

NSSC Education in Nuclear Science, Technology, and Policy



Prof. Bethany Goldblum
University of California, Berkeley

October 18, 2023

The NSSC Model

We attract the **best**
and **brightest**
students from our
11 partner
institutions



Match their interests to 1 of our 6 Academic Focus
Areas and **Crosscutting Areas**

NUCLEAR
PHYSICS
AND
NUCLEAR
DATA

RADIOCHEMISTRY
AND NUCLEAR
CHEMISTRY

NUCLEAR
MATERIAL
SCIENCE

RADIATION
DETECTION

NUCLEAR
AND
CHEMICAL
ENGINEERING

COMPUTING
AND
OPTIMIZATION
IN NUCLEAR
APPLICATIONS



In collaboration with our **5** National Lab Partners



Transition students into **careers** at the national labs
supporting the NNSA's National Security Agenda!

The NSSC Educational Experience

LAB ENGAGEMENT

- Lab Mentors
- In-Residence Research
- Topical Seminars

ACADEMIC SUPPORT

- Academic Advisor
- Sponsored Courses

LAB INTERNSHIPS

- Internships available at all 5 partner laboratories!
- NSSC-LANL Keepin Program
- NSSC-LLNL Summer Experience

SUMMER SCHOOLS AND BOOTCAMPS

- Nuclear Data and Analytical Techniques Summer School
- Nuclear Inspector School at LANL
- Public Policy and Nuclear Threats Boot Camp (PPNT)

PROFESSIONAL DEVELOPMENT

- University Program Review Meeting
- Academic Conferences
- NSSC-LLNL Nonproliferation Workshop

CAREER SUPPORT

- NSSC Lab Connections
- Opportunities Mailing
- Network of Alumni



NSSC3 Webinars and Seminars (2022-2023)

NSSC3: A NEW FRONTIER (AY22-23 WEBINAR SERIES)



Our Guest Speaker

Prof. Angela Di Fulvio



Our Guest Speaker

Prof. Raluca Scarlat



Our Guest Speaker

Prof. Osman Anderoglu



Our Guest Speaker

Prof. Djamel Kaoui



Our Guest Speaker

Prof. Juan Manfredi



NSSC Co-Sponsored Keynote Speaker Event with Amb. Gottemoeller

NSSC IN-PERSON CO-SPONSORED TALKS



Dr. Mark B. Chadwick (LANL)



Dr. Andrea Kritcher (LLNL)



Dr. Jason Reinhardt (SNL)



Scan this QR Code to sign up for our mailing list!

2023 University Program Review Meeting

The NSSC hosted a successful UPR meeting on June 6-8, 2023 in Berkeley, CA!



- Over **275 participants**
- Four DNN R&D consortia: NSSC, MTV, ETI, and CNF
- Visit from **NNSA DNN Deputy Administrator Corey Hinderstein**

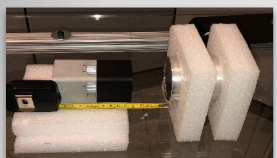


- *Best Oral Presenter: Jenna Garcia (TAMU)*
- *Best National Laboratory Collaboration: Benjamin Walusiak (GWU)*
- *Best Poster Presenter: Dominic Lioce (UCB)*

2023 Nonproliferation Consortia Workshop

Fast Facts:

- Held in conjunction with UPR meeting
- Co-hosted by **NSSC** and **LLNL**
- 20 participants from **across the DNN R&D Consortia**
- Hands-on experimental modules



Safeguards



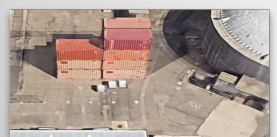
Lead: Ram Venkataraman



Arms Control



Lead: Bonnie Cannon



Smuggling Detection



Lead: Brian Jennings



Radiological Search & Characterization

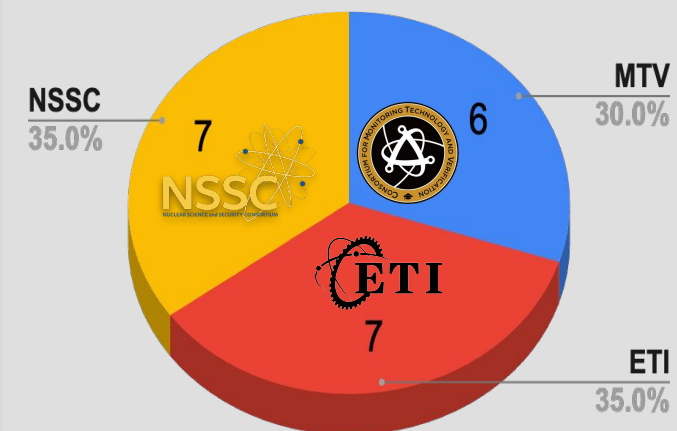


Lead: Pete Marleau and Erik Brubaker



Dr. Kim Budhil, Director of LLNL, provided participants with an overview of the LLNL capabilities and mission

Participants per DNN R&D Consortium




LLNL-Photo-851394

2023 LANL Nuclear Safeguards Summer School

Introductory safeguards course held at Los Alamos National Laboratory

- **Program Dates:** June 12 - June 16, 2023
- Features lectures and hands-on activities in **nondestructive assay** of uranium and plutonium bearing materials using **gamma-ray and neutron measurement techniques**
- 8600 ft² facility w/ radiological and nuclear materials

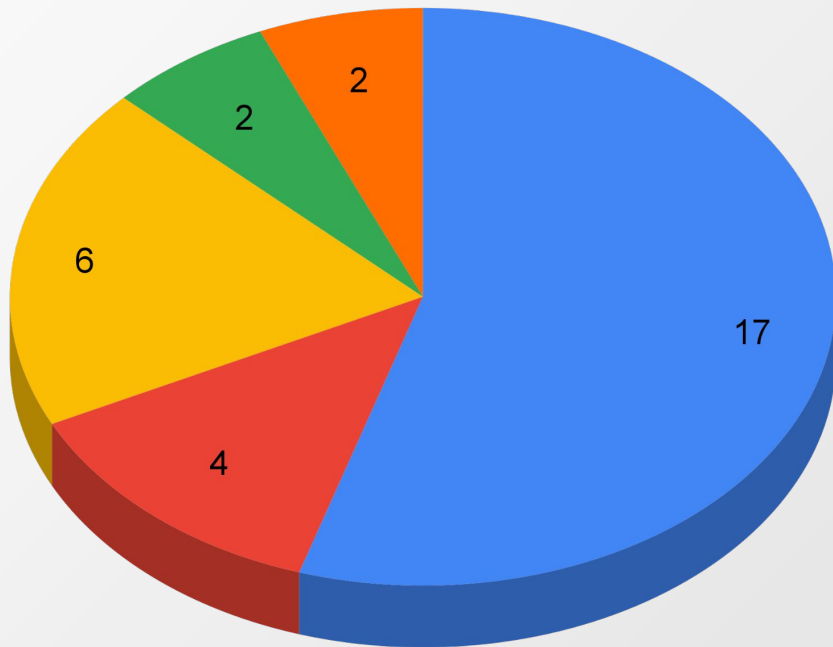
Gamma-ray Spectroscopy 	Thermal Neutron Counting 	Passive and Active Coincidence Counting 
U/Pu Isotopic Ratios 	Uranium Enrichment 	



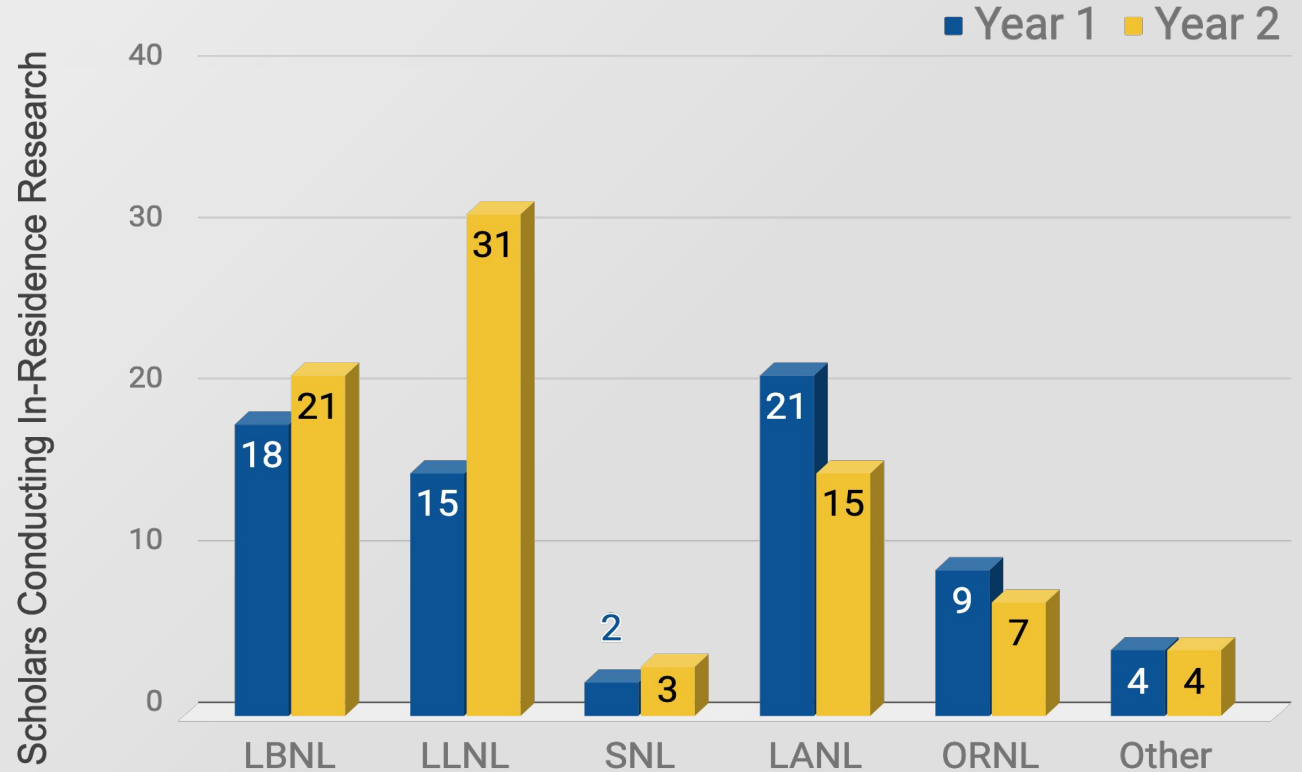
2023 Laboratory Internship Participation

Thirty-one NSSC scholars from all eleven NSSC universities participated in an internship at one of our five partner National Laboratories, where they conducted research on-site with a lab mentor.

• LLNL • SNL • LANL • LBNL • ORNL



2023 NSSC Internship Participation by Laboratory



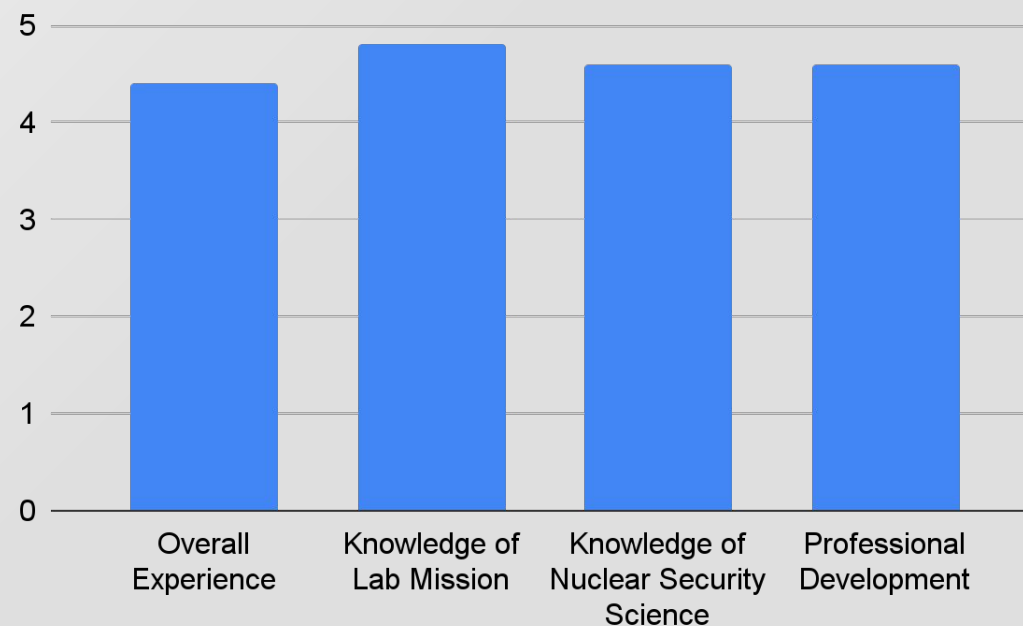
NSSC3 In-Residence Research by Laboratory

2023 Keepin Nonproliferation Summer Program

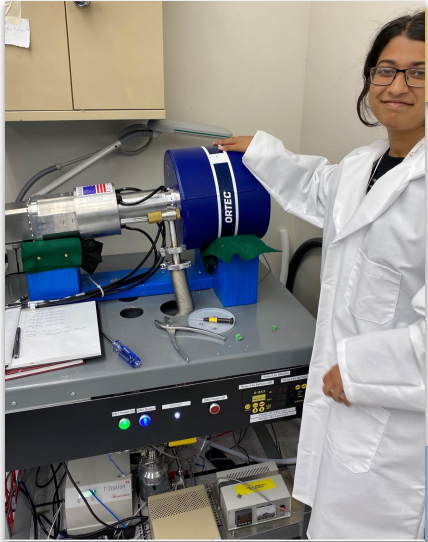
8-week research internships at LANL and SNL

- **Program Dates:** Jun 19 - Aug 11, 2023
- 85% research, 15% enrichment
- Visits to **Nevada National Security Site** and the **National Criticality Experiments Research Center (NCERC)**

“There is no other summer program like it and it is extremely career-shaping!”



NSSC3 Scholar Research Highlights



Kate Joshi (UTK)
Intern at Lawrence Livermore National Lab

Research focus: Enhancing radiation sensing materials to detect, identify, and prevent the diversion of special nuclear materials

NSSC Experience:

- 2022 NSSC NAT Program Participant
- 2023 NSSC-LLNL Workshop Participant

Lab Mentor: Steve Payne (LLNL)
Advisor: Prof. Chuck Melcher (UTK)



John Leland (UIUC)
Research at NCERC/LANL

Research focus: Optimizing a high-efficiency gamma-ray imager based on ASIC readout

NSSC Experience:

- 2023 NSSC-LLNL Workshop Participant
- 2023 NSSC INDAT Program Participant

Lab Mentor: Jesson Hutchinson (LANL)
Advisor: Prof. Angela Di Fulvio (UIUC)



Dominic Lioco (UCB)
Intern at Sandia National Laboratories

Research focus: Modeling neutron and thermal radiation transport in turbulently mixed materials

NSSC Experience:

- 2022 NSSC-LANL Keepin Participant
- 2023 UPR Poster Presentation

Lab Mentor: Aaron Olson (SNL)
Advisor: Prof. Jasmina Vujic (UCB)



Rebecca Manns (UNLV)
Intern at Lawrence Livermore National Lab

Research Focus: Characterization of post-detonation and synthetic glassy debris by gamma spectroscopy

NSSC Experience:

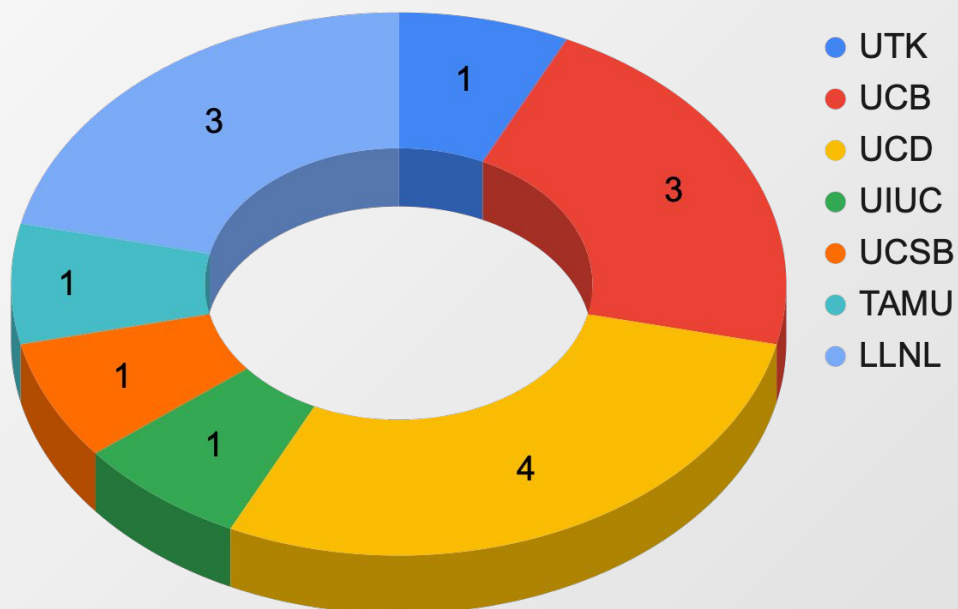
- 2023 LANL NDA Program Participant
- 2023 NSSC-LLNL Workshop Participant

Lab Mentor: Dr. Jennifer Shusterman (LLNL)
Advisor: Prof. Daniel Koury (UNLV)

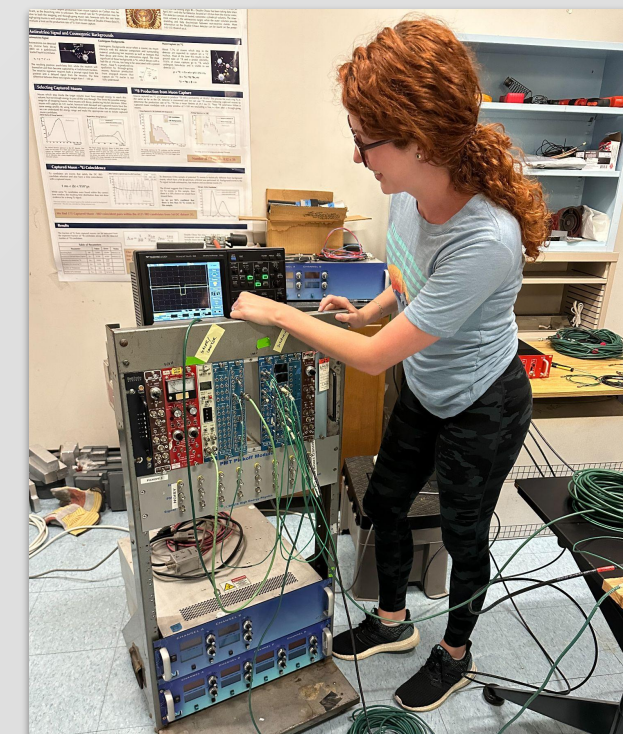
Fusion of the Nuclear Analytical Techniques & Nuclear Data Summer Schools

- **Program Dates:** Jun 21 - Jun 29, 2023
- Lectures and hands-on activities
- Visits to **McClellan Nuclear Research Center, Crocker Nuclear Laboratory, and LLNL's High Explosives Applications Facility**

Affiliation of Participants



“I really appreciated learning more topics in nuclear physics since I’m a nuclear chemist.”



2023 Public Policy and Nuclear Threats Boot Camp

Provides the knowledge needed to contribute to future U.S. nuclear policy discussions

- **Program Dates:** July 9 - July 29, 2023
- Co-hosted by **NSSC** and **IGCC, UC San Diego**
- Features lectures, panel discussions, hands-on enrichment activities, and policy simulations

“This program has shifted my post-grad job search already.”



Speakers included:

- Ambassador Linton Brooks (**NNSA**)
- Sig Hecker (**LANL**)
- Maj. Gen. Robert Wheeler (**USAF/STRATCOM**)
- Stephen Kung (**DOE-NE**)
- Elaine Bunn (**DASD/NMD**)
- Mark Schanfein (**IAEA/INL**)
- Bruce Goodwin (**LLNL**)
- Newell Highsmith (**State**)
- Rolf Mowatt-Larsen (**CIA**)
- Laura Rockwood (**IAEA**)
- *and more ...*

NSSC3 Success Stories



Austin Mullen
University of California,
Berkeley

- Attended NSSC LANL Program in 2021 under the mentorship of Madison Andrews

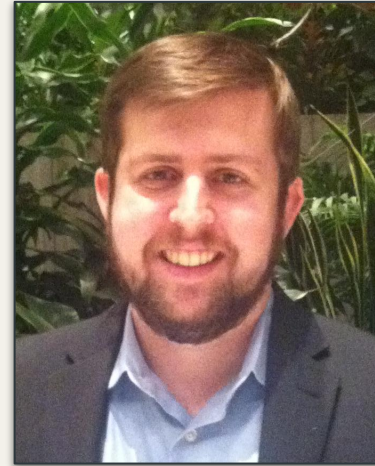
→ Now a **Staff Scientist** in the **XCP-7** group at **LANL**



Elizabeth Rubino
Michigan State University

- Attended the Data Science Summer Institute at LLNL in 2021

→ Now a **Staff Scientist** at **LLNL**



Aaron Nowack University of Tennessee Knoxville

- Conducted in-residence research at SNL-Livermore in 2019

→ Now research staff at **SNL- Livermore**



Jyothiraj Johnson
University of California,
Davis

- Conducted research under the mentorship of Carl Grace at LBNL

→ Now an **Integrated Circuits Design Engineer** at **LBNL**

NSSC Laboratory Investigators Rotation

NSSC Prof. Peter Hosemann wins the 2023 LLNL Faculty Sabbatical Program Award



Research in advanced materials and additive manufacturing



Prof. Raluca Scarlat at LANL in 2022

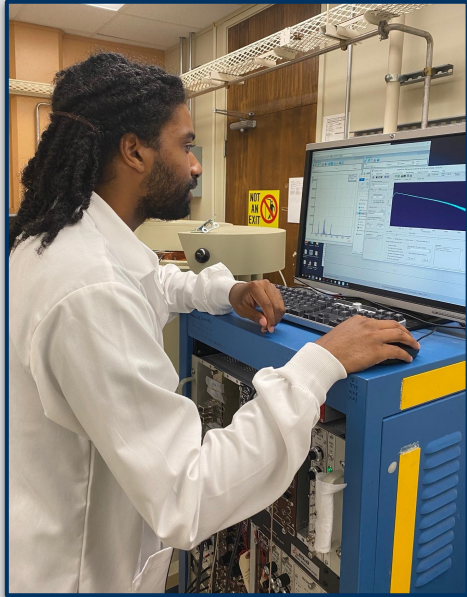


- Connecting with **national laboratory experts** to initiate new research projects and facilitate existing ones
- Deepened **University-Lab connections**
- **Participation in seminars, lectures, and tours** for broad exposure to the nuclear security mission

A New Cadre of Nuclear Scientists and Engineers!



**Since 2011, 165 NSSC
Fellows & Affiliates placed
into careers at the National
Laboratories and other
government agencies**



Acknowledgements



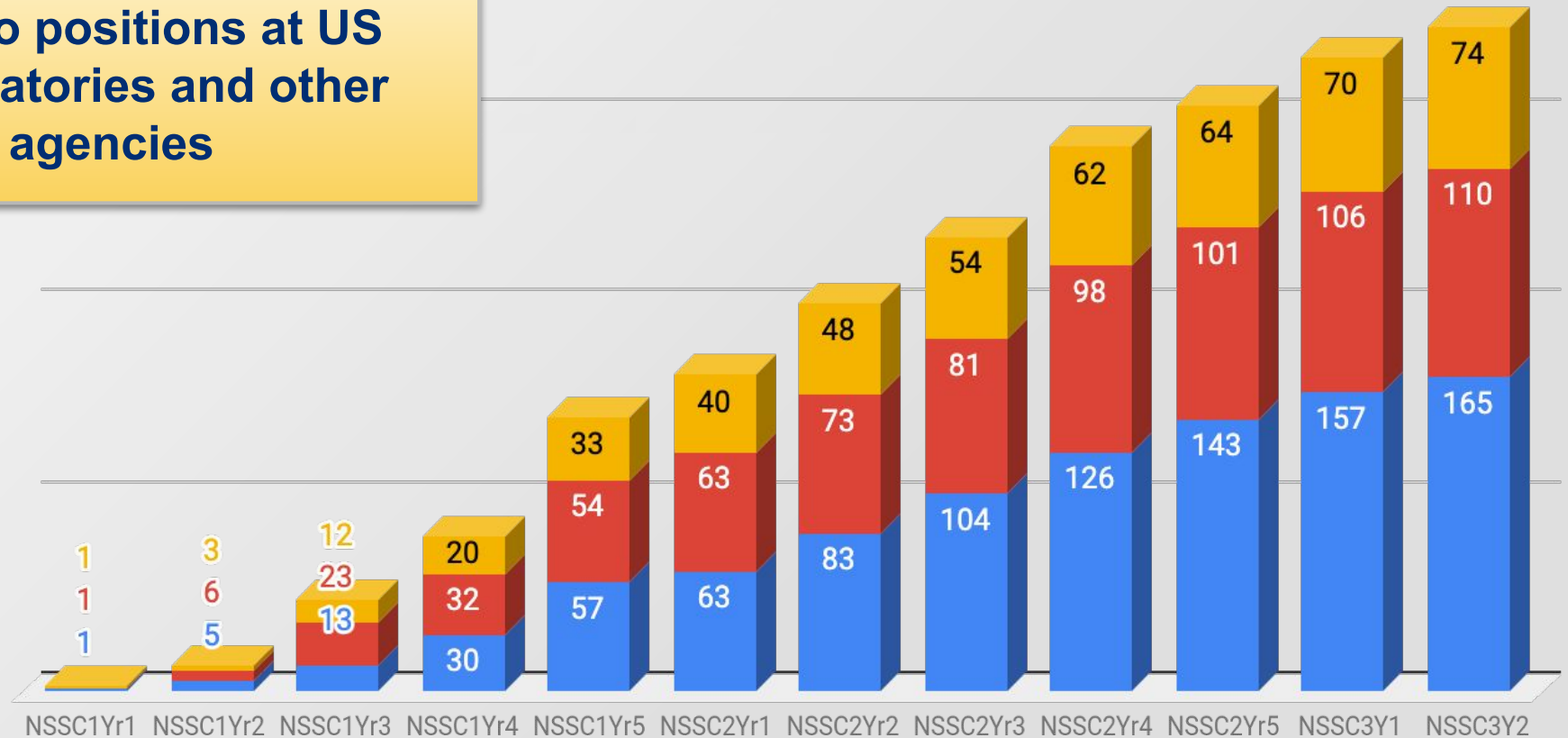
This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number **DE-NA0003996**.

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A New Cadre of Nuclear Scientists and Engineers!

Since 2011, 165 NSSC Fellows & Affiliates placed into positions at US DOE National Laboratories and other government agencies

- Academia
- Industry
- National Lab or Other Gov



NSSC Cumulative Pipeline