



# Nuclear Science and Security Consortium Newsletter

*Fall 2023 Edition*

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# Letter from the NSSC Director

## Dear NSSC Community and Friends,

As NSSC Director, it is my honor to share some of the remarkable developments and achievements from within our Consortium over the past year.

From the very beginning, our team deeply believed that our students must receive an excellent background in the **fundamental nuclear sciences**—including nuclear physics and nuclear data, nuclear chemistry and radiochemistry, and nuclear materials science—before choosing to specialize in **applied nuclear science and engineering**, including radiation detection and instrumentation development, nuclear chemical engineering, general nuclear engineering, reactor design, or computing and optimization for nuclear applications. NSSC fellows, who are the top talent recruited from a diverse student body, are provided with continuing intensive academic advising and mandatory national laboratory mentoring.

The NSSC has amassed over a decade of experience, fostering a robust network of alumni who are actively contributing to the work conducted within the DOE National Laboratories. Throughout our journey that started in 2011, we have supported and **engaged 670 individuals**, spanning undergraduate and graduate students, postdoctoral researchers, specialists, and faculty members. This collective effort has led to the awarding of **391 degrees**, receipt of **264 prestigious awards**, publication of **459 peer-reviewed publications**, and the delivery of over **1600 oral and poster presentations**. Notably, we also take great pride in having facilitated the **placement of 162 students and postdocs**, which accounts for **40% of scholars completing the program**, into careers within the U.S. DOE National Laboratories and other esteemed government agencies.

# Letter from the NSSC Director

This year, the NSSC hosted a very successful annual **University Program Review (UPR)** meeting on June 6-8, 2023, in Berkeley, with participation of four DNN R&D-funded consortia. There were **276 participants**, including **students and faculty from ~30 universities**, scientists from national laboratories and representatives from multiple governmental agencies. NNSA DNN was represented by **Deputy Administrator Corey Hinderstein** and **NNSA DNN R&D Director Craig Sloan**.

In addition to the existing eight-week hands-on summer programs developed in collaboration with **Los Alamos, Lawrence Livermore, and Sandia National Laboratories**, this year the NSSC was proud to introduce the **first ever Consortia Workshop** on June 9th at LLNL. The students' day commenced with presentations by **Lab Director Kim Budil**, providing an overview of LLNL, and **Scot Olivier**, the Lab's point of contact for NNSA's Defense Nuclear Nonproliferation (DNN) R&D, discussing nuclear threat reduction.

As we reflect on these achievements and milestones, I want to express my gratitude to the **dedicated individuals** within the NSSC community, whose **hard work and commitment** continue to drive our success. Together, we remain steadfast in our pursuit of excellence and contributions to the critical field of nuclear security."

— *Jasmina Ujic*



# NSSC Overview

## NSSC Executive Team



### **Jasmina Vujic**

Director  
UC Berkeley



### **Bethany Goldblum**

Executive Director  
UC Berkeley



### **Kai Vetter**

NNSA Liaison  
UC Berkeley



### **Jason Hayward**

Deputy Executive Director  
UT Knoxville



### **Lee Bernstein**

Lab Liaison  
UC Berkeley

## NSSC ADVISORY BOARD

**DR. CAROL BURNS – Chair**  
Lawrence Berkeley National Laboratory

**DR. TRISH BAISDEN**  
Retired from Lawrence Livermore National Laboratory

**DR. ROGER FALCONE**  
University of California, Berkeley

**DR. MIRIAM “MIM” JOHN**  
Retired from Sandia National Laboratories

**DR. IBO MATTHEWS**  
Lawrence Livermore National Laboratory

**DR. KARY MYERS**  
Los Alamos National Laboratory

**DR. JASON NEWBY**  
Oak Ridge National Laboratory

**DR. BENN TANNENBAUM**  
Sandia National Laboratories

## NSSC Support Team

**DEREK JOHNSON**  
Financial Analyst

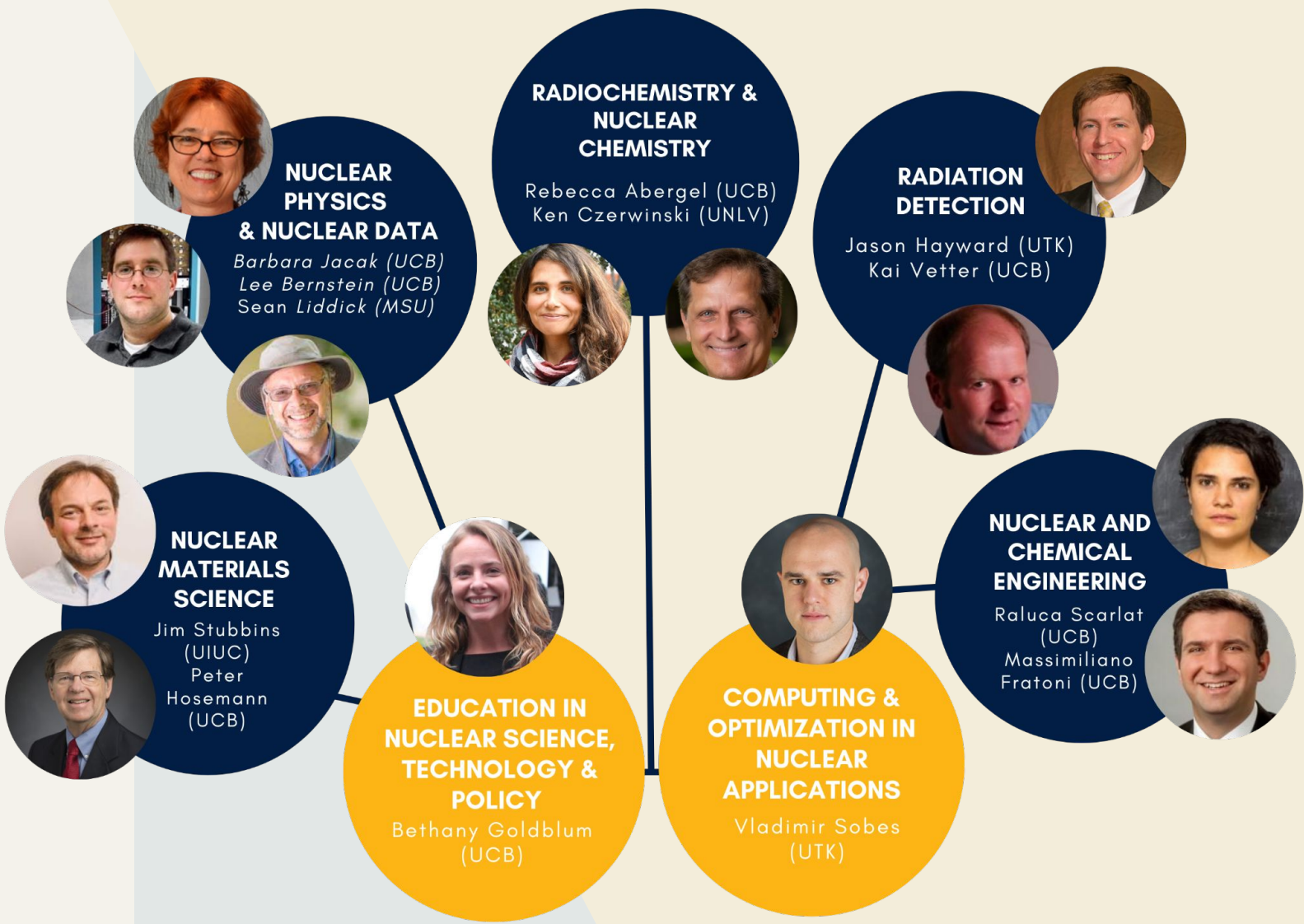
**AVA BENKHATAR**  
Program Manager

# The Mission of the NSSC

The NSSC has two primary objectives: (i) develop world-class nuclear scientists and engineers with expertise in the critical disciplines required for careers at U.S. DOE National Laboratories and other nuclear-related fields, and (ii) provide innovative concepts, technologies, and ideas to the labs in support of the NNSA DNN R&D mission. Our Consortium brings an end-to-end approach, by attracting and training exceptional students, connecting them with research in relevant nuclear disciplines, and facilitating their transition to careers in the national and nuclear security.

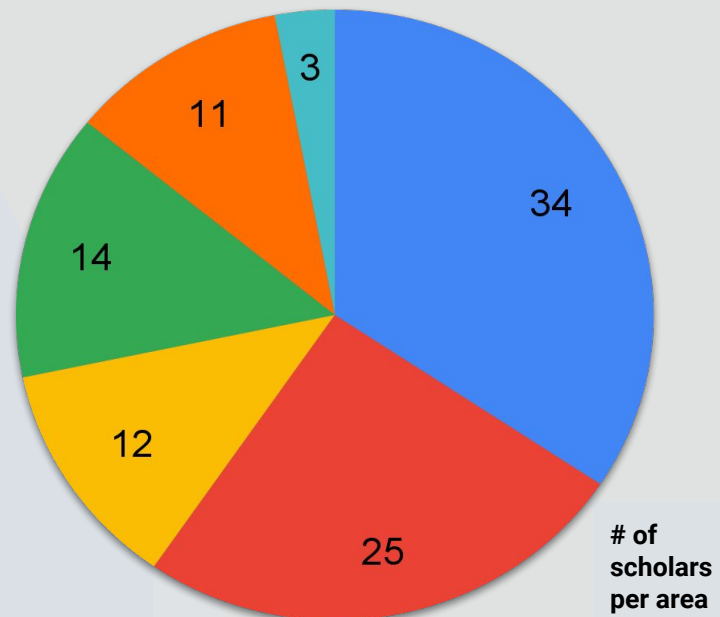


# NSSC3 Focus & Crosscutting Areas



**Broad scholar participation across six Focus and Crosscutting Areas!**

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

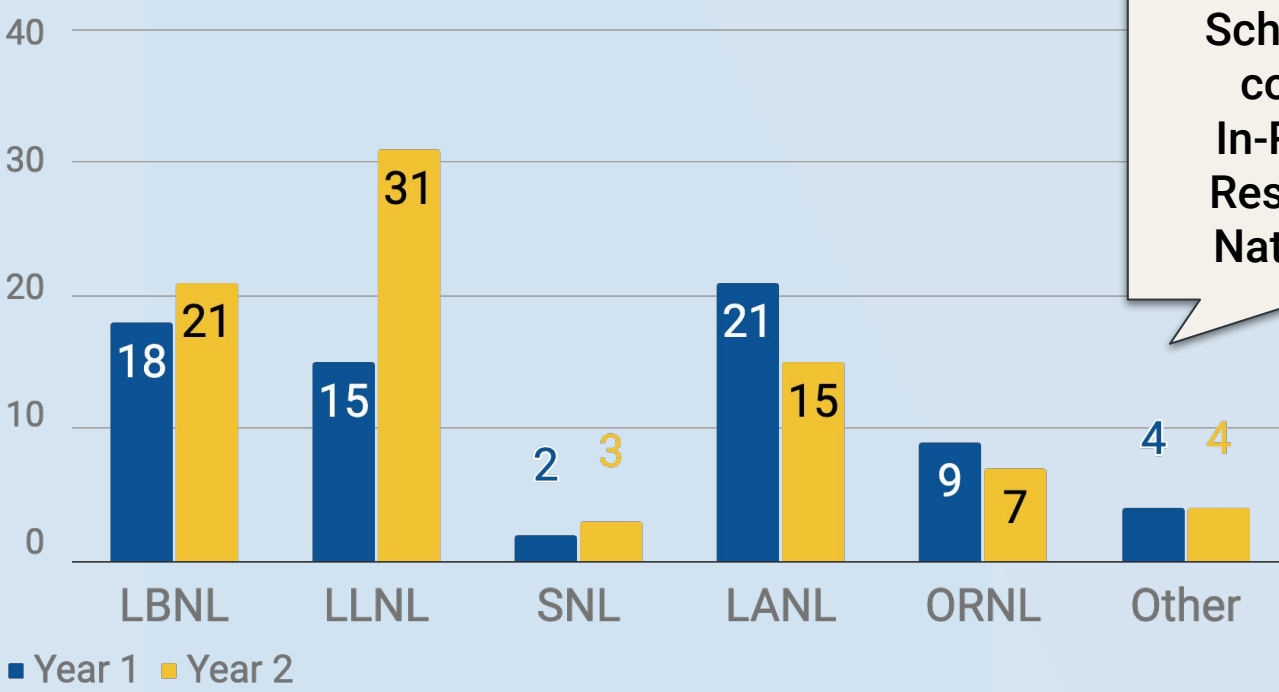


# of scholars per area

# Partner Institutions & Laboratories



## NSSC3 In-Residence Research by Lab



150 NSSC3 Scholars have conducted In-Residence Research at a National Lab!



# University Program Review (UPR)



The Nuclear Science and Security Consortium hosted a **successful annual University Program Review (UPR)** meeting on June 6-8, 2023, in Berkeley, CA. The meeting was held in-person at the ASUC Student Union on the UC Berkeley campus. During the first day of the annual meeting, we were pleased to welcome **NNSA DNN Deputy Administrator, Corey Hinderstein**.



# University Program Review (UPR)

The UPR meeting welcomed **four DNN R&D-funded consortia**: the Nuclear Science and Security Consortium (**NSSC**), the Consortium for Monitoring, Technology, and Verification (**MTV**), the Consortium for Enabling Technologies & Innovation (**ETI**), and the Consortium for Nuclear Forensics (**CNF**). The meeting brought together **more than 275 participants**, including faculty and students from **~30 universities**, scientists from national labs, and representatives from multiple government agencies.



NSSC Executive team with NNSA Leadership. Left to right: Prof. Jason Hayward (UTK), Prof. Lee Bernstein (UCB), Prof. Bethany Goldblum (UCB), NNSA Deputy Administrator Corey Hinderstein, Director Craig Sloan (NNSA DNN R&D), and Prof. Vetter (UCB).

# NSSC UPR Awards



Left to right: Prof. Cody Folden (TAMU), NNSC Fellow Jenna Garcia (TAMU), Prof. Bethany Goldblum (UCB), Director Craig Sloan (NNSA DNN R&D), NNSC Fellow Benjamin Walusiak (GWU), and NNSC Fellow Dominic Lioce (UCB).



## **Jenna Garcia** *Best Oral Presenter*

Garcia (TAMU) was awarded for her presentation on “Dissolution of a  $^{224}\text{Ra}$  mock sample for future nuclear forensic analyses of a  $^{226}\text{Ra}$  pigment sample,” in collaboration with LANL.



## **Benjamin Walusiak** *Best National Laboratory Collaboration*

Walusiak (GWU) was awarded for his research on “Differential Scanning Calorimetry and Neutron Diffraction of  $\text{Cs}_2\text{UCl}_6$   $\text{Cs}_2\text{UO}_2\text{Cl}_4$ : Structural Insights,” in collaboration with LANL.



## **Dominic Lioce** *Best Poster Presenter*

Lioce (UCB) was awarded for his poster presentation on “Modeling Radiation Transport in Stochastically Mixed Media,” in collaboration with SNL.

# 2023 Consortia Workshop on Nuclear Security and Nonproliferation

Co-organized by NSSC and LLNL

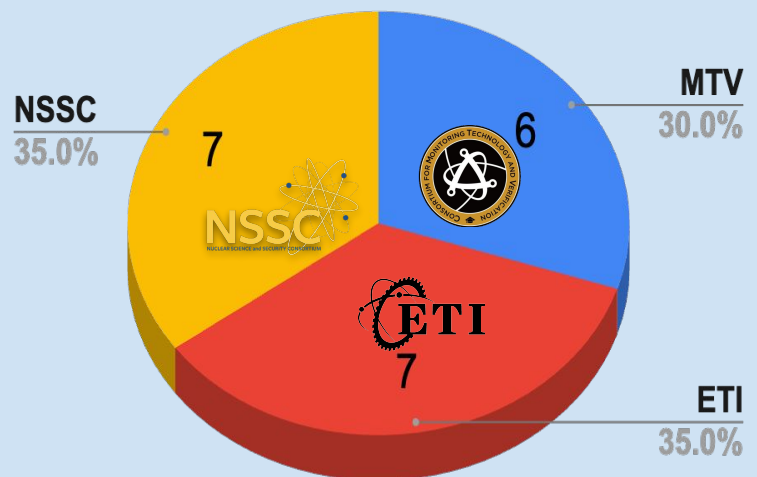


NSSC and LLNL co-hosted the **first-ever Consortia Workshop on Nuclear Security and Nonproliferation** on June 9, 2023. This day-long workshop provided participants with **exposure to the DNN R&D mission and the role of LLNL in nuclear threat reduction**. Twenty attendees from **across the DNN R&D Consortia** participated in hands-on experimental modules to gain valuable skills in R&D relevant for nuclear security and nonproliferation.



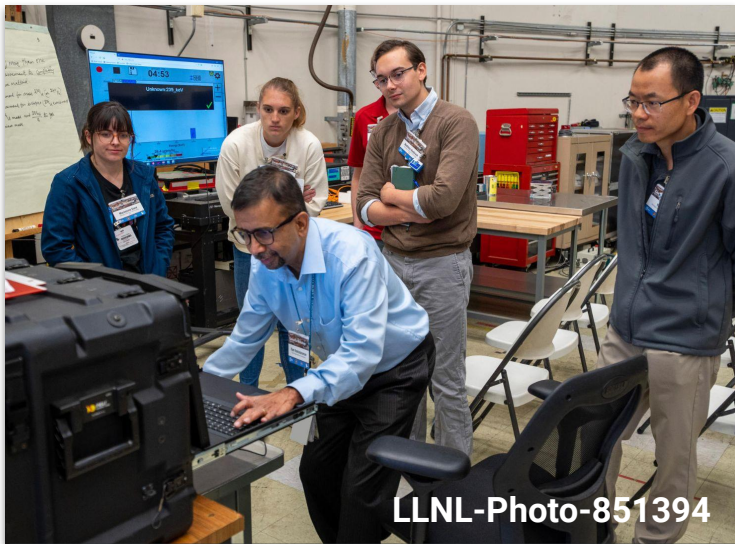
**Dr. Kim Budhil**, Director of LLNL, provided participants with an overview of the LLNL capabilities and mission

## Participants per DNN R&D Consortium



# 2023 Consortia Workshop on Nuclear Security and Nonproliferation

Participants engaged in **four hands-on experimental modules** conducted in Bldg. 262 at LLNL. These modules included warhead verification, instructed by **LLNL** researchers; safeguards, instructed by researchers from **ORNL**; nuclear smuggling, instructed by researchers from **LANL**; and radiological search, jointly instructed by researchers from **SNL** and **LLNL**.



LLNL-Photo-851394

Ram Venkataraman (**ORNL**) instructing the Safeguards and Security: Non-Destructive Assay Module

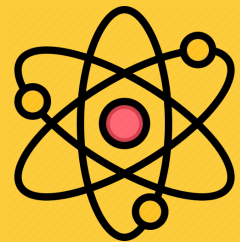


Bonnie Canion (**LLNL**) instructs participants on the use of a handheld radiation monitor



LLNL-Photo-851394

LLNL-Photo-851394



Bonnie Canion (**LLNL**) and Vladimir Mozin (**LLNL**) instructing the Warhead Verification for Future Nuclear Arms Reduction Treaties Module

# 2023 Summer Programs

## PPNT

The Public Policy and Nuclear Threats (PPNT) Boot Camp, run by **NSSC Executive Director Bethany Goldblum**, is a summer workshop hosted by the Institute on Global Conflict & Cooperation at UC San Diego

This bootcamp aims to give participants the knowledge and analytic tools needed to contribute to the debate on **future U.S. nuclear policy**. This year's event featured lectures, discussions, and debates, by distinguished researchers, academics, policy officials, and operational specialists from leading universities, National Laboratories, and government agencies.

## INDAT

The International Nuclear Data and Analytical Techniques (INDAT) Summer School held at **UC Davis** is a fusion of two previous NSSC programs: the Nuclear Analytical Techniques Summer School & the Nuclear Data Summer School.

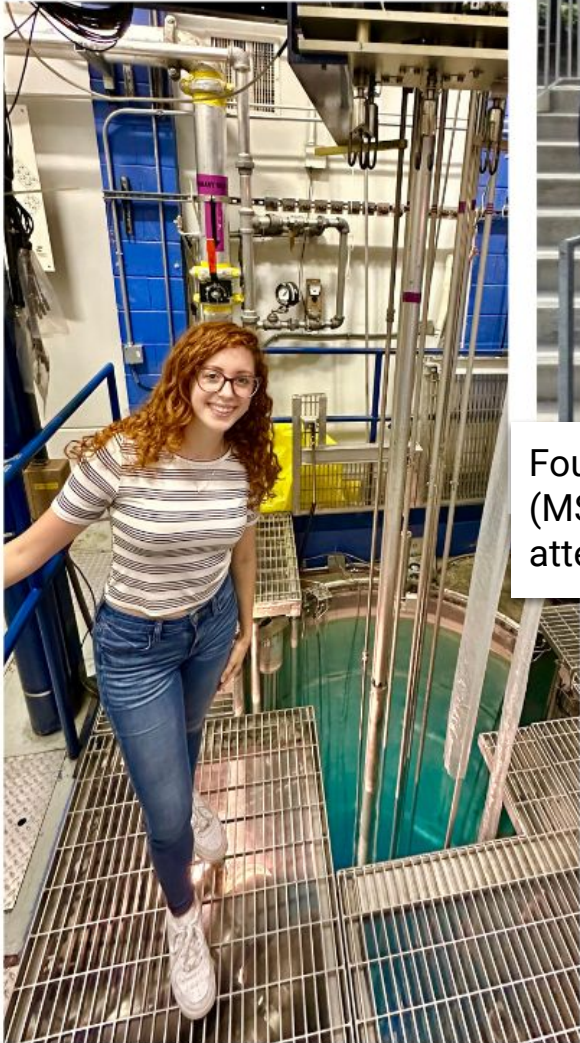
This program consists of lectures and hands-on activities in nuclear detection, analysis techniques, and the nuclear data pipeline. INDAT featured a lecture series by DOE scientists and number of experimental modules including neutron activation analysis using the **McClellan nuclear research center**, pulse shape discrimination with organic scintillators, FPGA programming, and a lab practical at the **UC Davis Crocker Cyclotron Laboratory**.

## NDA School

The Nuclear Inspector's School (NDA) is an introductory course held at **Los Alamos National Laboratory**.

This program is an introduction to **nondestructive assay measurement techniques** that are used for nuclear material accountancy at the **IAEA**. The course taught students the fundamentals of gamma-ray and neutron based detection. It included lectures and a number of hands-on exercises at LANL's training facility, leveraging the expertise and resources that are also used to instruct IAEA inspectors in NDA principles each year.

# 2023 Summer Programs



**Gabriela Ortega Morales** at the NIF tour as part of the **INDAT Summer School**



Four NSSC Fellows, **Jacob Sebastian** (UCB), **Tracy Edwards** (MSU), **Joe Brackbill** (UCB), and **Sasha Kennedy** (UCB), attended the **2023 PPNT Bootcamp**

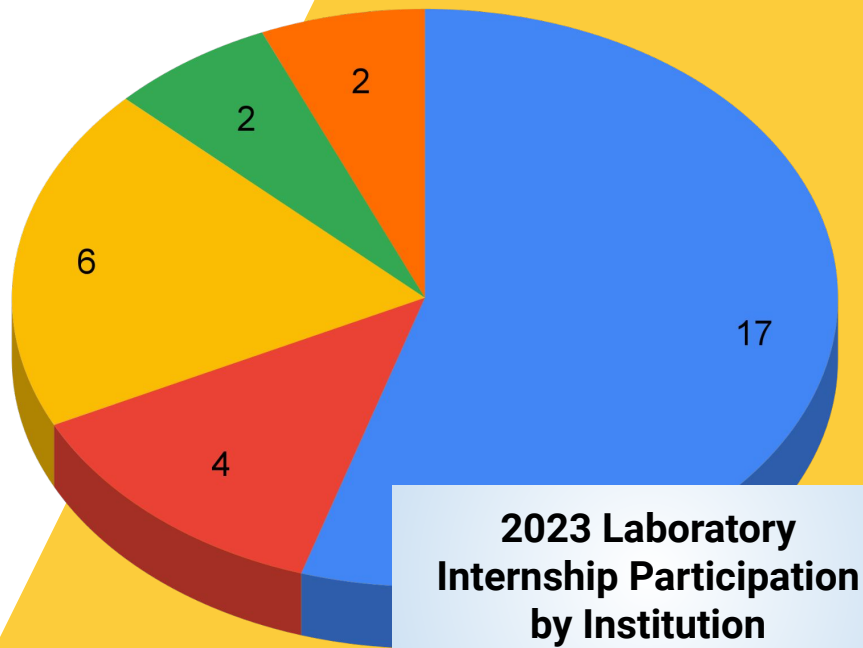


Five NSSC Fellows, **Anthony Dai**, (UCB), **Darren Parkison** (UCB), **Rebecca Manns** (UNLV), **Jason Victor** (UNLV), and **Dominic Piedmont** (UIUC), attended the **NSSC-LANL Nuclear Safeguards (NDA) Summer School**

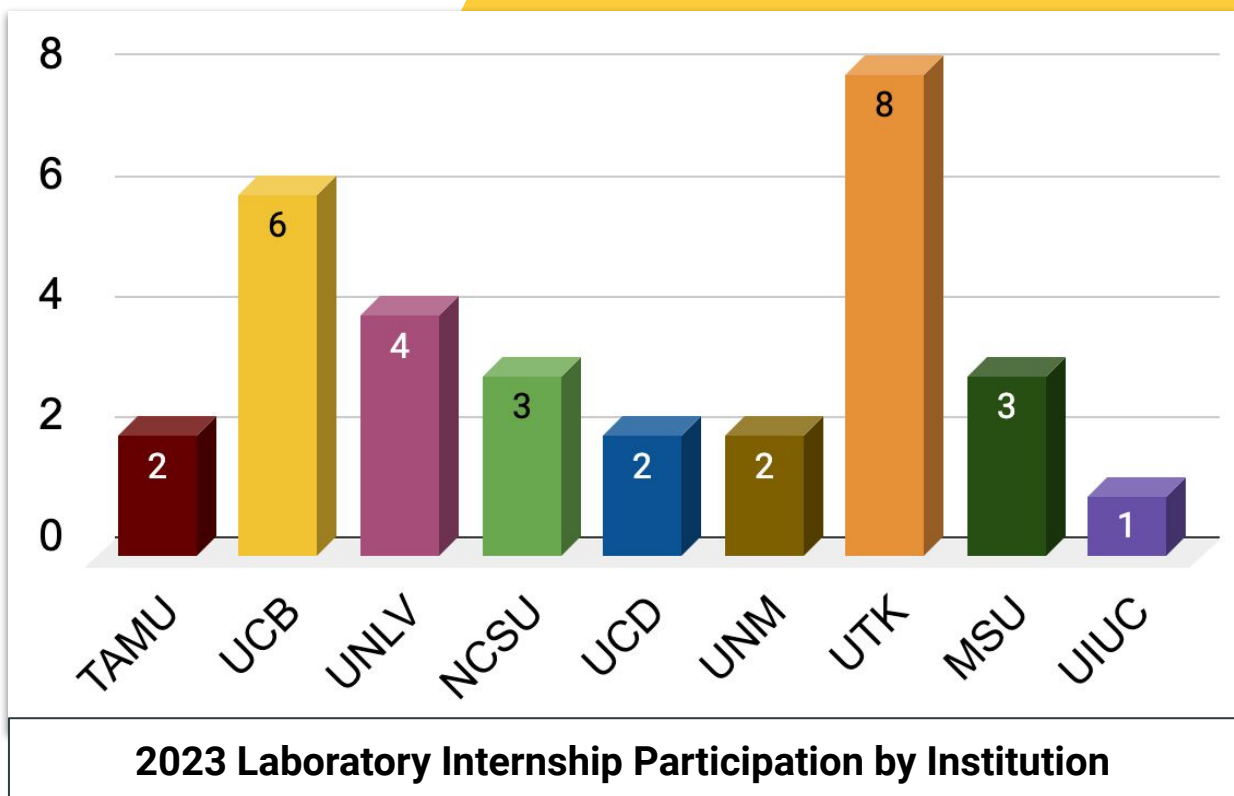
# 2023 NSSC Laboratory Internships

The 2023 NSSC National Laboratory internship cycle began on June 19, 2023. **Thirty-one NSSC scholars** from all **eleven NSSC universities** attended a laboratory internship at one of the five partner national laboratories, where they conducted research on-site with a lab mentor.

• LLNL • SNL • LANL • LBNL • ORNL



2023 Laboratory Internship Participation by Institution



2023 Laboratory Internship Participation by Institution

Interested in participating in NSSC events? Sign up to receive announcements on our programs: [bit.ly/NSSCMailer](https://bit.ly/NSSCMailer)



# 2023 NSSC Laboratory Internships

## NSSC-LANL Keepin Nonproliferation Science Summer Program

This summer, Keepin Scholars had the opportunity to visit the **Nevada National Security Site** and the **National Criticality Experiments Research Center (NCERC)**. The NCERC facility is equipped with a substantial special nuclear material inventory and nuclear critical assembly machines dedicated to conducting research to support a wide variety of nuclear security missions.



Six NSSC students—Anthony Dai (UCB), Bruno Caruso (NCSU), Chineme Uba (UCD), Austin Williams (UTK), Noah Walton (UTK), and Anneli Brackbill (UTK)—participated in the 2023 LANL Keepin Program and attended the NCERC Tour.

# 2023 NSSC LLNL Internship

**Seventeen NSSC Fellows and Affiliates** from **eight institutions** spent the summer of 2023 working on projects in nuclear threat reduction, security, and nonproliferation R&D at LLNL. During this eight-week internship, scholars worked **directly with an LLNL staff member** and collaborated with teams of experts to implement research methodologies, perform analytical and laboratory research, and present on research outcomes. Interns also participated in activities that provide insight into national security mission areas, including **technical lectures, facility tours, and hands-on training.**



*NSSC affiliate Rida Rahman (UTK) working on a laboratory directed experimental project at LLNL with Dr. Daniel Siefman.*

“ My favorite part of the summer was being able to meet and work with the Criticality Safety group here at LLNL. They were super welcoming and helped me learn a lot about the field.

”  
Rida Rahman, UTK  
NSSC Fellow

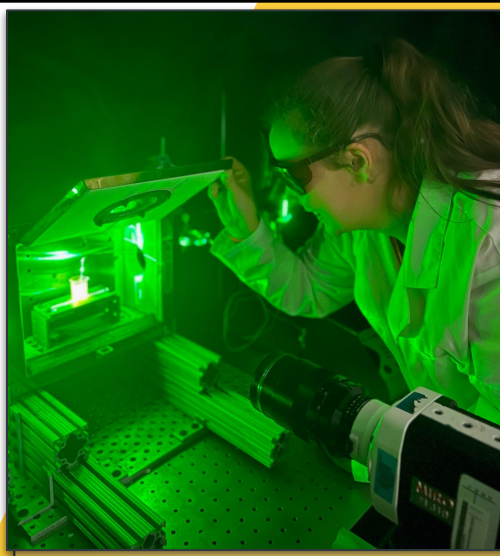
# 2023 Internships at ORNL, SNL, and LBNL

Through the NSSC, scholars also have the opportunity to participate in enriching internship experiences at **ORNL, LBNL, and SNL**. These internships offer access to unique resources and mentorship, providing scholars with the opportunity to join active projects in the fields of **basic nuclear science** and **nuclear security and nonproliferation R&D**. Each summer, NSSC internship participants engage in **research-related enrichment activities** such as technical lectures, facility tours, and hands-on training.



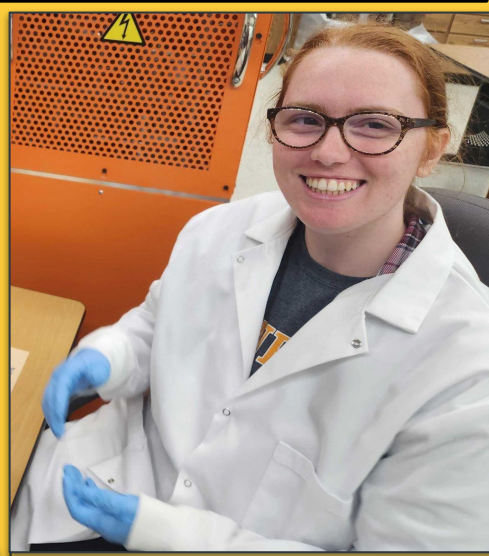
*Location: Oak Ridge National Laboratory in Oak Ridge, TN*

During the summer, **NSSC Fellow, Lance Drouet (UTK)** used SCALE to quantify the effects of nuclear data uncertainties on spent fuel metrics at **Oak Ridge National Laboratory**. Lance spent 8 weeks at ORNL working with his mentor Dr. Rike Bostelmann. He enjoyed the diverse and welcoming environment and the connections and knowledge he gained in support of his Ph.D. research.



*Location: Thermal Hydraulic Research Lab at Texas A&M University*

During the summer, **NSSC Fellow, Kara Wilke (TAMU)**, conducted research on the performance of various passive safety systems in light water reactors in accident-based scenarios using MELCOR. She was excited collaborate with her national lab mentor, Dr. David Luxat, at **Sandia National Laboratories** and hopes to further reactor safety and nonproliferation research.



*Location: Scintillation Materials Research Center at UT Knoxville*

This summer, **NSSC Graduate Fellow, Sarah Longworth (UTK)**, worked with Dr. Federico Moretti at **Lawrence Berkeley National Laboratory** to measure nanosecond time profiles of ultra-fast scintillator crystals recently grown at the Scintillation Materials Research Center at UTK by another NSSC Fellow, Daniel Rutstrom.

# 2022/2023 Webinars & Seminars

The NSSC hosted an **AY22-23 Webinar Series** entitled, “**NSSC3: A New Frontier**,” that showcased the research activities of **new NSSC faculty members**. This series served as a forum for **collaboration amongst all NSSC universities and national laboratories** and fostered a **bridge between academic and laboratory research**.

## 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 Kaoumi**



Our Guest Speaker

**Prof. Juan Manfredi**

For more about NSSC webinars and seminars, visit [bit.ly/NSSCwebinars](https://bit.ly/NSSCwebinars)

# 2022/2023 Webinars & Seminars

## NSSC IN-PERSON CO-SPONSORED TALKS



Dr. Mark B. Chadwick (LANL)



Dr. Andrea Kritcher (LLNL)



Dr. Jason Reinhardt (SNL)

This year, the NSSC co-hosted a series of engaging discussions featuring notable speakers. **Mark Chadwick** delved into the **early breakthroughs of determining DT and DD fusion cross sections** in the 1940s at **LANL**, highlighting their impact on the course of nuclear fusion energy. Additionally, in collaboration with **UCB's Nuclear Engineering Department**, the NSSC organized a fusion ignition webinar featuring **Dr. Andrea Kritcher**, the principal designer of LLNL's **NIF lab experiment**. Furthermore, **Dr. Jason Reinhardt of SNL** engaged with the **Berkeley Risk and Security Lab** and the NSSC to explore contemporary challenges in **Modern Nuclear Deterrence**.



NSSC worked with UCB's **Berkeley Risk and Security Laboratory** to bring **former Deputy Secretary General of NATO, Amb. Rose Gottemoeller**, to campus. Amb. Gottemoeller discussed the **future of strategic stability and arms control** at this Keynote Speaker Event and met with NSSC scholars.

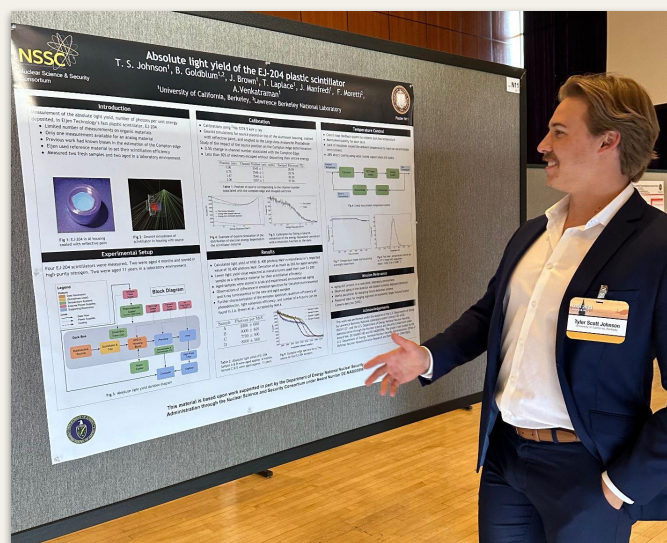
# NSSC Student Highlights



**Aaron Nowack** defended his PhD dissertation in June 2023 on "The Varying Probability of Fission Model for Calculation of Neutron Moments and Applications" and started work as a **staff researcher in July at SNL**.

Sample results were obtained for images of kg-quantity U-235 metal objects, 10 cm or more in dimension, that were interrogated with tagged neutrons from a Deuterium-Tritium generator using a validated MCNP workspace. Aaron developed a **fast and accurate method for quantifying nuclear material characteristics**

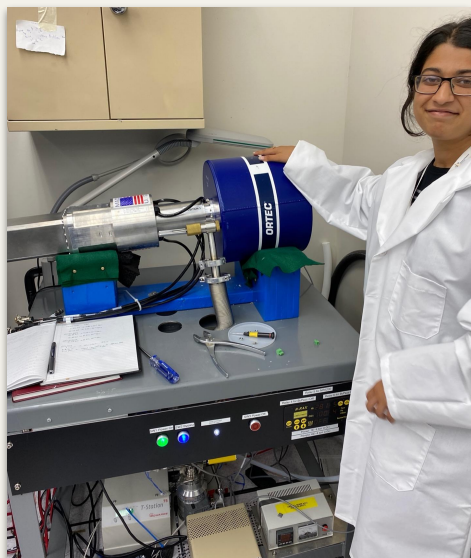
**from generated images**, including the spatially-dependent probability of fission, that is to be integrated into Associated Particle Imaging systems for field use, in order to enable a near-real-time quantification capability for operators. Aaron's lab mentor is **Dr. Paul Hausladen (ORNL)**, and his research advisor is **Prof. Jason Hayward (UTK)**.



**Tyler Johnson's** was an undergraduate NSSC Fellow at UCB majoring in nuclear engineering. He developed instrument control software and performed Geant4 simulations in support of a measurement of the absolute light yield of plastic scintillators at the **88-Inch Cyclotron at LBNL**, which was **published in *Nuclear Instruments and Methods A*** with Tyler as co-author. He also analyzed data from a previous experiment to extract the proton light yield of a Li-loaded

plastic scintillator developed at LLNL, a novel material sensitive to gamma rays as well as fast and slow neutrons. Tyler earned a **B.S in nuclear engineering** at UC Berkeley in May 2023 and recently started a career at Siemens Healthineers in Knoxville, Tennessee supporting the development of industry-defining nuclear imaging technologies. Tyler's academic advisor is **Prof. Bethany Goldblum (UCB/LBNL)** and his lab mentors are **Dr. Josh Brown (UCB/LBNL)** and **Dr. Thibault Laplace (UCB/LBNL)**.

# NSSC Student Highlights



**NSSC Graduate Student, Kate Joshi (UTK)**, constructed a temperature controlled chamber and compared the performance of photomultiplier tubes, silicon photomultiplier arrays, and avalanche photodiodes for the detection of the near infrared scintillation emission from new perovskite single crystal scintillators,  $\text{CsEuI}_3$  (Sm1%) and  $\text{CsEuBr}_3$  (Sm1%), that she grew previously. She investigated the emission characteristics under both ultraviolet light and ionizing radiation. This summer, Kate interned at **LLNL** and also attended the **Consortia Workshop** that was co-hosted by the NSSC and LLNL.

Kate's lab mentor is **Steve Payne (LLNL)**, and her research is **Prof. Chuck Melcher (UTK)**.

NSSC Graduate Fellow, **John Leland (UIUC)**, is currently working on a high-efficiency gamma-ray imager based on ASICs readout. John's work has focused on optimizing the imager hardware, in particular implementing temperature control of the silicon photomultipliers used for scintillator light readout. This summer, John attended the **INDAT summer school at UC Davis** and the **Consortia Workshop** that was co-hosted by the NSSC and LLNL. He also performed an experimental campaign at the Device Assembly facility to demonstrate the imager's ability to track special nuclear material in motion. John's lab mentor is **Tom Weber (SNL)**, and his research advisor is **Prof. Angela Di Fulvio (UIUC)**.



NSSC Graduate Affiliate, **James Kingston (UCD)**, worked with his laboratory mentor, **Jingke Xu (LLNL)**, on the development and characterization of low-energy detectors for the direct detection of dark matter. Dark matter accounts for ~80% of the universe but its nature remains unknown. James's work on the **CHILLAX project** aims to combine the strengths of two of the world's most sensitive dark matter detector technologies in a single system, which could lead to the identification of dark matter in a future experiment. **Prof. Mani Tripathi (UCD)** is his research advisor.



# NSSC Community Highlights



*Our consortium members received an impressive array of awards and achievements, standing as testament to their talent and remarkable research contributions in the field of nuclear security science and engineering.*

☉ Many NSSC scholars were honored by their universities for their excellence in mentorship and research. For example, NSSC Fellow **James McGreivy (UCB)** earned the esteemed "**Departmental Citation**" during the 2023 Berkeley Physics Commencement, while NSSC Fellow **Sasha Kennedy (UCB)** received the "**Virgil E. Schrock Award for Outstanding Mentorship**" from the UC Berkeley Nuclear Engineering Department, highlighting the impact of her guidance as a graduate student instructor.

☉ NSSC scholars were also heralded for their excellence in publication of scientific research. For example, to commemorate his research strides in the development of a program that transforms a rudimentary "hot spot" image into a 3D model, **Jonathan Mitchell (UTK)** was awarded the "**JD Williams Student Paper Award**" at the INMM Annual Meeting in September 2022. The **Lansing State Journal (LSJ)**, published a highlight on the experimental work that **Ava Hill (MSU)** is conducting with the gamma-ray tracking array GRETINA at the Facility for Rare Isotope Beams at FRIB.

☉ Demonstrating the global reach of their research endeavors, **Kalie Knecht (UCB)** delivered a presentation on "Scene-Informed Optimal Measurement Positions for Quantitative Safeguards Measurements" at the **INMM/ESARDA Joint Annual Meeting** in Vienna this May. Meanwhile, in November of 2022, **Dinara Ermakova (UCB)** was featured in a **New York Times article** for her role as a panelist and nuclear energy advocate at the **COP27 conference** in Sharm el Sheikh, Egypt.



# NSSC Community Highlights

⚛ Highlighting their exceptional achievements, NSSC faculty members earned notable recognitions as well. In acknowledgment of his commitment to graduate education, **Prof. Juan Manfredi (AFIT)** was honored with the "**Leslie M. Norton Teaching Excellence Award**." This summer Springer published "**Women in Power: Research and Development Advances in Electric Power Systems**" that covers the challenges in modern power system, highlighting women leaders. **Prof. Vujic (UCB)** contributed a chapter in this book, entitled "**Nuclear Power in the Twenty-First Century? – A Personal View**".

⚛ NSSC faculty members were also distinguished by their career accomplishments. **Bethany Goldblum**, NSSC Executive Director, was named an **Associate Professor** in the Department of Nuclear Engineering at UCB. She continues her role at LBNL as a faculty scientist in the Nuclear Science Division. Also, **Djamel Kaoumi**, NSSC co-PI at NCSU, was promoted to **Full Professor** in the Department of Nuclear Engineering at North Carolina State University.

⚛ Our NSSC alumni continue to achieve remarkable success, exemplifying the staying power of our program. **Anagha Iyengar**, a UCB and UTK alumna, received the prestigious "**2023 Early Career Award**" from the Institute of Nuclear Materials Management (INMM) for her role as **deputy program director** for Analytics and Innovation within **NNSA's Office of International Nuclear Security**.

**Jake Hecla**, NSSC Fellow and UCB recent graduate, received the esteemed **2023 Stanton Fellowship** at the **Massachusetts Institute of Technology**. Adding to their accomplishments, **Daniel Puentes**, MSU Alum, was named a **2023 NNSA Graduate Fellow**. The accomplishments of our alumni are further highlighted by **Brenden Longfellow**, an MSU graduate, who secured a **permanent staff role at LLNL** within the group where he conducted his NSSC internship and postdoc.



**Prof. Juan Manfredi**, the NSSC AFIT POC, received the **2023 Leslie M. Norton Teaching Excellence Award**

# NSSC Community Highlights



**Prof. Peter Hosemann (UCB)** wins the 2023 LLNL Faculty Sabbatical Program Award

☯ The Nuclear Science and Security Consortium itself was featured in June 2022 issue of the **ANS Nuclear News: “UC Berkeley-led Science and Security Consortium enters its eleventh year”**, while in the February 2023 issue of the **ANS Nuclear News**, Dr. Vujic wrote on **“The NSSC and the workforce”**.

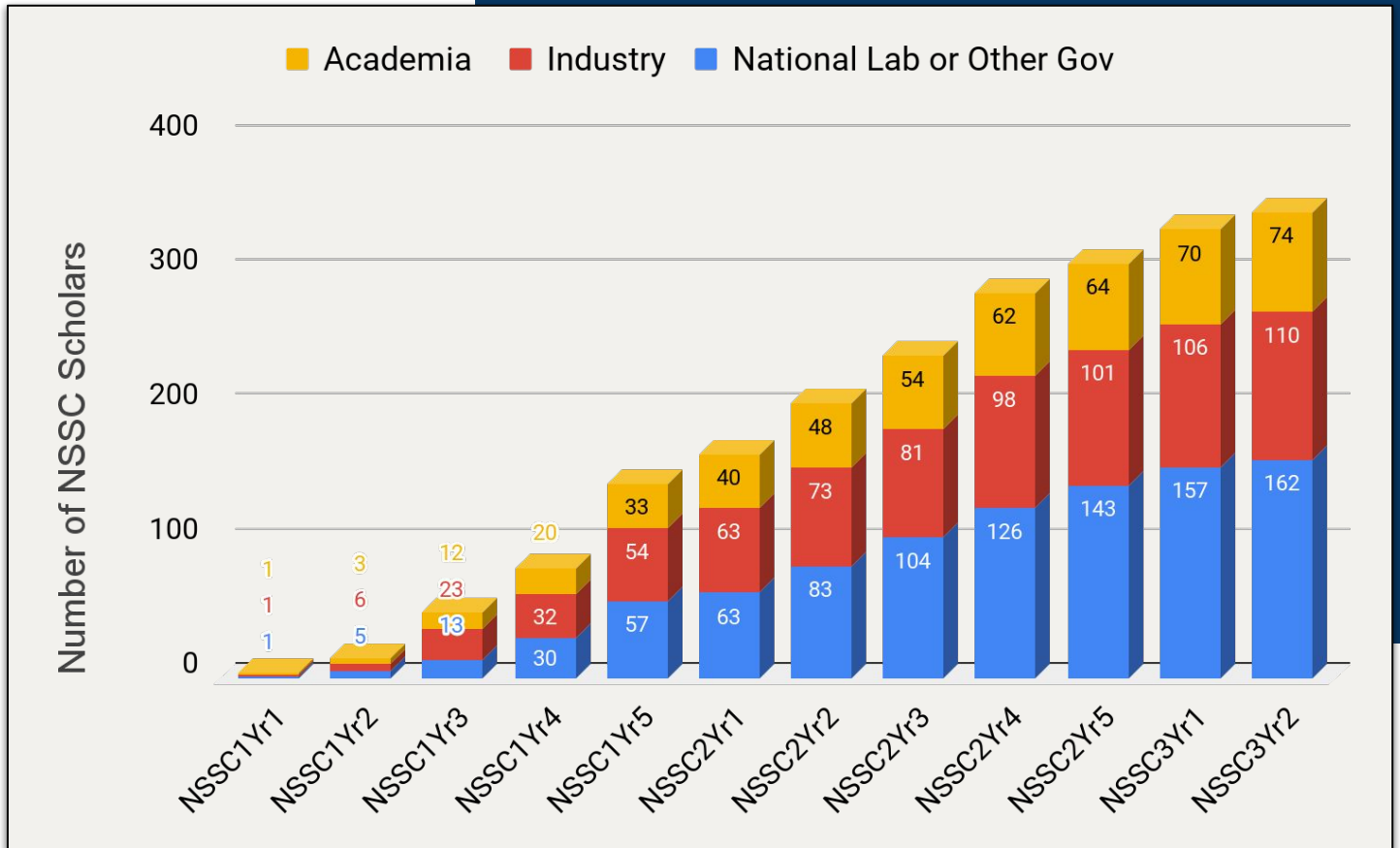
☯ Through their research endeavors, members of the NSSC Community also demonstrate their commitment to **multi-institutional engagements** between universities and national laboratories. **Prof. Peter Hosemann (UCB)** received the esteemed **“2023 LLNL Faculty Sabbatical Program Award,”** which facilitates knowledge exchange and partnerships through an in-residence experience at LLNL. **Michigan State University** collaborated with **LANL** to organize an **MSU cohort of NSSC scholars** to visit LANL this summer. A total of **ten scholars** and two NSSC of **ten scholars** and two NSSC Faculty, **Prof. Sean Liddick and Prof. Jaideep Singh (MSU)**, toured LANL this July, further **fostering the relationship** between **NSSC MSU students and faculty and LANL scientists**.

**Seven MSU NSSC Scholars**, including Mejdi Mogannam, Chloe Kleinfeldt, Hannah Berg, Karina Martirosova, Nicholas Mendez, Lexie Weghorn, Colleen Graham, had the opportunity to **participate in LANL tours alongside NSSC Faculty members Prof. Sean Liddick and Prof. Jaideep Singh**.



# NSSC Demonstrated Excellence & Innovation

(2011-2026)



## METRICS OF SUCCESS since 2011



**670**

Personnel Supported



**647**

Posters



**459**

Peer-Reviewed Publications



**52**

Webinars & Seminars



**264**

Awards



**977**

Oral Presentations

# NSSC Degrees Awarded (2011-2023)



141

Bachelors Degrees

95

Masters Degrees

155

PhD Degrees

391

B.S., M.S., and Ph.D. degrees!



# NSSC Pipeline Metrics (2011-2023)

NSSC Alums Hired at the National Labs or Government Positions

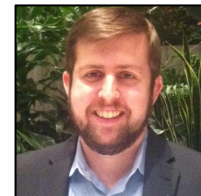
162 NSSC Fellows & Affiliates have been placed!



Daniel Puentes  
PhD MSU  
NNSA  
2023



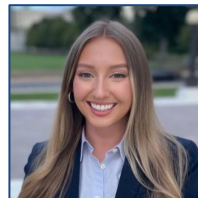
Brian Lenardo  
PhD UCD  
SLAC  
2023



Aaron Nowack  
PhD UTK  
SNL  
2023



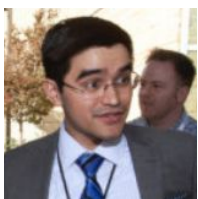
Scott  
Essenmacher  
Postdoc MSU  
LLNL  
2023



Sarah Stevenson  
PhD UCB  
Air Force  
2022



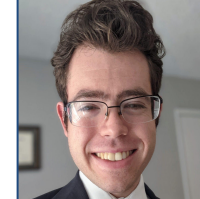
Nicole Byrne  
PhD GWU  
Argonne  
2022



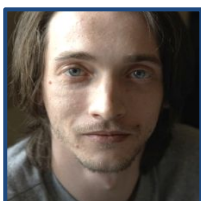
Ethan Boado  
Bachelors UCD  
PNNL  
2022



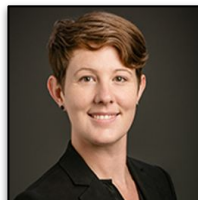
Sarah Loftin  
Masters TAMU  
DOE NNSA  
2022



Austin Mullen  
PhD UCB  
LANL  
2023



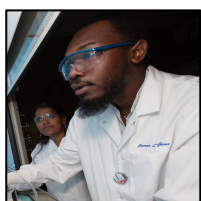
Billy Boxer  
PhD UCD  
PNNL  
2022



Kathryn Huff  
PhD UCB  
DOE  
2022



Peter Huck  
PhD GWU  
LLNL  
2022



James  
Louis-Jean  
PhD UNLV  
SRNL  
2022



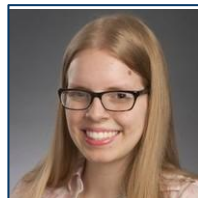
Luca Pagani  
PhD UCD  
PNNL  
2022



Fernando  
Torales-Acosta  
PhD UCB  
LBNL  
2022



Jyothisraj  
Johnson  
PhD UCD  
LBNL  
2022



Katherine  
Thornock Luebke  
PhD UNLV  
LANL  
2022



Matthew Weiss  
Postdoc UIUC  
LLNL  
2022

# NSSC Pipeline Metrics (2011-2023)

## NSSC Alums Hired at the National Labs or Government Positions



Elizabeth Rubino  
PhD MSU  
LLNL  
2022



Leon Pickard  
Postdoc UCD  
LBNL  
2022



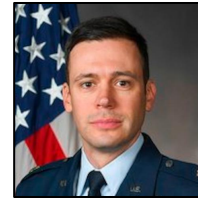
Aaron Chester  
Postdoc MSU  
FRIB  
2022



Roy Ready  
PhD MSU  
US Naval  
Research Lab  
2021



Joshua Smith  
PhD UTK  
LLNL  
2021



James  
Bevins  
PhD UCB  
LANL  
2021



Juan Manfredi  
Postdoc UCB  
AFIT  
2021



Mariah Ramirez  
PhD TAMU  
DTRA  
2021



Katie Childers  
PhD MSU  
RSL  
2021



Jake Tibbetts  
Masters UCB  
Intelligence  
2021



Caleb Redding  
PhD UTK  
ORNL  
2021



Eric Nelius  
Masters UTK  
SNL  
2021



Carl Britt  
PhD UTK  
PNNL  
2021



Andrea Richard  
PhD MSU  
LLNL  
2021



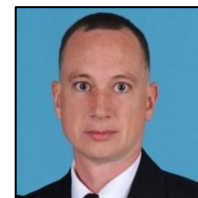
Jason Matheny  
Masters UCB  
LANL  
2021



Cordell Delzer  
PhD UTK  
LANL  
2021



Kelly Kmak  
PhD UCB  
LLNL  
2021



Brian Champine  
PhD UCB  
LLNL  
2021

# NSSC Pipeline Metrics (2011-2023)

## NSSC Alums Hired at the National Labs or Government Positions



Rebecca Lowe  
PhD UNLV  
NNSS  
2021



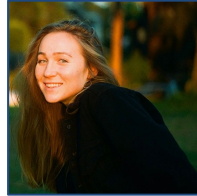
Kevin Glennon  
PhD TAMU  
LLNL  
2021



Hi Vo  
PhD UCB  
LANL  
2021



John Ash  
PhD MSU  
TRIUMF  
2021



Paulina Wheeler  
Bachelors UCB  
NASA  
2021



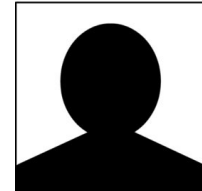
Stephanie  
Lyons  
Postdoc MSU  
PNNL  
2020



Jon Balajthy  
PhD UCD  
SNL  
2020



Jackie Dorhout  
PhD UNLV  
LANL  
2020



Jonathan Daniel  
Hartman  
Masters UTK  
Y-12  
2020



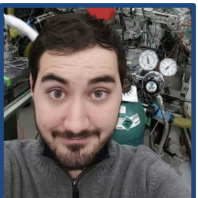
Athena Gallardo  
PhD UNLV  
LANL  
2020



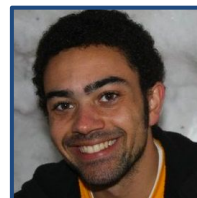
Teal Pershing  
PhD UCD  
LLNL  
2020



Rebecca  
Krentz-Wee  
PhD UCB  
IAEA  
2020



Brenden  
Longfellow  
PhD MSU  
LLNL  
2020



Micah Folsom  
PhD UTK  
LBNL  
2020



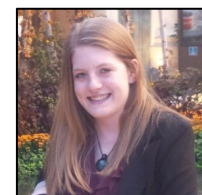
Andrew  
Reddie  
Postdoc UCB  
SNL  
2020



Max Wallace  
Bachelors  
UCB  
LLNL  
2020



August  
Ridenour  
PhD GWU  
NRL  
2020



Kelsey  
Amundson  
Bachelors UCB  
LANL  
2020

# NSSC Pipeline Metrics (2011-2023)

## NSSC Alums Hired at the National Labs or Government Positions



Adriana Sweet  
PhD UCB  
LLNL  
2020



Tucker  
McClanahan  
PhD UTK  
LANL  
2020



Eleanor Comer  
Masters UTK  
Y-12 National  
Security Complex  
2020



Terri  
Poxon-Pearson  
PhD MSU  
NNSA  
2020



Travis Smith  
Masters UTK  
State of  
Nebraska  
2020



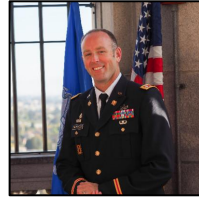
J.R. Powers-Luhn  
PhD UTK  
PNNL  
2020



Daniel Votaw  
Masters MSU  
LANL  
2019



Caroline  
Hughes  
Masters UCB  
PNNL  
2019



Keith McManus  
PhD UCB  
NNSA  
2019



Daniel Hellfeld  
PhD UCB  
LBNL  
2019



Aaron  
Manalaysay  
Postdoc UCD  
LBNL  
2019



William Kerlin  
PhD UNLV  
LLNL  
2019



Christian  
Bustillos  
PhD UCI  
LLNL  
2019



Rachel Mersch  
PhD UTK  
ORNL  
2019



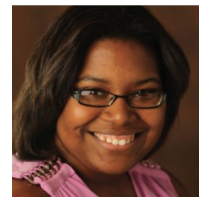
Jaclynn Unangst  
PhD UCI  
SNL  
2019



Bradley Childs  
PhD UNLV  
LLNL  
2019



Madhuri Kumari  
PhD UCD  
SNL  
2019



Ardelia Clarke  
PhD Fisk  
PNNL  
2019



# NSSC Pipeline Metrics (2011-2023)

## NSSC Alums Hired at the National Labs or Government Positions



Milos Atz  
PhD UCB  
ANL  
2019



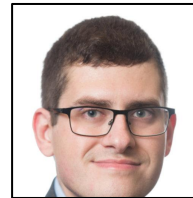
Angela Simone  
Moore  
PhD UTK  
PNNL  
2019



Michael Moore  
PhD UTK  
PNNL  
2019



Kelsey  
Ammundon  
Masters UCB  
LANL  
2019



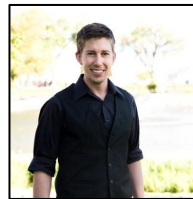
Lucas  
Boron-Brenner  
PhD UNLV  
PNNL  
2019



Vincent Fisher  
Postdoc UCD  
FERMI  
2019



Winston  
Degraw  
Bachelors UCB  
LBNL  
2018



Scott Parker  
PhD UCB  
LANL  
2018



Nicole Apadula  
Postdoc UCB  
LBNL  
2018



Elizabeth  
Heckmaier  
PhD UCI  
LLNL  
2018



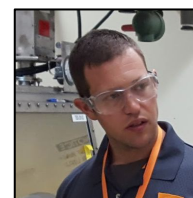
Tomi  
Akindede  
PhD UCB  
LLNL  
2018



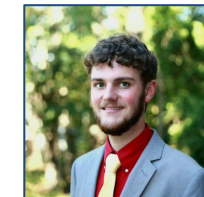
Krystin Stiefel  
PhD MSU  
ORNL  
2018



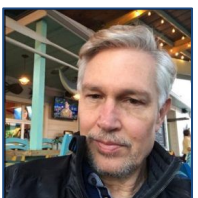
Jason Richards  
PhD UNLV  
ORNL  
2018



Mark Quint  
Masters UTK  
U.S. Army  
2018



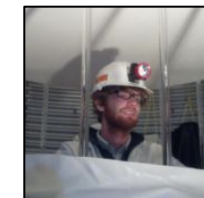
Daniel Harding  
PhD UTK  
Norfolk Naval  
Shipyard  
2018



Maxwell  
Sherrod  
PhD UNLV  
SRNL  
2018



Mike Shattan  
PhD UTK  
AFIT  
2018



Morgan Askins  
PhD UCD  
LBNL  
2018

# NSSC Pipeline Metrics (2011-2023)

## NSSC Alums Hired at the National Labs or Government Positions



Matthew Tweardy  
PhD UTK  
NSA at PNNL  
2018



Steven Gardiner  
PhD UCD  
Fermi National  
Accelerator Lab  
2018



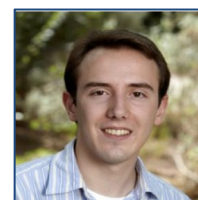
Sarah Laderman  
Masters UCB  
IAEA  
2018



Joseph Labrum  
Bachelors UCB  
Intelligence  
2017



Josh  
Despotopulos  
Graduate UNLV  
LLNL  
2017



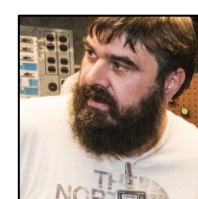
Marc Fitzgerald  
PhD UNLV  
LLNL  
2017



Leo Kirsch  
PhD UCB  
LLNL  
Spring 2017



Joe Belarge  
Postdoc MSU  
MIT Lincoln Lab  
2017



Josh Brown  
PhD UCB  
SNL  
Fall 2017



Gian Surbella  
PhD GWU  
PNNL  
Spring 2017



Jessica Roche  
Bachelors UCB  
LLNL  
2016



Cassara Higgins  
Postdoc UNLV  
LANL  
2017



Anthony Juarez  
UCB  
SNL  
2016



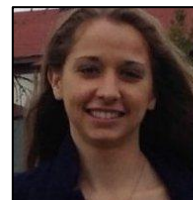
Thomas  
Halverson  
Masters UCB  
West Point  
2016



Scott Suchyta  
PhD MSU  
Postdoc UCB  
RSL  
2016



Eva Uribe  
PhD UCB  
SNL  
2016



Kalee Hammerton  
PhD MSU  
Savannah River  
2016



Keenan Thomas  
Masters UCB  
LLNL  
2016

# NSSC Pipeline Metrics (2011-2023)

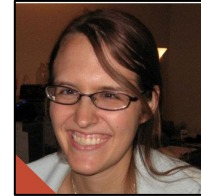
## NSSC Alums Hired at the National Labs or Government Positions



Chris Morse  
PhD MSU  
LBNL  
2016



Quinlan Smith  
Masters UNLV  
ORNL  
Spring 2016



Nicole Larson  
Bachelors MSU  
INL  
2016



Janelle Droessler  
PhD UNLV  
LANL  
2016



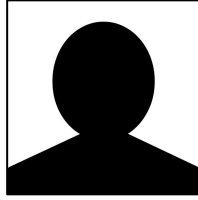
Nick Bricker  
Masters UCB  
LBNL  
2016



Derek McLain  
PhD UNLV  
ANL  
2016



Nick Walsh  
Postdoc UCD  
LLNL  
2016



Christopher  
Prokop  
PhD MSU  
LANL  
2016



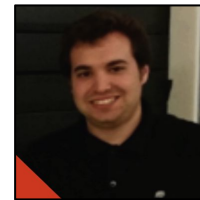
Charles Loelius  
Masters MSU  
NNSA | PNNL  
2016



Sergey Uvarov  
Masters UCD  
LLNL  
2016



David Weisz  
PhD UCB  
LLNL  
2016



Michael Jones  
PhD MSU  
LBNL  
2016



Barbara Wang  
Postdoc UCB  
LLNL  
2016



Caleb Roecker  
PhD UCB  
LANL  
2016



Ross Barnowski  
PhD UCB  
LBNL  
2016



Uday Mehta  
Bachelors UCB  
LLNL  
2016



Christopher Brand  
Bachelors UCB  
LLNL  
2015



Marc Bergevin  
Postdoc UCD  
LLNL  
2015

# NSSC Pipeline Metrics (2011-2023)

## NSSC Alums Hired at the National Labs or Government Positions



Timothy Shokair  
Postdoc UCB  
LLNL  
2015



Ross Meyer  
Bachelors UCB  
LBNL  
2015



Andrew Wysong  
Masters UCB  
LLNL  
2015



David Sweeney  
Postdoc UCB  
DTRA  
2015



Tenzing Joshi  
PhD UCB  
LBNL  
2015



Justin Munson  
PhD UCB  
LLNL  
2015



Sherry Faye  
PhD UNLV  
LLNL  
Spring 2015



Deepa Khatri  
Bachelors UCB  
NNSA/LFO  
2014



Andrew  
Haefner  
PhD UCB  
LBNL  
2015



Jenna Smith  
PhD MSU  
TRIUMF  
Spring 2014



Anagha Iyengar  
Bachelors UCB  
NNSA  
2014



Maryline Ferrier  
PhD UNLV  
LANL  
2014



Steven Stroberg  
PhD MSU  
TRIUMF  
Spring 2014



Andrew Gillick  
Masters UCB  
Army  
2014



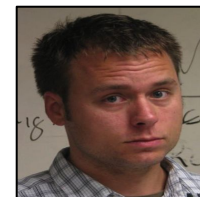
Anthony Lubbers  
Bachelors UCB  
LLNL  
2014



Alex Braatz  
PhD UCI  
ORNL  
2015



Perry Chodash  
PhD UCB  
LLNL  
2015



Duane Smalley  
Postdoc MSU  
LANL  
2014

# NSSC Pipeline Metrics (2011-2023)

## NSSC Alums Hired at the National Labs or Government Positions



Matthew Proveaux  
Masters UCB  
PNNL  
2014



Tim Aucott  
PhD UCB  
SRNL  
2014



Keri Campbell  
PhD UNLV  
LANL  
2014



Jeromy Tompkins  
Postdoc MSU  
NSCL  
2014



Audrey Roman  
PhD UNLV  
LANL  
2014



Victor Negut  
Bachelors UCB  
LBNL  
2014



Cameron Bates  
PhD UCB  
LANL  
2014



Jeremy Mock  
PhD UCD  
LBNL  
2014



Brian Plimley  
PhD UCB  
LBNL  
May 2014



Adam Rice  
Masters UCB  
Intelligence  
2013



Ligang Bai  
Postdoc UNLV  
ANL  
2013



Paul Davis  
Postdoc UCB  
NNSA  
Spring 2013



Brian Daub  
Postdoc UCB  
LLNL  
2013



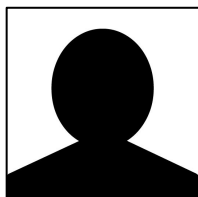
Quinn Looker  
PhD UCB  
SNL  
2013



Jonathan Plaué  
PhD UNLV  
LANL  
2012



Noah Fischer  
Bachelors UCB  
LANL  
2012



Joshua Meyers  
PhD UCB  
LLNL  
2012



Alexander Dixon  
Bachelors UCB  
US Navy  
2012

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# NSSC

NUCLEAR SCIENCE and SECURITY CONSORTIUM

# Featured NSSC Publications



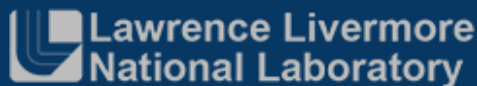
## “Women in Power”

**NSSC Director and Principal Investigator, Jasmina Vujic**

## “Crossing N=28 Toward the Neutron Drip Line: First Measurement of Half-Lives at FRIB”

### First FRIB Paper

- 5 LLNL Collaborators
- 1 LANL Collaborator
- 6 ORNL Collaborators
- 1 BNL Collaborator
- 5 LBNL Collaborators



BERKELEY LAB



## “Absolute light yield of the EJ-204 plastic scintillator”

### NSSC Collaborative Paper

- 2 NSSC Undergraduates (UCB)
- 1 NSSC Research Specialist (UCB)
- 1 National Laboratory Collaborator (LBNL)
- 2 NSSC Institutions (UCB & AFIT)



BERKELEY LAB

# Featured NSSC Publications



## “Synthesis and Morphological Control of UO<sub>2</sub>F<sub>2</sub> Particulates”

### ACS Omega Article

- NSSC Affiliate, **Harry Jang** and Previous NSSC Fellow, **James Louis-Jean** (now at SRNL)

## “ARTIE 1 Result”

### First FRIB Paper

- NSSC Fellow, **Julie He**
- Previous NSSC Fellow **Leon Pickard** (now at LBNL)
- Previous NSSC Fellow **Luca Pagani** (now at PNNL)

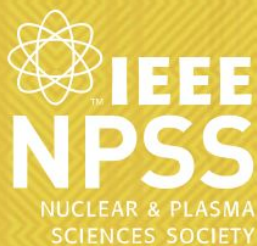
**UC DAVIS**  
UNIVERSITY OF CALIFORNIA



**Pacific Northwest**  
NATIONAL LABORATORY



**BERKELEY LAB**



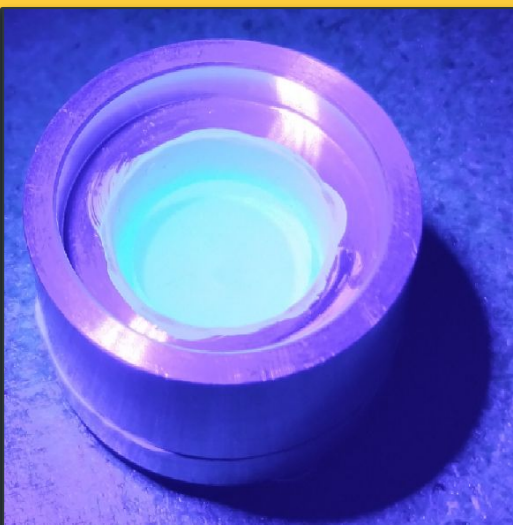
## "Needs, trends, and advances in scintillators for radiographic imaging and tomography”

### IEEE Transactions of Nuclear Science

- **Daniel Rutstrom** was invited to contribute a chapter in a review paper co-authored by top-level experts in the field of scintillators and radiation detectors



# Featured NSSC Publications



J.A. Brown, T.A. Laplace, B.L. Goldblum, J.J. Manfredi, T.S. Johnson, F. Moretti, A. Venkatraman, **“Absolute light yield of the EJ-204 plastic scintillator,”** Nucl. Instrum. Meth. A, 168397 (2023).

<https://doi.org/10.1016/j.nima.2023.168397>

A team of NSSC scholars and scientists from UC Berkeley, the Air Force Institute of Technology, and Lawrence Berkeley National Laboratory reported the first direct measurement of the absolute light yield of the EJ-204 plastic organic scintillator. In this work, the absolute light yield of four EJ-204 samples was measured: two fresh samples manufactured only four months prior and stored in high-purity nitrogen, and two aged samples manufactured approximately eleven years prior and stored in ambient air. This work also showcased the first observation of light output degradation due to aging in EJ-204, with deviation from the manufacturer-reported value of as much as 26%. The manuscript was led by Dr. Josh Brown, a former NSSC Fellow and now research engineer at UC Berkeley. The team also included two NSSC Undergraduate Fellows (Johnson and Venkataraman), two NSSC faculty members (Goldblum and Manfredi), an NSSC research specialist (Laplace), and national laboratory mentor, Dr. Federico Moretti.



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