The DOE Webinar will begin shortly . . .

• Why is there no sound?

Once you logged into the webinar, you were provided two options to listen to this broadcast. The first option is through your computer speakers, the second option is via dialing the phone number provided to you upon login to the webinar. If you chose to listen through your computer speakers, you may need to turn your speaker volume on or up.

• Will DOE provide access to the recorded webinar after the meeting?

 Yes, all those who registered will receive a link to the slides and to the recorded webinar soon after the meeting. It will also be available on the DOE SBIR/STTR web site.

• Where can I find the Topics being discussed today?

This link will take you to the Funding Opportunity Announcement (FOA) page that lists the FY 2022
 Phase I Release 1 Topics: <u>https://science.osti.gov/sbir/Funding-Opportunities</u>

• What if my question was not answered at today's webinar?

- Please contact the point of contact that follows each subtopic in the document listed above for further clarification.
- If you have a question about the grant application process, please send us an email at: <u>sbir-sttr@science.doe.gov</u>.



DOE SBIR/STTR Phase I Release 1 Topics Webinar

Topics associated with the FY 2022 Phase I Release 1 Funding Opportunity Announcement

Topics 01-23

DOE SBIR/STTR Programs Office

July 20, 2021

TODAY'S AGENDA

Topics Introduction	DOE SBIR/STTR Programs Office
Topics 01 – 06	Office of Advanced Scientific Computing Research
Topics 07 – 23	Office of Basic Energy Sciences



FY 2022 Phase I Schedule

	Release 1	Release 2
Topics Issued	Monday, July 12, 2021	Monday, November 8, 2021
Webinar(s)	Week of July 19, 2021	Week of November 15, 2021
FOA Issued	Monday, August 9, 2021	Monday, December 13, 2021
Webinar(s)	Friday, August 13, 2021	Friday, December 17, 2021
Letters of Intent (LOI) Due	Monday, August 30, 2021	Monday, 3 January, 2022
Non-responsive LO Feedback Provided	Monday, September 20, 2021	Monday, January 24, 2022
Applications Due	Tuesday, October 12, 2021	Tuesday, February 22, 2022
Award Notification	Monday, January 3, 2022	Monday, May 16, 2022



Phase I Funding Opportunity Announcements <u>Participating DOE Programs (FY 2022)</u>

Office of Advanced Scientific Computing Research

- Office of Basic Energy Sciences
- Office of Biological and Environmental Research
- Office of Nuclear Physics
- Office of Cybersecurity, Energy Security, and Emergency Response
- Office of Defense Nuclear Nonproliferation

Phase I Release 2

Phase I

Release 1

- 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



Funding Opportunity Announcement (FOA) Webinar

- FY22 Phase I Release 1 FOA will be issued on August 9th
- Join our Mailing List this field is on every DOE SBIR/STTR web page
 - Following the issuance of the FOA, look for an email with a link to the FOA
- Webinar with Q&A for this FOA on August 13th
 - Overview of the FY 2022 DOE SBIR/STTR Programs
 - Following the issuance of the FOA, look for an email announcing this webinar



Topic Basics

- Topics are created by DOE program managers and define important technology breakthroughs needed in R&D areas that support the DOE mission
- Topics are organized by DOE Program Office, e.g., ASCR, BES, etc.
- DOE program managers are listed with each subtopic
 - Questions to DOE program managers are limited to clarification of the topic and subtopic (including references)
 - Clarification is provided to help *you* determine whether your technology fits within the topic and subtopic
 - You may communicate with these topic managers from the release of topics until the grant application due date
 - The decision to apply is yours



Example Topic

- Topic & Subtopic
 - You must specify the same topic and subtopic in your Letter of Intent and grant application
- Topic Header
 - Lists the maximum award amounts for Phase I & Phase II and the types of application accepted (SBIR and/or STTR)
- Program Manager
 - Each subtopic lists the responsible DOE program manager
- "Other" Subtopic
- References

12.INSTRUMENTATION FOR ADVANCED CHEMICAL IMAGING

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

The Department of Energy seeks to advance chemical imaging technologies that facilitate fundamental research to understand, predict, and ultimately control matter and energy at the electronic, atomic, and molecular levels. The Department is particularly interested in forefront advances in imaging techniques that combine molecular-scale spatial resolution and ultrafast temporal resolution to explore energy flow, molecular dynamics, breakage, or formation of chemical bonds, or conformational changes in nanoscale systems.

Grant applications are sought in the following subtopics:

a. High Spatial Resolution Ultrafast Spectroscopy

Chemical information associated with molecular-scale processes is often available from optical spectroscopies involving interactions with electromagnetic radiation ranging from the infrared spectrum to x-rays. Ultrafast laser technologies can provide temporally resolved chemical information via optical spectroscopy or laser-assisted mass sampling techniques. These approaches provide time resolution ranging from the breakage or formation of chemical bonds to conformational changes in nanoscale systems but generally lack the simultaneous spatial resolution required to analyze individual molecules. Grant applications are sought that make significant advancements in spatial resolution towards the molecular scale for ultrafast spectroscopic imaging instrumentation available to the research scientist. The nature of the advancement may span a range of approaches including sub-diffraction limit illumination or detection, selective sampling, and coherent or holographic signal analysis.

Questions - Contact: James Rustad, James.Rustad@Science.doe.gov

b. Time-Resolved Chemical Information from Hybrid Probe Microscopies

Probe microscopy instruments (including AFM and STM) have been developed that offer spatial resolution of molecules and even chemical bonds. While probe-based measurements alone do not typically offer the desired chemical information on molecular timescales, methods that take advantage of electromagnetic interactions or sampling with probe tips have been demonstrated. Grant applications are sought that would make available to scientists new hybrid probe instrumentation with significant advancements in chemical and temporal resolution towards that required for molecular scale chemical interactions. The nature of the advancement may span a range of approaches and probe techniques, from tip-enhanced or plasmonic enhancement of electromagnetic spectroscopies to probe-induced sample interactions that localize spectroscopic methods to the molecular scale.

Questions - Contact: James Rustad, James.Rustad@Science.doe.gov

c. Other

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

Questions - Contact: James Rustad, James.Rustad@Science.doe.gov

References:

- U.S. Department of Energy, 2006, Office of Science Notice DE-FG01-05ER05-30, Basic Research for Chemical Imaging, BES Chemical Imaging Research Solicitation. (<u>http://science.energy.gov/~/media/grants/pdf/foas/2005/DE-FG01-05ER05-30.pdf</u>].
- National Research Council, 2006, Visualizing Chemistry, The Progress and Promise of Advanced Chemical Imaging, National Academies Press. (<u>http://www.nap.edu/catalog.php?record_id=11663</u>).



Topic 01: TECHNOLOGIES FOR MANAGING AND ANALYZING COMPLEX DATA IN SCIENCE AND ENGINEERING

Maximum Phase I Award Amount: \$250,000	Maximum Phase II Award Amount: \$1,600,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

Application Area 1: Advanced Data Analytic Technologies for Systems Biology and Bioenergy Application Area 2: Technologies and Tools to Integrate and Analyze Data from Multiple User Facilities, Community Resources, Instruments and Data Systems Application Area 3: Capabilities for Sharing, Mining and Extracting Knowledge from Chemical

and Geochemical Data

Questions: Application Area 1 – Ramana Madupu, <u>Ramana.Madupu@Science.doe.gov</u> Questions: Application Area 2 – Paul Bayer, <u>Paul.Bayer@science.doe.gov</u> Questions: Application Area 3 – Aaron Holder, <u>Aaron.Holder@science.doe.gov</u> and Raul Miranda, <u>Raul.Miranda@science.doe.gov</u>

Topic 02: ACCELERATING THE DEPLOYMENT OF ADVANCED SOFTWARE TECHNOLOGIES

Maximum Phase I Award Amount: \$250,000	Maximum Phase II Award Amount: \$1,600,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

- a. Deployment of ASCR-Funded Software
- b. Integration of ASCR-Funded Libraries
- c. Other

Questions: Subtopic a & b – Hal Finkel, <u>hal.finkel@science.doe.gov</u> and/or William Spotz, <u>William.Spotz@science.doe.gov</u> Questions: Subtopic c – Hal Finkel, <u>hal.finkel@science.doe.gov</u>

Topic 03: HPC CYBERSECURITY

Maximum Phase I Award Amount: \$250,000	Maximum Phase II Award Amount: \$1,600,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

- a. Cybersecurity Technologies
- b. Other

Questions: Robinson Pino, robinson.pino@science.doe.gov

Topic 04: TECHNOLOGIES FOR SHARING NETWORK PERFORMANCE DATA

Maximum Phase I Award Amount: \$250,000	Maximum Phase II Award Amount: \$1,600,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

- a. Anonymization Tools and Services
- b. Correlate Log Data and or Host Sensor Data with Network Trace Data
- c. Other

Questions: Richard Carlson, <u>Richard.Carlson@science.doe.gov</u>

Topic 05: TRANSPARENT OPTICAL QUANTUM NETWORK TECHNOLOGIES

Maximum Phase I Award Amount: \$250,000	Maximum Phase II Award Amount: \$1,600,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

- a. Photonic Quantum Light Sources
- b. Quantum Buffers
- c. Optical Quantum Multiplexers/De-Multiplexers

Questions: Thomas Ndousse-Fetter, <u>Thomas.ndousse-fetter@science.doe.gov</u>

Topic 06: TECHNOLOGY TO FACILITATE THE USE OF NEAR-TERM QUANTUM COMPUTING HARDWARE

Maximum Phase I Award Amount: \$250,000	Maximum Phase II Award Amount: \$1,600,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

a. Software for Calibration, Characterization, and Control of Quantum Processors

Questions: Claire Cramer, <u>Claire.Cramer@science.doe.gov</u>

Topic 07: MANUFACTURING OF ULTRA-HIGH QUALITY X-RAY MIRRORS

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

- a. Development of Deterministic Surface Finishing Techniques
- b. Other

Questions: Eliane Lessner, <u>Eliane.Lessner@science.doe.gov</u>

Topic 08: STRAIN-FREE PROCESSING AND MOUNTING OF ULTRA-THIN DIAMOND CRYSTALS FOR APPLICATIONS AT NEXT GENERATION X-RAY SOURCES

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

- a. Development of Damage-free and Strain-free Processing and Mounting of Ultra-thin Diamond Crystal Plates
- b. Other

Questions: Eliane Lessner, <u>Eliane.Lessner@science.doe.gov</u>

Topic 09: NOVEL MANUFACTURING CAPABILITIES FOR HIGH RESOLUTION X-RAY GRATINGS

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

- a. Holographic, Lithographically Recorded and Parallelly Written Gratings Schemes
- b. Other

Questions: Eliane Lessner, <u>Eliane.Lessner@science.doe.gov</u>

Topic 10: HOLLOW-CORE FIBER BASED ULTRAFAST HIGH-POWER LASER BEAM DELIVERY SYSTEM

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

- a. Development of Hollow-Core Fiber based High-Power Laser Beam Delivery System
- b. Other

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

Topic 11: SUPERCONDUCTING UNDULATOR WITH HIGH HEAT-LOAD LIMIT

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

- a. Development of Superconducting High Heat-load Undulator
- b. Other

Questions: Eliane Lessner, <u>eliane.lessner@science.doe.gov</u>

Topic 12: VISIBLE WAVELENGTH-TUNABLE PHOTOCATHODE DRIVE LASER

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

- a. Development of Wavelength-Tunable Visible Laser System
- b. Other

Questions: Eliane Lessner, <u>eliane.lessner@science.doe.gov</u>

Topic 13: ULTRA-HIGH RESOLUTION ELECTRON MONOCHROMATOR FOR APPLICATIONS IN TEM, STEM, AND LEEM

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

- a. Development of Ultra-high Resolution Electron Monochromators
- b. Other

Questions: George Maracas, <u>george.maracas@science.doe.gov</u>

Topic 14: THEORETICAL TOOLS TO ACCELERATE DISCOVERY AND IMPROVE CONTROL OF MULTI-MODAL AUTONOMOUS CORRELATIVE NANOSCALE MEASUREMENTS

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

- a. Open-Source Software Framework for Multi-Scale Modeling Theoretical and Computational Tools
- AI/ML Framework for Correlative Multi-modal Analysis and Fingerprint Matching for Anomaly Detection and Knowledge Extraction – Theoretical and Computational Tools
- c. Electron Energy Loss Spectroscopy (EELS) Toolkit Theoretical and Computational Tools
- d. Other

Questions: George Maracas, <u>george.maracas@science.doe.gov</u>

Topic 15: FAIR DATA MANAGEMENT SOFTWARE TOOLS FOR USER FACILITIES

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

- a. Microscopy Tools Theoretical and Computational Tools
- b. Other

Questions: George Maracas, <u>george.maracas@science.doe.gov</u>

Topic 16: LOW COST, SOLUTION PROCESSIBLE PEROVSKITE MATERIALS FOR HIGH PERFORMANCE X-RAY IMAGING

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

- a. Low-Cost Pixelated X-Ray Imager
- b. Pixelated Circuits on a Single Crystal Perovskite Wafer
- c. Other

Questions:George Maracas, <u>george.maracas@science.doe.gov</u>

Topic 17: INSTRUMENTATION AND TOOLS FOR MATERIALS RESEARCH USING NEUTRON SCATTERING

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

- a. Advanced Sample Environments
- b. Beam Conditioning Optics
- c. Situation-responsive Experiment Planning and Optimizations Tools
- d. Advanced Choppers
- e. Other

Questions: P. Thiyagarajan (Thiyaga), P.Thiyagarajan@science.doe.gov

Topic 18: MEMBRANES FOR ELECTROCHEMICAL ENERGY STORAGE APPLICATIONS

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

- a. Ion-Selective Membranes for use with Non-Traditional Chemistries, Electrolytes, and Architectures in Advanced Rechargeable Batteries
- b. Polymeric Membranes for Solar Fuels Generators
- c. Other

Questions: Subtopic a – Craig Henderson, <u>Craig.Henderson@science.doe.gov</u> Questions: Subtopic b – Chris Fecko, <u>Christopher.Fecko@science.doe.gov</u> Questions: Subtopic c – Craig Henderson, <u>Craig.Henderson@science.doe.gov</u> or Chris Fecko, <u>Christopher.Fecko@science.doe.gov</u>

Topic 19: DESIGN OF COLOR CENTERS FOR SPIN QUBIT DEVICES

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

- a. Synthesis of High-Quality Color Centers
- b. Other

Questions: Athena S. Sefat, <u>Athena.Sefat@science.doe.gov</u>

Topic 20: HIGH PERFORMANCE MATERIALS FOR NUCLEAR APPLICATION

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

- a. Bimetallic Structures for Liquid-Cooled, High Temperature Reactor Systems
- b. Material Development and Compatibility for Molten Salt Thermodynamic Reference Electrodes
- c. Other

Questions: Subtopic a &c – Sue Lesica, <u>sue.lesica@nuclear.energy.gov</u> Questions: Subtopic b – Stephen Kung, <u>Stephen.Kung@nuclear.energy.gov</u>

Topic 21: ADVANCED SUBSURFACE ENERGY TECHNOLOGIES

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

- a. Geothermal
- b. Turning Oilfield Waste into a Feedstock: Technologies for Realizing Value from Produced Water
- c. Novel Concept for Underground Gas Storage Reservoir Management
- d. Machine Learning (ML)/Artificial Intelligence (AI) to Create Innovative and Productive Use of Carbon Storage Datasets Available Within EDX
- e. Turnkey Service to Enable a Passive Seismic Monitoring Network During Carbon Storage Site Characterization

f. CO2 Use to Enhance Biochar for Soils or Agricultural Carbon Products
Questions: Subtopic a – William Vandermeer, <u>william.vandermeer@ee.doe.gov</u>
Questions: Subtopic b – William Fincham, <u>william.fincham@netl.doe.gov</u>
Questions: Subtopic c – Christopher Freitas, <u>christopher.freitas@hq.doe.gov</u>
Questions: Subtopic d&e – Sarah Leung, <u>sarah.leung@hq.doe.gov</u>
Questions: Subtopic f – Aaron Fuller, <u>aaron.fuller@hq.doe.gov</u> and Amishi Kumar, <u>amishi.kumar@hq.doe.gov</u>

Topic 22: ADVANCED FOSSIL ENERGY AND CARBON MANAGEMENT TECHNOLOGY RESEARCH

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

- a. Production of "Blue Hydrogen" using Novel Membrane Technologies
- b. Low-Cost High-Performance Regenerative Fuel Cells (RFCs) for Fossil-Integrated Hydrogen Energy Storage
- c. Decision Support Tools for Decarbonization through Hybrid Systems

Questions: Subtopic a – Kourosh Kian, <u>kourosh.kian@hq.doe.gov</u> Questions: Subtopic b – Mani Gavvalapalli, <u>nagamani.gavvalapalli@hq.doe.gov</u> Questions: Subtopic c – Mary Underwood, <u>mary.underwood@netl.doe.gov</u>

Topic 23: RARE EARTH ELEMENTS AND CRITICAL MINERALS

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

a. Advanced Alloy Development

Questions: Heather Hunter <u>heather.hunter@netl.doe.gov</u>

Topic 24: TECHNOLOGY TRANSFER OPPORTUNITIES: BASIC ENERGY SCIENCES

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

a. Split Laser Sensor for Harsh Environment Sensing Applications

Questions: James Rustad, <u>James.Rustad@science.doe.gov</u>

DOE SBIR/STTR Programs Office Contact Information

- SBIR/STTR Web: <u>https://science.osti.gov/sbir</u>
- Email: <u>sbir-sttr@science.doe.gov</u>
- Phone Assistance Hotline: 301-903-5707



- DOE Phase 0 Assistance Program: <u>http://www.dawnbreaker.com/doephase0/</u>
- DOE Application Assistance: <u>https://science.osti.gov/SBIRLearning</u>

