

# NUCLEAR SCIENCE AND SECURITY CONSORTIUM Summer 2020 Newsletter





## Letter from the NSSC Director

The Nuclear Science and Security Consortium (NSSC) has completed another successful year in recruiting, educating, and training top students in relevant nuclear science and security topics, while at the same time demonstrating scientific excellence in cutting-edge research. At the end of its 9th year, the NSSC has proudly supported 521 people (undergraduate and graduate students, postdocs, specialists, and faculty) and placed 42% of students and postdocs completing the program into DOE national laboratories or other government positions.

The primary objective of NSSC from the beginning has been to connect students with a core set of disciplines that support the nonproliferation and nuclear security mission and to expand national laboratory collaboration to provide students the opportunity to engage deeply in research under the guidance of national laboratories staff scientists. All current NSSC Graduate Fellows have a laboratory mentor in addition to an academic mentor. Since 2016, 148 NSSC students and postdocs have conducted in-residence lab research, and 117 NSSC students are working on lab-led projects. The NSSC has graduated 111 B.S., 67 M.S., and 108 Ph.D. student fellows and affiliates and has supported 47 postdoctoral scholars through program completion.

In addition to 112 (42%) NSSC Fellows and Affiliates that have accepted positions in DOE national laboratories or other government, an additional 50 were hired into faculty and research positions at U.S. universities. These stellar NSSC Fellows and Affiliates represent the next generation of young scientists and researchers, with research skill sets and expertise required to support critical nuclear science and engineering disciplines needed in nuclear nonproliferation, nuclear arms control, nuclear incident response, nuclear intelligence activities, nuclear energy, and other nuclear-related fields.

The NSSC has demonstrated scientific excellence through the publication of numerous highly cited manuscripts in influential journals. The Consortium has produced 333 peer-reviewed publications and 1,264 oral and poster presentations on fundamental and applied research in nuclear and particle physics, nuclear engineering, radiation detection, radiochemistry and nuclear chemistry, and nuclear security policy supporting the nuclear security mission. The wide reach of the NSSC provides a unique infrastructure for recruitment, education and training, as well as human capital development, formidable for the quantity, quality, and diversity of fellows and a rich collaborative research environment between the university members, their students, faculty researchers, and the DOE National Laboratory scientists and staff.

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Prof. Jasmina Vujic, NSSC Director, with UC Berkeley students.

Masuina Vulic

# The Mission of NSSC

Train the next generation of nuclear scientists and engineers while engaging in research and development spanning basic aspects of new technology and methods to programmatic work directly supporting the nuclear security and nonproliferation mission.



# The History of NSSC



NSSC in 2011





The Nuclear Science and Security Consortium was established as the first NNSA academic consortium. The first phase of the NSSC included the partners: UC Berkeley, UC Davis, UC Irvine, UC San Diego, UN Las Vegas, Michigan State University, Washington University in St. Louis, Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, Sandia National Laboratory, and Los Alamos National Laboratory. During this phase, NSSC also worked with several Minority Serving Institutions, including Clark Atlanta, Fisk, Hampton, South Carolina State, and UT El Paso.

In 2016, the NSSC recompeted and was awarded funding for an additional five years of support. The NSSC added partners UT Knoxville, Texas A&M University, George Washington University, and Oak Ridge National Laboratory.

During the Summer of 2020, the NSSC will continue their work supporting top students during their academic studies and facilitating career connections at the national laboratories.

2019



## NSSC Partners & Leadership



#### **ADVISORY BOARD**

**DR. CAROL BURNS** – Chair Los Alamos National Laboratory

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

**DR. MIRIAM "MIM" JOHN** Retired from Sandia National Laboratories

**DR. DAVID MCCALLEN** University of Nevada, Reno

**DR. BENN TANNENBAUM** Sandia National Laboratories

**DR. CATHERINE ROMANO** Oak Ridge National Laboratory

**DR. MAVRIK ZAVARIN** Lawrence Livermore National Laboratory

#### NSSC STAFF

CHARLOTTE CARR Program Manager

**DEREK JOHNSON** Financial Analyst

## ACADEMIC POINTS OF CONTACT

**DR. MANI TRIPATHI** UC Davis

**DR. FREDERIC POINEAU** UN Las Vegas

**DR. CODY FOLDEN** Texas A&M University

DR. CHRIS CAHILL

**DR. JASON HAYWARD** UT Knoxville

**DR. SEAN LIDDICK** Michigan State Universit

### LAB POINTS OF CONTACT

DR. JOHN VALENTINE

DR. VLADIMIR MOZIN

**DR. DAVE WILLIAMS** ORNL

**DR. DAVID PETERS** SNL

#### **EXECUTIVE TEAM**

**DR. JASMINA VUJIC** Director UC Berkeley

**DR. BETHANY GOLDBLUM** Executive Director UC Berkeley

**DR. JASON HAYWARD** Deputy Executive Director UT Knoxville

**DR. KAI VETTER** NNSA Liaison UC Berkeley

**DR. LEE BERNSTEIN** Director for Laboratories UC Berkeley/LBNL



NSSC Director Prof. Jamina Vujic presents at the NSSC Fall Workshop in 2019.



*Prof. Kai Vetter with students. (photo courtesy of LBNL)* 





# Research Highlights from NSSC Fellows and Affiliates

#### **Micah Folsom** UT Knoxville

Micah Folsom was a member of the first cohort of NSSC Fellows in 2011 while he was an undergraduate at UC Berkeley working with Professor Kai Vetter. Micah went on to continue his studies at UT Knoxville. While at UTK, Micah worked on the development of a portable fast neutron camera for use in nuclear security applications such as emergency response or arms control treaty verification. This included modeling new designs, optimizing the geometry and components, and performing experimental measurements to obtain data necessary to improve the simulations. Micah recently defended his thesis work, which concluded with the construction and demonstration of a prototype detector system in the lab. He will soon begin a postdoc position at ORNL. Micah's academic advisor is Prof. Jason Hayward, and his lab mentor is Klaus Ziock at ORNL.



## Mariah Ramirez



Mariah Ramirez's research focuses on a technical study with the main objective of supporting nuclear safeguards approaches for neptunium present in spent fuel. The main premises of this work are to support the reduction of global nuclear security threats and improve safeguard measures currently in place by the IAEA. This project utilizes benchtop radiochemical experimental methods and computational radiation transport simulations to analyze neptunium present in irradiated spent fuel or high-level radioactive waste.

Mariah's advisor at TAMU is Prof. Charles Folden. Mariah's lab mentors are Alex McSpaden and Rene Sanchez, from the Advanced Nuclear Technologies group (NEN-2) at Los Alamos National Laboratory.



#### Joseph Gordon

UC Berkeley



Joseph Gordon (center) with Thibault Laplace (left) NSSC Assistant Research Engineer, and Josh Brown (right) NSSC Alumni and now LBNL Affiliate Scientist.

Joseph Gordon works on the Gamma-Energy Neutron-Energy Spectrometer for Inelastic Scattering (GENESIS), a new experimental platform at the 88" Cyclotron at Lawrence Berkeley National Laboratory that combines high-resolution gamma ray detectors with fast neutron detectors to measure double differential neutron spectra in coincidence with gamma ray production following inelastic scattering. Initial experiments with Fe-56, under the guidance of Dr. Darren Bleuel from LLNL, and U-238, under the guidance of Dr. Lee Bernstein from UC Berkeley, will improve understanding of reaction product correlations which are crucial aspects in the design of nuclear technologies, from advanced reactors to improved active interrogation set-ups.

#### James Louis-Jean UN Las Vegas

James is pursuing a Ph.D. degree in Radiochemistry at the University of Nevada Las Vegas (UNLV) while working full-time at Los Alamos National Laboratory (LANL). At UNLV and LANL, his work focuses on the preparation, analysis, and characterization of nuclear materials. This includes fundamental and applied studies of the uranium fuel cycle and specific fission products such as technetium (Tc) and samarium (Sm). With his contribution, the clean chemistry team at LANL has developed a novel method to measure the isotopic ratios from a nanoscopic amount of Sm. This improvement expands on the capability of using thermal ionization mass spectrometer (TIMS) in the realm of nuclear forensic analysis. James' advisor at UNLV is Prof. Frederic Poineau, and his lab mentor at LANL is Dr. Jeremey Inglis.





#### **Vincent Fischer**

UC Davis



Vincent is working on the Accelerator Neutrino Neutron Interaction Experiment (ANNIE), a gadolinium-loaded water Cherenkov detector located on a neutrino beam at Fermilab. ANNIE aims to measure the neutron multiplicity of neutrino interactions and demonstrate the use of new technologies in the field of fast photosensors and new detection media. Vincent designed, developed, and built the water circulation and purification system of the experiment, a one-of-its-kind apparatus capable of efficiently purifying gadolinium-loaded water at a fraction of the cost and space of existing systems. He also performed laboratory tests and simulations on Water-based Liquid Scintillator (WbLS), a novel detection medium combining the advantages of water and liquid scintillator. Both technologies are of the highest interest of the Advanced Instrumentation Testbed (AIT) and the WATCHMAN experiment, a 1000-ton detector dedicated to nuclear non-proliferation through the detection of neutrinos from nuclear reactors. Vincent's academic advisor is Prof. Robert Svoboda, UCD, and his lab mentor is Steven Dazeley, LLNL.

#### **Alicia Palmisano** Michigan State University

Alicia performs direct cross section measurements on protonrich nuclei for the astrophysical p process. She has developed and validated a new experimental and analysis technique for these direct measurements and successfully measured the  $^{82,84}$ Kr(p,  $\gamma$ ) $^{83,85}$ Rb cross section from 2.7 MeV - 3.7 MeV. This technique can be applied to other (p,  $\gamma$ ) and ( $\alpha$ , $\gamma$ ) reactions.

Alicia's advisor is Prof. Artemis Spyrou and she works with lab mentor Aaron Couture, LANL.



Alicia Palmisano (left) with NSSC Postdoc Andrea Richard (right) at Argonne National Lab setting up the SuN detector



## Sandra Bogetic

Sandra Bogetic has just completed her Ph.D. at UC Berkeley. Her thesis research was performed within the Nuclear Science and Radiochemistry group at the National Ignition Facility (NIF) at LLNL. The Ph.D. thesis was performed under the mentorship of Professor Jasmina Vujic, and lab mentorship of Dr. Lucile Dauffy and Dr. Dawn Shaughnessy. Sandra's Ph.D. work dealt with the further development, validation, and applications of a novel, cross-cutting modeling capability for tailoring neutron energy for nuclear security and nonproliferation related applications. The specific focus was initially on the generalization of a metaheuristic optimization software package (Gnowee/COEUS), as a part of an ongoing collaboration between UC Berkeley, NIF/LLNL, and the Air Force Institute of Technology (with Prof. James Bevins). This new capability enables the development of optimal designs of neutron spectra tuning assemblies at a fraction of



Sandra Bogetic at the machine lab at NIF with Dr. Charles Yeamans.

the cost in terms of manpower and research effort, thereby greatly accelerating efforts in many areas of nuclear science and engineering that need neutron spectra with specific desired characteristics. As part of Sandra's Ph.D. thesis and work at LLNL, she had the exciting opportunity to work at NIF in planning and designing several integral validation experiments for materials of interest, during four NIF shot campaigns. The experiments have generated important data that have been used for comparison and validation of the computational design models. Her work presented several examples of the application of the optimization package to design energy tuning assemblies at the NIF to cover specific national security applications of neutrons. This experience broadened her knowledge of the concepts of validation, uncertainties, and the use of different spectroscopic methodologies to measure neutron flux and reaction rates.

## Julie He

Julie He is a graduate student currently working on developing firmware for the novel Large-Area Picosecond Photodetector (LAPPD), which will be used in neutrino detectors and other nuclear security applications. Julie also conducts material compatibility studies for detectors that use gadolinium-doped water and water-based liquid scintillator as their detection medium. Julie's academic advisor is Prof. Bob Svoboda at UC Davis, and her lab mentors are Adam Bernstein and Steven Dazeley from LLNL.





#### Mara Grinder MSU



Mara is currently working on a Doppler shift attenuation lifetime measurement of excited states in 36 and 38Si along with an implementation of an active diamond target to further improve the method under the direction of her advisor Hironori Iwasaki. During her practicum, Mara worked on a project determining how diamond detectors behave in high radiation environments at Los Alamos National Laboratory with her Laboratory mentor Hye Young Lee. She also had the opportunity to attend the Joint ICTP-IAEA workshop on Nuclear Decay Data: Theory, Experiment, and Evaluation that was held in Trieste, Italy acquiring hands-on experience learning how nuclear data are evaluated. These projects further the NNSA's mission by improving detection systems and deepening understanding of nuclear structure data to improve models.

#### **Mairead Montague** UT Knoxville

Mairead first joined the NSSC as an undergraduate fellow at UC Berkeley working at LBNL. As an undergraduate, she worked with lab mentor Darren Bleuel (LLNL) and academic advisor Bethany Goldblum to perform a feasibility study on a carbon backscatter time-of-flight detector for use at LLNL's neutron imaging facility. Mairead is now an NSSC graduate student fellow at UTK. At present, she is working with Paul Hausladen at ORNL on a Fast Neutron Imager for spent fuel verification. Her team is designing and prototyping a neutron detector with a modified parallel slit collimator to be used to determine the location and age of individual fuel pins in a fuel assembly. Using a number of boron-coated straw detectors, fission product neutrons from Cm-244 can be detected after making it through the stainless steel and high-density polyethylene collimator. Using the calculated fields-ofview for each slit in the collimator, analytic models are being developed which can localize the neutron source. Mairead is working with MCNP6.1 to simulate the detection response for the full collimator. Ultimately she will create a neutron response model that will generate the response



functions suggested by physical principles with empirical fit parameters. Various components of the response include detector straw efficiency, collimator penetration, inter-detector scattering, and edge transmission. Ensuring that these components are correctly accounted for and that their output matches a detector response simulated in MCNP6.1 is her current work.



#### Eric Matthews UC Berkeley



Eric's Ph.D. thesis research focuses on fission and the improvement of nuclear data related to that process. He has worked on the development of the Fast Loading User Facility for Fission Yields (FLUFFY), which is a pneumatic system that rapidly transports actinide samples between a neutron beam and an HPGe detection array. FLUFFY is being used to measure fission yields for short-lived products (~1-second half-lives). In addition to this, Eric has developed a Monte Carlo method for model-independent fission yield covariance matrix generation. Finally, Eric is working with Dr. Denise Neudecker at LANL to write a template of expected uncertainties for fission yield measurements. Eric's academic advisor is Prof. Lee Bernstein.

August Ridenour George Washington University

August's research duties and aspirations at The George Washington University are two-fold as he completes his Ph.D. in Chemistry with Dr. Christopher Cahill. His efforts in the lab focus on a fundamental exploration of f-element bearing materials, the determination of their molecular structure through X-ray diffraction, and their characteristic spectroscopic signatures to better understand their properties under environmental and security relevant conditions. This is highlighted most acutely by a scientific collaboration between August's lab and Dr. Ken Czerwinski's lab at the University of Nevada – Las Vegas, that synthesized and characterized the structure and spectroscopic signatures of the first americium-containing metal-organic framework. August spent the summer of 2018 as a Keepin Nonproliferation Fellow at Los Alamos National Laboratory working with Dr. Robert Rundberg on a project to detect and identify X-ray



August Ridenour (right) with Prof. Chris Cahill in the Science and Engineering Hall lab at GWU.

signatures from nonproliferation-relevant actinides. Concurrently, August serves as the teaching assistant for "The Science of Nuclear Materials" – a course in GW's Elliot School of International Affairs aimed at introducing nuclear chemistry and physics to nuclear science and technology policy graduate students. August has assisted with both the lecture and lab-practical portions of the course, providing equipment demonstrations for weekly lab practical experiments in radiation detection with lab-based and "in-the-field" analytical techniques.



## NSSC Recent Events



Attendees of the 2019 NSSC Fall Engagement Workshop hosted by LLNL.

#### Fall Engagement Workshop and External Advisory Board Meeting 2019 - Hosted by LLNL

The 2019 NSSC annual workshop and advisory board meeting was held Oct. 8 - 9. The event was jointly organized by LLNL with Dr. Vladimir Mozin as host and the University of California, Berkeley, and was attended by more than 60 university students, postdocs, faculty, and over 50 national lab scientists from several laboratories. The event featured oral and poster presentations from students. The workshop concluded with tour offerings from LLNL including visits to the National Ignition Facility Tour (NIF), High Performance Computing Lab, and the Nuclear Forensics Lab.

#### University Program Review 2019

The NSSC participated in the annual Department of Energy (DOE) National Nuclear Security Administration (NNSA) Defense Nuclear Nonproliferation Research and Development (DNN R&D) University Program Review (UPR) meeting from June 4 - 6, 2019 in Raleigh, North Carolina, hosted by North Carolina State University. The event was attended by students, faculty, national laboratory scientists, and DOE NNSA program officials. Students presented on their research and contributions to the NNSA mission. NSSC Student Fellows and Affiliates presented 18 oral presentations and 30 poster presentations.



Students tour the NIF as part of the NSSC Fall Engagmenet Workshop at LLNL.



During UPR 2019 Rebecca Krentz-Wee (UCB) was awarded best oral presentation from NSSC. Eric Matthews (UCB) was awarded best national laboratory collaboration from NSSC.



## NSSC Sponsors new course on Radiation Detection for undergraduates at UC Berkeley

NSSC Specialist Dr. Ali Hanks developed and taught the undergraduate level course, A Hands-On Introduction to Radiation Detection, during the Fall 2019 semester. Freshman and Sophomore engineering students received an introduction to radiation detection and radiation in the environment. As part of the course, students built their own nuclear radiation detectors.

#### Nuclear Security: The Nexus Between Technology and Policy Graduate Level Course Held for the Ninth Year

The only nuclear security policy focused course held at UC Berkeley was co-taught by Prof. Michael Nacht of the Goldman School of Public Policy and Prof. van Bibber of the Department of Nuclear Engineering for the ninth year during the Spring 2020 semester. Guest speakers for the course included Scott Kemp (MIT), Brad Roberts (LLNL), Sheryl Hingorani (LLNL), and George Moore (MIIS). All classes were broadcast live for all partners and recordings are hosted on the NSSC website.

#### Webinar Series brings lab scientists and former U.S. Secretary of Energy to Berkeley

A few highlights from the past year's webinars include Yana Feldman, Nonproliferation and International Safeguards Analyst, LLNL discussing, "A Multimodal-Deep Learning System for Monitoring Nuclear Proliferation Activities Using Open Sources", and Mark Chadwick, Chief Scientist and Chief Operating Officer, ALDX, LANL, on "Nuclear Science, Engineering & Deterrence. A Career that Matters at Los Alamos". NSSC also partnered with NTI and NPWG to host a panel discussion on, "How Close to Doomsday? Nuclear Dangers and Stopping a New Nuclear Arms Race." The panel consisted of former California Governor Jerry Brown, former U.S. Secretary of Energy and Nuclear Threat Initiative (NTI) Co-chair and CEO, Dr. Ernest J. Moniz, and Dr. Bethany Goldblum, NSSC Executive Director. Events were attended by an in-person audience in Berkeley, and broadcast live to all partners.

## NSSC and the Project on Nuclear Gaming host the "The Largest Online Wargaming Event Ever!"

NSSC hosted a SIGNAL play festival at UC Berkeley in November 2019. Gamers worldwide participated in playing SIGNAL, a video game focused on understanding the issues surrounding nuclear deterrence and strategic stability. SIGNAL was developed by the Project on Nuclear Gaming, which includes some NSSC personnel and lab staff working together to study deterrence through experimental wargaming.



Example of the portable devices prepared and assembled by students in the NSSC Radiation Detection course at UC Berkeley.



Dr. Bethany Goldblum (UCB/NSSC) and Dr. Ernest J. Moniz (NTI)



Dr. Mark Chadwick, ALDX, LANL presenting at UC Berkeley.



Sample screen of the Project on Nuclear Gaming's wargame SIGNAL



# NSSC Summer Programs

NSSC has supported **39** Summer Programs since 2011.



Many planned programs for Summer 2020 have been cancelled due to COVID-19 travel restrictions



#### NSSC LANL Keepin Nonproliferation Science Summer Program

The NSSC LANL Summer Program debuted in the summer of 2017. NSSC Graduate Fellows attend the summer program to learn how game-changing science, engineering, and technology are applied to reduce the dynamic threats of nuclear nonproliferation. The NSSC LANL Summer Program is an eight-week extended research internship hosted by the Nuclear Science and Security Consortium and Los Alamos National Laboratory. The program provides a survey of the national laboratory activities and mission space, focused research projects with a strong connection to nonproliferation science and technology, and a companion symposium series linking nuclear security science, technology, and policy.

Students in the program have broad exposure to LANL, access to mentors from LANL and SNL, and opportunities for lab-directed research.



During Summer 2020, the NSSC-LANL Keepin program will be held online due to COVID-19 related travel restrictions. Students will be working remotely with lab mentors at LANL or SNL. Enrichment activities will be broadcast live.

Two days of lectures from LANL now available to audit

Due to the unique setup of this year's summer program for the first time, two days of Keepin program lectures will be available to be audited online for non-program participants, including members of other NA22 consortia.

Above left: NSSC LANL Keepin Summer Program participants in 2019. Above right: Tyler Jordan working on LANL directed research.



#### NSSC GW Boot Camp on Nuclear Security Policy

The boot camp features an intensive introduction to nuclear security for the prevention of nuclear weapons proliferation and nuclear terrorism. This two-week course explores the implications of scientific and technological developments on government function and policy issues as well as international norms, treaties, and diplomacy. Specific topics include technical policy issues associated with nuclear weapons, nuclear energy, forensics, and missile defense, as well as regional issues such as the Iran Nuclear Deal, the North Korean nuclear situation, the Russian and Chinese arsenals, and more. The Boot Camp leverages GW's unique location two blocks from the White House and across the street from the State Department featuring high level personnel from government agencies and nuclear arena NGOs, as well as field trips to NNSA/DOE, Capitol Hill, and other government agencies.

#### Nuclear Analytical Techniques Summer Program at UC Davis

The Nuclear Analytical Techniques Summer School consists of some lectures, but mostly handson activities involving nuclear analytical techniques. Students perform Neutron Activation Analysis using the McClellan Nuclear Research Center, study proton elastic scattering at



Mark Straub (UCB), Alicia Palmisano (MSU), and Cordell Delzer (UTK) participate in a mock congressional briefing as part of the GW Boot Camp.



Benn Tannenbaum, SNL, presents on stockpile stewardship as part of the GW Boot Camp.

the Crocker cyclotron facility, gain experience and skills in counting with NaI and HPGe crystals, and learn about detectors and analysis techniques important across a broad range of science and industry.

## Remote Learning Experience at LLNL

In response to the need for additional online educational opportunities, LLNL is developing a remote learning experience for Summer 2020. The program is designed to support the educational process, provide data from laboratory demonstrations, and conduct experiments to benefit university research projects. Experimental activities will be broadcast for university participants. The first planned activity is an evaluation of prompt gamma-ray emissions from neutron interrogation of meteorites.



## NSSC by the numbers 2011 - 2020



Metrics of Success 333 Publications 756 Oral Presentations 508 Poster Presentations

176 Awards



Former NSSC Fellows, Sarah Laderman (UCB, now IAEA), Daniel Hellfeld (UCB, now LBNL), and Tomi Akindele (UCB, now LLNL) Degrees Awarded 111 Bachelors 67 Masters 108 Ph.D

Prof. Lee Bernstein, Prof. Jasmina Vujic with Dr. Thibault Laplace, a UCB graduate and now current NSSC Assistant Research Engineer.



	LBNL	SNL	LANL	LLNL	ORNL	Other Lab or Gov.	TOTAL
UCB	14	4	4	15	0	18	55
UCD	3	2	1	4	0	1	11
UCI	0	1	0	2	1	0	4
UNLV	0	0	6	5	2	4	17
MSU	1	0	2	1	1	10	15
TAMU	0	0	0	0	0	0	0
UTK	0	0	1	0	2	5	8
Fisk	0	0	0	0	0	1	1
GWU	0	0	0	0	0	1	1
TOTAL	18	7	14	27	6	40	112

**42%** of NSSC alumni go on to careers in the National Laboratories or other Gov. positions



**117** Students or Postdocs worked on Lab Directed Projects

**100%** of Graduate Fellows have a mentor at a National Laboratory

**141** Lab Mentors at National Laboratories have worked one on one with a NSSC Fellow or Affiliate



## 112 NSSC Alumni working in the National Labs or other Government Positions



Sherry Faye PhD UNLV Postdoc UCB Postdoc | LLNL Dec 2015



Jonathan Plaue PhD UNLV DNFSB LANL Fall 2012



B.A. UCB Staff, NSD | LBNL Applied Nuclear Physics Spring 2014

Victor Negut



Ross Meyer B.Sc. UCB Staff, NSD | LBNL Applied Nuclear Physics Spring 2015

Joe Belarge

Postdoc MSU

MIT Lincoln Lab



Jeff Rolfes M.S. UNLV DTRA | Postdoc Spring 2017



Thomas Halverson Masters UCB West Point Spring 2016





Nicole Apadula Postdoc UCB LBNL Fall 2018



Joseph Curtis M.S. UCB Staff | LBNL Dec 2014



Brian Daub Postdoc UCB Staff | LLNL Weapons & Complex Integration Directorate Fall 2013





Tomi Akindele PhD UCB LLNL | Postdoc 2018



Jon Balajthy PhD UCD SNI Spring 2020

Ardelia Clarke

PhD Fisk

Spring 2019

PNNI



Max Wallace Bachelors UCB LLNL Spring 2020



Micah Folsom PhD UTK ORNL Spring 2020

Ross Barnowski

Postdoc | LBNL

PhD UCB

Spring 2016



Deepa Khatri B.S. UCB NNSA/LFO Summer 2014



B.Sc. UCB Staff Engineer | LLNL Safety Basis Division Summer 2014

Anthony Lubbers



Kalee Hammerton PhD MSU Staff | Savannah River Spring 2016

Alexander Dixon





Joseph Labrum BS UCB Intelligence Spring 2017



Sarah Laderman Dual Masters | UCB IAEA Spring 2018



PhD UCB



Spring 2020

Sandra Bogetic Postdoc |LLNL Spring 2020



2018

Spring 2015 Steven Gardiner PhD UCD Fermi National

Andrew Haefner PhD UCB Staff, NSD | LBNL Applied Nuclear Physics

Accelerator Lab | Postdoc





Marc Bergevin Postdoc UCD Staff | LLNL May 2015



Christopher Brand B.S. UCB Staff | LLNL Safety Basis Division May 2015



Caleb Roecker PhD UCB Staff | LANL May 2016



Keri Campbell PhD UNLV Postdoc | LANL Fall 2014



Maryline Ferrier PhD UNLV Postdoc | LANL Fall 2014





Audrey Roman PhD UNLV Postdoc | LANL Fall 2014



Matthew Proveaux M.Sc. UCB NNSA Fellow Pacific Northwest NL June 2014



Caroline Hughes M. Sc PNNL Spring 2019



Tashi Parsons-Moss Postdoc UCB Postdoc | LLNL Nuclear & Chemical Sciences Division



Fall 2014 Perry Chodash PhD UCB Postdoc | LLNL

Spring 2015



Cameron Bates PhD UCB Postdoc | LANL Fall 2014





Tenzing Joshi PhD UCB Postdoc, NSD | LBNL Applied Nuclear Physics Spring 2015



Sergey Uvarov Masters UCD Postdoc | LLNL Spring 2016



Janelle Droessler PhD UNLV Postdoc | LANL Mar 2016





Madhuri Kumari PhD UCD SNL



Brian Plimley PhD UCB Postdoc | LBNL May 2014



Jeremy Mock PhD UCD Postdoc | LBNL Fall 2014



Michael Jones PhD MSU Postdoc | LBNL Feb 2016



Erika Suzuki B.S. UCB Staff | LBNL Dec 2013

Scott Parker

Staff | LANL

PhD UCB

Dec 2018



Barbara Wang PhD UCB Postdoc UCB Postdoc | LLNL





Postdoc MSU Staff | NSCL Summer 2014

PhD MSU DNN NNSA Spring 2019

Jeromy Tompkins



Daine Danielson B.S. UCD Intern | LANL Summer 2014

May 2016







Steven Ragnar Stroberg PhD MSU Postdoc | TRIUMF 2014



Jenna Smith PhD MSU Postdoc | TRIUMF 2014



Tim Aucott PhD UCB Staff | SRNL December 2014



Paul Davis Postdoc UCB NNSA Spring 2013



Angela Simone Moore PhD UTK Staff | PNNL Spring 2019

Alex Braatz

Postdoc | ORNL

PhD UCI

2015



David Sweeney Postdoc UC Berkeley Postdoc | DTRA Fall 2015

Derek McLain

Postdoc | ANL

PhD UNLV

May 2016





Stephanie Lyons Postdoc MSU PNNL Spring 2020



Anagha Iyengar B.S. UCB Staff | NNSA May 2014



Scott Suchyta PhD MSU Postdoc UCB Staff | RSL Apr 2016



Ligang Bai Postdoc UNLV Postdoc | ANL May 2013



Masters UCB Staff | LBNL Summer 2016



David Weisz PhD UCB Postdoc | LLNL Summer 2016



Uday Mehta Bachelors UCB Engineer | LLNL Spring 2016



Quinlan Smith Masters UNLV Staff | ORNL Spring 2016

Nick Walsh

Postdoc UCD

Postdoc | LLNL

Summer 2016





Aaron Manalaysay Postdoc UCD LBNL Spring 2019



Keenan Thomas Masters UCB Staff | LLNL Summer 2016



B.S. UCB Staff | LLNL Spring 2016

Jessica Roche



Nicole Larson B.S. | MSU Nuclear Ops. Engineer INL Spring 2016



Andrew Wysong M.S. UCB Staff | LLNL Fall 2015



Anthony Juarez MPP | UCB Staff | SNL Spring 2016

Christopher Prokop

Postdoc | LANL

Justin Munson

PhD UCB Postdoc | LLNL

Spring 2015

PhD MSU

Spring 2016





James Bevins PhD UCB Staff | AFIT Summer 2017



Tucker McClanahan

Nick Bricker





Adam Rice Masters UCB Intelligence 2013





Masters UCB Army 2014



Eva Uribe



PhD UCB SNL | Staff

2016



Daniel Votaw PhD MSU LANL Spring 2019



Elizabeth Heckmaier PhD UCI LLNL | Postdoc Spring 2018



Jason Richards PhD UNLV ORNL | Postdoc Spring 2018



Kelsey Ammundon Masters UCB LANL | Staff Spring 2019

Matthew Tweardy

NNSA at PNNL



Spring 2018

PhD UTK



Winston Degraw Bachelors UCB LBNL Spring 2018



**Teal Pershing** PhD UCD LLNL Spring 2020

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Rachel Mersch

PhD UTK

Spring 2019

Charles Loelius

Masters MSU

NNSA | PNNL

Mark Quint

M.S. UTK

U.S. Army

2018

2016

ORNL





Mike Shattan PhD UTK AFIT | Staff 2018



ANL Spring 2019









Andrew Reddie Postdoc UCB Spring 2020









Morgan Askins

Postdoc | LBNL

PhD UCD

2018

Christian Bustillos PhD UCI Staff | LLNL Spring 2019

Daniel Hellfeld

PhD UCB

Spring 2019

LBNL





Kelly Rowland PhD UCB LBNL Spring 2018

Marc Fitzgerald

PhD UNLV

LLNL | Staff Spring 2017

William Kerlin

PhD UNLV

LLNL | Staff

Spring 2019









Jeffrey Kwarsick PhD UCB LBNL

Spring 2019

Brenden Longfellow PhD MSU LLNL Spring 2020

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PhD MSU Spring 2018

ORNL



Maxwell Sherrod PhD UNLV SRNL | Staff

Spring 2018 Michael Moore

PhD UTK

Spring 2019

PNNL





Gian Surbella

PNNL | Fellow

PhD GWU









