NSSC Virtual Scholar Showcase

Nuclear Science and Security Consortium Program and Metrics

June 2, 2020

Dr. Jasmina Vujic
University of California, Berkeley
NSSC Objectives

- Recruit and train top students in relevant nuclear disciplines

- Connect students with a core set of disciplines that support the nonproliferation and nuclear security mission

- Expand national laboratory collaboration to provide students the opportunity to engage deeply in research under the guidance of lab scientists
NSSC2 Organizational Chart

NNSA DNN

NSSC EXECUTIVE TEAM

PI/Director: Jasmina Vujic - UCB
Executive Director: Bethany Goldblum - UCB
Deputy Executive Director: Jason Hayward - UTK
NNSA Liaison: Kai Vetter - UCB
Director for Laboratories: Lee Bernstein - UCB/LBNL

ADVISORY BOARD

Chair - Carol Burns - LANL
Roger Falcone - UCB
Miriam John - SNL (retired)
David McCallen - UN Reno
Benn Tannenbaum - SNL
Catherine Romano - ORNL
Mavrik Zavarin - LLNL

POINT OF CONTACT COUNCIL

UNIVERSITY
Chris Cahill - GWU
Sean Liddick - MSU
Cody Folden - TAMU
Mani Tripathi - UCD
Frederic Poineau - UNLV
Jason Hayward - UTK

LABORATORY
Margie Root - LANL
John Valentine - LBNL
Vladimir Mozin - LLNL
Dave Williams - ORNL
David Peters - SNL

NSSC SUPPORT STAFF

Program Manager: Charlotte Carr
Financial Analyst: Derek Johnson
NSSC2 Research Focus Areas and Crosscutting Areas

Nuclear & Particle Physics
Lead: Barbara Jacak, UCB

Radiochemistry & Forensics
Lead: Ken Czerwinski, UNLV

Nuclear Engineering
Lead: Max Fratoni, UCB

Radiation Detection
Lead: Kai Vetter, UCB

Nuclear Data
Lead: Lee Bernstein (UCB)

Modeling & Simulation
Lead: Jasmina Vujic (UCB)

Nuclear Security Policy
Lead: Michael Nacht (UCB)

Education
Lead: Bethany Goldblum (UCB)
Virtual Scholar Showcase: Day 1 Focus

Nuclear & Particle Physics
Lead: Barbara Jacak, UCB

Radiochemistry & Forensics
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Lead: Michael Nacht (UCB)

Education
Lead: Bethany Goldblum (UCB)
NSSC1 History (2011-2016)

2011 - NSSC established as the first NNSA academic consortium

2012 – New course: Nuclear Security Policy and Technology

2013 – The NSSC webinar series debuts

2014 – NSSC LANL Summer Program partnership begins

2014 – NSSC supports 5 MSIs

2015/16 – NSSC1 concludes having supported:
  ● 127 Undergraduates
  ● 139 Grad Students
  ● 34 Postdocs
  ● 42 Faculty Members
NSSC2 History (2016-Present)

2016 - NSSC re-competes and is awarded funding for an additional five years

NSSC Phase 2 begins.
New partners UTK, TAMU, GWU & ORNL are introduced.

2017 – NSSC2 holds annual Fall Engagement Workshop and Advisory Board Meeting at LBNL

2018 – NSSC GW Boot Camp on Nuclear Security Policy is held for the first time

2019 – A total of 112 NSSC alumni are working in the national labs or other government positions. The NSSC pipeline to the national labs continues to grow!
NSSC Personnel
2011 - Present

Completed:
108 Ph.D. degrees
67 M.S. Degrees
111 B.S. Degrees

Gender ratio of NSSC scholars
Female * 30.9%
Male 69.1%

521 people have been supported by NSSC

*The student body of the College of Engineering at UC Berkeley is 28.6% female.
NSSC Metrics Overview
2011 - Present

333 Peer Reviewed Publications

Thibault Laplace (UCB)

508 Poster Presentations

Kevin Glennon (TAMU)
presented “A Forensic Investigation of Legacy Separated Pu” at LANL. Kevin also won Outstanding Presentation in Chemistry at LANL.

176 Awards

Daine Danielson (UCD) and Travis Smith (UTK) won 2019 Innovations in Nuclear Technology R&D Awards.

756 Oral Presentations

Stephanie Lyons (MSU) "β-decay of neutron-rich Co with Total Absorption Spectroscopy" Nuclear Seminar, Technical University Darmstadt, Germany.
NSSC Summer Programs

NSSC has supported 39 Summer Schools

*The majority of summer programs for 2020 have been cancelled due to COVID-19
NSSC-LANL Keepin Nonproliferation Science Summer Program

Goals:

- Create **working relationships** between NSSC students and LANL scientists
- Increase number of students performing **programmatic research** with LANL
- Turn research and training into **careers at the national laboratories**

<table>
<thead>
<tr>
<th>Dates</th>
<th>NSSC Participants</th>
<th>Other Participants</th>
<th>Total</th>
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<td>June 22 - Aug 14, 2020</td>
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At the end of the summer program all participants present oral “**lightning presentations**” for LANL personnel on their summer research project.

Many participants return to LANL to conduct dissertation research, or in postdoc or staff positions.

**Program alumni who have been awarded a Seaborg Summer Fellowship to return to LANL**

1. Katherine Luebke (UNLV)
2. James Louis-Jean (UNLV)
3. Kevin Glennon (TAMU)
The NSSC LANL Keepin Nonproliferation Science Summer Program goes **VIRTUAL** for Summer 2020:

- Program fully supported with all participants working with lab mentors on lab directed projects remotely
- Enrichment activities and lectures moved online
- Plans for onsite opportunities in the future

- 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
Objectives:

- Support the educational process
- Provide data from laboratory demonstrations
- Benefit university research projects

Instrumentation:

- **Neutron generators**: DT, DD, Cf, Cm, (α,n)
- **Gamma-ray detectors**: HPGe, LaBr₃, CZT, NaI(Tl), etc.
- **Neutron detectors**: ³He, EJ-301, EJ-309, Stilbene
- **Imaging**: X-Ray and Neutron transmission

Materials:

- Gamma-ray and neutron sources
- Low- and high-Z shielding
- Pu material samples
- U mass and enrichment standards
- Containers and enclosures

Evaluation of prompt gamma-ray emissions from neutron interrogation of meteorites
## NSSC Sponsored Courses

### NSSC has supported 9 courses held at four partner institutions

<table>
<thead>
<tr>
<th>Course</th>
<th>Institution</th>
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<tr>
<td>Nuclear Security: The Nexus Between Policy and Technology</td>
<td>UC Berkeley</td>
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<tr>
<td>A Hands-On Introduction to Radiation Detection</td>
<td>UC Berkeley</td>
</tr>
<tr>
<td>Special Topics: Nuclear Data</td>
<td>UT Knoxville</td>
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<tr>
<td>Radiochemical Methods in Nuclear Technology and Forensics</td>
<td>UC Berkeley</td>
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<tr>
<td>Radiation Detection and Nuclear Instrumentation Lab Course</td>
<td>UC Berkeley</td>
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<tr>
<td>Advanced Concept for Radiation Detection &amp; Measurements</td>
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<tr>
<td>Nuclear Criticality Safety</td>
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<tr>
<td>Nuclear and Radiochemistry</td>
<td>UC Irvine</td>
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<td>Designed Emphasis in Nuclear Science (DENS)</td>
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</table>

Special Topics: Nuclear Data with Prof. Heilbron and Prof. Sobes

Nuclear Security: The Nexus Between Policy and Technology with Prof. van Bibber and Prof. Nacht

A Hands-On Introduction to Radiation Detection with NSSC Specialist Dr. Ali Hanks
Since 2013, NSSC webinars have been connecting students to scientists at all of our partner institutions.

Former U.S. Secretary of Energy Dr. Ernie Moniz, former California Governor Jerry Brown, and NSSC Executive Director Dr. Bethany Goldblum with students at the panel discussion on “How Close to Doomsday? Nuclear Dangers and Stopping a New Nuclear Arms Race”
NSSC Cumulative Degrees
2011 - Present

NSSC Cumulative Degrees
2011 - 2012
2012 - 2013
2013 - 2014
2014 - 2015
2015 - 2016
2016 - 2017
2017 - 2018
2018 - 2019
2019 - 2020

PhD
Masters
Bachelors
42% of NSSC alumni are in careers in the national labs or other government positions (DoD, DoE, NNSA, DTRA, AirForce, US Navy, US Army, NsTec, Intelligence)
### NSSC Pipeline to the National Laboratories and Other Government

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Acknowledgements

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