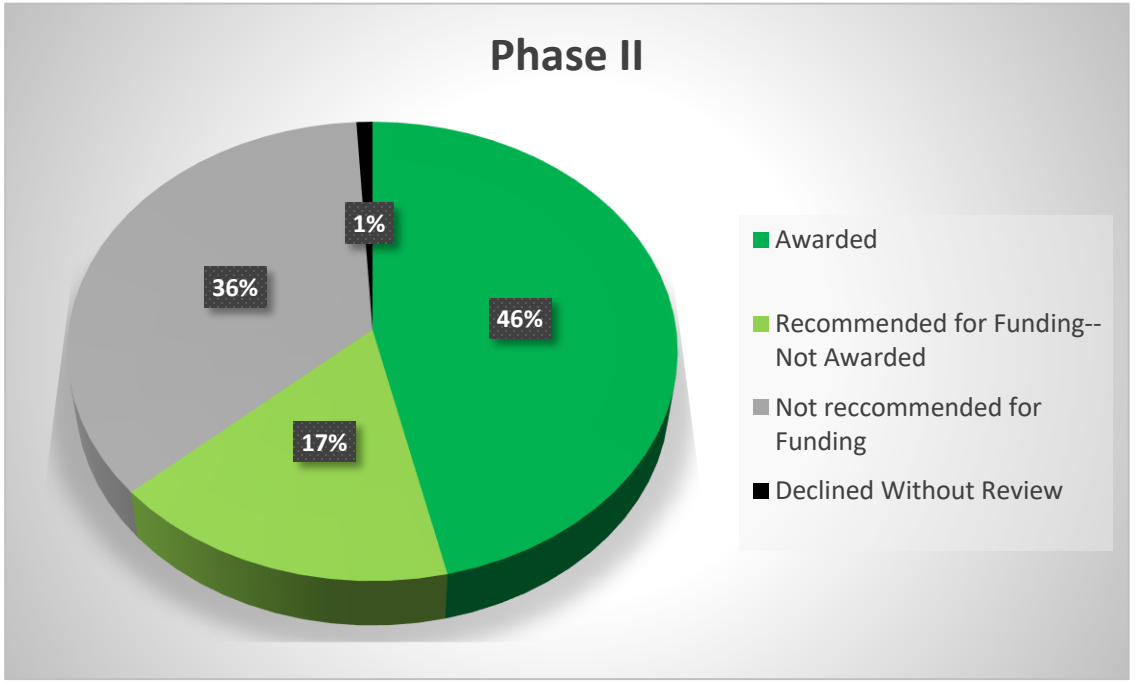
Phase I Application & Award Statistics for FY 2019

- Phase I
  - 1,600 applications
  - 417 awards

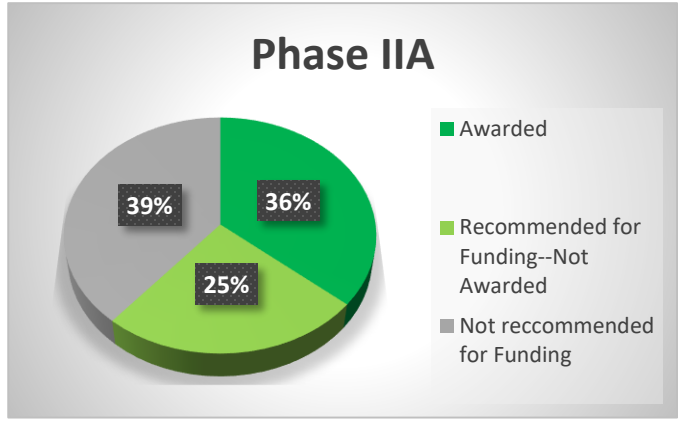


Phase II Application & Award Statistics for FY 2019

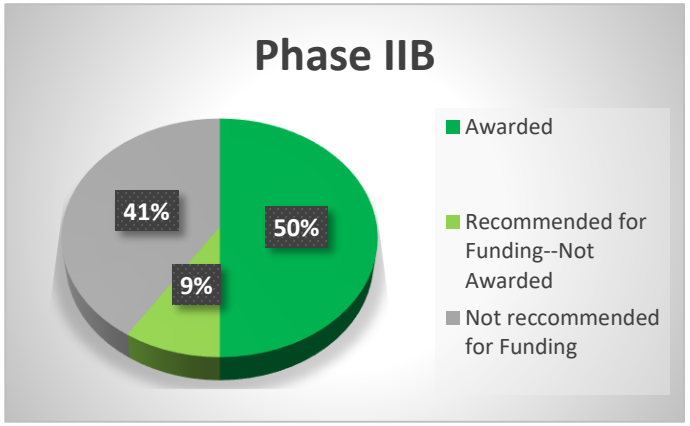
- Phase II
  - 431 applications
  - 200 awards



- Phase IIA
  - 29 applications
  - 13 awards



- Phase IIB
  - 44 applications
  - 22 awards



Phase I Principal Investigator Meeting

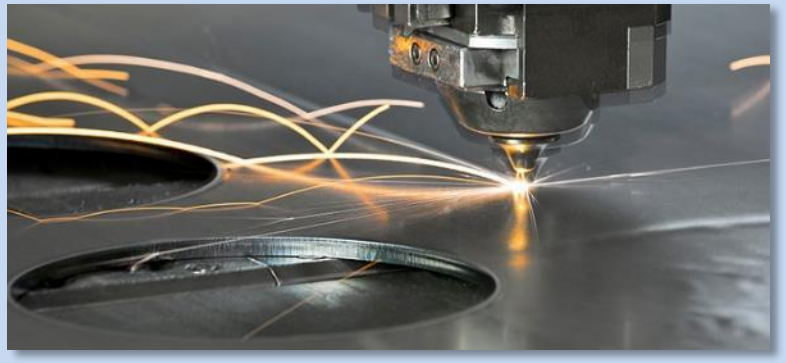
- Phase I Principal Investigators are expected to attend a two day DOE SBIR/STTR Principal Investigator Meeting held in the DC area
  - Release 1: June
  - Release 2: October
- Objectives
  - In-person meetings with DOE program managers and DOE Commercialization Assistance provider
  - Presentations relating to Phase II and Commercialization
  - Small business networking
- You may include the cost for the trip (registration, travel) in your Phase I budget
- Exceptions
  - If the DOE program office that funds your topic has a separate principal investigator meeting, you will be notified that your participation in the Phase I PI meeting is optional

Commercialization Assistance

- DOE Commercialization Assistance
  - Phase I assistance
    - Assistance with development of Phase II commercialization plans
    - Or, Industry-specific business consultant
  - Phase II assistance
    - Flexible offerings to meet a variety of commercialization needs
    - Or, Industry-specific business consultant
  - Vendor website: http://www.larta.org/doecap
- Company-selected commercialization assistance vendor
  - Companies may select their own vendor(s) to provide commercialization assistance
  - Company must include this vendor(s) as a subcontractor or consultant in their Phase I or II application
  - Up to $6,500 for Phase I

Commercialization

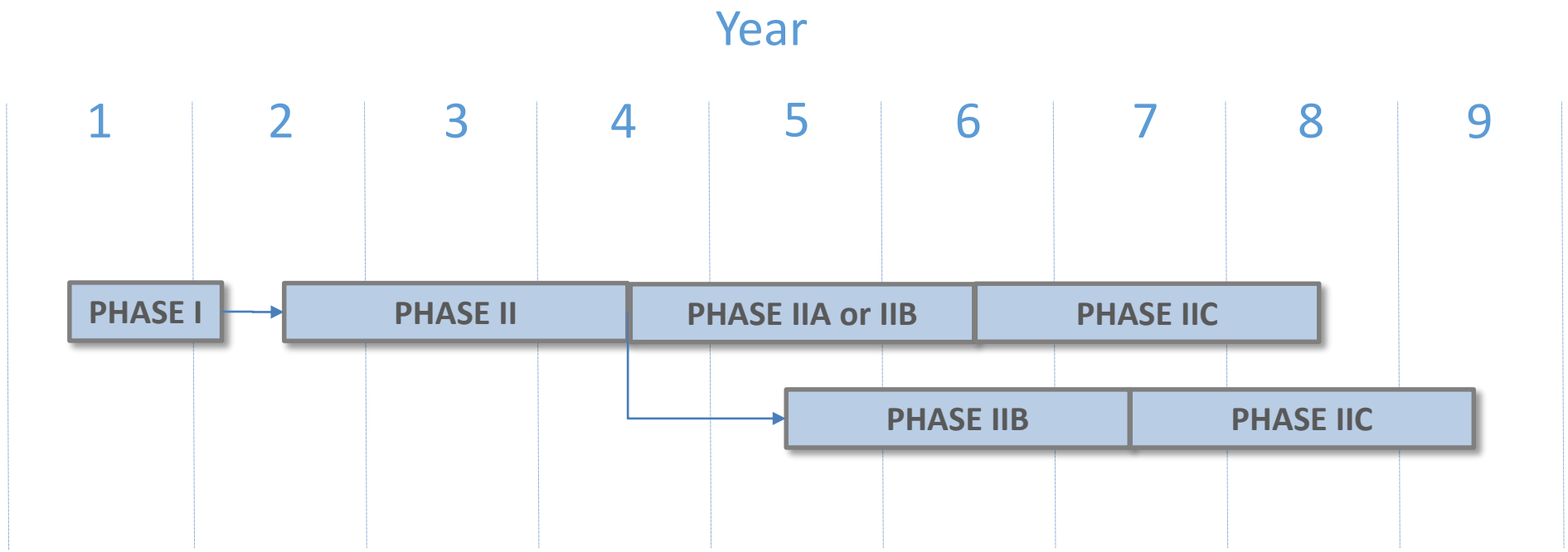
- DOE topics are drafted by program managers who are aware of the important technology roadblocks that are preventing progress in their mission areas
- Small business applicants are expected to address the commercialization challenges and ensure that there is a profitable, self-sustaining, business opportunity
  - Phase I & II Applications must include Commercialization Plans
  - Commercialization Plans can accommodate long commercialization timeframes
  - Ability to address adjacent markets can also be included in your commercialization plan
- DOE performs follow-up surveys to track commercialization outcomes of its SBIR/STTR awards



Support for Deep Tech Projects

- DOE supports technology development that may require more than a single, conventional Phase I/II award to complete prototype/process development
- Funding Strategies
  - Larger award sizes
    - DOE has included topics with Phase I awards up to $450,000 and Phase II awards up to $4,500,000
  - Collaborative Proposals
    - Topics may solicit small businesses to collaborate on multi-disciplinary projects where individual small businesses each receive their own Phase I/II award
  - Second Phase II awards
    - DOE offers second Phase II awards to complete or supplement prototype/process development

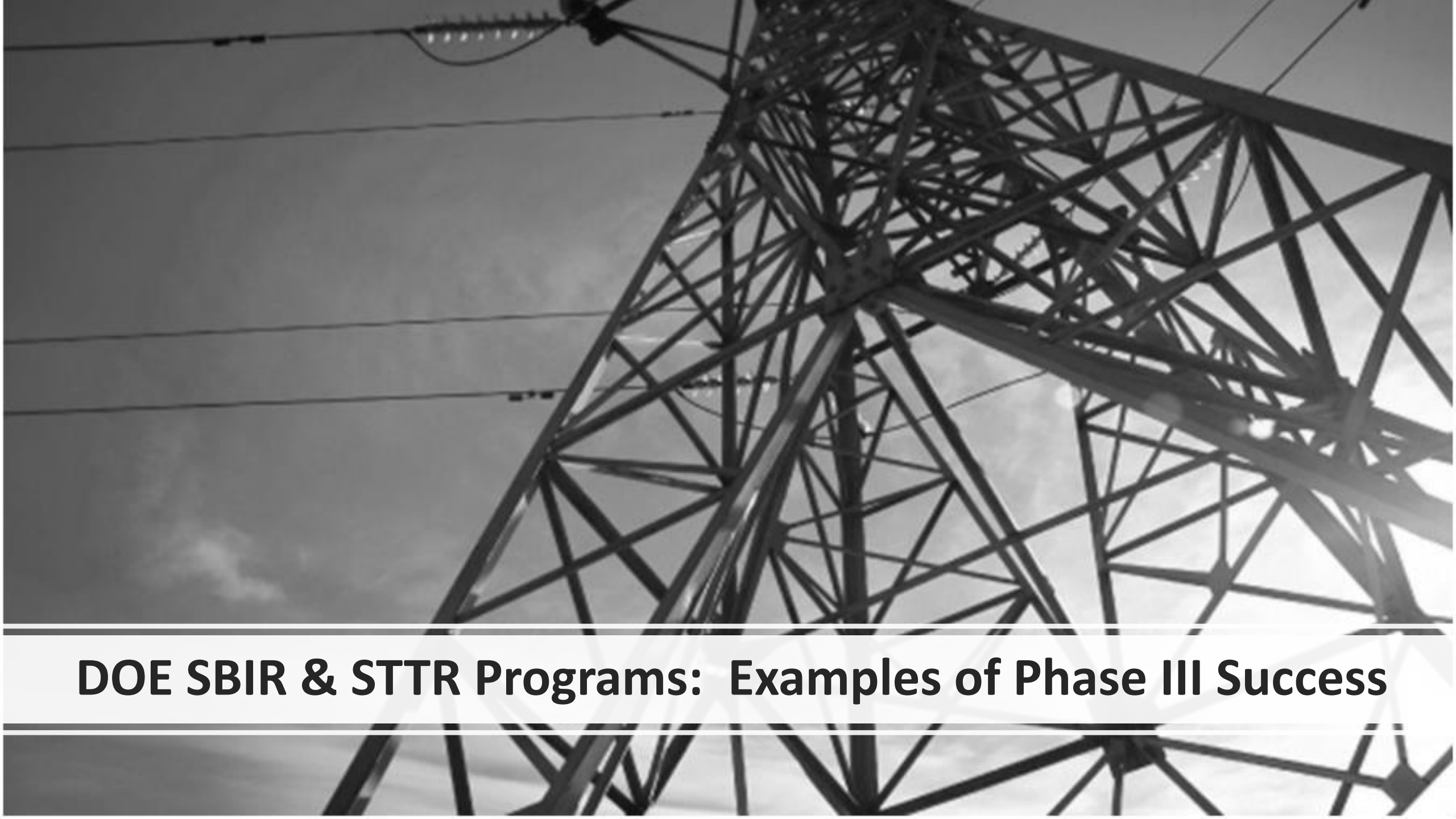
DOE Award Timeline



Phase IIA: For projects requiring more time and funding than available with a single Phase II award to complete prototype or process development

Phase IIB: For projects that have successfully completed prototype or process development and require additional R&D funding to transition an innovation towards commercialization

Phase IIC: Pilot program to leverage matching funds for commercialization



DOE SBIR & STTR Programs: Examples of Phase III Success

IMPACT

Ground-breaking characterization tool enabling 3D, element sensitive, high resolution imaging for next-generation energy-efficient and nanotechnology devices

DOE OFFICES: Basic Energy Sciences (BES), High Energy Physics (HEP).

TECHNOLOGY: table-top, femtosecond pulsed x-ray lasers for imaging and time-resolved spectroscopy with applications in semiconductor industry, bio-imaging and neuroscience.

COMMERCIALIZATION TIMELINE: SBIR support starting in 2002 with a DOD grant and 6 DOE SBIR Phase II award since 2007. $14M in product sales; >$13M in two rounds of investments by Intel Capital, Kairos Ventures and Colorado Impact Fund.

SiNode's core technology was developed at the Center for Electrical Energy Storage (CEES) at Argonne National Laboratory in partnership with Northwestern University

DOE OFFICES: Energy Efficiency and Renewable Energy (EERE), Vehicle Technologies Office (VTO).

TECHNOLOGY: "graphene-wrapped" silicon anode for Li-ion batteries with 50% higher performance.

COMMERCIALIZATION TIMELINE: Private investment from Energy Foundry after DOE Phase I. DOE Phase II in 2014. Immediately after, $4M contract from automotive consortium with DOE share.
In 2018, formation of Nanograph, joint venture with Tokyo-based company.
In 2019, additional Series A Angel investment for a total of $5.5M.

DOE OFFICES: Advanced Scientific Computing Research (ASCR).

TECHNOLOGY: Fiber optic interconnects.

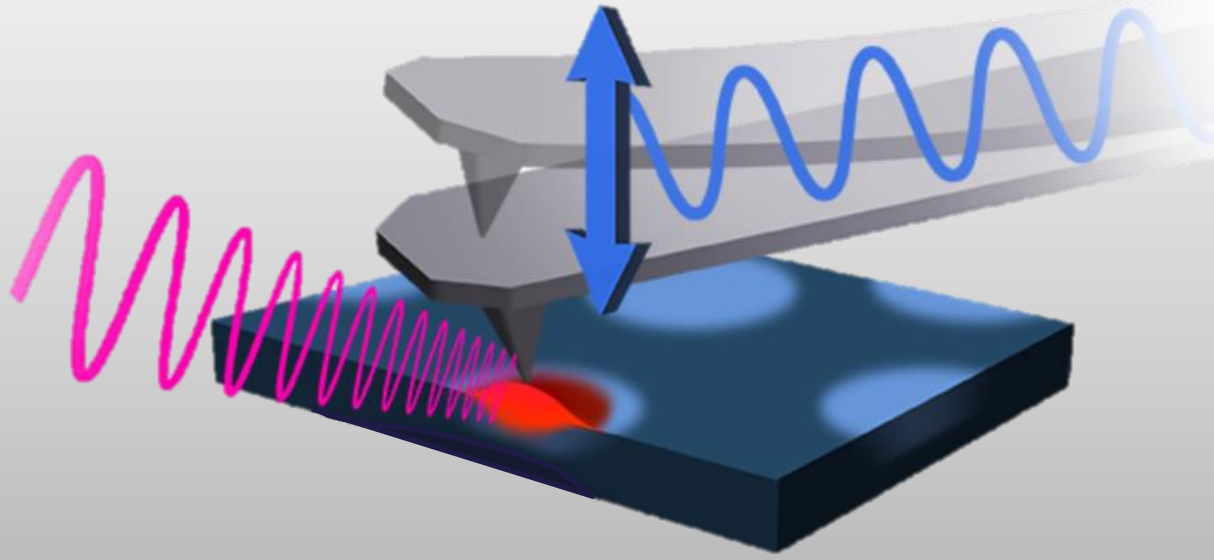
TIMELINE: 3 DOE SBIR Phase II awards and a Phase IIB since 2010. First Phase II lead to significant Angel Investments.

ROI: $5M in product sales rapidly growing. $15M in Angel Investments. 36 employees. Deployed in 15 large data centers. Customers include Verizon. 38+ patents.

TAKEAWAY MESSAGE: Game-changing technology born from a String Theory mathematical representation.

ANASYS INSTRUMENTS
The nanoscale spectroscopy company

BRUKER



DOE OFFICES: Basic Energy Sciences (BES).

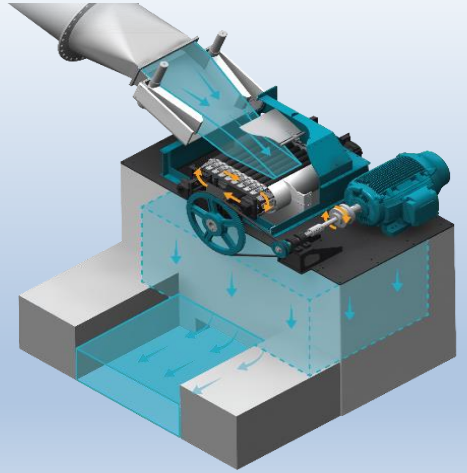
TECHNOLOGY: Nanoscale IR spectroscopy through AFM.

TIMELINE: 5 DOE SBIR Phase II awards in 2010 - 2017. Critical to validate a large potential market.

ROI: By 2018 Anasys' growing sales made the acquisition by Bruker possible.

TAKE-AWAY MESSAGE: Intensive multi-disciplinary R&D with significant advances in multiple disciplines like IR lasers, optics, AFM probes, mechanics, and electronics.

NATEL ENERGY



DOE OFFICES: Energy Efficiency and Renewable Energy (EERE).

TECHNOLOGY: low civil work hydropower turbines

IMPACT: tap into the undeveloped 70 GW hydropower potential at drops between 5 and 20 feet. Preserving the environment.

TIMELINE: founded in 2009. One Phase II SBIR followed by $10M investment from three-billion-dollar family investment firms. Currently expanding manufacturing.

STRENGTHS: Knowing there is a market. Balanced leadership. Vision.

DOE Office of Inspector General:
Fraud, Waste & Abuse

DOE Office of Inspector General

Combating Fraud

- ***What types of fraud are found in the SBIR Program?***
- Application Process
  - submitting a plagiarized proposal
  - providing false information regarding the company, the Principal Investigator (PI), or work to be performed
  - seeking funding for work that has already been completed
- During Award
  - using award funds for personal use or for any use other than the proposed activities
  - submitting plagiarized reports or reports falsely claiming work has been completed
  - claiming results for an award that were funded by a different source

DOE Office of Inspector General

Knowing the Rules

- ***Which SBIR rules should you be particularly familiar with?***
  - Duplicate or overlapping proposals may not be submitted to multiple agencies without full disclosure to all agencies.
  - The company must meet SBA's requirements for a small business, including being majority American owned and have 500 employees or fewer.
  - For SBIR: The PI's primary employment must be with the company during the grant period. The PI may not be employed full time elsewhere.
  - For SBIR: For Phase I, a minimum of two thirds of the research effort must be performed by the grantee company; for Phase II, a minimum of one-half of the research effort must be performed by the grantee company. Work performed by a university research lab is NOT work completed by the grantee company.
  - University employees participating on an SBIR award should disclose their involvement to the university as well as their use of university facilities.
  - R&D must be performed in the United States.

DOE Office of Inspector General

Consequences

- ***What Happens If You Break the Rules?***
  - If you commit fraud or other wrongdoing in applying for or carrying out an SBIR award, we will investigate.
  - We refer violations of civil or criminal law to the Department of Justice (DOJ). If DOJ prosecutes you for fraud or false statements, you may be sentenced to prison and required to pay full restitution. If DOJ pursues a civil action under the False Claims Act, you may have to pay treble damages and $11,000 for each false claim. In addition, DOE may terminate your awards and debar you from receiving grants or contracts from any federal agency.

Recent Prosecution

Friday, September 11, 2015

Scientists Sentenced To Prison For Defrauding The Small Business Innovation Research Program

Tampa, Florida – U.S. District Judge Virginia Hernandez Covington has sentenced Mahmoud Aldissi (a/k/a Matt) and Anastassia Bogomolova (a/k/a Anastasia) for conspiracy to commit wire fraud, wire fraud, aggravated identity theft, and falsification of records. Aldissi was sentenced to 15 years in federal prison and Bogomolova was sentenced to a term of 13 years. As part of their sentences, the court entered a money judgment in the amount of $10.6 million, representing the proceeds of the crime, and ordered them to pay $10.6 million in restitution. Aldissi and Bogomolova were found guilty on March 20, 2015.

According to testimony and evidence presented during the month-long trial, through their two companies, Fractal Systems, Inc., and Smart Polymers Research Corp., Aldissi and Bogomolova fraudulently obtained approximately $10.5 million of small business research awards from the federal government. In order to be awarded contracts, they submitted proposals using the stolen identities of real people to create false endorsements of and for their proposed contracts. In the proposals, they also lied about their facilities, costs, the principal investigator on some of the contracts, and certifications in the proposals.

https://www.justice.gov/usao-mdfl/pr/scientists-sentenced-prison-defrauding-small-business-innovation-research-program

DOE Office of Inspector General

Reporting Fraud

- The Department of Energy's Office of Inspector General (OIG) promotes the effective, efficient, and economical operation of DOE's programs and operations through audits, inspections, investigations, and other reviews.
- Within DOE OIG, the Office of Investigations is responsible for investigating any fraudulent acts involving DOE, its contractors or subcontractors, or any crime affecting the programs, operations, Government funds, or employees of those entities.
- ***If you want additional information or to report wrongdoing***

  Internet: ig.energy.gov
  E-mail: ighotline@hq.doe.gov
  Telephone: 202-586-4073
  Hotline: 800-541-1625
  Fax: 202-586-5697

  U.S. DEPARTMENT OF ENERGY
  OFFICE OF INSPECTOR GENERAL
  ATTN: OFFICE OF INSPECTIONS
  1000 INDEPENDENCE AVENUE, SW
  MAIL STOP 5D-031
  WASHINGTON, DC 20585

Questions? *Please submit any question you may have via the **Q&A box**, center bottom of you screen.*

Contact information:

- DOE SBIR/STTR Operations Call Center: 301-903-5707 (M-F, 8:30am to 5:00 ET)
- DOE SBIR/STTR Email: sbir-sttr@science.doe.gov

Our Website:

- DOE SBIR/STTR main website: https://science.osti.gov/sbir

Join our Mailing List:

- Join our Mailing List – this field is on every DOE SBIR/STTR web page

DOE Application Assistance Program: http://www.dawnbreaker.com/doephase0/

Provide Feedback

- Submit suggestions for improving the SBIR & STTR Programs: https://science.osti.gov/sbir/Anonymous-Feedback

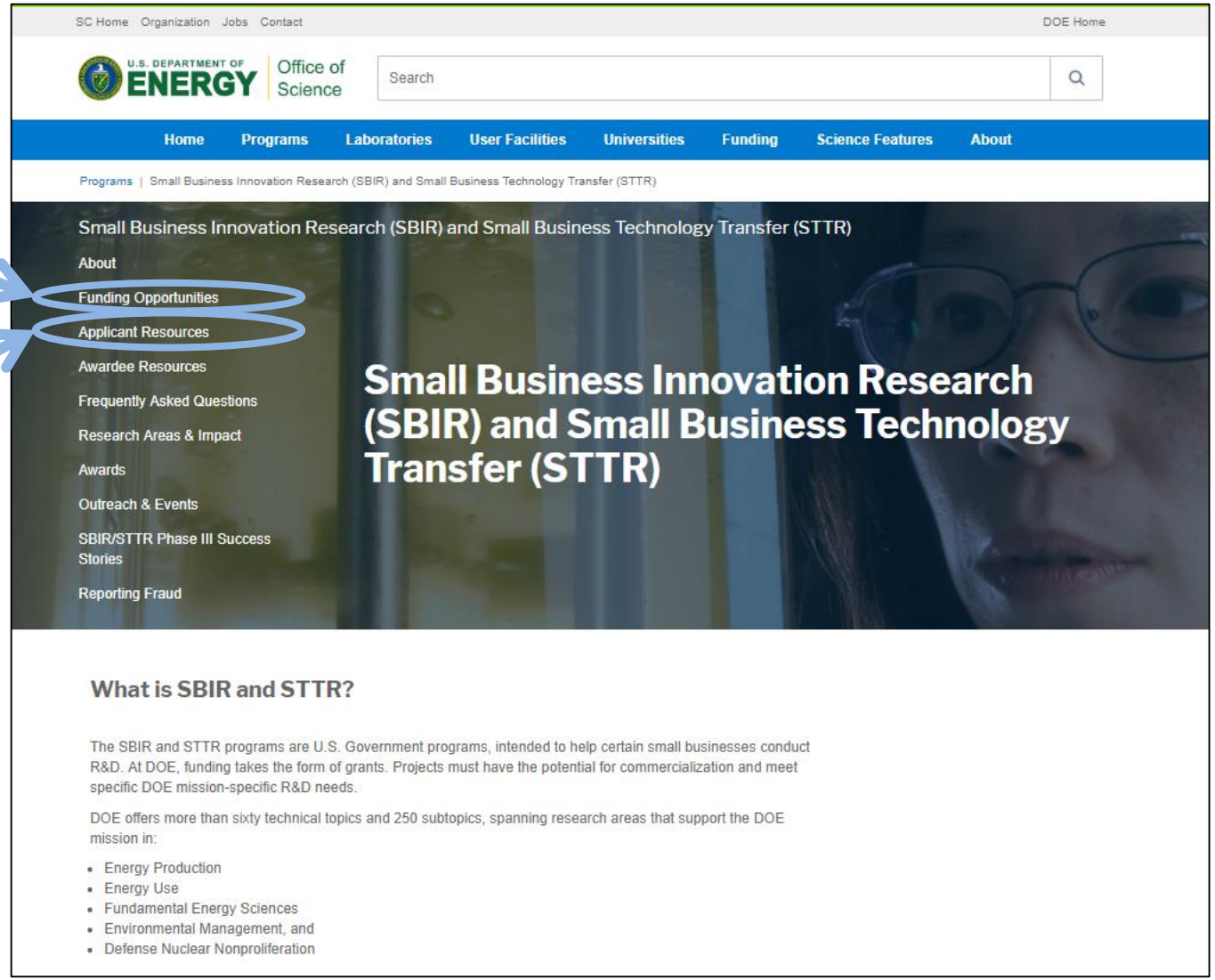
Resources

DOE SBIR webpage

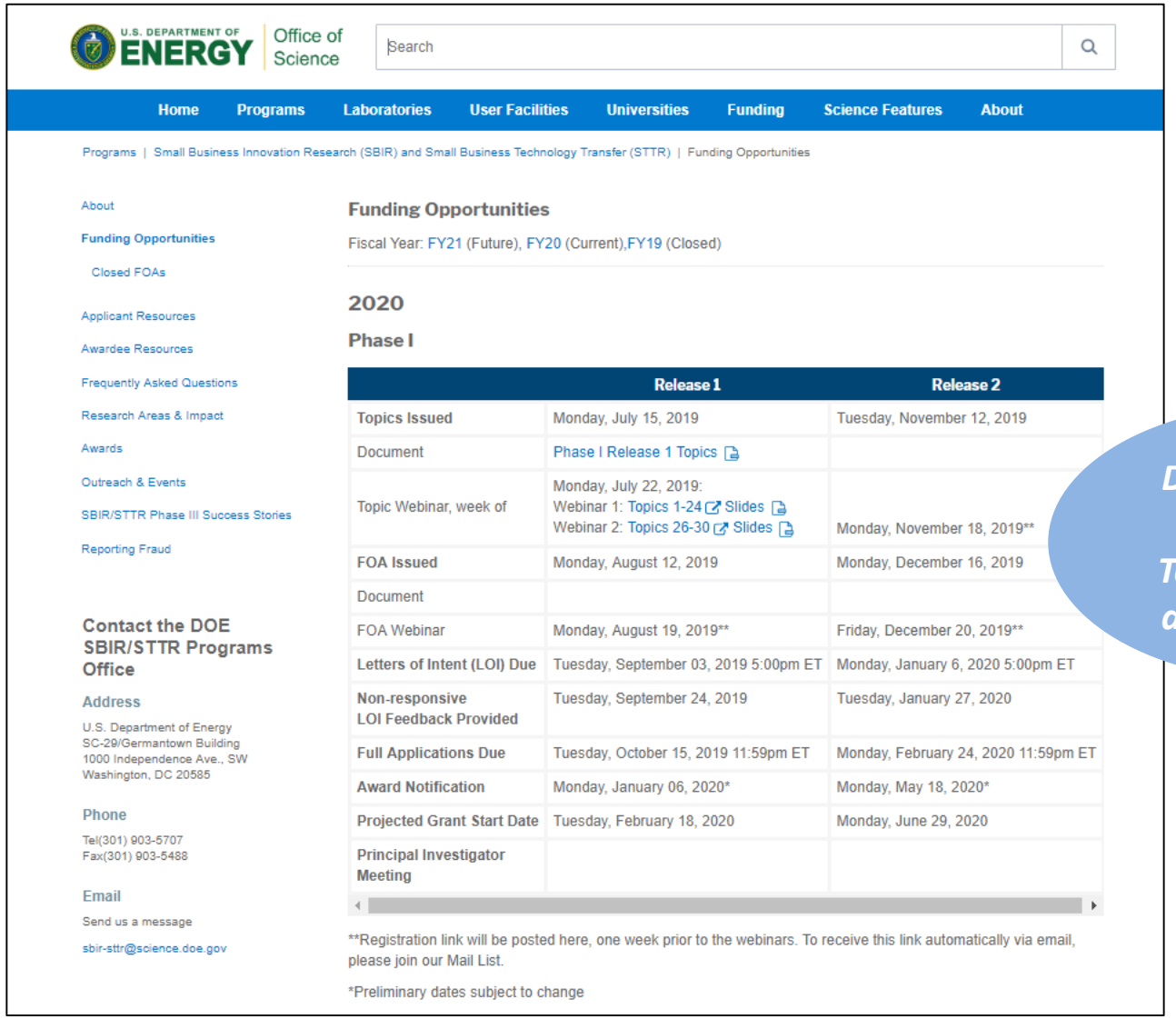
https://science.osti.gov/sbir

Funding Opportunities

Applicant Resources



DOE Funding Opportunities Tab



Documents and Webinars for Topics and FOAs are posted here

Federal SBIR webpage

sbir.gov

general information for those new to SBIR

Search topics across all federal agencies