Welcome! Please answer the following question in the chat box:

How many DOE National laboratories do you know?
Why are you interested in the SCGSR program?

U.S. Department of Energy

OFFICE OF SCIENCE

Office of **SC**ience **G**raduate **S**tudent **R**esearch (**SCGSR**) Program

Application Assistance Workshop 1
for 2024 Solicitation 2

September 12, 2024

"The SCGSR program will remain a highlight of my PhD. An invaluable opportunity to grow as a researcher."

Trevor Price SCGSR 2022 S2

U.S. DEPARTMENT OF ENERGY | Office of Science

SCGSR Program Management Team

U.S. Department of Energy (DOE), Office of Science (SC)

- Dr. Igor I. Slowing
  SCGSR Program Manager
  Office of Workforce Development
  for Teachers and Scientists (WDTS)

U.S. DEPARTMENT OF ENERGY | Office of Science
Office of Workforce Development for Teachers and Scientists (WDTS)

sc.scgsr@science.doe.gov

Oak Ridge Institute for Science and Education (ORISE)

- Dr. Megan M. Morris
  Associate Manager
  STEM Workforce Development
- Abby Robbins
  Program Specialist
  Workforce Development

OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

doe-scgsr@orau.org

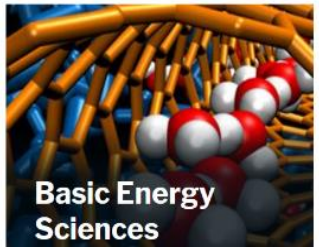
The SCGSR Program Involves Multiple Institutions

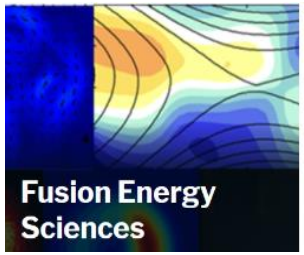
The SCGSR program is sponsored and managed by

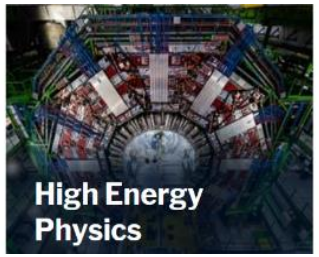
U.S. DEPARTMENT OF ENERGY | Office of Science

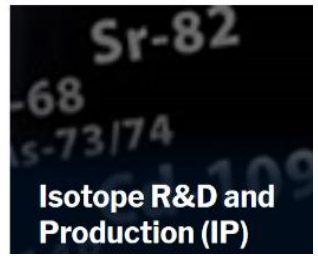
Office of Workforce Development for Teachers and Scientists (WDTS)

In collaboration with the SC Program Offices of









and the US DOE National Laboratories/Facilites

AMES LABORATORY

Fermilab

Lawrence Livermore National Laboratory

NREL NATIONAL RENEWABLE ENERGY LABORATORY

Pacific Northwest NATIONAL LABORATORY

DIII-D NATIONAL FUSION FACILITY

Argonne NATIONAL LABORATORY

INL Idaho National Laboratory

NETL NATIONAL ENERGY TECHNOLOGY LABORATORY

OAK RIDGE National Laboratory

Sandia National Laboratories

Jefferson Lab

Brookhaven National Laboratory

BERKELEY LAB Lawrence Berkeley National Laboratory

Los Alamos NATIONAL LABORATORY EST.1943

PPPL

Savannah River National Laboratory

SLAC NATIONAL ACCELERATOR LABORATORY

Online application and awards administration provided by

OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

Two Workshops

Workshop I: This one

- Overview of the Office of Science
- SCGSR Program:
  - Benefits
  - Application Process
  - Requirements
  - General tips/advice on application
- General Questions
- Abstract Perparation Workshop – 2 Breakout groups
- Breakout sessions: Meet SC Managers for Discussing your Research (3:00-3:30 PM ET)

> *"From this SCGSR experience, I have developed skills and knowledge I would not otherwise have the opportunity to have gained."*
>
> Thomas Chan 2022 S1

Workshop II: October 10, 2024, 2:00-4:30 PM ET

- Office Hours
- Specific steps of application, common issues
- Tips on proposal writing
- Meet current and former SCGSR awardees
- Meet US DOE National Laboratory scientists

U.S. Department of Energy (DOE) Office of Science: A Mission of Research

SC Mission:

Deliver scientific discoveries and major scientific tools to:

- transform our understanding of nature
- advance the energy, economic and national security of the United States

https://science.osti.gov/

- **118** Nobel Laureates affiliated to DOE
- **65** affiliated to DOE National Laboratories

https://science.osti.gov/About/Honors-and-Awards/DOE-Nobel-Laureates

The largest Federal sponsor of basic research in the physical sciences.

7 SC Research and R&D and Production Programs

Advanced Scientific Computing Research (ASCR)	World leading computational and networking capabilities
Biological and Environmental Research (BER)	Understand complex biological, earth, and environmental systems
Basic Energy Sciences (BES)	Understand, predict, and control matter and energy at the electronic, atomic, and molecular levels
Isotope R&D and Production (DOE IP)	National preparedness for isotope production and distribution
Fusion Energy Sciences (FES)	Build the scientific foundations for a fusion energy source
High Energy Physics (HEP)	Understand how the universe works at its most fundamental level
Nuclear Physics (NP)	Discover, explore, and understand all forms of nuclear matter

SC Program Managers

Dr. David Rabson – ASCR

Dr. Justin Hnilo – BER

Dr. Robin Hayes – BES

Dr. Julie Ezod – DOE IP

Dr. Curt Bolton – FES

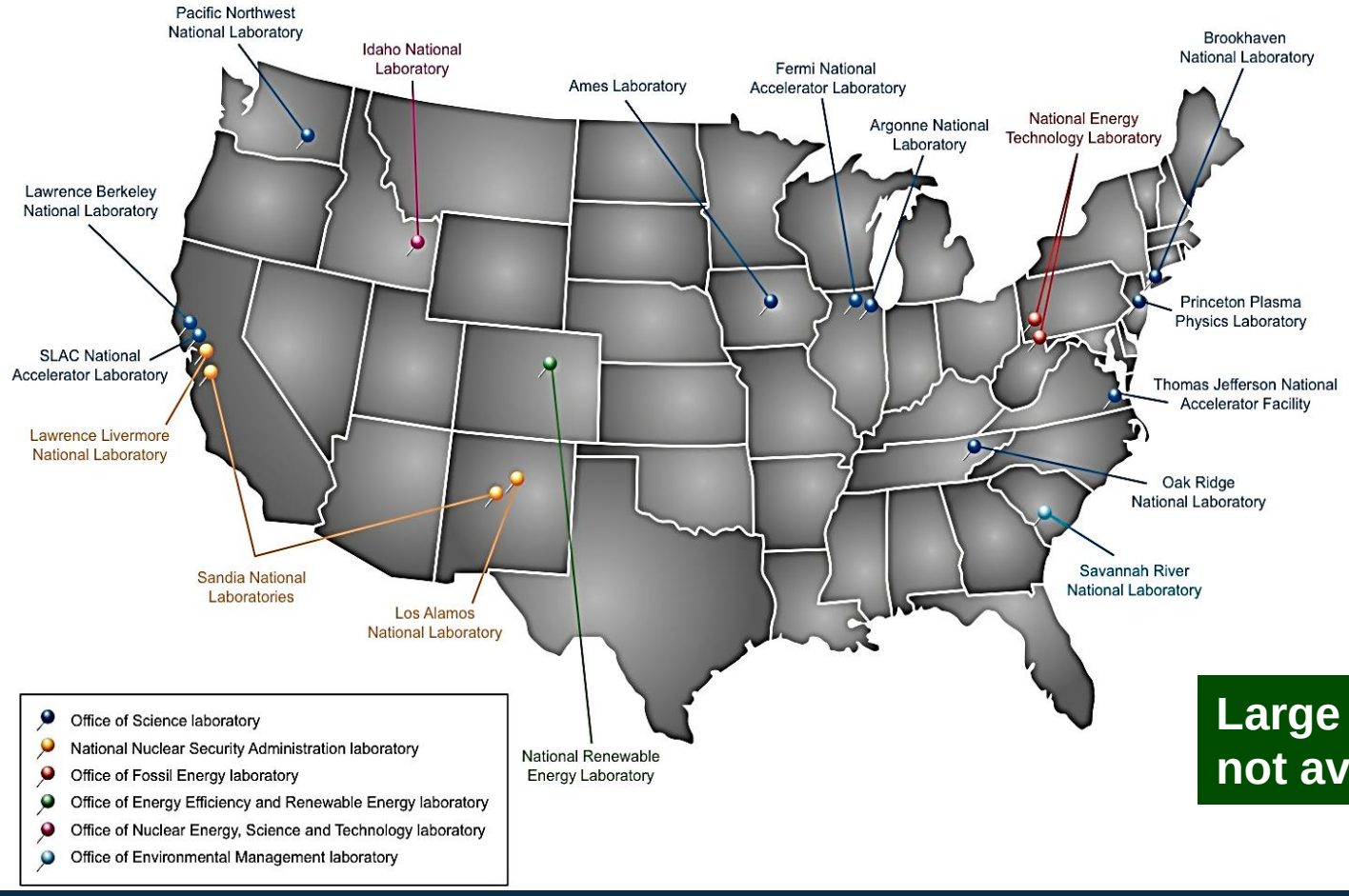
Dr. Jeremy Love – HEP

Dr. Tasia Bryson – NP

Meet them later in the Breakout Rooms!!!

DOE National Laboratories:
A Unique Asset for Training and Scientific Discovery

Created as a home for large-scale, costly scientific facilities that universities cannot afford.

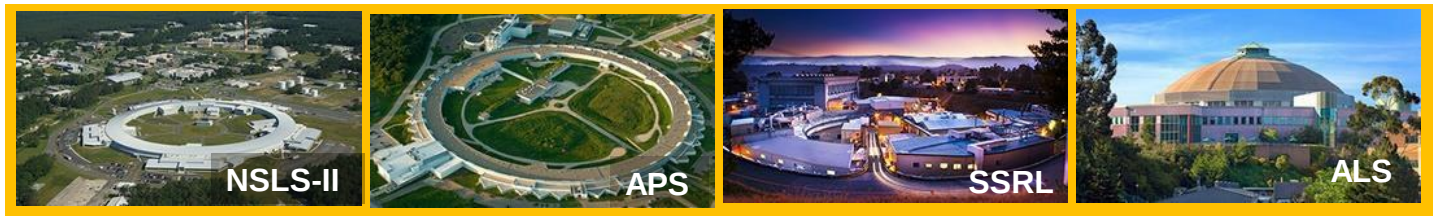


DOE National labs employ >30,000 scientists and engineers

World leading scientific user facilities, expertise, and resources

Large multidisciplinary research programs not available in universities or industry

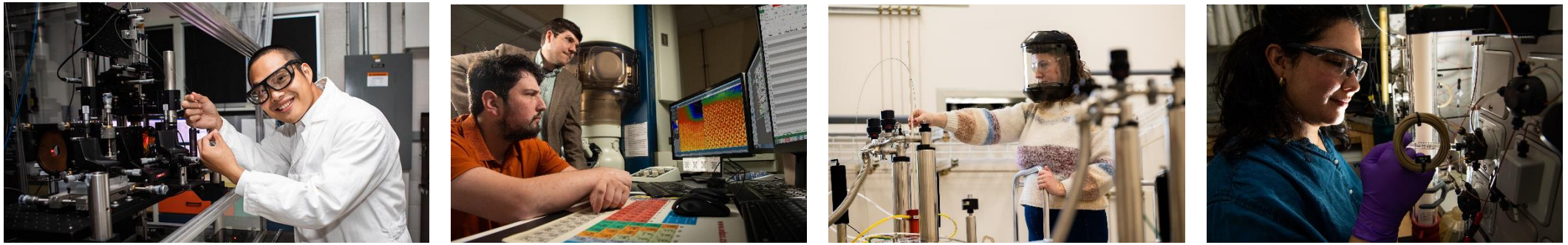
28 Scientific User Facilities



Over 35,000 users per year!

Office of Workforce Development for Teachers and Scientists (WDTS)

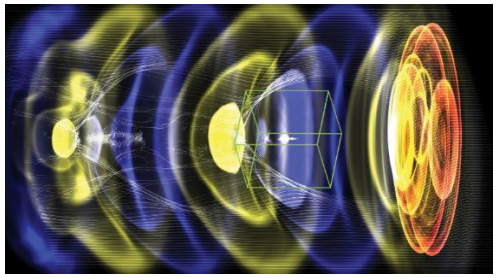
Foster the development of the **next generation of scientists, engineers, and technicians** to support DOE mission and conduct the research to realize the nation's science and innovation agenda.

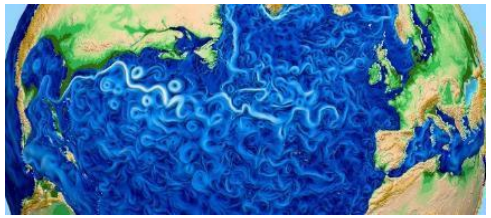


Training Opportunities for Students and Faculty at DOE National Laboratories:

- Science Undergraduate Laboratory Internships – SULI
- Community College Internships – CCI
- Visiting Faculty Program – VFP
- **Office of Science Graduate Student Research Program – SCGSR**

SCGSR Program



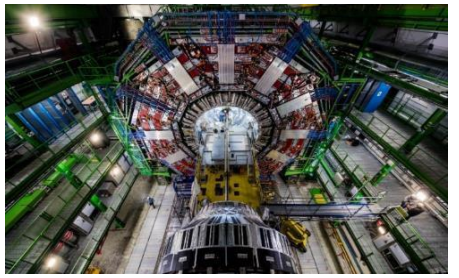


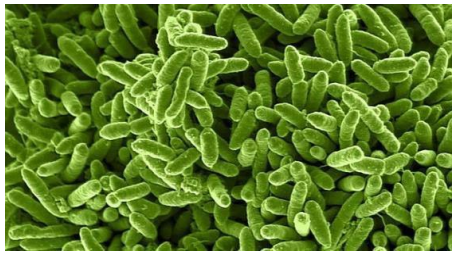
Supplemental funding
to outstanding U.S. PhD candidates

Move to a DOE National Laboratory/Facility
to do part of their PhD thesis research

3 – 12 months collaborating
with a DOE National Laboratory Scientist

Areas that address high-priority workforce needs in scientific challenges central to the SC mission





https://science.osti.gov/wdts/scgsr/How-to-Apply/Priority-SC-Research-Areas

Benefits and Eligibility

Awards/Compensation

- Stipend up to $3,600/month
- Reimbursement of inbound/outbound travel expenses to/from the host DOE National Laboratory/facility of up to $2,000 (> 50 miles away)

Eligibility

- **U.S. Citizen or Lawful Permanent Resident**
- **Ph.D. Candidacy**
- Research **aligned with an SCGSR priority research area**
- Collaboration with a **DOE laboratory scientist**
- **New research experience**

Full details, requirements, FAQs, and link to application at: https://science.osti.gov/wdts/scgsr/

Program Contact: sc.scgsr@science.doe.gov

Professional Development

- SCGSR awardees are **Scientists in Residence** at their host National Labs
- **Networking** opportunities

"This was a really impactful experience in my graduate education. I think the general connections with experts in the field and exposure to new equipment are probably the most important aspect of the experience, even than the research itself."

Anna Kundmann, SCGSR 2022 S2

What Are We Looking For?

PhD candidates who…

1) …propose research relevant to SC Priority Areas

https://science.osti.gov/wdts/scgsr/How-to-Apply/Priority-SC-Research-Areas

2) …need tools and/or expertise that are not available at their Universities

The unique expertise/capabilities of scientists/facilities at DOE National Labs/Facilities may enable a more in depth understanding of your research!

https://www.energy.gov/national-laboratories

47 Priority Research Areas for 2024 Solicitation 2

Advanced Scientific Computing Research (ASCR)
(a) Applied **Mathematics**
(b) **Computer** Science
(c) Advanced Computing **Technologies**

Biological and Environmental Research (BER)
(a) Computational Biology and **Bioinformatics**
(b) **Biomolecular** Characterization and **Imaging** Science
(c) **Plant Science** for Sustainable **Bioenergy**
(d) Environmental **Microbiology**
(e) **Environmental System** Science
(f) **Atmospheric** System Research
(g) Earth System Model Development
(h) Regional and Global Model and Analysis

Basic Energy Sciences (BES)
(a) **Accelerator** and Detector R&
(b) Basic **Geosciences**
(c) Basic Science for **Advanced Manufacturing**
(d) Basic Science for **Clean Energy** and **Decarbonization**
(e) Chemical and Materials Sciences for **Quantum Information Science** (QIS)
(f) **Data and Computational Science** for Materials and Chemical Sciences
(g) Fundamental **Electrochemistry** for Chemical and Materials Sciences
(h) Gas Phase **Chemical Physics**
(i) Instruments R&D for **Neutron and X-ray** Facilities
(j) Instruments and Techniques R&D for **Electron and Scanning Probe Microscopy**
(k) Materials Sciences and Chemistry for **Microelectronics**
(l) **Nuclear Chemistry** and **Radiochemical Separations**
(m) **Radiation Effects** in Materials and Chemistry

Fusion Energy Sciences (FES)
(a) **Burning Plasma** Science & Enabling Technologies
(b) Discovery Plasma Science

High Energy Physics (HEP)
(a) **Theoretical and Computational** Research in High Energy Physics
(b) Advanced **Accelerator** and Advanced **Detector** Technology Research and Development in High Energy Physics
(c) **Experimental** Research in High Energy Physics

Nuclear Physics (NP)
(a) Medium Energy **Nuclear Physics**
(b) **Heavy Ion** Nuclear Physics
(c) **Fundamental Symmetries**
(d) Nuclear Structure and **Nuclear Astrophysics**
(e) **Nuclear Theory**
(f) Nuclear Data and Nuclear Theory **Computing**
(g) **Accelerator** Research and Development for Current and Future Nuclear Physics Facilities
(h) **Quantum Information Science** for Experimental and Computational Nuclear Physics
(i) **Artificial Intelligence** and **Machine Learning** for Nuclear Physics
(j) Advanced **Detector** Technology Research and Development in Nuclear Physics

Isotope R&D and Production (DOE IP)
(a) **Isotope** Production Research
(b) Isotope Processing, Purification, Separations and **Radiochemical Synthesis**
(c) **Biological Tracers** and Imaging
(d) **Isotope Enrichment** Technology

Convergence Research Topical Areas
(a) **Microelectronics** (ASCR, BES, HEP, and NP)
(b) **Data Science** (ASCR, BES, BER, FES, HEP, and NP)
(c) **Quantum Information Science** (ASCR, BER, HEP, and NP)
(d) **Accelerator** Science (ASCR, BES, BER, FES, HEP, NP, and DOE IP)

https://science.osti.gov/wdts/scgsr/how-to-apply/priority-sc-research-areas/

Ask Us!!!
Check Awardee Publications
Breakout Rooms

Two General Types of Research that the SCGSR Program Supports

- **Hypothesis driven research:** We support fundamental research - not applied research.

  Hypothesis: **Clear**, **Concise**, **Testable**

- **Method or instrument development**: when aimed to enable fundamental research, or when it is part of a large fundamental science experiment.

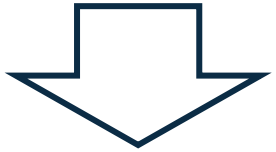
  What are the big scientific questions that these new tools will eventually help to answer?

Identifying the Needs of your Thesis Research

Instrumentation – specialized spectrometers, microscopes, sequencers…
Tools – specialized codes, custom cells, detectors…
Libraries – Datasets, sample collections, materials, handling protocols…
Facilities – clean rooms, light/particle sources, high performance computers…
Advanced techniques
Theoretical frameworks
Expertise

Training that you don't get at your university

Contributing to ongoing large projects: DUNE, ATLAS, E3SM, EIC, QIS…
Using AI/ML to contribute to projects



https://www.energy.gov/national-laboratories

Identifying a DOE National Lab Scientist

An Example

Developing a methodology for selectively inducing point defects in the surface of a crystalline material, and refilling vacancies with heterobimetallic catalytic pairs.

What questions do I need to answer?

- efficiency of defect creation – efficiency of site creation
- bimetallic nature of the sites
- isolation – spatial distribution
- stability
- mechanism

What techniques do I need to use?

- PhD advisor
- Literature review

→ XAS, *In situ*? *Operando*?
Computed Tomography

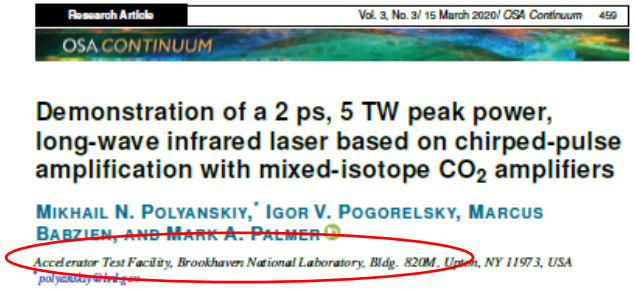
↓

National Labs: experts and instrumentation

Do I need to have already the expertise in these techniques?

Identifying a DOE National Lab Scientist

1. Directly from the scientific literature

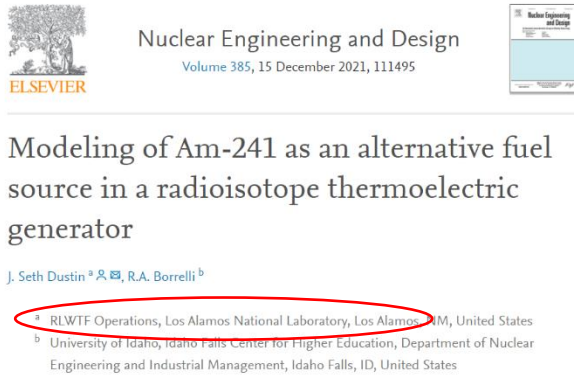

Research Article Vol. 3, No. 3/ 15 March 2020/ OSA Continuum 459

OSA CONTINUUM

Demonstration of a 2 ps, 5 TW peak power, long-wave infrared laser based on chirped-pulse amplification with mixed-isotope CO_2 amplifiers

MIKHAIL N. POLYANSKIY,* IGOR V. POGORELSKY, MARCUS BABZIEN, AND MARK A. PALMER

Accelerator Test Facility, Brookhaven National Laboratory, Bldg. 820M, Upton, NY 11973, USA


ELSEVIER

Nuclear Engineering and Design

Volume 385, 15 December 2021, 111495

Modeling of Am-241 as an alternative fuel source in a radioisotope thermoelectric generator

J. Seth Dustin [a], R.A. Borrelli [b]

[a] RLWTF Operations, Los Alamos National Laboratory, Los Alamos, NM, United States

[b] University of Idaho, Idaho Falls Center for Higher Education, Department of Nuclear Engineering and Industrial Management, Idaho Falls, ID, United States

2. Your advisor and their network

3. Searchers: ISI Web of Science, SciFinder, Google Scholar…

Search by topic -> refine by institution

4. Browse National Laboratories websites https://www.energy.gov/national-laboratories

5. SCGSR website: list of potential collaborating scientists

Includes research descriptions and contact information

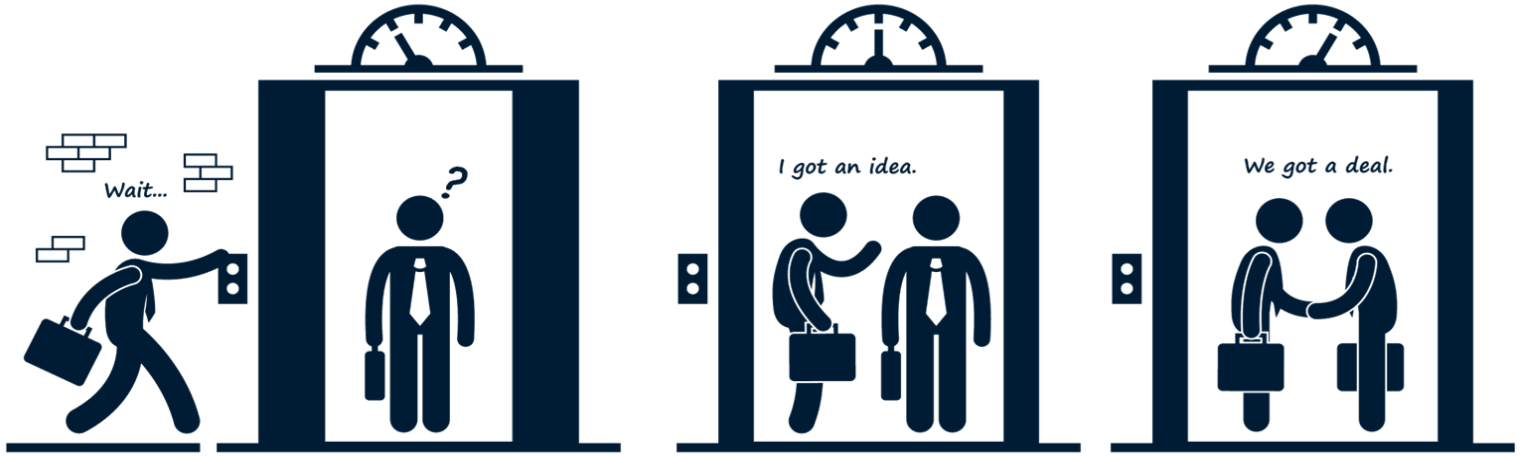
https://science.osti.gov/wdts/scgsr/How-to-Apply/Identifying-a-Collaborating-DOE-Laboratory-Scientist

6. Email us (SC.SCGSR@science.doe.gov) or the Managers of each Program Office (emails in the last slide)

Contacting National Laboratory Scientists

Scientists receive **A LOT** of spam, so:

1. Use your **school's email address**
2. Subject line: "Interest in collaborating on a DOE SCGSR project on xxx" (**your topic in 3-4 words**!)
3. Cc your **advisor**
4. Brief description of the program. (Essential information: the program pays you: **No cost to them!**)
5. **Brief summary** of the work you want to do.



A Constant and Dynamic Conversation

Advisor

One of our challenges is modeling radiative transfer, which while known is computationally expensive.

You

We are modeling the dynamics of interstellar dust in galaxy formation.

DOE Scientist 1

I could get you access to HPC. However, my colleague is an expert in this new ML algorithm that may help get a good and fast approximation.

You

So we need either access to high performance computing resources, or to develop a code that isn't too expensive.

DOE Scientist 2

Yes. Our algorithm may be applicable. You can come and we can train you so you can adapt it to your problem.

You

I can expand on the existing model details so you can help me better understand the tool and I can write a compelling proposal.

DOE Scientist 1

We should be able to provide some training data, and talk with collaborators for some measurements.

Setting Things Clear Upfront

- Discuss your research thesis and ideas to find out:
  1. Is there an **overlap of interests**?
  2. Do they have **time** for working with you?
  3. What type of **instrumentation is available**?
  4. How **accessible** is equipment? Is there a schedule?
  5. Do you need to build/make some specialized **adaptations** for the equipment? *e.g.*, specialized cells, set two instruments in tandem/parallel, etc.
  6. Do you need to **apply for using specific facilities**?

- If you agree it makes sense to work together…
  1. Discuss with your **thesis advisor**
  2. Start drafting your proposal and send early versions to advisor and collaborating scientist for **feedback** (many iterations!)

This is a **team effort,** but **you must lead it,** and **you** will have the **major responsibilities!**

SCGSR Proposal

- Developed by **yourself** in collaboration with the DOE national laboratory scientist, and in consultation with your thesis advisor
- The part of your PhD thesis project that will be conducted at the DOE national laboratory/facility. **This part is your SCGSR proposal.**
- Aims should address at least one of the **SCGSR Priority Research Areas**,
- Describe how you will take advantage of the **DOE national laboratory/facility's research capabilities and assets**.

Citing a reviewer:

"The strongest of SCGSR proposals outline both sides of the student-Lab relationship in a balanced manner."

https://science.osti.gov/wdts/scgsr/how-to-apply/research-proposal-guidelines/

SCGSR Application

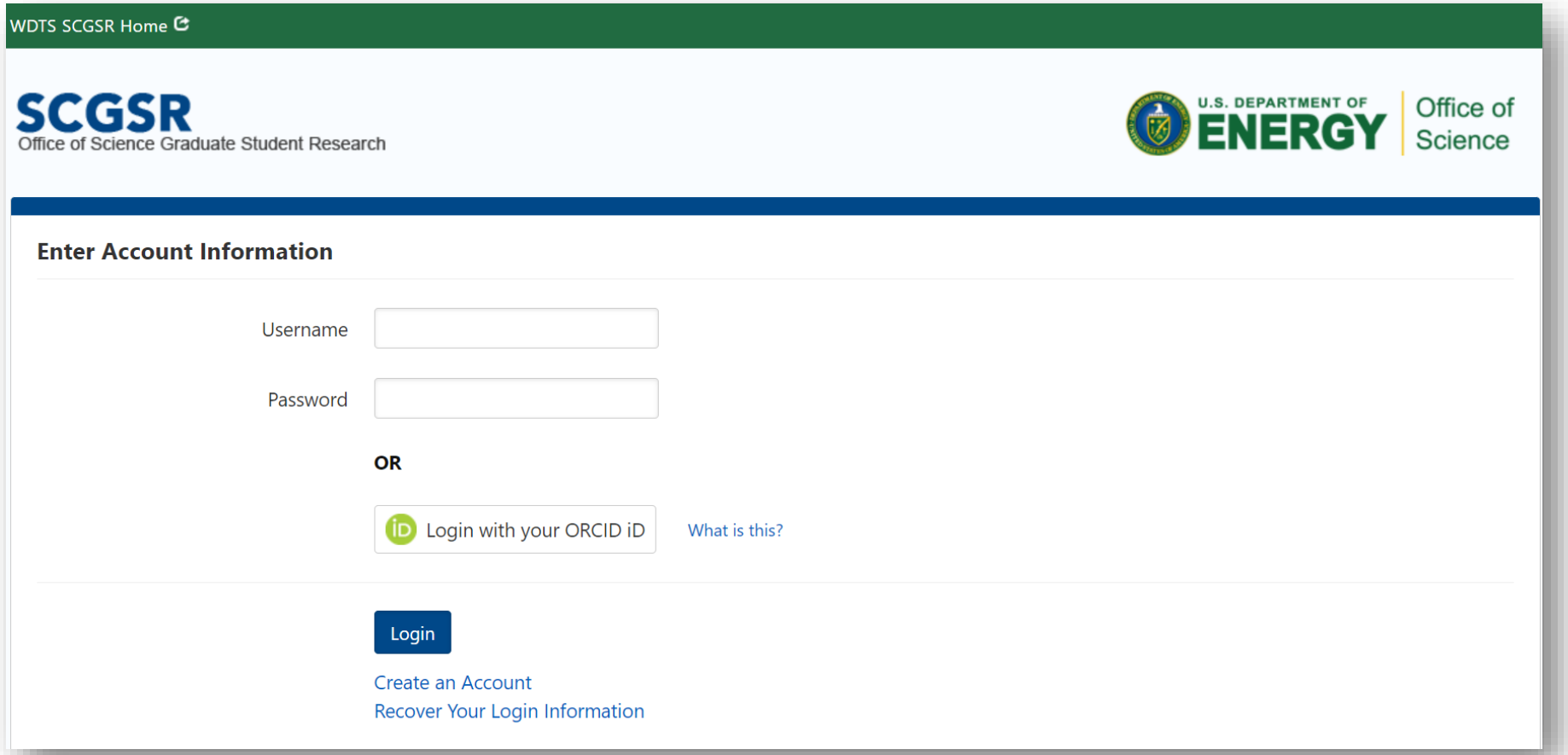
Only COMPLETE applications submitted by the deadline will be considered!

Due **Nov. 6, 2024, 5:00 PM ET**

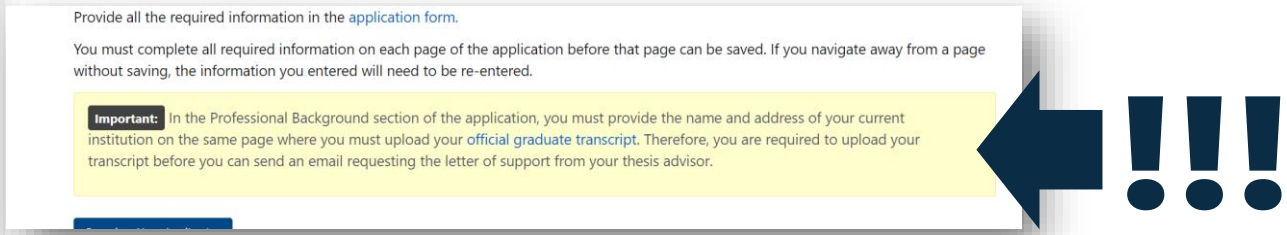
A Complete SCGSR Application includes:

- All **required fields** of the Online Application System, *including:*
  - **Contact information** of the **applicant**, thesis **advisor**, and collaborating National Laboratory **scientist**.
  - **Academic information**.
  - **Professional information**, including research experiences, scientific publications, awards, etc.
  - **Alignment** of proposed research to one of the **SCGSR Priority Research Areas**.
- **Official graduate transcripts** and **proof of Ph.D. Candidacy**.
  - Please **remove SSN or dates of birth** from transcripts, transcripts that have this information will be *immediately eliminated from the system and deemed non-compliant*.
- **Two Letters of Support**: by thesis **advisor**, and by **collaborating National laboratory scientist**.
- **Research Proposal** (*3-pages maximum*).

WARS: Online Application System



https://apps.orau.gov/SCGSR



1. **Complete a page before moving on** – you can always come back and edit
2. **Gray non-fillable boxes** – need to fill **prior sections**
3. **Placeholders** – type in TEXT or upload blank PDFs if you don't have everything at hand, **remember to come back and replace** the placeholders when ready
4. E-mails for advisor and collaborating scientist are **sent from the system**, => you must upload their contact information – Remind them **not to wait till the last minute**
5. **Proofreading**

Alignment with Research Priority Areas

- Priority research areas descriptions: what is your **match**?
- Writing a justification: use **keywords**, but then read again to make sure your explanation makes sense.
- Discuss today with specific **Program Managers**, you can also email them or us.
- During review, managers may **move your application to a more suitable area**.
- Convergence areas: outline how your proposed work applies to **each office**.

Proposal Structure

1. **Overarching Goal:** What is the central **problem/question**?

2. **Background:** Why is this problem **relevant**? What is the **current understanding/state of the art**? How does it **fit in a SCGSR priority area**? What is your central **hypothesis**? What **preliminary steps/data** have you got that suggest your ideas may work?

3. **Specific Aims:** The **basis of your research plan**. How will you **test your hypothesis**?

4. **Approach:** **Strategy,** general steps with **rationale**. What **results do you expect**? What could go wrong and how could you **overcome potential problems**?

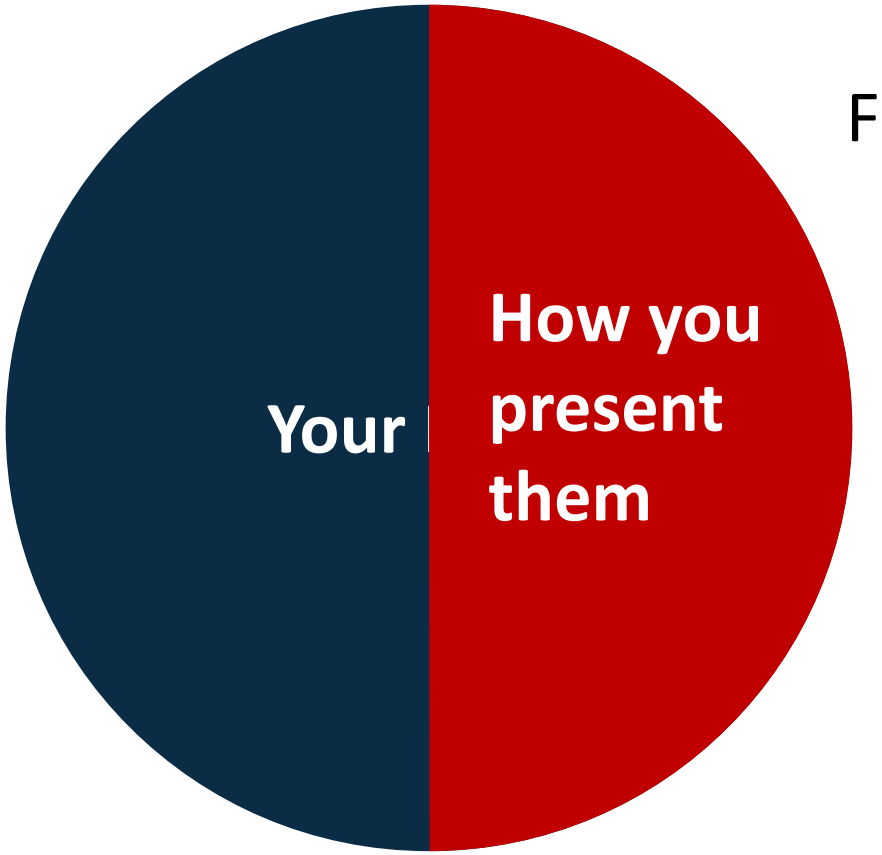
5. **Timeline:** What is the expected **pace of progress**?

3 pages

6. **References:** Separate page.

https://science.osti.gov/-/media/wdts/scgsr/pdf/SCGSR_Research_Proposal_Full_Guidance_Document_2023.pdf

Grantsmanship - Craftsmanship



Focused – Flowing

Clarity

- **Jargon free**
- **Direct**
- **Short sentences**
- **Active voice**

If the reviewer does not understand what you are saying: Is it their fault?

Writing Your Proposal: Iterations are Key

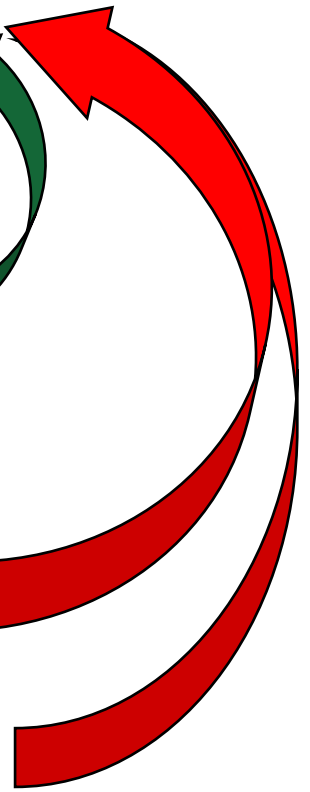
Address key points as **bullets**

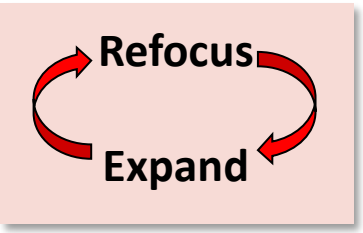
Expand each gradually into paragraphs

Trim - Connect

Colleague's feedback
Does your message get
across the way you thought?

Advisor and **Collaborator**

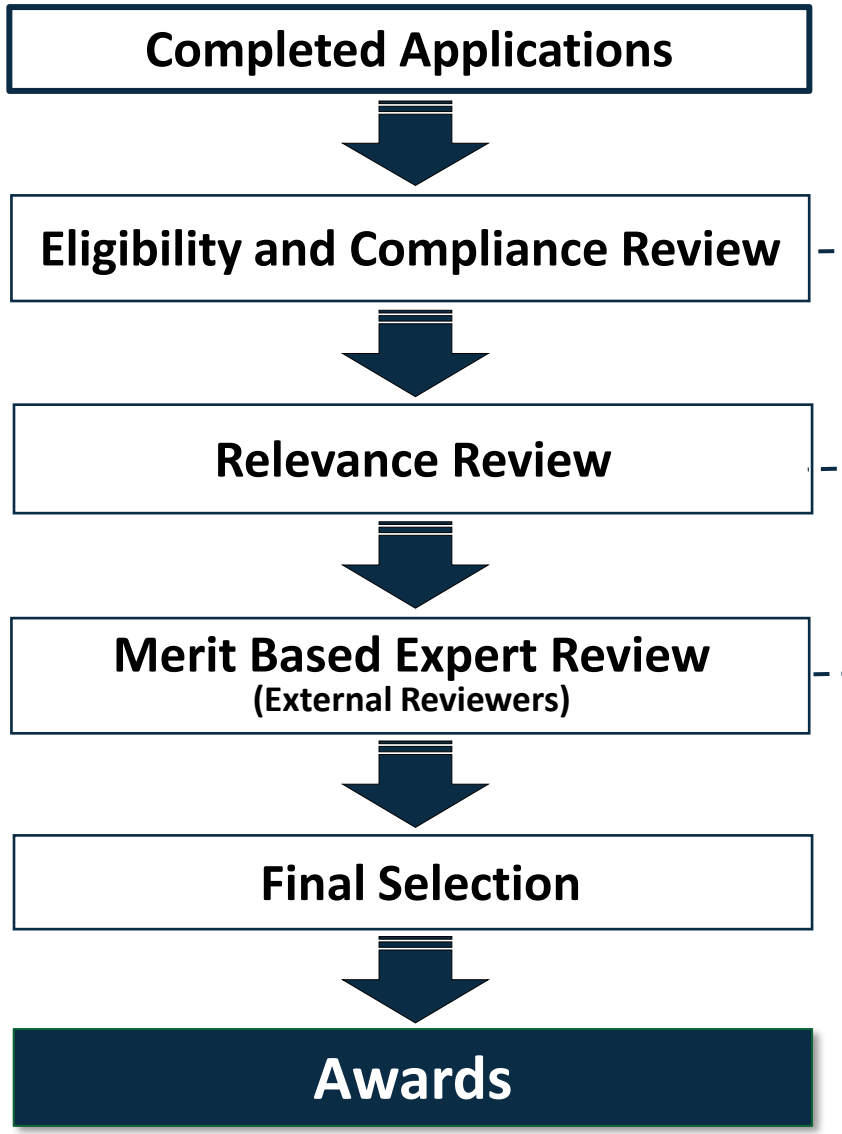




The Strength of your Argument for Funding

What is the innovation?
How important is the work?
Scientific excitement!

Review and Selection Process



Does the application **meet all the guidelines**?

Alignment with at least one of the **SCGSR Priority Research Areas**?

Expert reviewers from the scientific community. **Scientific merit** and **value for PhD training**.

Merit Review Criteria

1. Scientific and/or Technical Merit of the Proposed Research (Score 1 – 6)
a. Is the proposed research **well-conceived**, and does it demonstrate a **clear understanding** of the scientific and technical challenges involved? b. Is the proposed **method and approach** for the proposed research appropriate? c. Is the applicant **sufficiently prepared** to conduct the proposed research? d. Are the DOE laboratory **resources** adequate? If applicable, has the necessary access to a scientific user facility been secured?
2. Relevance of the Proposed Research to Graduate Thesis Research and Training (Score 1 – 4)
a. Does the proposed research have the potential to make a **significant contribution to the applicant's PhD thesis** research project? b. Will the proposed research enhance the applicant's **training and research skills**?

Key Dates

At the submission deadline, the application system will close, and no additional materials will be accepted. The online application system closes at 5:00 PM Eastern Time

Applications Due (including all letters of support)	**November 6, 2024, 5:00 PM ET**
Offer Notification Period	Early April 2025*
Earliest Start Date for Proposed Project Periods	June 9, 2025*
Latest Start Date for Proposed Project Periods	October 6, 2025*

* Dates are tentative.

- Project are 3 to 12 consecutive months long, depending on the applicant's proposed work.
- Awardees can choose the start dates within the window above.

SCGSR Program by the Numbers

"The SCGSR program has been the most valuable part of my graduate education."

Christine Burgan 2022 S2

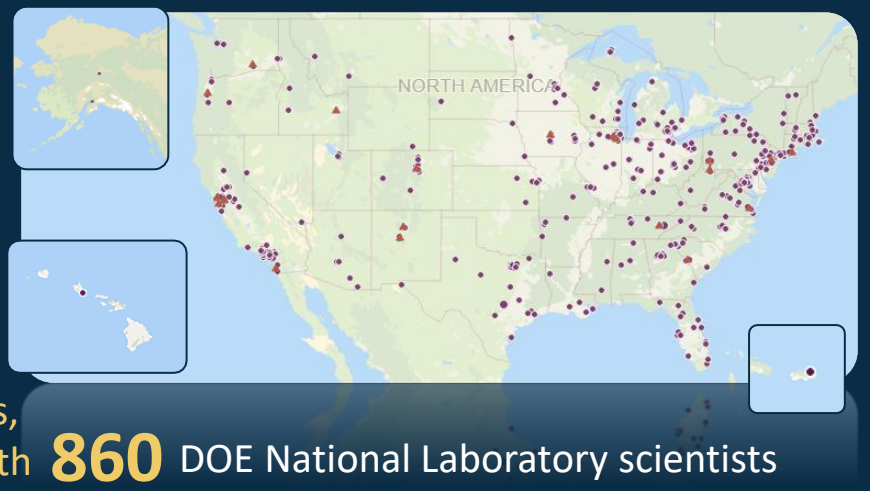
Since **2014**

1214 awardees from

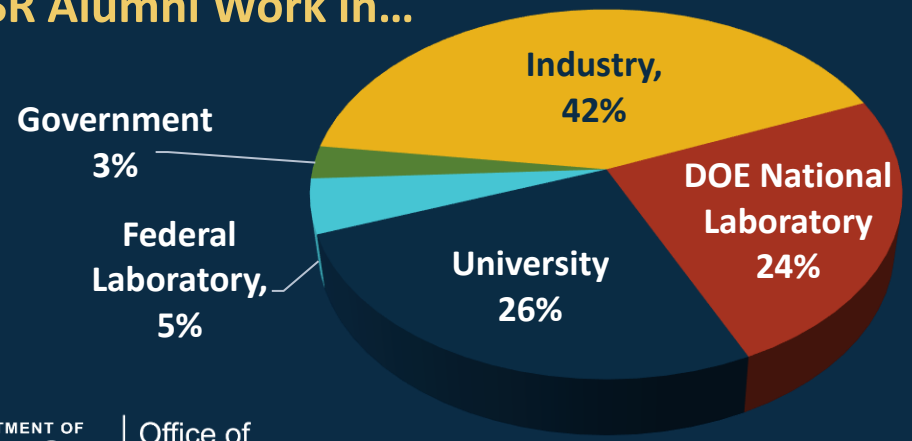
476 hometowns in

48 States + DC + Puerto Rico, pursuing PhDs at

168 Universities, working with **860** DOE National Laboratory scientists



SCGSR Alumni Work in…



>460 Research articles

>700 Research presentations

100 International Presentations

10 Patents

WHAT AWARDEES SAY ABOUT SCGSR

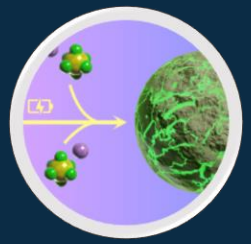
99% Received training not available at their universities

99% **Expanded their networks**

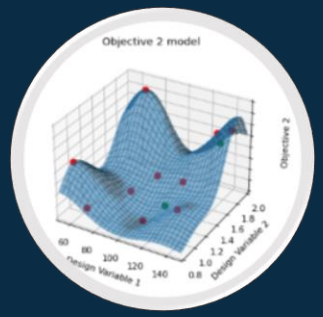
99% SCGSR introduced them to careers outside academia

100% **Their SCGSR award led to completion of a key part of their PhD dissertation**

Thank You!



Questions???

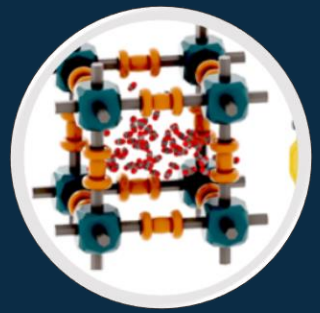


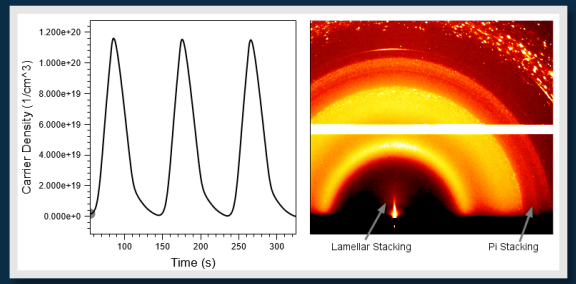
After this Q&A please visit the Breakout Rooms to meet with

Program Managers of the SC Research Offices

Talk with them about of your research

After the breakout session,
please come back to the main room and
answer our **feedback poll**





Next Application Assistance Workshop
October 10, 2024, 2:00 – 4:30 pm ET:
Helpdesk + meet Scientists and Former Awardees

"My time at LANL has been a journey of growth, filled with enriching conversations and access to unparalleled equipment... This experience highlighted the need for better dialogue and collaboration between national labs and academia to enhance research efficiency—a yet unrealized potential. It also emphasized the crucial role students like myself can play in bridging these worlds, despite often being underappreciated. Our energy and fresh perspectives are key to driving advancements in both sectors."

Stephen Porter SCGSR 2023 S1

Office of Science Research and R&D Programs

- Dr. David Rabson – ASCR (david.rabson@science.doe.gov)
- Dr. Justin Hnilo – BER (Justin.Hnilo@science.doe.gov)
- Dr. Robin Hayes – BES (Robin.Hayes@science.doe.gov)
- Dr. Ethan Balkin – DOE IP (Ethan.Balkin@science.doe.gov)
- Dr. Curt Bolton – FES (Curt.Bolton@science.doe.gov)
- Dr. Jeremy Love – HEP (Jeremy.Love@science.doe.gov)
- Dr. Kenneth Hicks – NP (Kenneth.Hicks@science.doe.gov)