

# Overview of the Nuclear Science and Security Consortium



**Prof. Jasmina Vujic**  
**University of California, Berkeley**

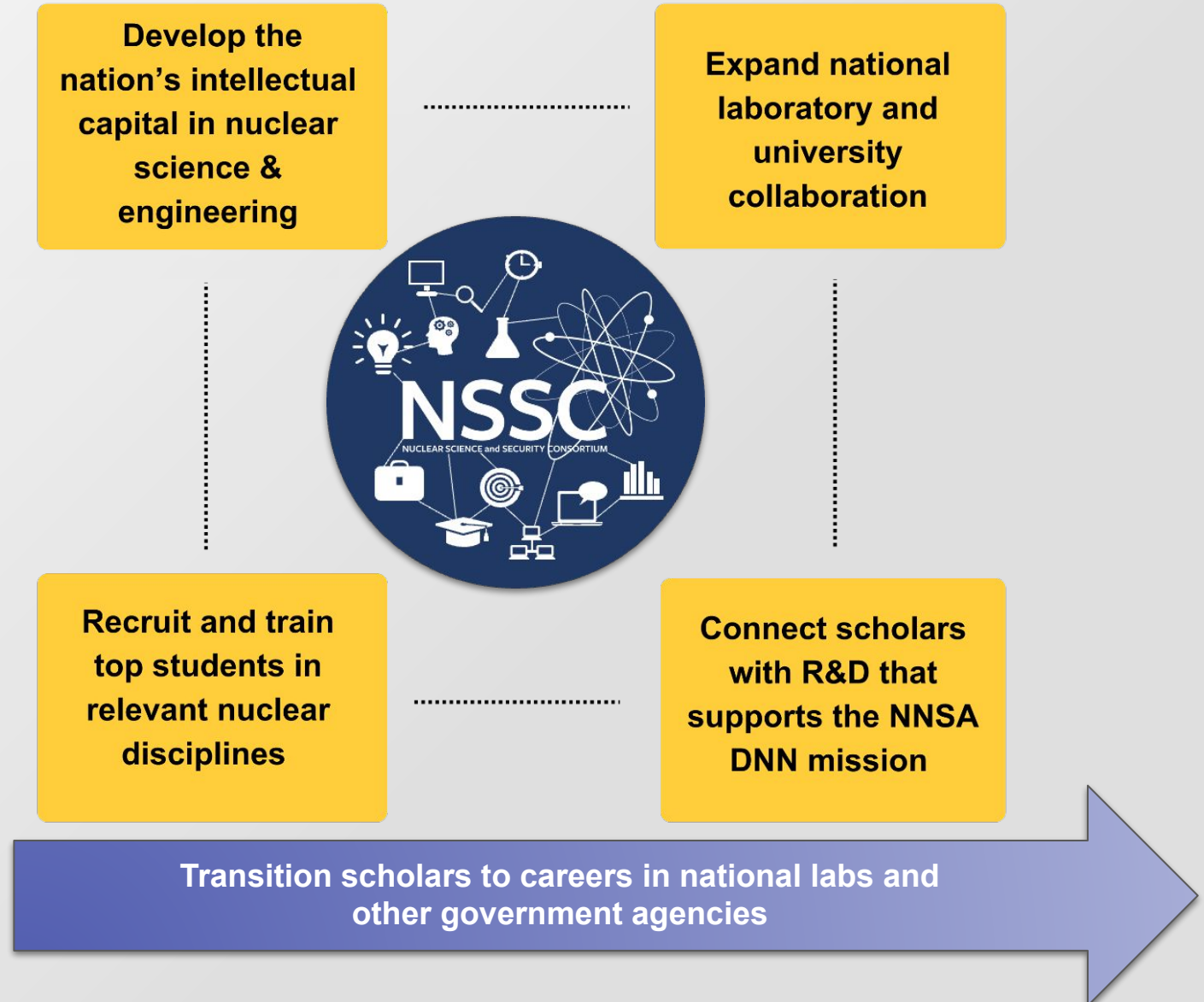
**October 17, 2023**

## NSSC HISTORY

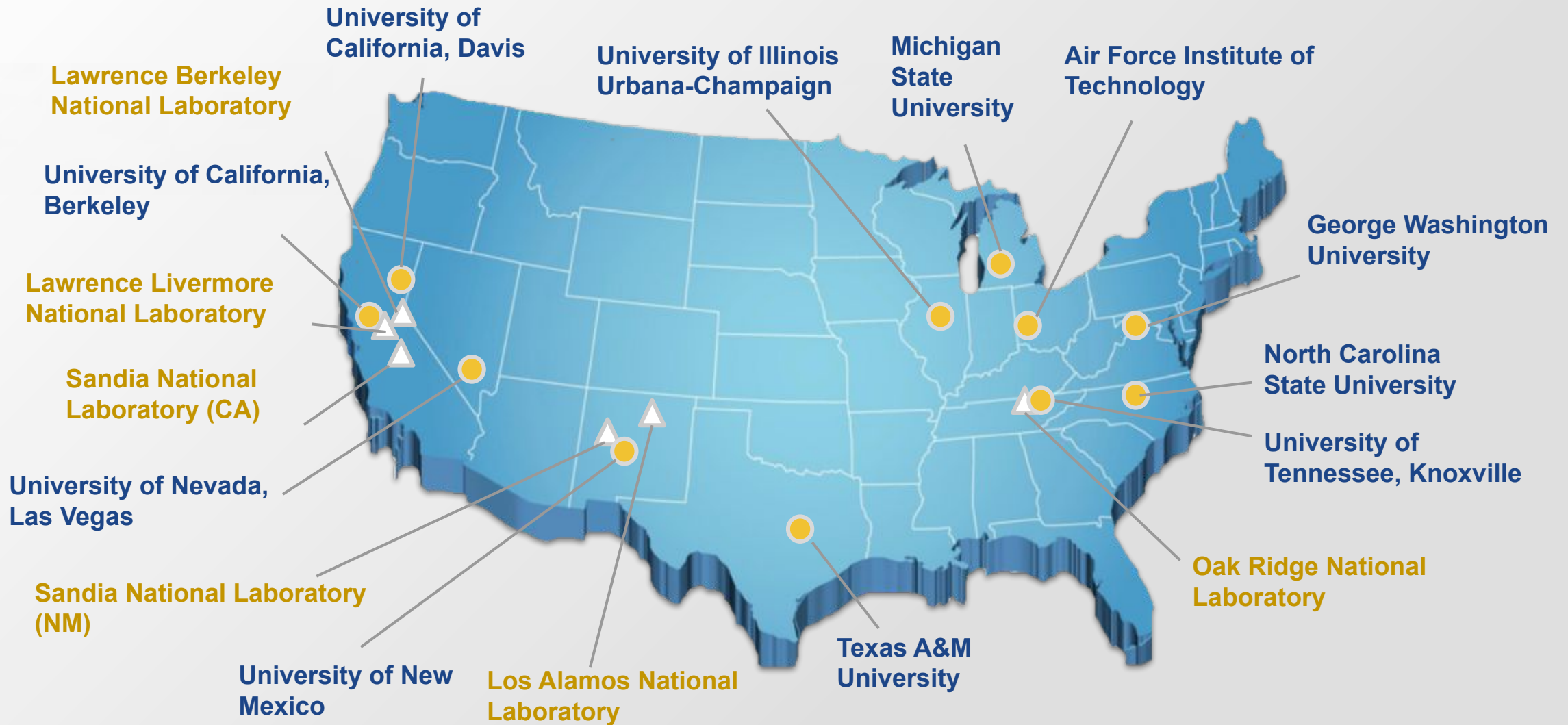
- Originally established in 2011
- Led by University of California, Berkeley
- Successfully re-competed in 2016 and 2021

## NSSC3 FOCUS

- New partners & research directions
- New education and training initiatives
- Expanded national laboratory opportunities



# NSSC3 Partners (2021-2026)



# NSSC3 Organizational Chart



## National Nuclear Security Administration, Defense Nuclear Nonproliferation R&D

Program Manager *Dr. Jonathan Baker*

### NSSC EXECUTIVE TEAM

*Jason Hayward, UTK*  
Deputy Exec. Director

*Bethany Goldblum, UCB/LBNL*  
Executive Director

*Jasmina Vujic, UCB*  
PI/Director

*Kai Vetter, UCB/LBNL*  
NNSA Liaison

*Lee Bernstein, UCB/LBNL*  
Lab Liaison

### PARTNER INSTITUTIONS MAIN POINTS OF CONTACT (*Academic & Lab*)

*Juan Manfredi*  
AFIT

*Chris Cahill*  
GWU

*Sean Liddick*  
MSU

*Djamel Kaoumi*  
NCSU

*Cody Folden*  
TAMU

*Mani Tripathi*  
UCD

*Angela Di Fulvio*  
UIUC

*Frederic Poineau*  
UNLV

*Anil Prinja*  
UNM

*Jason Hayward*  
UTK

*Tom Stockman*  
LANL

*John Valentine & Shawn Tornga*  
LBNL

*Vladimir Mozin*  
LLNL

*Benjamin Thomas Jr.*  
ORNL

*David Peters & Jonathan  
Zimmerman*  
SNL

### EXTERNAL ADVISORY BOARD

*Dr. Carol Burns*  
Chair

*Dr. Roger Falcone*

*Dr. Miriam John*

*Dr. Trish Baisden*

*Dr. Benn Tannenbaum*

*Dr. Ibo Matthews*

*Dr. Jason Newby*

*Dr. Kary Myers*

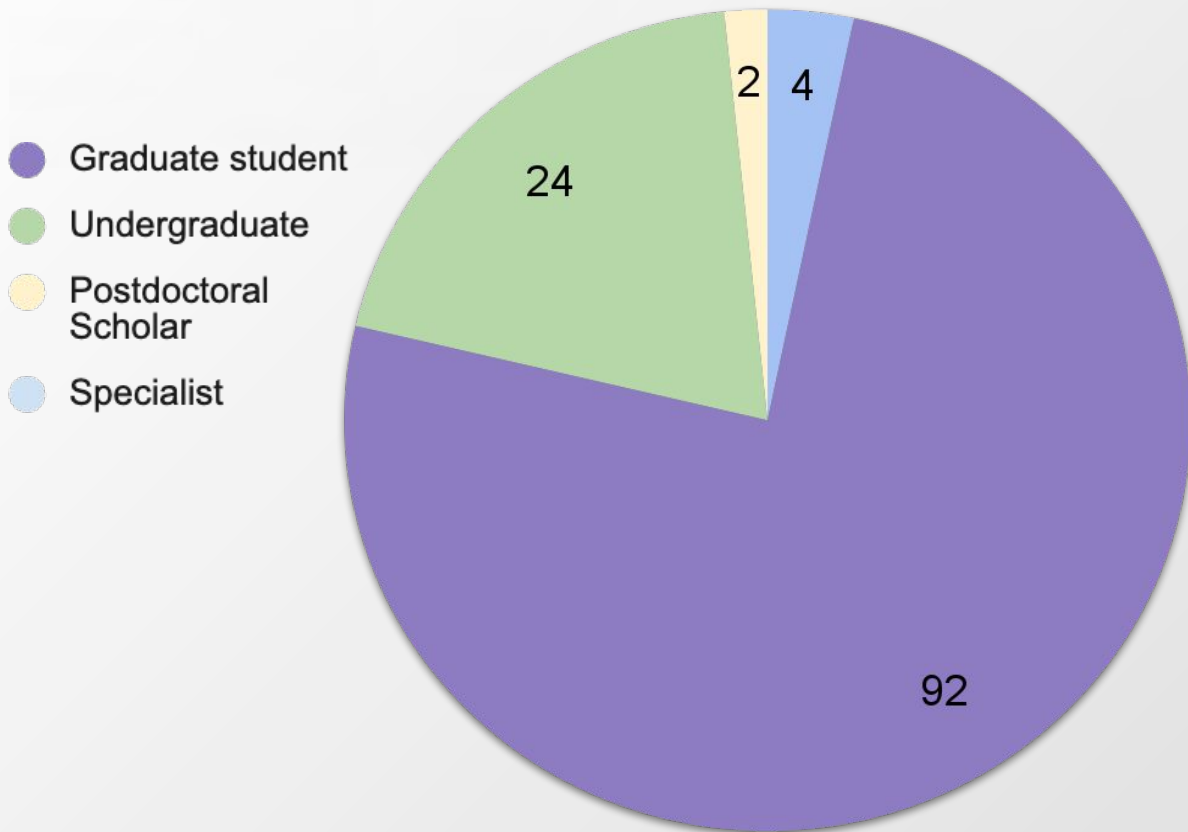
### SUPPORT STAFF

*Ava Benkhatar, UCB*  
Program Manager

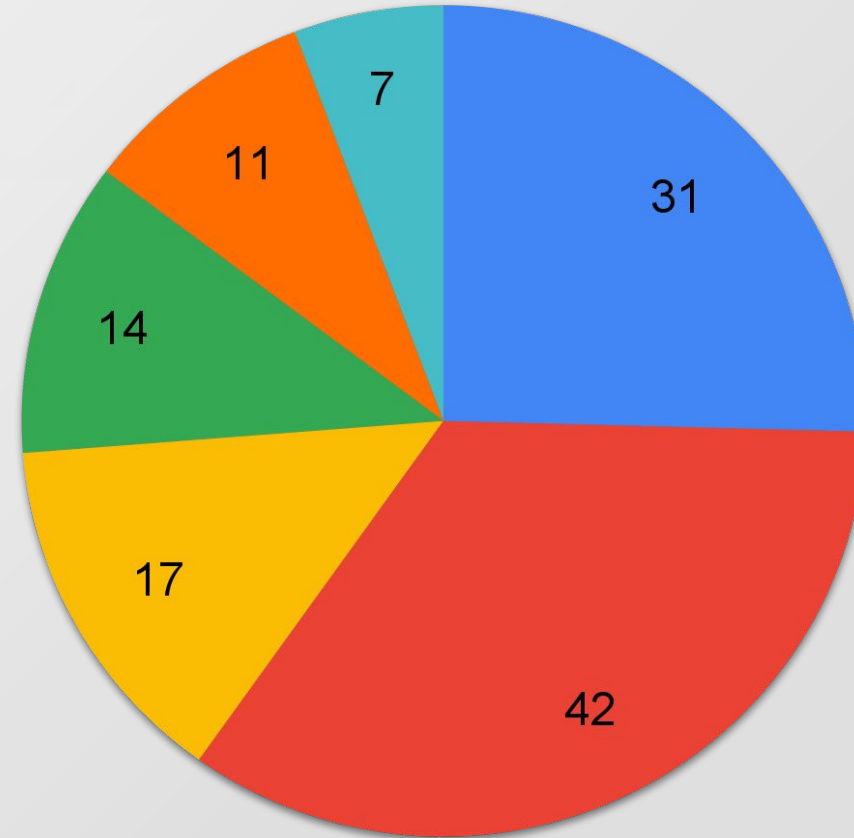
*Derek Johnson, UCB*  
Financial Analyst

# The NSSC3 Community

Large community of scholars working in fundamental disciplines supporting the nonproliferation mission



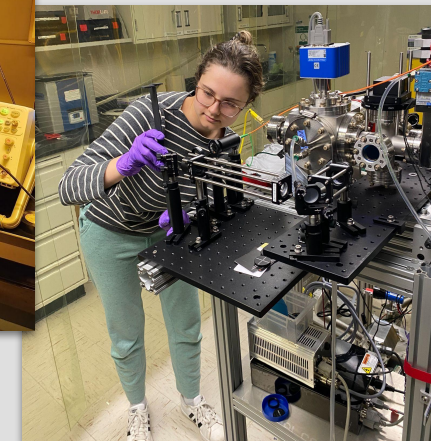
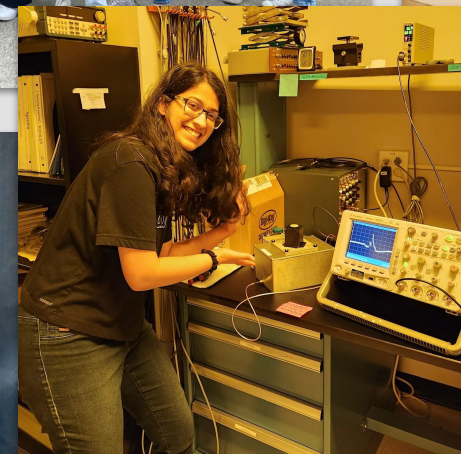
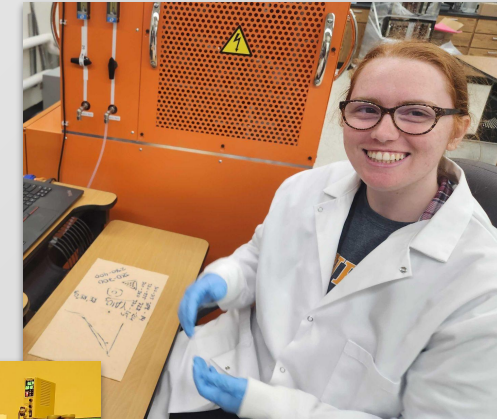
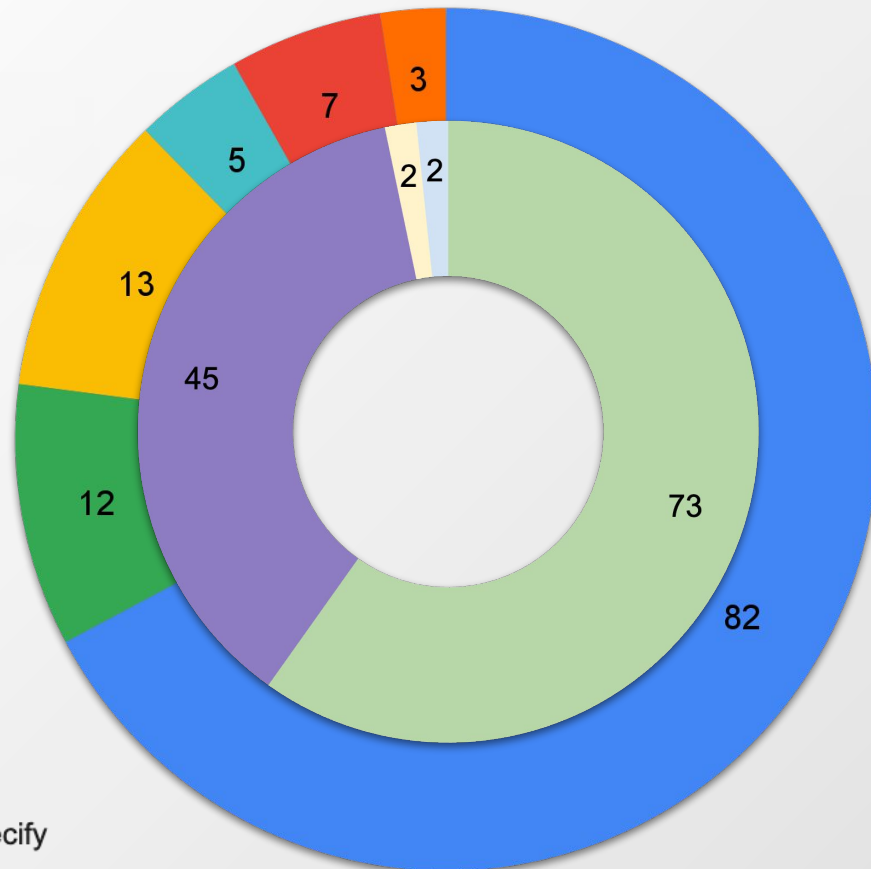
122 NSSC Graduate Fellows and Affiliates!



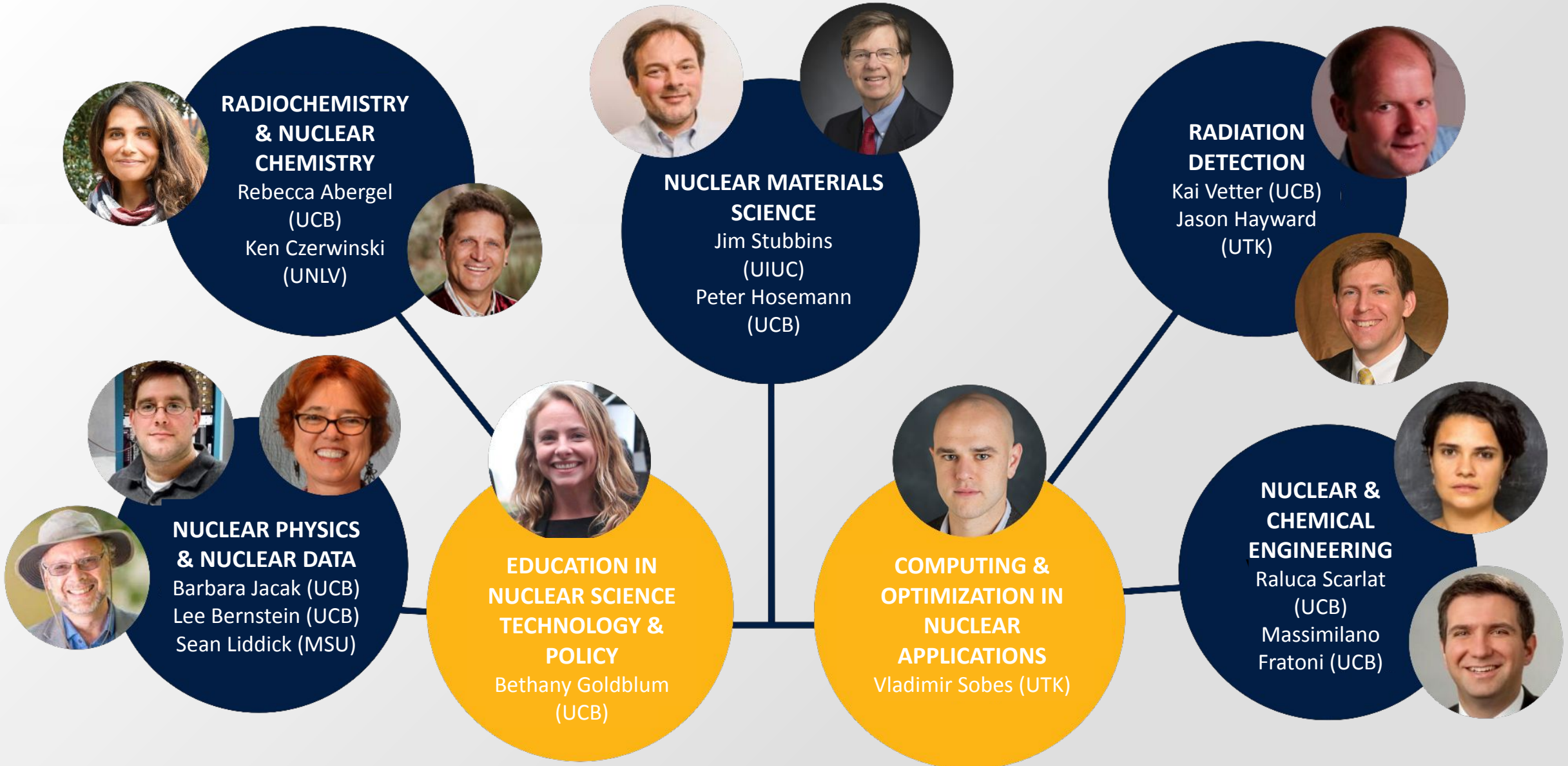
Broad participation across six Focus and Crosscutting Areas

- Radiation Detection
- Nuclear physics and nuclear data
- Radiochemistry and nuclear chemistry
- Nuclear materials science
- Computing and Optimization in Nuclear Applications
- Nuclear and chemical engineering

# A Diverse Community of Scholars



# NSSC3 Focus and Crosscutting Areas



# Nuclear Physics & Nuclear Data

→ Includes 20 NSSC Fellows and 5 Affiliates



**Barbara Jacak**  
*Professor of Physics*  
(lead)



**Sean Liddick**  
(co – lead)



**Lee Bernstein**  
(co – lead)

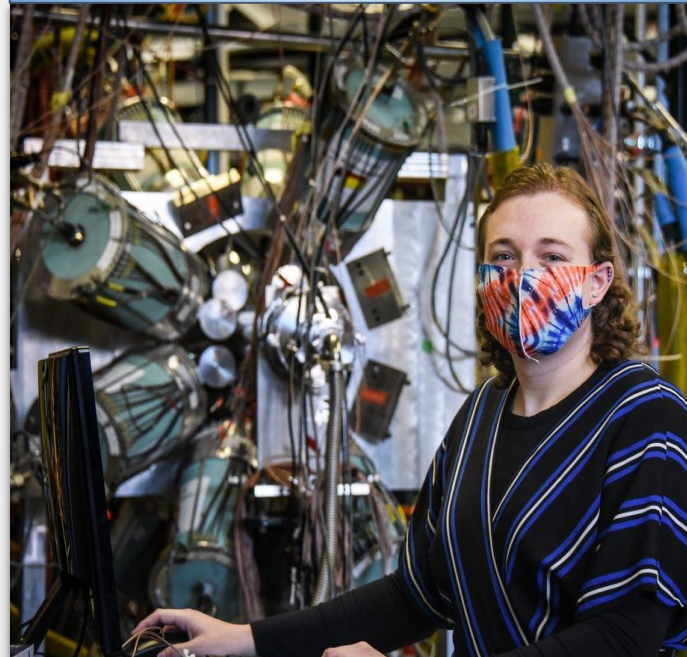


## Research Areas Include:

- Cross section measurements
- Detectors for charged particles, photons, and neutrons
- Neutrino physics



**Ava Hill**  
**Michigan State University**



**Advisor:** Alexandra Gade



**Lab Mentor:** Hye Young Lee

**Tyler Nagel**  
**University of California, Berkeley**



**Advisor:** Lee Bernstein



**Berkeley**  
UNIVERSITY OF CALIFORNIA

**Lab Mentor:** Josh Brown



**BERKELEY LAB**



# Radiochemistry and Nuclear Chemistry

→ Includes 9 NSSC Fellows and 3 Affiliates



**Ken Czerwinski**  
*Associate Professor, Department of  
Chemistry & Biochemistry/Radiochemistry  
(lead)*



**Rebecca  
Abergel**  
(co – lead)



## Research Areas Include:

- Radiochemical separations
- Compound synthesis and characterization
- Forensic application



**Harry Jang**  
**University of Nevada, Las Vegas**



**Advisor:** Frederic Poineau **UNLV**



**Lab Mentor:** Sarah Hickam

**Jenna Garcia**  
**Texas A&M University**



**Advisor:** Cody Folden **ATM**



**Lab Mentor:** Evelyn Bond

# Nuclear Materials Science

→ Includes 11 NSSC Fellows and 3 Affiliates



**Peter Hosemann**  
Professor, Nuclear Engineering Department  
(lead)



**Jim Stubbins**  
(co – lead)


## Research Areas Include:

- Additive manufacturing
- Electrical and thermal resistivity
- Inductively coupled plasma mass spectrometry




**Benjamin Walusiak**  
George Washington University



Advisor: Christopher Cahill   
Los Alamos NATIONAL LABORATORY EST. 1943  
Lab Mentor: Alice Smith

**Jared Justice**  
University of New Mexico



Advisor: Osman Anderoglu   
Lawrence Livermore National Laboratory  
Lab Mentor: Andrew Hoff

# Radiation Detection

→ Includes 23 NSSC Fellows and 11 Affiliates



**Kai Vetter**  
Professor, Department of Nuclear  
Engineering  
(lead)



**Berkeley**  
UNIVERSITY OF CALIFORNIA



**Jason  
Hayward**  
(co – lead)



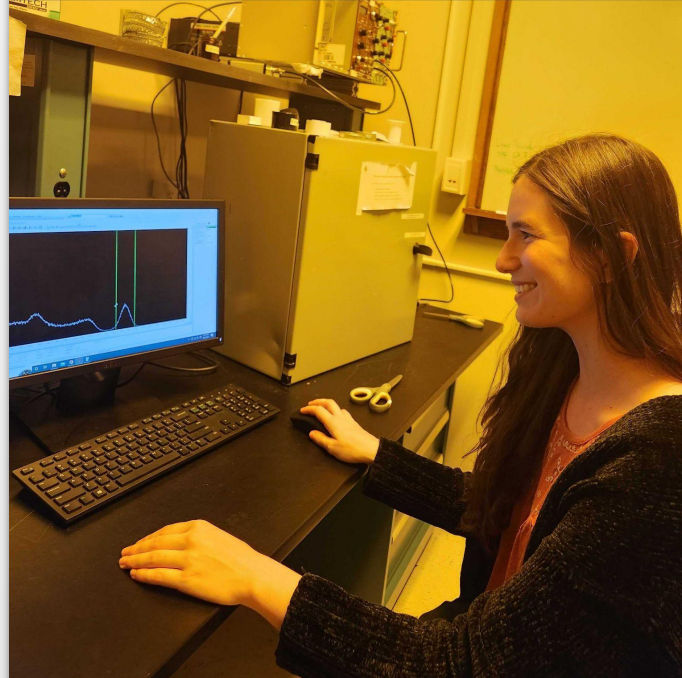
THE UNIVERSITY OF  
**TENNESSEE**  
KNOXVILLE

## Research Areas Include:

- Detector materials
- Detector development, readout, & characterization
- Systems & Scene-Data Fusion



**Rebecca Lalk**  
University of Tennessee, Knoxville

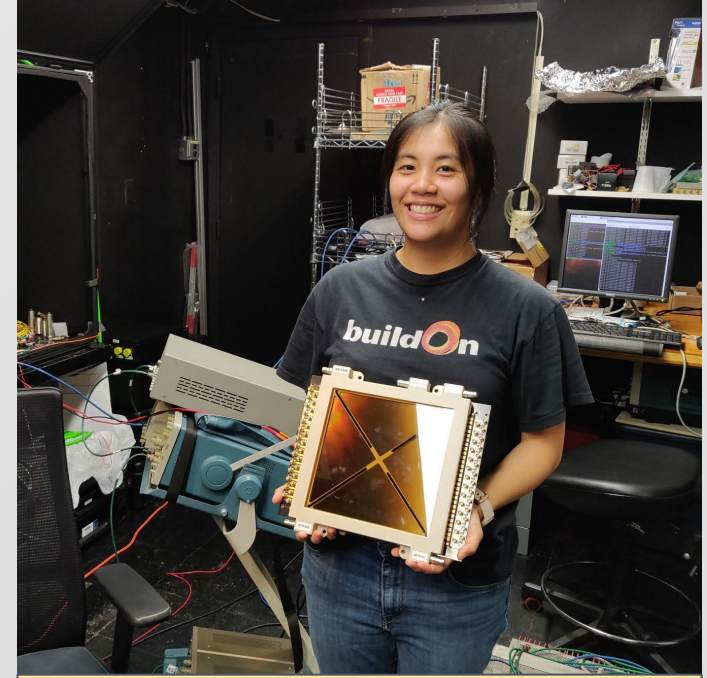


Advisor: Jason Hayward



Lab Mentor: Paul Hausladen

**Julie He**  
University of California, Davis



Advisor: Robert Svoboda



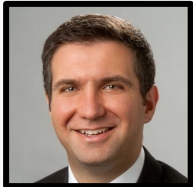
Lab Mentors: Adam Bernstein,  
Steven Dazeley

# Nuclear and Chemical Engineering

→ Includes 2 NSSC Fellows and 1 Affiliates



**Raluca Scarlat**  
*Assistant Professor, Department of Nuclear Engineering*  
(lead)



**Massimiliano Fratoni**  
(co – lead)

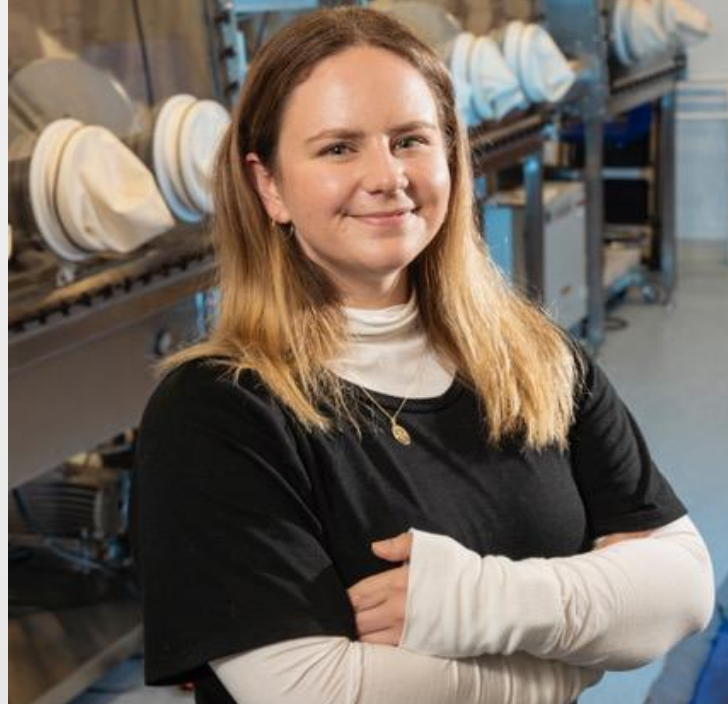


## Research Areas Include:

- Molten Salt Reactors
- Corrosion experimentation and measurements
- Advanced fuel cycles



**Sasha Kennedy**  
**University of California, Berkeley**

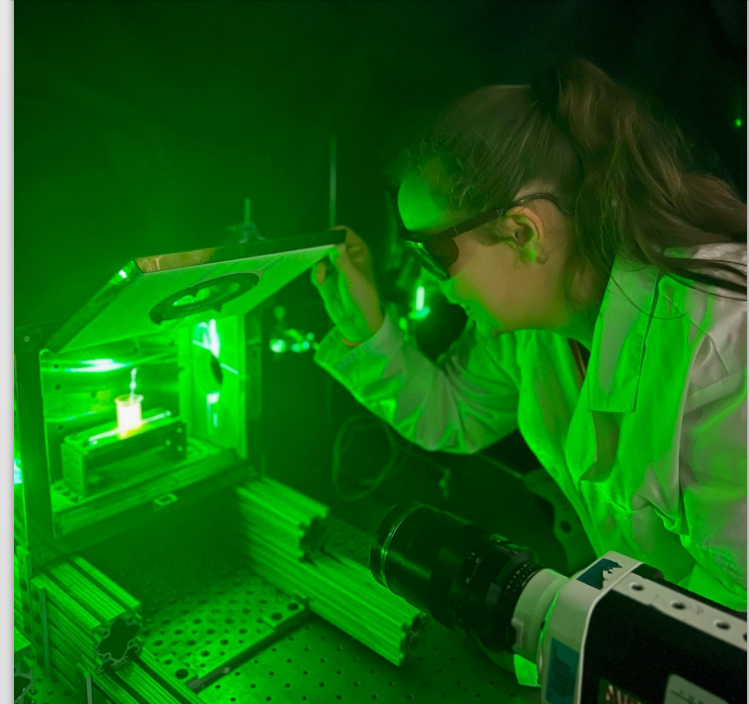


Advisor: Raluca Scarlat



Lab Mentor: Marisa Monreal

**Kara Wilke**  
**Texas A&M University**



Advisor: Yassin Hassan



Lab Mentor: Vincent Mousseau

# Computing & Optimization in Nuclear Applications

→ Includes 10 NSSC Fellows and 1 Affiliates



**Vladimir Sobes**  
Assistant Professor, Dept of  
Nuclear Engineering  
(Lead)



**Sandra Bogetic**  
(co – lead)




## Research Areas Include:

- Optimization of nuclear data algorithms and simulations
- Monte Carlo code development
- Machine learning methods



**Noah Walton**  
University of Tennessee,  
Knoxville



Advisor: Vladimir Sobes 



Lab Mentor: Jesse Brown

**John Leland**  
University of Illinois, Urbana  
Champaign



Advisor: Angela Di Fulvio



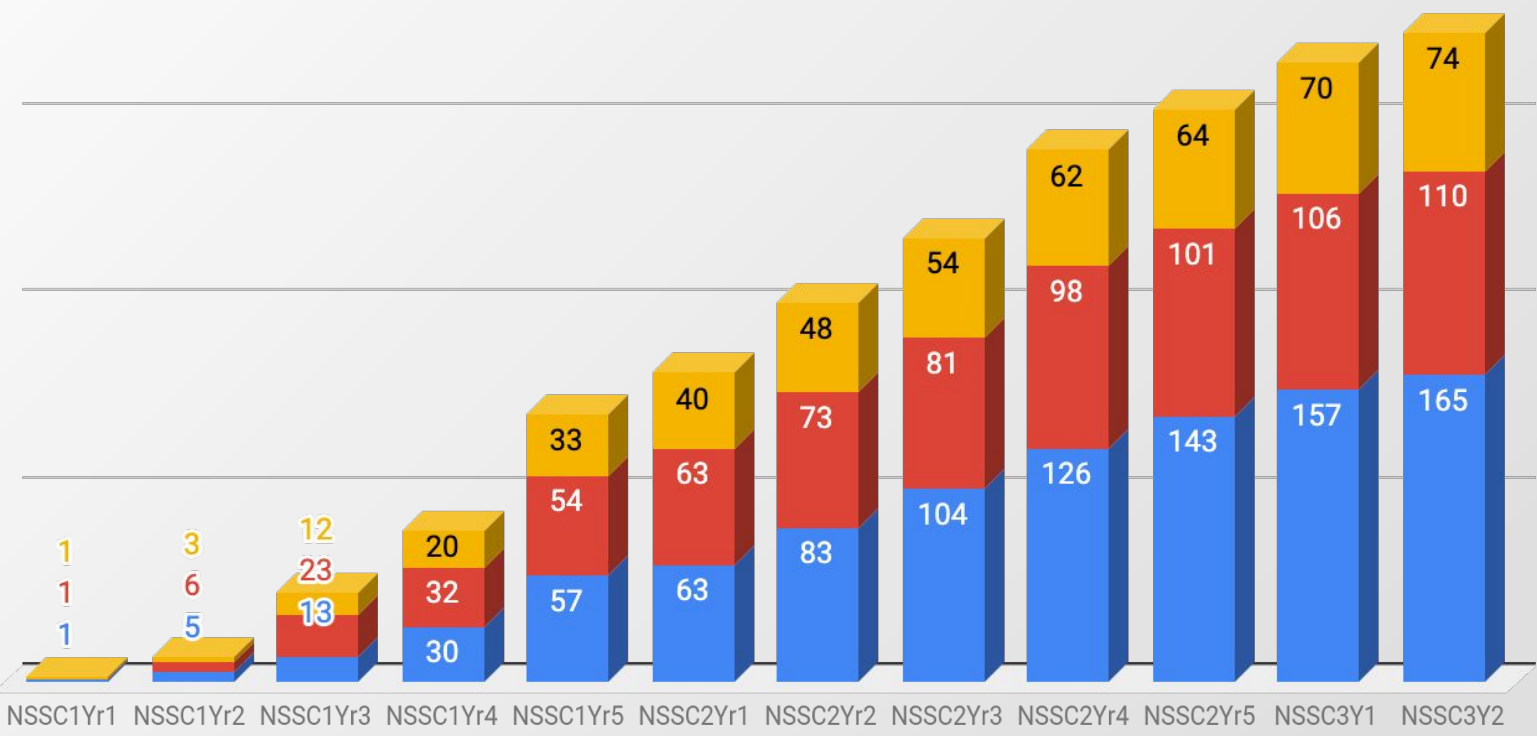
Lab Mentors: Zoe Gastelum; Tom Weber



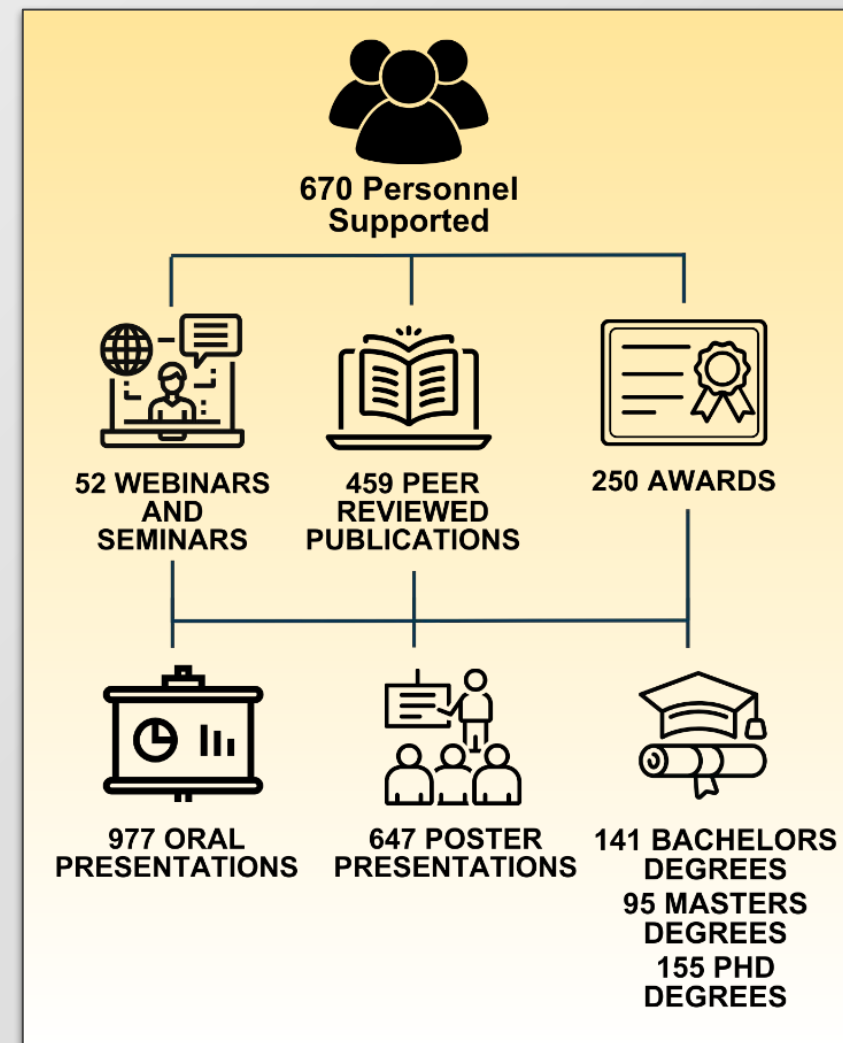
# A New Cadre of Nuclear Scientists and Engineers!

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**



# NSSC3 Success Stories



**James McGreivy**  
University of California,  
Berkeley

→ PhD Student at MIT



**Karen Koop Hogue**  
University of  
Tennessee, Knoxville

→ R&D Staff at ORNL



**Scott Essenmacher**  
Michigan State  
University

→ Lab Position at LANL



**Sarah Stevenson**  
University of California,  
Berkeley

→ AAAS/ANS  
Congressional Fellow



**Jonathan George**  
University of Las  
Vegas, Nevada

→ Stable Isotope  
Processing Chemist  
at ORNL

# Acknowledgements



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