

U.S. Department of Energy
OFFICE OF SCIENCE

Office of **SC**ience **GR**aduate **ST**udent **R**esearch
(**SCGSR**) Program

Application Assistance Workshop 2
for 2024 Solicitation 2

October 10, 2024

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

What has been the hardest part of applying to the
SCGSR program so far?

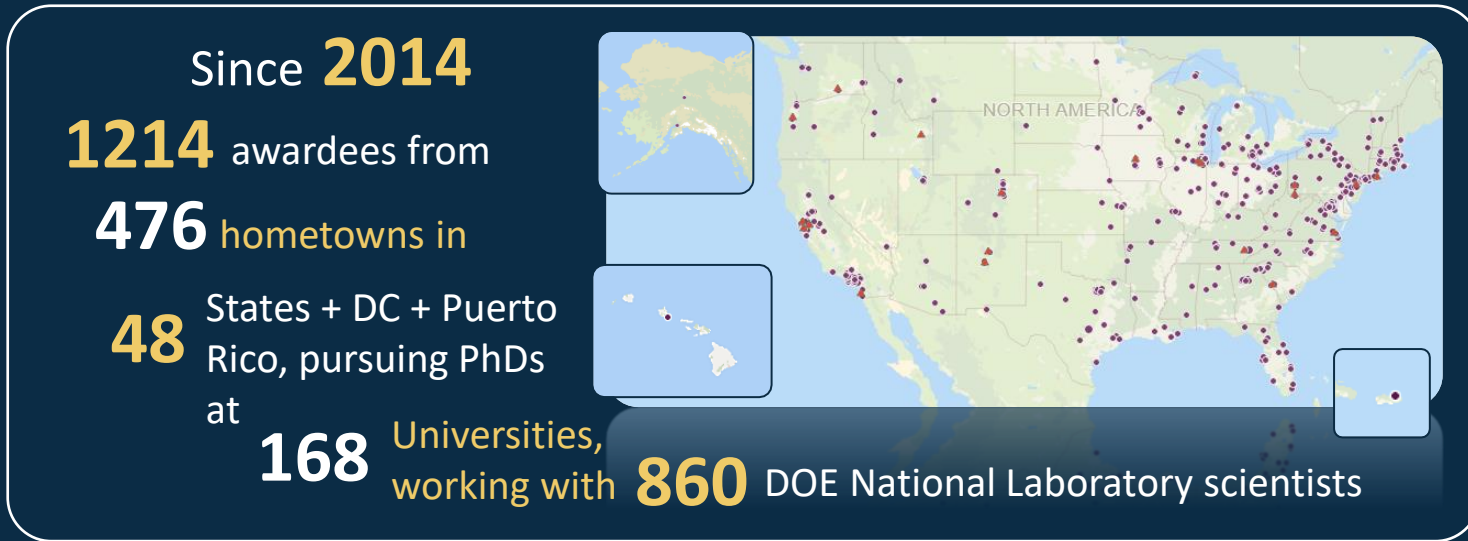


U.S. DEPARTMENT OF
ENERGY

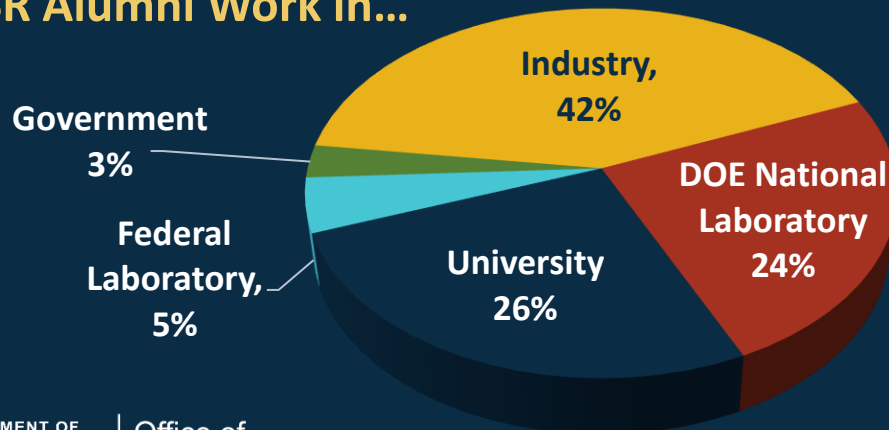
Office of
Science

SCGSR Program by the Numbers

"It was so cool seeing such intelligent and successful individuals work together as a team and continuously support each other... best part of my graduate school experience."
– Bronte Sone, SCGSR 2023 S1



SCGSR Alumni Work in...



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

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)

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Igor.Slowing@science.doe.gov

Oak Ridge Institute for Science and Education (ORISE)

- Dr. Megan Morris
Project Manager
Workforce Development
- Abby Robbins
Program Specialist
Workforce Development

Email:

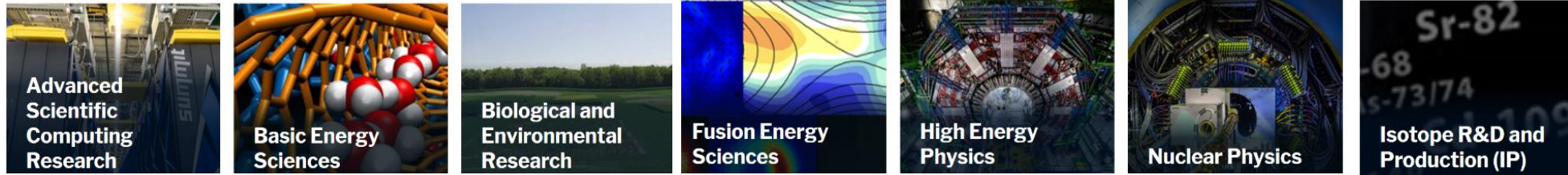
DOE-scgsr@ornl.gov

SCGSR Program Involves Multiple Institutions

The SCGSR program is sponsored and managed by



In collaboration with the SC Program Offices of



and the US DOE National Laboratories/Sites



Online application and awards administration by



Schedule

(All times East)

“On a daily basis, the many theorists with whom I shared an office led any deep discussions on topics and we shared many tips on overcoming the challenges we've faced. Overall, the experience I gained as an SCGSR awardee was a huge boost to my development as a scientist and as a professional.”

Kevin Moseni, SCGSR 2023 S1

2:00-2:50 PM Webinar:

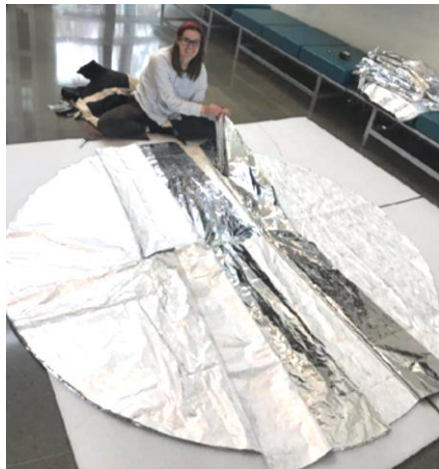
The SCGSR Program
Evaluation of the Applications
Proposal format
Tips on Proposal Writing
Q&A

3:00-3:30 PM **Panel I: Recent SCGSR Awardees** (2 parallel panels)

3:30-4:00 PM **Panel II: DOE National Lab Scientists** (2 parallel panels)

SCGSR Supports PhD Students whose Research...

- Advances our fundamental understanding of nature
- Develops tools or methodologies that enable scientific discovery



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SCGSR Awards and Publications

Awards from Past SCGSR Solicitations

Eligibility

Benefits

Participant Obligations

How to Apply

Information for Laboratory Scientists and Thesis Advisors

Key Dates

Frequently Asked Questions

Reporting Harassment or Discrimination

Contact

Contact DOE Office of Science Graduate Student Research Program

Address
U.S. Department of Energy
SC-321 Forrestal Building
1000 Independence Ave., SW
Washington, DC 20585

SCGSR Publications

Publication Year: 2024 | 2023 | 2022 | 2021 | 2020 | 2019 | 2018 | 2017 | 2016

2024

- Margaret Capooi** (SCGSR 2019 S1/BER/LLNL)
Karis McFarlane
High methane concentrations in tidal salt marsh soils: Where does the methane go?
Global Change Biol. 2024, 30, e17050
<https://doi.org/10.1111/gcb.17050>
- William Cordell** (SCGSR 2020 S2/BER/NREL)
Gregg Beckham
Comparison of wild-type KT2440 and genome-reduced EM42 Pseudomonas putida strains for muconate production from aromatic compounds and glucose
Metabol. Eng. 2024, 81, 88
<https://doi.org/10.1016/j.ymben.2023.11.004>
- Jennifer Nill** (SCGSR 2017 S1/BER/LBNL)
Hoi-Ying Holman
Spatiotemporal dynamics of cellulose during enzymatic hydrolysis studied by infrared spectromicroscopy
Green Chem., 2024, 26, 396
<https://doi.org/10.1039/D3GC03279E>
- Austin Dick** (SCGSR 2020 S2/Accelerator Science/FNAL)
Jonathan Jarvis
Numerical modeling of a proof-of-principle experiment on optical stochastic cooling at an electron storage ring
Phys. Rev. Accel. Beams 2024, 27, 012801
<https://doi.org/10.1103/PhysRevAccelBeams.27.012801>
- Zachary Windom** (SCGSR 2022 S2/BES/ORNL)
Daniel Claudino
A comparison of QTP functionals against coupled-cluster methods for EAs of small organic molecules
J. Chem. Phys. 2024, 160, 014106
<https://doi.org/10.1063/5.0177136>
- Logan Augustine** (SCGSR 2021 S1/BES/LANL)
Ping Yang
Insights into the Mechanism of Neptunium Oxidation to the Heptavalent State
Chem. Sci., 2024, 15, 12345

<https://science.osti.gov/wdts/scgsr/SCGSR-Awards-and-Publications>

47 SCGSR Research Priority Areas

Advanced Scientific Computing Research (ASCR)

Mathematics, Computer and Computational Sciences, etc.

Biological and Environmental Research (BER)

Biology (non-medical), bioinformatics, environmental science, plant science, microbiology, atmospheric science, earth systems modeling, etc.

Basic Energy Sciences (BES)

Chemistry, Materials Science, Geosciences, Chemical Physics, etc.

Isotope R&D and Production (DOE IP)

Separations, radiochemicals, imaging, enrichment, etc.

Fusion Energy Sciences (FES)

Plasma physics, magnetic confinement fusion, energetic particles, dynamics, etc.

High Energy Physics (HEP)

Theory, experiment, accelerator and detector technologies

Nuclear Physics (NP)

Theory, fundamental symmetries, QIS, AI, accelerator and detector technologies, etc.

Convergence Areas

Exclusions!

SCGSR Supports PhD Students whose Research...

Needs advanced/unique instrumentation and/or expertise available at
US DOE National Laboratories



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

<https://science.osti.gov/User-Facilities/User-Facilities-at-a-Glance>

Finding a Collaborating Scientist

Literature • Network • Labs Websites • SCGSR Website

<https://science.osti.gov/wdts/scgsr/How-to-Apply/Identifying-a-Collaborating-DOE-Laboratory-Scientist/View-Potential-Collaborating-Scientists>



SC.SCGRS@science.doe.gov

Today's advice:

- SCGSR awardees panel (3:00-3:30 PM)
- National lab scientists panel (3:30-4:00 PM)

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View Potential Collaborating Scientists

DOE National Laboratory Scientists with Interest in Collaborating with SCGSR Awardees

Susannah Burrows - Susannah.Burrows@pnl.gov – Pacific Northwest National Laboratory – BER
I'm an atmospheric physicist focused on advancing understanding of the processes controlling atmospheric aerosols and other trace constituents, and their interactions with climate and the Earth System. I do this by developing, implementing, and advancing models that incorporate findings from laboratory, field, and remote sensing data, often in close collaboration with experimental and observational experts. I have a strong history of mentoring students and postdoctoral research associates throughout my career; former mentees have gone on to a variety of new roles in academia, research institutions, and the private sector.

Zhehui (Jeph) Wang - zwang@lanl.gov - Los Alamos National Laboratory - BES, NP, HEP, NP and DOE IP
Dr. Wang is a focus team leader at LANL. His research and collaborations cover many topics in experimental physics with strong ties to both fundamental physics and applied science. One of the recent directions is to apply the ideas and methods of data science to enhance measurements and their interpretation.

Nobuo Sato – nsato@jlab.org – Jefferson Lab/NSA – NP
Research in nuclear tomography, perturbative QCD phenomenology and machine learning.

Sally Dawson – dawson@bnl.gov – Brookhaven National Laboratory – HEP
My research centers around theoretical calculations for Higgs boson processes at future colliders and the study of new physics models involving electroweak symmetry breaking.

Ravi Madduri – madduri@anl.gov – Data Science and Learning Division, Argonne National Laboratory – ASCR
My group works in the intersection of computing and biomedicine where we develop methods that enable large-scale data analysis and application of deep learning to problems in biomedicine and health.

Aaron Roodman – roodman@slac.stanford.edu - SLAC National Accelerator Laboratory - HEP
My main research interest is the study of Dark Energy using data from imaging surveys such as the Dark Energy Survey and the upcoming Vera C. Rubin Observatory's Legacy Survey of Space and Time. We use the observation of hundreds of millions, or billions, of galaxies to study the accelerated expansion of the universe and the distribution of matter in the universe to better understand Dark Energy. Research opportunities include topics such as weak and strong gravitational lensing, photometric redshift calibration, point spread function estimation as well as studies of the LSST Camera's operation and performance.

A Non-Exhaustive List!

SCGSR Applications

Only COMPLETE applications will be considered!

1. All required fields of the Online Application System
2. Official graduate transcripts and proof of Ph.D. Candidacy
Remove SSN or dates of birth from transcripts
3. Letters of Support: - graduate thesis advisor
- collaborating DOE national laboratory scientist
4. Research Proposal (**3-pages maximum**)

Deadline: November 6, 2024, 5:00 PM ET

Online Application System

<https://apps.orau.gov/SCGSR/Account/Login>

1. Complete a page before moving on, otherwise it won't be saved
2. Gray non-fillable boxes → need to fill prior sections
3. If you don't have the answer or document, type in or upload **placeholders**, remember to **come back and replace** the placeholders when ready
4. E-mails for advisor and collaborating scientist **sent from the system**, you must upload their information

Provide all the required information in the application form.

You must complete all required information on each page of the application before that page can be saved. If you navigate away from a page without saving, the information you entered will need to be re-entered.

Important: In the Professional Background section of the application, you must provide the name and address of your current institution on the same page where you must upload your **official graduate transcript**. Therefore, you are required to upload your transcript before you can send an email requesting the letter of support from your thesis advisor.



Proposal Structure

1. Overall Goal:

Overarching problem or question? **THE BIG PICTURE!**

2. Background:

Current understanding/state of the art? **UP TO DATE!**

Relevance? **THE BIG PICTURE!**

Fit in an SCGSR priority research area?

Broadly: how can this problem/question be answered? **GENERAL STRATEGY**

Preliminary results/data suggesting your idea may work? **CREDIBILITY**

3. Specific aims:

Basis for your research plan. Split Goal into smaller targets.

4. Approach:

Strategy, general steps with rationale. Will you use the best methods there are?

What will you be doing in the lab from day 1? **SPECIFICS**

What results do you expect? The impact of your work.

Potential problems? **PREPAREDNESS**

5. Timeline:

Expected pace of progress?

Build in time for trainings!

3 pages

6. References:
Separate **1** page.

Proposal 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**?

Some Ideas for Presenting your Ideas

The aim of the proposed research is to develop the scientific basis for..... This work will provide key elements for developing a fundamental understanding of XXX is considered one of the most promising approaches for(REF) Unfortunately, it is not well understood the mechanism of how XXX.... We have observed that... and... (REF). Our results suggest that YYY... To establish the potential role of YYY on the mechanism of XXX... we propose to... ZZZ at AAA National laboratory has developed ...tools that are ideally suited to test our hypothesis. Thus, we propose to collaborate with AAA to.... We will first... this will determine whether.... Based on the outcomes of this examination, we will either... or It is possible that..., if this is the case we will... Ultimately, we expect to achieve... Reaching this fundamental understanding addresses the grand challenge listed in the report... (REF or link).

Let's Split the Ideas a Bit...

The aim of the proposed research is to develop the scientific basis for....
This work will provide key elements for developing a fundamental understanding of

Goal

XXX is considered one of the most promising approaches for(REF)
Unfortunately, it is not well understood the mechanism of how XXX....

**Background
Rationale**

We have observed that... and... (REF). Our results suggest that YYY...

**Credibility
Hypothesis**

To establish the potential role of YYY on the mechanism of XXX... we propose to...

Overall strategy

ZZZ at AAA National laboratory has developed ...tools that are ideally suited to test our hypothesis.

SCGSR

Thus, we propose to collaborate with AAA to.... **SCGSR**

We will first... this will determine whether.... **Steps**

Based on the outcomes of this examination, we will either... or **Expectations
Strategy**

It is possible that..., if this is the case we will... **Contingency plans**

Ultimately, we expect to achieve... **Expected results**

Reaching this fundamental understanding addresses the grand challenge listed in the report... (REF or link).

Overall goal – Relevance/Impact –Vision

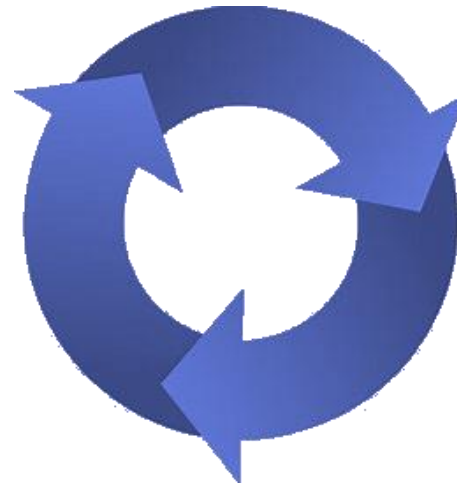
The Ultimate Resource: Readers

Your target audience: **The Reviewers**

You won't have chance to respond to the reviewer,
so you better write clear for them!

Draft Readers:

- Peer (at least 1)
- Collaborating Scientist
- Advisor



Write-Feedback-Write

A Few Thoughts from the Reviewer's Perspective

- 1) **Clarity**: make readers' lives easier: *identify key points* for them
 - discussions around key ideas – articulate connections
- 2) How well defined is your **hypothesis or problem statement** → how well you can design your activities
 - Are your research activities adequately designed to **test the hypotheses**?
 - How well can you control or account for key **variables/parameters/conditions**?
 - Will they provide new insights? Lead to new questions? **Impact** on the scientific community!
- 3) Identifying **challenges** → “Good understanding of the challenges” → you understand the science
 - Contingency plans
- 4) Are methods/conditions/model systems/tools appropriate? The **best tools** for your scientific problem?
- 5) Could you do this in your university? Are all the tools you need **available** at the lab?
- 6) Essential **details**: not all the details but the most relevant ones to understand the work you plan to do.

Science Writing Tips

Writing Science in Plain English

Anne E. Green



1. Why Write Science in Plain English?
2. Before You Write
3. Tell a Story
4. Favor the Active Voice
5. Choose Your Words with Care
6. Omit Needless Words
7. Old Information and New Information
8. Make Lists Parallel
9. Vary the Length of Your Sentences
10. Design Your Paragraphs
11. Arrange Your Paragraphs

- Short! (<100 pages)
- Provides before and after edit examples
- Provides passages for you to practice

Omit Needless Words

“Inhalation of vapor phase particulate matter chemical contaminants from biomass combustion in domestic settings is a significant contributor to local disease burden.” (22 words)

“Domestic wood smoke causes local health problems.” (7 words)

Anne E. Green *Writing Science in Plain English*, p40

Omit Needless Words

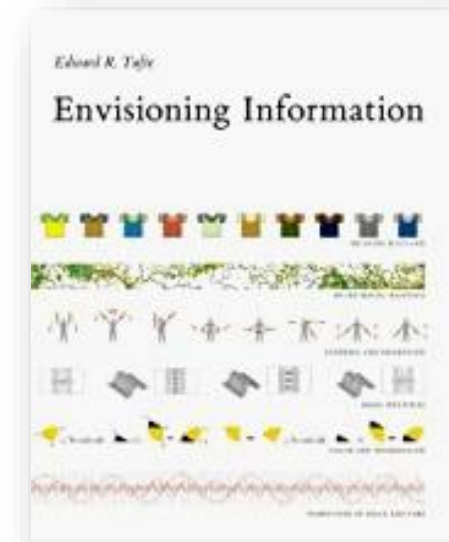
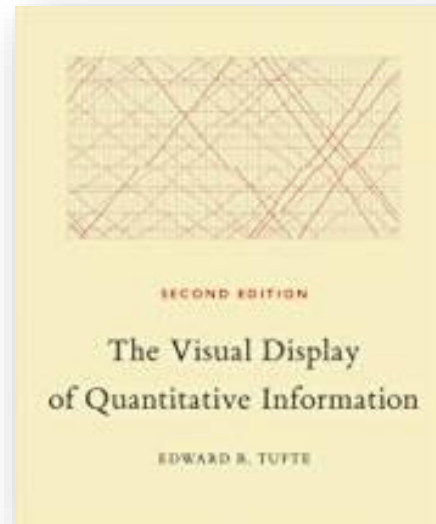
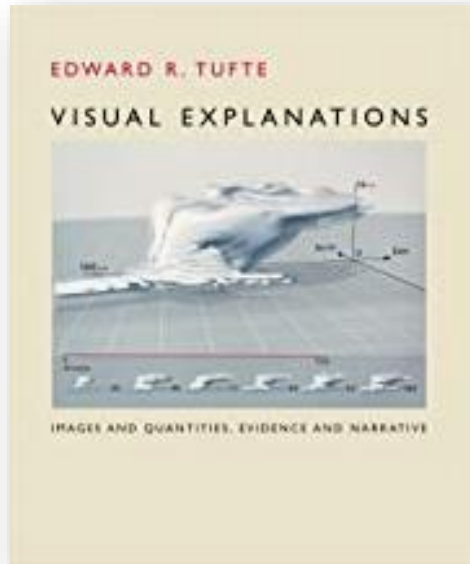
in this study we assessed
conduct an investigation of
the analysis presented in this paper
during the course of
undertake an examination of
past research has shown

we assessed
investigate
our analysis
during
study
research has shown

Anne E. Green *Writing Science in Plain English*, p43

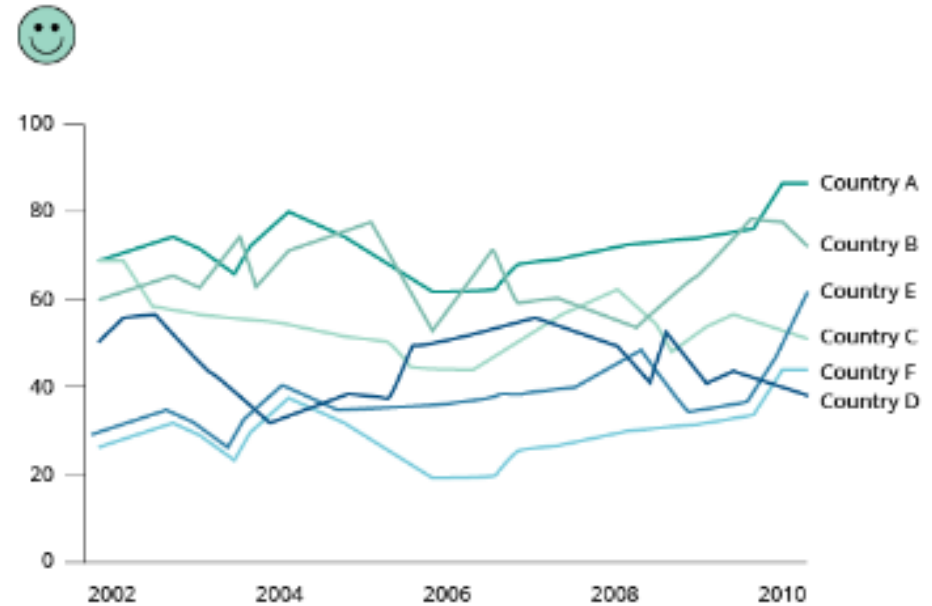
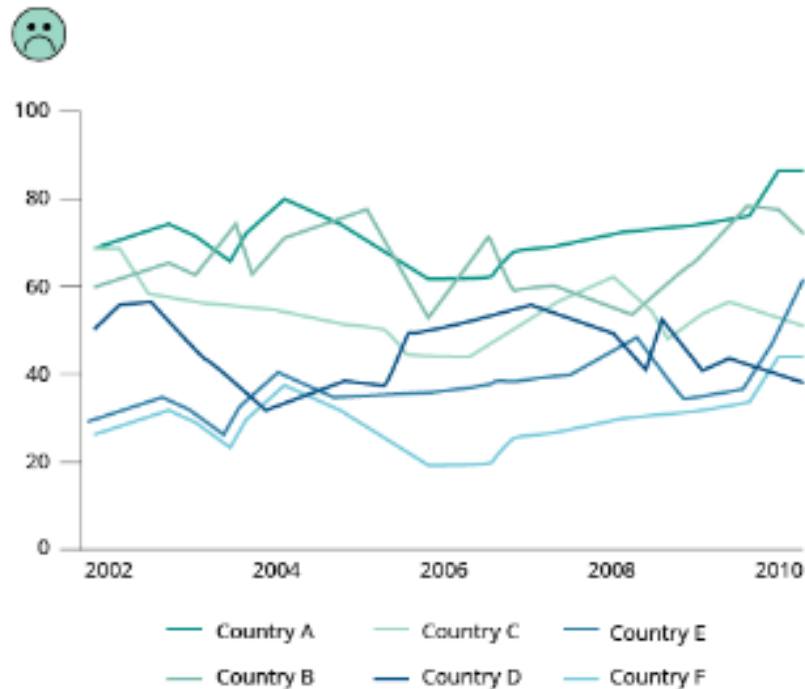
Presenting Data

Books by Edward R. Tufte



Presenting Data

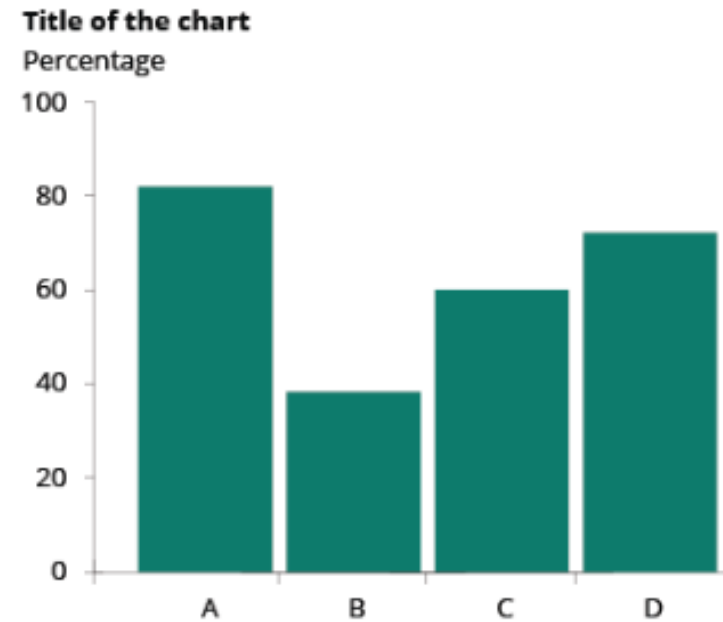
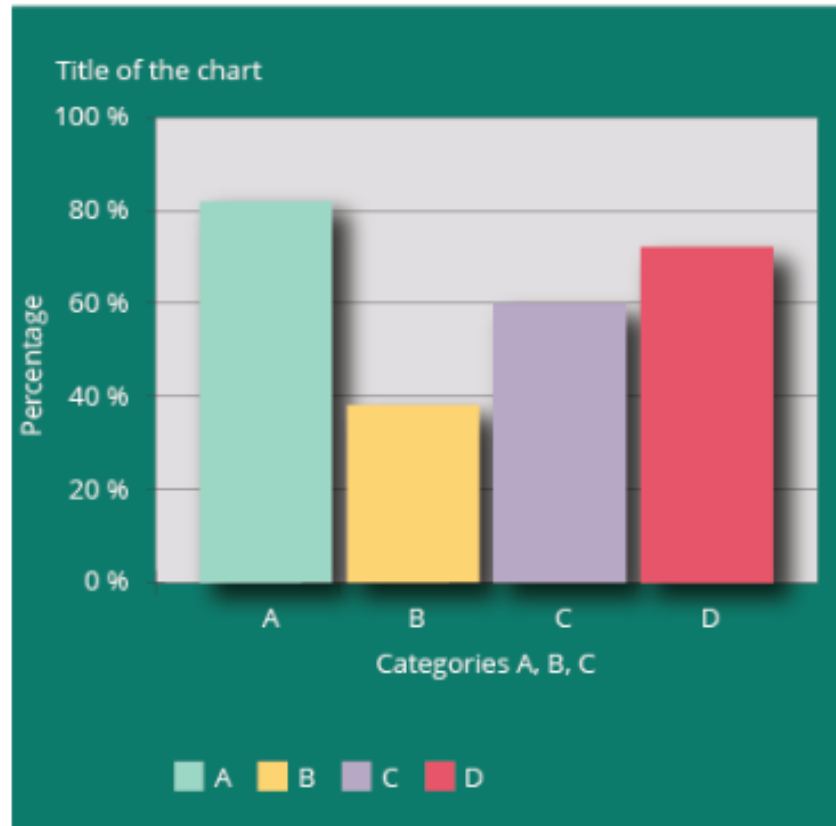
Label the line, not the legend



[Do's and don'ts of data visualisation — European Environment Agency \(eea.europa.eu\)](http://eea.europa.eu) — European Environment Agency

Presenting Data

Remove visual clutter



[Dos and don'ts of data visualisation — European Environment Agency \(eea.europa.eu\) — European Environment Agency](#)

Questions So Far? Discussion Time

“I also had direct help from my mentors and other Principal Investigators who were in my field or adjacent. Their advice, criticisms and knowledge were vital to my development both personally and professionally... My SCGSR experience has become one of the most important and invaluable parts of my graduate career.”

Katherine Lloyd, SCGSR 2022 S2

Panels with 2023 S2 SCGSR Awardees

Panel 1:

- **Caroline Tatsuoka** – ORNL – *Applied Mathematics*: Machine learning modeling for multi-fidelity models and data
- **Christopher Storfer** – LBNL – *Data Science*: Analysis and Characterization of Strong Gravitational Lenses in DESI
- **Simo Pajovic** – LANL – *Materials Sciences and Chemistry for Microelectronics*: Violating Kirchhoff's Law of Radiation Using Spatiotemporally Modulated Metasurfaces

Panel 2:

- **Liana Shpani** – FNAL – *Accelerator Science*: Enhancing Nb₃Sn Synthesis for Next-Generation SRF Cavities
- **Desiree Sarmiento** – PNNL – *Atmospheric System Research*: Role of Environmentally Persistent Free Radicals in Aged Soot Ice Nucleating Particles
- **Collin Sutton** – LANL – *Basic Geosciences*: Single fracture to fracture network: validating observational data with reduced order models

Panels with National Laboratory Scientists

Panel 1:

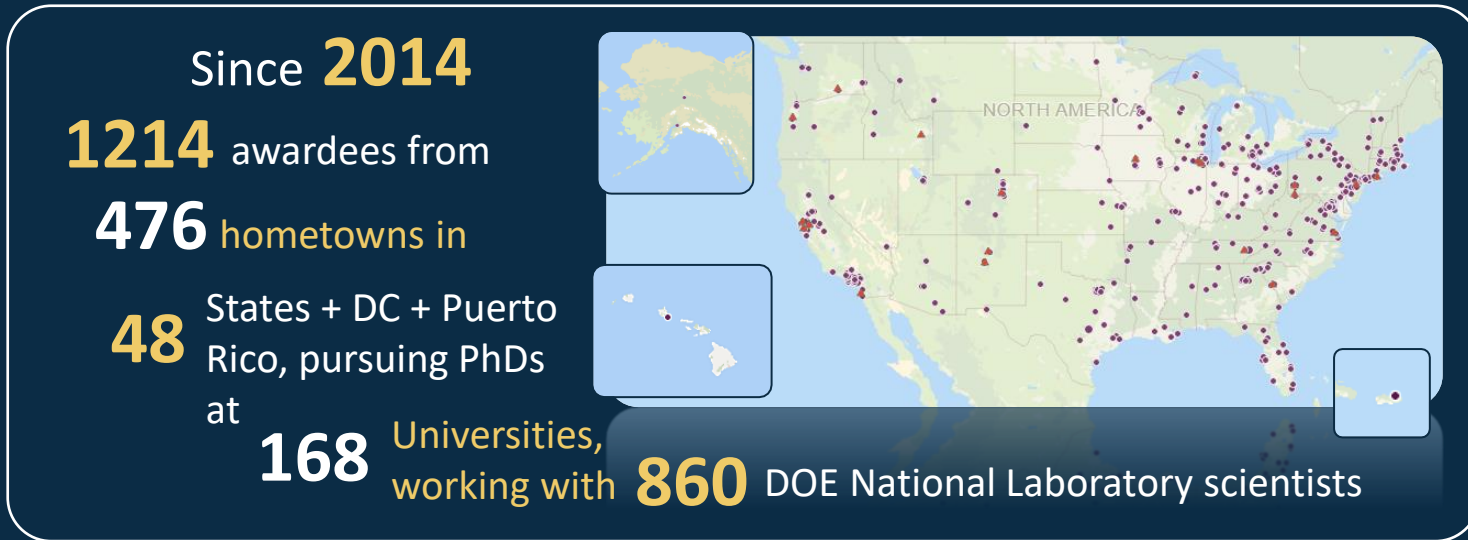
- **Dr. Philip Ryan** ANL – Scattering from magnetic thin films, condensed matter physics, materials science
- **Dr. Minerba Betancourt** – FNAL – MINERvA Experiment, Short-Baseline Neutrino program, and DUNE Near Detector
- **Dr. Ruishu Wright** –NETL – Quantum sensing, electrochemistry, plasmonic and interferometric sensors

Panel 2:

- **Dr. Christopher Shaddix** – SNL – Laser diagnostics, soot formation, coal and biomass combustion and gasification
- **Dr. Mariefel Olarte** – PNNL – Catalytic conversion of biomass to renewable fuels, analytical methods to characterize bio-oils and its products
- **Dr. Alexandre Camsonne** – TJNAF – Nucleon structure mainly through exclusive reactions, DVCS Data acquisition, and detectors
- **Dr. Alex Somers** – SRNL – Simulations of interactions between high energy plasmas and materials.

SCGSR Program by the Numbers

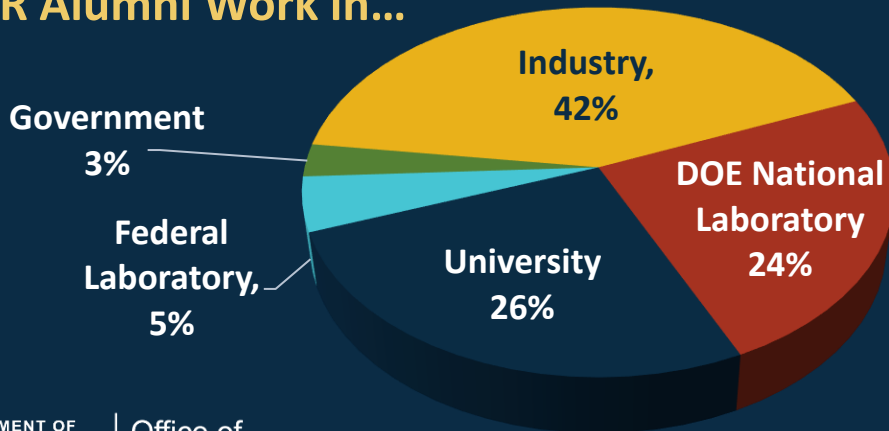
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- 99%** Expanded their networks
- 99%** SCGSR introduced them to careers outside academia
- 100%** Their SCGSR award led to completion of a key part of their PhD dissertation

SCGSR Alumni Work in...



- >460** Research articles
- >700** Research presentations
- 100** International Presentations
- 10** Patents

Thank You!

Remember:

the deadline for application is
November 6, 2024 at 5:00 PM ET

More questions:

Igor.Slowing@science.doe.gov
DOE-SCGSR@ORAU.org

After the panels in the breakout sessions please come back to fill
the feedback poll!

