The DOE Nuclear Physics SBIR/STTR Program

16th SBIR/STTR Exchange Meeting
July 29-30, 2025

Michelle D. Shinn, Ph.D.

Program Manager for Industrial Concepts
DOE Office of Science
Office of Nuclear Physics

U.S. DEPARTMENT of ENERGY | Office of Science

science.osti.gov/np

Outline

- DOE SBIR/STTR goals, funding, organization, and administration
- Exchange meeting goals and agenda
- NP SBIR/STTR proposal applications and awards metrics (FY 2024)
- The NP Mission and how it influences the SBIR/STTR Topics/Subtopics
- NP SBIR/STTR Phase III success
- DOE NP SBIR/STTR Program Updates
- Presentation Notes & Acknowledgement of Funding
- Conclusions

The DOE SBIR/STTR Program

SBIR: Small Business Innovation Research STTR: Small Business Technology TRansfer

- SBIR: Set-aside program for U.S. small businesses (SB) to engage in Federal Research and Development (R&D) with potential for commercialization. (SB: budget must be ≥66 % for Phase I and ≥50% for Phase II, Research Institution (RI): optional)
- STTR: Set-aside program to facilitate cooperative R&D between SB and U.S. RI with potential for commercialization. (SB: budget must be ≥ 40%, Rino less than 30%)
- "Both": submitted for consideration as SBIR or STTR (both). Must satisfy the minimum participation requirements listed above for both SBIR and STTR.
- Congressionally-mandated programs, funded by a small percentage of the extramural R&D budget set aside within each DOE technical program that participates.
- 2022 reauthorization bill has provided funding for the program until September 2025
- The SBIR/STTR Reauthorization Act of 2025 is under consideration by both chambers of Congress

	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	-----	FY2025
SBIR	0.028	0.029	0.030	0.032	0.0320	0.0320	----	0.0320
STTR	0.004	0.0045	0.0045	0.0045	0.0045	0.0045	----	0.0045
Total	**3.20%**	**3.35%**	**3.45%**	**3.65%**	**3.65%**	**3.65%**	**----**	**3.65%**

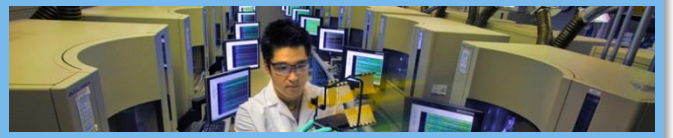
DOE SBIR/STTR Phases

Phase I: Feasibility, Proof of Concept
- Award Amount: $200,000 (guideline), $250,000 (max.)
- Project Duration: Up to 12 months

Phase II: Continue R/R&D for Prototypes or Processes
- Award Amount: $1,100,000 (guideline), $1,600,000 (max.)
- Project Duration: Up to 2 years

Sequential Phase IIA or IIB: Continue R/R&D for Prototypes or Processes
- **Phase IIA: For certain prototypes, products, or processes that need more development**
- **Phase IIB: For R&D funding required to transition and/or innovation towards commercialization.**
- **Phase IIC: Commercialization – requires matching funds**
- Award Amount: $1,100,000
- Project Duration: Up to 2 years

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



Modified the original slide from SBIR/STTR Office to include Phase IIC

Phase I Notice of Funding Opportunity Participating DOE Programs (FY2025)*

Phase I Release 1

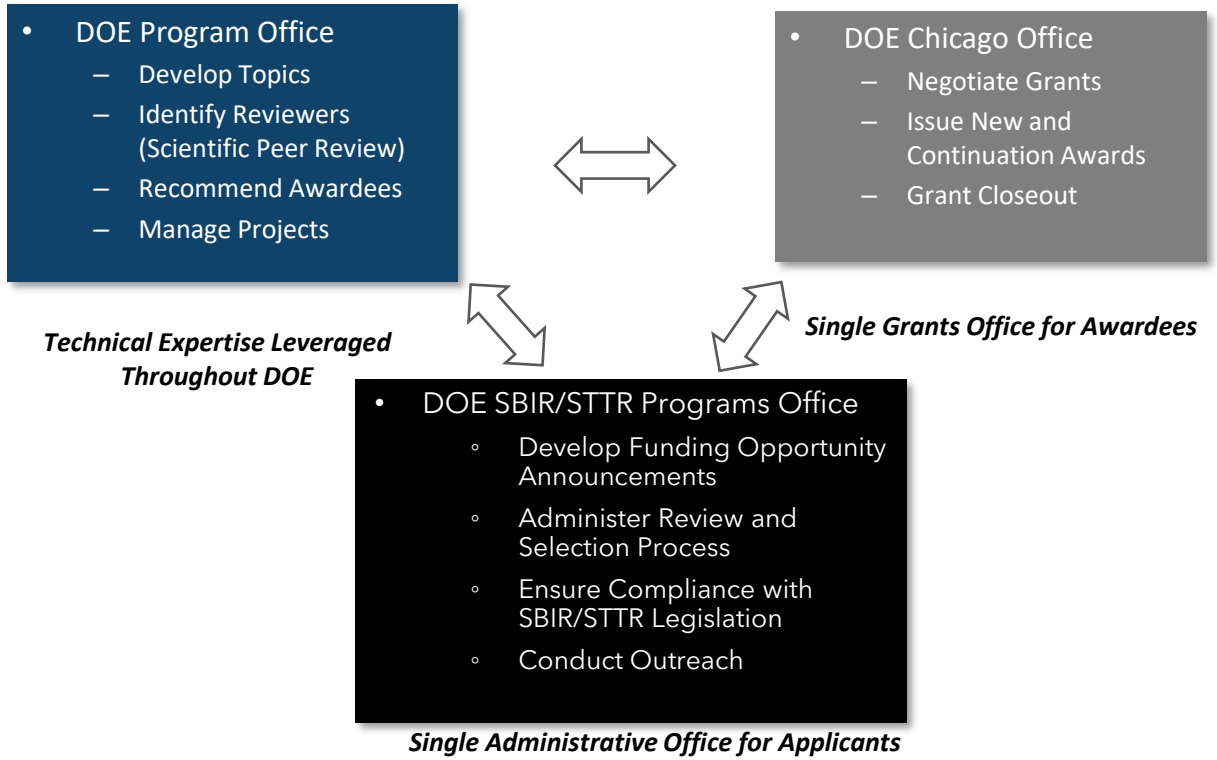
- Office of Advanced Scientific Computing Research (ASCR)
- Office of Biological and Environmental Research (BER)
- Office of Basic Energy Sciences (BES)
- Office of Fusion Energy Sciences (FES)
- Office of High Energy Physics (HEP)
- **Office of Nuclear Physics (NP)**

Phase I Release 2

- Office of Cybersecurity, 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 Environmental Management (EM)
- Office of Fossil Energy and Carbon Management (FECM)
- Office of Nuclear Energy (NE)

*FY2026 will be released as a Notice of Funding Opportunity (NOFO)

Organization of the DOE SBIR and STTR Programs



- NP recommends what R&D gets funded and deals with the technical evaluation of progress and approving final reports but is otherwise freed of much of the administration of those funds.
- In FY25 fees for this administration (due diligence, cybersecurity, and other initiatives) are about 4% of NP's total funding

Graphics courtesy SBIR/STTR Office

Sequential II A, B, and C - deciphering the alphabet

Since the 2012 SBIR/STTR Reauthorization agencies can issue sequential Phase II awards

- Only Phase II awardees are eligible
- At most, **2** additional sequential Phase II awards may be made per Phase II project

Invitation needed →

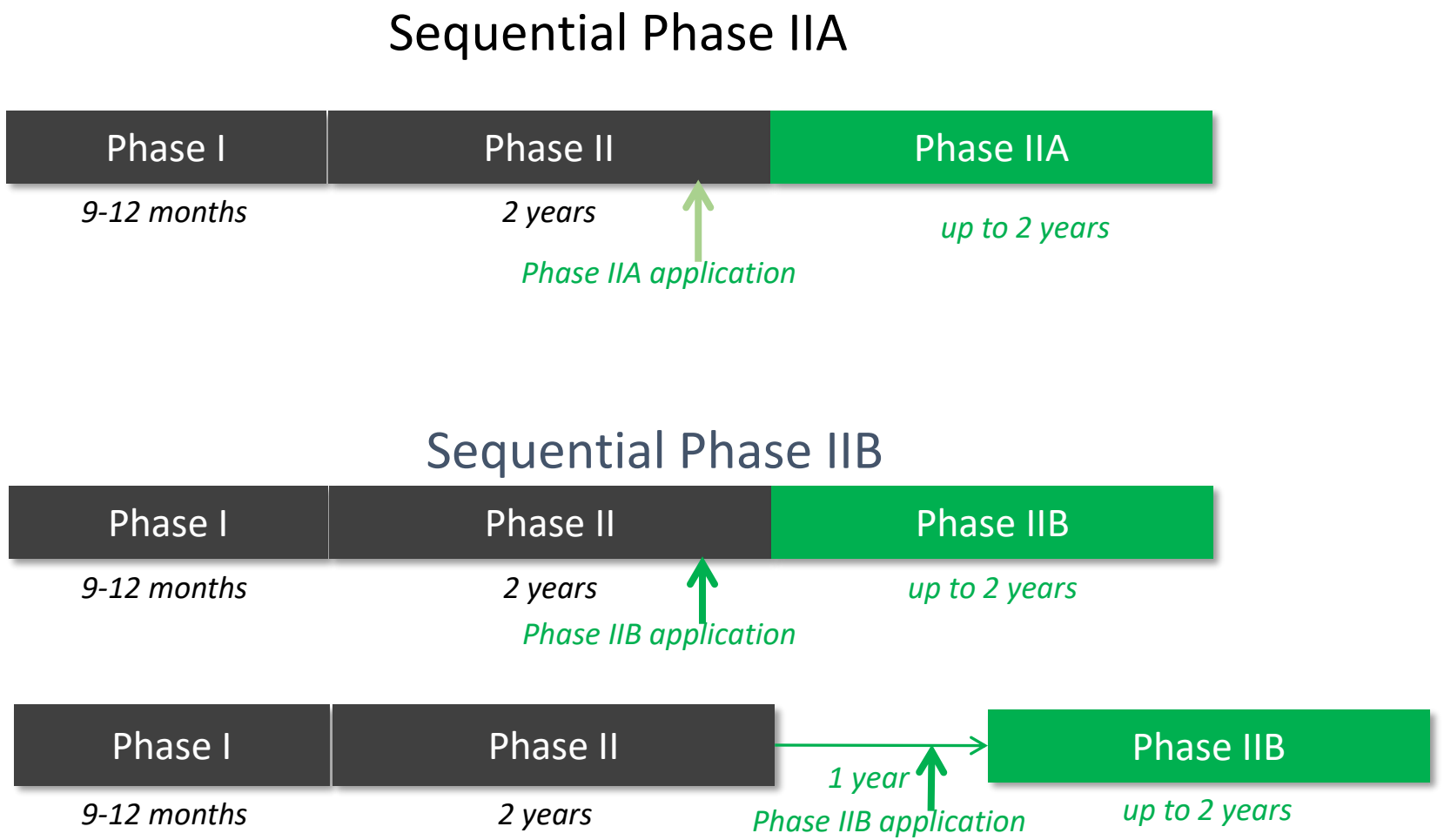
- **Phase IIA:** For certain prototypes, products, or processes that need more than a single Phase II award. Starts immediately upon completion of the Phase II.
  - *DOE NP Program Managers will select the topics/subtopics for which Phase IIA applications will be accepted (By subtopic invitation only)*

No Invitation needed →

- **Phase IIB:** For R&D funding required to transition an innovation towards commercialization. Starts immediately after completing a Phase II or up to 1 year later.
- **Phase IIC**: An R&D to improve commercialization outcome – requires equal match in funding (up to $1.1M) right after either a Phase IIA or Phase IIB

In the FY 2024 Phase II cycle: NP received 5 Ph IIAs, 2 Ph IIBs, and 0 Ph IIC applications. We funded no sequential proposals that fiscal year. FY 2025 Ph II awards not yet made public. As sequential IIA, B, and C compete with new Phase II applications, the success rate historically is usually lower.

Sequential Phase II timing



A Phase IIC immediately follows the Phase IIA or IIB

Slide Courtesy of Dr. Manny Oliver

No Fund Extensions and Sequential Phase II Eligibility

- A company can only receive a Sequential Phase II award if their Phase II project has completed, meaning all funds expended.
  - Phase II applicants applying for a Phase II Sequential (A or B) should generally not request no fund extensions past March of that Fiscal Year
    - Assuming it's a normal year, meaning proposals submitted in early December and funding begins in early April
  - This holds true for a Ph IIA or Ph IIB awardee applying for a Ph IIC

The NP SBIR/STTR Exchange Meeting

- Since FY2010, the Exchange Meeting is designed to achieve the following goals:
  - To **provide a platform** for small businesses to present the status of NP-supported Phase II grant work to the NP community and Federal Program Managers
  - To offer an opportunity to **exchange information** regarding the **companies' capabilities** and the technical needs of **NP's communities**
  - To **strengthen the ties** of the SBIR/STTR businesses **with the community** and enhance the possibilities for commercialization
- For this year's meeting, all Phase II awardees at the end of Year-1, Year-2, (started in FY24 and FY23) and awards still active or recently concluded under "no cost extension" are invited. A total of 21 SBIR/STTR PI presentations and 2 keynote presentations will be given in 2 days.
- Zoom "Breakout rooms" can be set up if you wish to meet and talk during breaks – you can just select the breakout room and move to it, then return.
- There will be a keynote talk by Dr. Eileen Chant, Acting Director of the DOE SBIR/STTR Program Office on the 2nd day of the meeting.

2025 Exchange Meeting Agenda (Day 1)

Time (EDT)	Dur. (min)	Grant Title	Speaker	Organization	NP SBIR/ STTR Topic	Grant Status
Tuesday, July 29, 2025						
11:00 AM	0:03	Welcome and Introductory Remarks	Mantica, Paul	DOE, Office of Nuclear Physics		
11:03 AM	0:02	Introductory Remarks	Farkhondeh, Manouchehr	DOE, Office of Nuclear Physics		
11:05 AM	0:40	NP SBIR/STTR Program Overview	Shinn, Michelle	DOE, Office of Nuclear Physics		
11:45 AM	0:25	A High Power Positron Converter Based on Recirculating Free Surface Liquid Metal Jets in Vacuum	Koustron, Val	Xelera Research LLC, Ithaca, NY	Accelerator	End Year 1
12:10 PM	0:25	High Spatial Resolution Detectors for Nuclear Physics Applications	Datta, Amlan	CapeSym, Inc., Natick, MA	Instrumentation	End Year 1
12:35 PM	0:20	Coffee Break				
12:55 PM	0:25	High Performance High Current CW polarized photocathodes for Electron Ion Colliders	Vasudevan, Kannan	Structured Materials Industries, Inc., NJ	Accelerator	End Year 2
1:20 PM	0:25	Versatile, High-Density, High-Yield, Low-Capacitance 3D Integration for Nuclear Physics Detectors	Sonde, Sushant	Epir, Inc., IL	Electronics	End Year 2/NCE
1:45 PM	0:25	High Average Current and High Voltage Reliable and Stable Power Supplies for High Current Electron Beam Sources	Sadwick, Larry	INNOSYS, INC., UT	Accelerator	End Year 1
2:10 PM	0:30	Lunch Break				
2:40 PM	0:25	High Channel Density Digital Data Acquisition System	Skulski, Wojtek	SkuTek Instrumentation, NY	Accelerator	End Year 1
3:05 PM	0:25	High Performance Scintillator and Beam Monitoring System	Friedman, Peter	Integrated Sensors, LLC, OH	Instrumentation	End Year 2/IIB
3:30 PM	0:25	Helium Flow Meter	Biallas, George	Hyperboloid LLC, VA	Accelerator	End Year 2
3:55 PM	0:25	3D Printed Bimetallic Structures for Radio Frequency Devices	Lalli, Jennifer	Nanosonic, VA	Accelerator	End Year 2/Ph IIA
4:20 PM	0:15	Coffee Break				
4:35 PM	0:25	Ultra-Rad-Hard Full-HD Image Sensor and Camera for Rare Isotope Beam Facilities	Mikkola, Esko	Alphacore Inc, Tempe, AZ	Electronics	End Year 1
5:00 PM	0:25	Novel Insulators in Silicon-on-Insulator Substrates to Improve Nuclear Physics Sensors and Circuits	O'Connor, Kevin	Caporus Technologies, LLC, IL	Electronics	End Year 2/NCE
5:25 PM	0:15	Adjourn				

2025 Exchange Meeting Agenda (Day 2)

Time (EDT)	Dur. (min)	Grant Title	Speaker	Organization	NP SBIR/ STTR Topic	Grant Status
Wednesday, July 30, 2025						
11:00 AM	0:25	Data Management for High Speed, Distributed Data Acquisition	Maggio, Jeffrey	SkuTek Instrumentation, NY	Software	End Year 2/NCE
11:25 AM	0:25	A New Medium Field Superconducting Magnet for the EIC	Gupta, Ramesh	Particle Beam Lasers, Inc., CA	Accelerator	End Year 3/NCE
11:50 AM	0:25	High Performance Glass Scintillators for Nuclear Physics	Horn, Tanja	Scintilex, LLC, VA	Instrumentation	End Year 2/IIA
12:15 PM	0:20	Coffee Break				
12:35 PM	0:25	High Performance Scintillator for Nuclear Physics Research	Datta, Amlan	CapeSym, Inc., Natick, MA	Instrumentation	End Year 3/NCE
1:00 PM	0:25	Novel High Voltage Cryogenic Breaks	Rey, Christopher	Energy to Power Solutions (e2P),	Accelerator	End Year 3/NCE
1:25 PM	0:25	High Output Pulsed Power Source	Smirnov, Alexander	Radiabeam Technologies, LLC., CA	Accelerator	End Year 3/NCE
1:50 PM	0:30	Lunch Break				
2:20 PM	0:25	Development of Ultra Low Radioactivity Cables and Circuitry	Uka, Harshad	Q-FLEX INC, Santa Ana, CA	Instrumentation	End Year 3/NCE
2:45 PM	0:25	An RF beam Sweeper for Purifying In-Flight Produced Rare Isotope Beams	Smirnov, Alexander	RadiaBeam Systems, CA	Accelerator	End Year 3/NCE
3:10 PM	0:25	Radiation Hardened Opto-atomic Magnetometer	Engelhart, Daniel	Hedgefog Research Inc., CA	Instrumentation	End Year 2/Ph IIA
3:35 PM	0:20	Coffee Break				
3:55 PM	0:25	Development and Testing of an Advanced HOM Absorber Design for SRF Accelerators Using Dielectric-Coated Cores	Arrieta, Victor	Ultramet, Pacoima, CA	Accelerator	End Year 2/Ph IIA
4:20 PM	0:40	Update on the Department of Energy SBIR/STTR Program, Q/A	Chant, Eileen	DOE, SBIR/STTR Office		
5:00 PM	0:15	Adjourn				

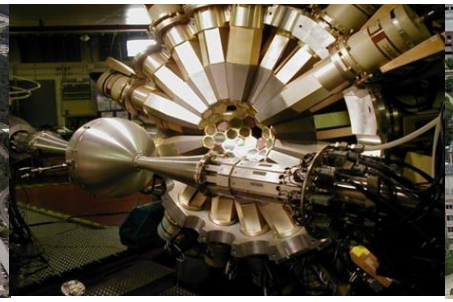
Nuclear Physics Mission

Discovering, exploring, and understanding all forms of nuclear matter

The Scientific Challenges

- The existence and properties of nuclear matter under extreme conditions, including that which existed at the beginning of the universe
- The exotic and excited bound states of quarks and gluons, including new tests of the Standard Model
- The ultimate limits of existence of bound systems of protons and neutrons
- Nuclear processes that power stars and supernovae, and synthesize the elements
- The nature and fundamental properties of neutrons and the neutrino and their role in the evolution of the early universe






How the NP Mission translates into subprograms

- NP's major program areas are:
  - Heavy Ion Nuclear Physics
  - Medium Energy Physics
  - Nuclear Structure-Nuclear Astrophysics
  - Fundamental Symmetries
  - Nuclear Theory

} Low Energy Nuclear Physics

- Accelerator Science and Technology is a major component that facilitates many of the NP subprograms.
- Within the program areas are two other subprograms, Nuclear Physics Computing and Nuclear Data, with communities we seek to serve.
- There is funding for Quantum Information Science (QIS) and Artifical Intelligence/Machine Learning(AI/ML) as Office of Science Crosscutting Initiatives

NP SBIR/STTR awards support these programs

Topics	Topic Associate
• Software and Data Management	G. Rai
• Electronics Design and Fabrication	M. Farkhondeh
• Accelerator Technology	M. Shinn
• Instrumentation, Detection Systems and Techniques	E. Bartosz

- Every year there is subtopic revision, based on community input.
- NP Program Managers are also given the opportunity to provide input or edit subtopics
- Requests are for perceived needs 5-7 years in the future
- Providing hardware and methods to advance initiatives recommended in the FY 2023 Long Range Plan for Nuclear Science are also important

NP's Phase III success

- As stated in the FY25 DOE SBIR/STTR FOA, SBIR/STTR Program Objectives, 3rd paragraph, "An important goal of the SBIR/STTR programs is the commercialization of DOE-supported research or R&D."
- To better achieve that goal, in FY2019 implemented program changes to ensure broader adoption of innovations by the NP communities that asked for them
  - Phase I proposals required a clear plan to have a prototype ready for testing in an NP application by the end of Phase II
  - Proposal reviewers thanked for their efforts and given links to the awards.
  - Initiated annual request that PIs provide Phase III and other sales information to provide metrics, *e.g.*, sales, to whom, and in response to what Topic. This also fulfills a request from the SBIR/STTR Office to provide Phase III info to the Small Business Agency.
- For FY2019: 41 transactions, Phase III total of $2.49M
- For FY2023: 47 transactions, Phase III total of $7.66M
- For FY2024: 37 transactions, Phase III total of $6.54M
- Responses are voluntary, so expect variation, but there is a positive trend since FY2019.
- Products created from Electronics and Instrumentation tend to dominate sales
- Majority of companies report sales of products developed ≥ 5 years after Phase II award started

NP SBIR/STTR Program Updates – FY25/26

- With the overlap between requests in our Software Topic and those from the Advanced Scientific Computing Research Office, etc. the Software and Data management Topic has been dropped in FY26.

- The Office of Research, Technology, and Economic Security is now integrated into the review process before grants to organizations other than our National Labs

- Consult the solicitation once it is published for other changes to the DOE SBIR/STTR program

Presentation Notes

- We have a tight agenda and must stay on time for each presentation.
- Sessions will start promptly at the time stated on the agenda.
- We ask that you present your slides, as well as submit your talk to the Teams site so we have a backup to show in case you have issues.
    - We will need a copy to share on our website approximately two weeks after the meeting.
- At Q&A time, please make your comments/questions short.
- We will stop sharing your screen at the end of your allotted time. A timer will be visible on screen as an aid. A prompt will be on the podium for on site presenters.
- As in the past, we would like all presenters submit a version of their talk that's suitable for publishing on our website.

Total presentation (min)	Presentation (min)	Q&A (min)	warning (minutes)
40	30	10	24
25	20	5	15

Acknowledging Funding in reports and presentations

- I've been returning a lot of final reports for lack of proper acknowledgement of support. As a reminder:

For peer reviewed and technical papers, the following acknowledgment of support is required:

For work directly supported by DOE Office of Science Financial Assistance (i.e., Grants and Cooperative Agreements):

- **Acknowledgment:** "This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of [insert the sponsoring SC Program Office, e.g., Basic Energy Sciences], [*Add any additional acknowledgements or information requested by the sponsoring SC Program Office*] under Award Number(s) [Enter the award number(s)]."

- **Example:** "This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics under Award Number DE-SC-000yyyy."

Follow this link:

- Acknowledgements of Federal Supp... | U.S. DOE Office of Science (SC) (osti.gov)

Conclusions

- NP uses the Congressionally-mandated SBIR/STTR Program –
  - To fund R&D that later becomes products that benefit the NP community and;
  - Foster and sustain a US-based commercial infrastructure that serves society in areas other than nuclear science

- NP uniquely fosters connections between its community and the small businesses that serve it through the structure of its Topics and this annual meeting
  - This annual meeting has fostered collaborations between the PIs that attended past meetings
- Only Office with a dedicated SBIR/STTR webpage to highlight R&D and provide a repository for the PI Exchange Meetings
- NP Small Business Innovation Res... | U.S. DOE Office of Science (SC)