

Kathryn A. Mummah

PHD CANDIDATE IN NUCLEAR ENGINEERING & ENGINEERING PHYSICS

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EDUCATION

University of Wisconsin–Madison

Madison, WI

PhD Student, Nuclear Engineering & Engineering Physics, GPA: 3.8 / 4.0

Aug. 2017 - **PRESENT**

M.S. Nuclear Engineering and Engineering Physics

May 2020

- Advisor: Professor Paul P.H. Wilson
- Fellow, NNSA Nuclear Nonproliferation and International Safeguards (NNIS) Graduate Fellowship Program
- Graduate Associate, Consortium for Monitoring, Technology, and Verification (MTV)
- Graduate Certificates in Science Communication (LSC) and Energy Analysis & Policy (EAP)

University of Illinois at Urbana-Champaign

Urbana, IL

B.S. Nuclear, Plasma, and Radiological Engineering, graduated with Honors, GPA: 3.6 / 4.0

May 2017

- Concentration in Power, Safety, and the Environment
- Minor in Atmospheric Sciences

EXPERIENCE

Los Alamos National Laboratory

Los Alamos, NM

Graduate Research Assistant, NEN-1 Safeguards Science & Technology

Jan. 2021 - **PRESENT**

- Built tool to convert cradle-to-grave nuclear fuel cycle simulations into IAEA-style nuclear material accounting reports.
- Generated realistic synthetic country-level nuclear fuel cycle simulations and characterized system-level behavior
- Advanced agent-based modeling at the material balance area level with high fidelity representations of nuclear material movements

UW-Madison Department of Engineering Physics

Madison, WI

Graduate Research Assistant, Computational Nuclear Engineering Research Group (CNERG)

Sept. 2017 - **PRESENT**

- Integrated acquisition pathway analysis into nuclear fuel cycle simulations
- Reviewed public communication efforts in consent-based siting of radioactive waste disposal facilities worldwide
- Designed uranium enrichment cascades in the Cyclus fuel cycle code to model post-JCPOA cascade performance scenarios

Grader

- NE405: Nuclear Reactor Theory, Spring 2018

Los Alamos National Laboratory

Los Alamos, NM

Grad Research Assistant, NEN-2 Advanced Nuclear Technology & Glenn T. Seaborg Summer Research Fellow

May 2018 - Aug. 2018

- Identified approaches to combine fuel cycle simulators and existing methodology for analyzing nuclear material diversion pathways.
- Taught nuclear engineering primer series including detailed background on nuclear energy industry and accidents

Visiting Student Guest, NEN-5 Systems Design & Analysis

May 2017 - Aug. 2017

- Developed MCNP decks for nuclear thermal rockets
- Created a reactor lab module to incorporate nonproliferation concepts into undergraduate curricula

University of Illinois Department of Nuclear, Plasma, and Radiological Engineering

Urbana, IL

Undergrad Research Assistant, Advanced Reactors and Fuel Cycle Research Group

Aug. 2016 - May 2017

Undergrad Research Assistant, Analysis of Reactor Transients and Stability Research Group

Jan. 2016 - Dec. 2016

Undergrad Research Assistant, Experimental Thermal Hydraulics Research Group

Aug. 2015 - Dec. 2015

Teaching Assistant

- Lead Engineering Learning Assistant, ENG 100 for Nuclear, Plasma, and Radiological Engineering. Fall 2015 & '16
- NPPE 100: Introduction to Nuclear, Plasma, and Radiological Engineering. Fall 2014, '15, & '16
- NPPE 101: Introduction to Energy Sources. Spring 2014 & '15

Grader

- ASTR 100: Introduction to Astronomy. Fall 2014

Idaho National Laboratory

Idaho Falls, ID

Intern, Fuels Modeling & Simulation

May 2016 - Aug. 2016

Oyster Creek Generating Station

Forked River, NJ

Intern, Reactor Engineering

Jun. 2015 - Aug. 2015

Exelon Generation

Intern, Spent Fuel & Decommissioning

Warrenville, IL

Jun. 2014 - Aug. 2014

Fermi National Accelerator Laboratory

QuarkNet Summer Intern, Optical Astronomy

Batavia, IL

Jun. 2012 - Aug. 2012

HONORS & AWARDS

AWARDS

- 2022 **American Nuclear Society Presidential Citation**
- 2022 **Best Presentation in Nuclear Technology & Society, ANS 2022 Student Conference**
- 2022 Semi-finalist, **Fulbright U.S. Student Program**
- 2020 First place, **Institute of Nuclear Materials Management J.D. Williams Student Paper Award**
- 2017 **Daniel F. Hang Outstanding Senior Design Award**
- 2017 **University of Illinois Knights of St. Patrick**
- 2016 **Alpha Nu Sigma**
- 2016 **Best Presentation in Public Image, ANS 2016 Student Conference**
- 2016 **William R. Schowalter Award**
- 2016 **American Nuclear Society Commendation for Service and Leadership**
- 2014 **American Nuclear Society UIUC Most Committed Member**
- 2013 **University of Illinois James Scholar**

SCHOLARSHIPS AND FELLOWSHIPS

- 2019-24 Graduate Fellow, **Nuclear Nonproliferation International Safeguards Program (NNIS)**
- 2022-23 **ANS Robert A. Dannels Memorial Scholarship**
- 2021-22 **ANS Graduate Scholarship**
- 2020-21 **ANS Michael J. Lineberry Memorial Scholarship**
- 2018 Summer Research Fellow, **Glenn T. Seaborg Institute**
- 2017-19 Graduate Fellow, **Consortium for Verification Technology**
- 2017-19 **ANS Fuel Cycle and Waste Management Division Randall Scholar**
- 2015-17 **DOE Nuclear Energy University Program IUP Scholarship Award**
- 2015-17 **Nuclear Regulatory Commission Scholarship**
- 2015-17 **American Nuclear Society Decommissioning & Environmental Sciences Scholarship**
- 2016-17 **Roy G. Post Foundation Scholarship**
- 2016-17 **Dale W. and Wanda L. Weaver Engineering Scholarship**
- 2016-17 **Crowe Horwath Scholarship**
- 2016-17 **Edith and Harry Darby Leadership Scholarship**
- 2015-17 **Catherine Pritchard Undergraduate Scholarship**
- 2013-17 **Mike Harper Leadership Scholarship**
- 2015-16 **Exelon Energy for Education Scholarship Award**
- 2014-16 **National Academy for Nuclear Training Scholarship**
- 2014-15 **ANS Incoming Sophomore Scholarships**

PAPERS AND PRESENTATIONS

CONFERENCES PAPERS AND ABSTRACTS

- [11] **Mummah, K. A.**, Jackson, D. E., Apt, K. E., Oakberg, J., Henzl, V., and Wilson, P. P. **May 2023**, "Simulated State Accounting Data for Development of Advanced and Automated State-level Safeguards Analysis," in *Proceedings of the 64th Annual Meeting of the Institute of Nuclear Materials Management*, Vienna, Austria.
- [10] Calice, M., Brossard, D., Edwards, M., Gruder, S., **Mummah, K. A.**, Nemet, G., Williams, S., and Wilson, P. P. **Nov. 2022**, "The Local Energy Transition: Perspectives on Community Energy Management in Wisconsin," presented at the Behavior, Energy and Climate Change (BECC) Conference, Washington D.C.
- [9] **Mummah, K. A. Apr. 2022**, "Learning from the "Successful Failure" of a Low- and Intermediate-Level Radioactive Waste Project as a Case Study in Consent-Based Siting," presented at the 2022 American Nuclear Society Student Conference, Champaign, IL.

- [8] **Mummah, K. A.** and Wilson, P. P. **Jul. 2020**, “Integrating Acquisition Pathway Analysis Into The Cyclus Fuel Cycle Simulator,” in *Proceedings of the 61st Annual Meeting of the Institute of Nuclear Materials Management*, Palm Desert, CA, USA.
- [7] **Mummah, K. A.** **Jun. 2019**, “Material Diversion Analysis Within a Fuel Cycle Simulator,” presented at the 2019 Technical Workshop of Fuel Cycle Simulation, Champaign, IL.
- [6] **Mummah, K. A.**, Bahran, R., Miller, K., and Wilson, P. P. **Jul. 2019**, “Acquisition Pathway Analysis using Fuel Cycle Simulators,” in *Proceedings of the 60th Annual Meeting of the Institute of Nuclear Materials Management*, Palm Desert, CA, USA.
- [5] Mouginot, B., **Mummah, K. A.**, and WILSON, P. P. **Nov. 2018**, “Assessing Material Inventory Uncertainties in Integrated Fuel Cycle Simulations,” presented at the Advances in Nuclear Nonproliferation Technology and Policy Conference (ANTPC 2018), Orlando, FL.
- [4] Mouginot, B., **Mummah, K. A.**, and Wilson, P. P. **Jul. 2018**, “Evaluating computational methods for modeling off-normal operation of gas centrifuge cascades,” in *Proceedings of the 59th Annual Meeting of the Institute of Nuclear Materials Management*, Baltimore, MD, United States. [Online]. Available: https://resources.inmm.org/system/files/annual_meeting_proceedings/2018/a161_2.pdf.
- [3] Mouginot, B., **Mummah, K. A.**, and Wilson, P. P. **Jun. 2018**, “Modeling Potential JCPOA Diversion Scenarios with Cyclus,” presented at the 2018 American Nuclear Society Annual Meeting, Philadelphia, PA.
- [2] **Mummah, K. A.**, Bae, J. W., O’Grady, D., and Lopez, A. **Apr. 2017**, “NuWWIS: An Interim Storage Solution for SPent Fuel,” presented at the 2017 American Nuclear Society Student Conference, Pittsburgh, PA.
- [1] **Mummah, K. A.** and Kuprianczyk, C. **Apr. 2016**, “Public Image in Spent Fuel Disposal: Lessons Learned from Sweden’s SKB,” presented at the 2016 American Nuclear Society Student Conference, Madison, WI, United States.

TECHNICAL REPORTS

- [2] **Mummah, K. A.**, Jackson, D. E., Oakberg, J., Apt, K. E., and Henzl, V. **Sep. 2023**, “Advanced Algorithms for Scrutiny of Mandatory State Reports Declarations to the IAEA (Final Project Report),” Los Alamos National Laboratory (LANL), Los Alamos, NM (United States), Tech. Rep. LA-UR-23-32729. doi: 10.2172/2208761.
- [1] Henzl, V., **Mummah, K. A.**, and Apt, K. **2022**, “Analysis of States’ Cadence of Nuclear Operations: Detecting Safeguards Violations,” Los Alamos National Laboratory, Los Alamos, NM, Tech. Rep. LA-CP-22-20328.

POSTERS

- [4] **Mummah, K. A.** **Mar. 2021**, “Good Practices and Clear Communication Gaps in the Effort to Site a Low- and Intermediate-Level Deep Geologic Waste Repository in Ontario,” Poster, presented at the Waste Management Symposium (Virtual).
- [3] **Mummah, K. A.**, Mouginot, B., and Wilson, P. P. **Apr. 2018**, “Off-normal Operation in Gas Centrifuge Enrichment Cascades,” presented at the 2018 American Nuclear Society Student Conference Poster Session, Gainesville, FL, United States.
- [2] **Mummah, K. A.** and Williamson, R. **Nov. 2016**, “Investigating the Effects of Fuel Pellet Geometry on Pellet Cladding Mechanical Interaction using BISON,” presented at the 2016 American Nuclear Society Winter Meeting, Las Vegas, NV, United States.
- [1] **Mummah, K. A.** **Nov. 2015**, “Reactivity Management: More than Just Reactor Engineers,” presented at the 2015 American Nuclear Society Winter Meeting, Washington D.C., United States.

SPONSOR PRESENTATIONS

- [9] **Mummah, K. A.** and Wilson, P. P. **Mar. 2024**, *Improved Time Behavior and Inventory Management to Support Nuclear Material Accounting in Cyclus*, Poster, Ann Arbor, MI.
- [8] **Mummah, K. A.**, Jackson, D. E., Apt, K., Oakberg, J., Henzl, V., and Wilson, P. P. **Mar. 2023**, *Progress in Simulated State Accounting Data*, Poster, Ann Arbor, MI.
- [7] **Mummah, K. A.**, Henzl, V., Apt, K., and Wilson, P. P. **Mar. 2022**, “Creating Synthetic State Declarations Using Cyclus,” presented at the 2022 Consortium for Monitoring, Technology, & Verification (MTV) Workshop.
- [6] **Mummah, K. A.** and Wilson, P. P. **Mar. 2021**, “Systems modeling of the nuclear fuel cycle to enhance safeguards implementation,” Poster, presented at the Consortium for Monitoring, Technology, and Verification Virtual Workshop 2021 (Virtual). [Online]. Available: <https://prezi.com/v/wineskjbpbj6x/mtv2021/#>.

- [5] **Mummah, K. A.** and Wilson, P. P. **Oct. 2019**, “Can We Study Material Diversion Analysis Within a Fuel Cycle Simulator?,” presented at the Consortium for Monitoring, Technology, & Verification (MTV) Fuel Cycle Facility Modeling Workshop 2019, Madison , WI.
- [4] **Mummah, K. A.** and Wilson, P. P. **Jun. 2019**, “Extending the Cyclus Fuel Cycle Simulator for International Safe-
guards,” presented at the 2019 NNSA University Program Review, Raleigh, NC.
- [3] **Mummah, K. A.**, Mouginit, B., and Wilson, P. P. **Jun. 2018**, “Progress on Studying Gas Centrifuge Cascade Be-
havior of Off-Normal Enrichment Scenarios,” presented at the 2018 NNSA University Program Review.
- [2] **Mummah, K. A.** and Wilson, P. P. **Oct. 2018**, “Simulation of the Nuclear Fuel Cycle and its Applications to Inter-
national Safeguards,” presented at the 2018 Consortium for Verification Technology (CVT) Workshop, Ann Arbor,
MI, United States.
- [1] **Mummah, K. A.**, Mouginit, B., and Wilson, P. P. **Nov. 2017**, “Modeling Post-JCPOA Cascade Performance with
Cyclus,” presented at the 2017 Consortium for Verification Technology Workshop, Ann Arbor, MI, United States.

SERVICE AND LEADERSHIP

PROFESSIONAL AFFILIATIONS AND SERVICE

American Nuclear Society (ANS)

Chair, Student Sections Committee (SSC)
 Treasurer, Decommissioning & Environmental Sciences Division
 Executive Committee, Fuel Cycle and Waste Management Division
 Committee Member, Student Sections Committee
 Referee/Reviewer
 Student Conference Judge

June 2021 - **PRESENT**
 June 2022 - **PRESENT**
 June 2021 - **PRESENT**
 June 2016 - **PRESENT**
 2019 - **PRESENT**
 2022 - **PRESENT**

Chair, Liaison Subcommittee of the Student Sections Committee
 Executive Committee, Young Members Group
 Vice Chair, Student Sections Committee
 Executive Committee, Nuclear Nonproliferation Policy Division
 Committee Member, Diversity and Inclusion Committee
 Student Director, ANS Board of Directors
 Chair, Commendations Subcommittee of the Student Sections Committee
 Committee Member, Local Sections Committee

Apr. 2021 - June 2023
 June 2019 - June 2022
 June 2019 - June 2021
 June 2018 - June 2021
 July 2018 - June 2021
 June 2017 - June 2019
 June 2016 - Jan. 2021
 June 2016 - June 2019

ACADEMIC SERVICE

American Nuclear Society, University of Wisconsin-Madison Student Section

Member
 Governor
 Advocacy co-chair

Aug. 2017-May 2022
 May 2018 - Dec 2018
 Jun. 2017 - Nov. 2017

University of Wisconsin-Madison Department of Engineering Physics

Department Representative to the College of Engineering Graduate Advisory Committee
 Chair, Student Advisory Committee

Aug. 2018 - Nov. 2022
 Apr. 2019-Jan. 2022

Catalysts for Science Policy

Member

June 2019 - June 2022

Wisconsin Baja Racing

Steering Team Member

Aug. 2018 - May 2020

American Nuclear Society, University of Illinois Student Section

Member
 President
 Internal Vice President
 Freshman President

Aug. 2013 - May 2017
 Apr. 2015 - Apr. 2016
 Apr. 2014 - Apr. 2015
 Oct. 2013 - Apr. 2014

Women in Nuclear, University of Illinois Student Section

Cofounder
 Member

Aug. 2015
 Aug. 2015 - May 2017

University of Illinois Department of Nuclear, Plasma, and Radiological Engineering

Undergraduate Advisory Board Representative

Apr. 2014 - Dec. 2016

Engineering Ambassadors, University of Illinois

Recruitment & Publicity Chair

Apr. 2016 - Dec. 2016

Ambassador

Nov. 2015 - May 2017

Engineering Council, University of Illinois

Student Introduction to Engineering (SITE) Reservations Chair

May 2015 - May 2016

University of Illinois Student Chapter of the American Meteorological Society

Secretary

Apr. 2015 - Apr. 2016

Member

Jan. 2015 - May 2017

Illinois Space Society

RASC-AL Technical Team Member

Aug. 2014 - Dec. 2014

Representative to Students for the Exploration and Development of Space (SEDS)

Sept. 2013 - Sept. 2014

OTHER SERVICE

Generation Atomic

Advisory Board Member

July 2020 - Jan. 2023

Rethinking Nuclear/Friends of Fission Midwest Chapter

Science Advisor

2018 - 2022

Phi Mu - Delta Beta Chapter

Academic Excellence Chair

Dec. 2016 - May 2017

INVITED TALKS

Atomic Allies , Expanding your Outreach Impact for Nuclear Science Week Webinar, <i>Panelist</i>	Sept. 13, 2023
American Nuclear Society , Social Media for Local & Student Sections Webinar, <i>Panelist</i>	Aug. 3, 2023
ANS Student Conference , Saturday Plenary, <i>Panelist</i>	Apr. 15, 2023
ANS Student Conference , Holding Onto a Professional/Personal Identity in Your Career, <i>Panelist</i>	Apr. 15, 2022
Women in Nuclear Region III , Academia Panel, <i>Panelist</i>	Aug. 19, 2021
Generation Atomic , Nuclear Advocacy Lab, <i>Seminar</i>	June 17, 2021
American Nuclear Society Trinity Local Section , <i>Keynote</i>	May 21, 2021
Los Alamos National Lab , Nuclear Engineering and Nonproliferation Division, <i>Seminar</i>	May 11, 2021
American Nuclear Society , What Does Earth Day Mean To You? Webinar, <i>Panelist</i>	Apr. 22, 2021
ANS Student , Interested in Nonproliferation? Opportunities to Build Your Expertise, <i>Panelist</i>	Apr. 10, 2021
ANS Student Conference , Taking Care of You, <i>Workshop</i>	Apr. 8, 2021
Purdue University , Women in Nuclear Student Section, <i>Seminar</i>	Mar. 3, 2021
American Nuclear Society , Graduate Fellowships, <i>Webinar</i>	Dec. 21, 2020
Stanford & Moscow Engineering Physics Institute , Young Professionals Nuclear Forum, <i>Speaker</i>	Dec. 9, 2020
NAYGN , Science Communication Series, <i>Speaker</i>	Oct. 13, 2020
UW-Madison , American Nuclear Society Student Section, <i>Seminar</i>	Oct. 8, 2020
Nuclear Energy Agency , Global Nuclear Science and Engineering Commencement, <i>Speaker</i>	Aug. 27, 2020
ANS Annual , Communicating Safety & Risk to the Public, <i>Panelist</i>	June 9, 2020
ANS Young Professionals Congress , Advocating to Policymakers, <i>Panelist</i>	Nov. 16, 2019
Ecomodernism , Nuclear Big Vs. Small, <i>Panelist</i>	Sept. 2019
Idaho National Laboratory , Atomic Week 2019, <i>Workshop</i>	Aug. 6, 2019
ANS Annual , From Nuclear Advocacy to Policy, From Local to Global, <i>Panelist</i>	June 13, 2019
ANS Annual , Results of the April 2019 "Fastest Path to Zero" Summit and Unconference, <i>Panelist</i>	June 12, 2019
ANS Winter , Advocacy and Communication: A Clean Energy Discussion, <i>Panelist</i>	Nov. 1, 2017
Nuclear Innovation Bootcamp , <i>Pitch Competition</i>	July 28, 2017
Environmental Progress , Atomic Vintage, <i>Lightning Talk</i>	July 26, 2017

SHORT COURSES AND OTHER TRAINING

Nuclear Material Control and Accountability (MC&A) and Metallography Pilot Case Study

NNSA Office of Defense Nuclear Security and Oak Ridge National Lab

[Knoxville, TN](#)

Aug. 2023

International Nuclear Facilities Experience

Argonne National Lab and Texas A&M University

[AT/SK/CZ/DE/NL](#)

May 2023

IAEA Safeguards: From Theory to Practice

Pacific Northwest National Lab

[Richland, WA](#)

Mar. 2023

Machine Learning for International Safeguards

NNSA Office of International Nuclear Safeguards (NA-241)

[Virtual](#)

July 2022

Nuclear Engineering Student Delegation

Independently student-organized. Delegation policy statement ([link](#))

[Washington, D.C.](#)

Sept. 2021

Young Professionals Nuclear Forum

Stanford Center for International Security and Cooperation and the Moscow Engineering Physics Institute

[Virtual](#)

Dec. 2020

International Safeguards Policy and Information Analysis-Intensive Summer Course

Middlebury Institute of International Studies at Monterey and Lawrence Livermore National Lab

[Virtual](#)

June 2021

Nuclear Security: The Nexus Between Policy and Technology

University of California, Berkeley Course NE C285

[Virtual](#)

Jan. 2021 - Apr. 2021

Nonproliferation and International Safeguards Summer Course

Pacific Northwest National Lab

[Virtual](#)

June 2020

Nondestructive Assay (NDA) Summer Course

Los Alamos National Lab

[Los Alamos, NM](#)

June 2018

Nuclear Innovation Bootcamp

University of California, Berkeley

[Berkeley, CA](#)

July 2017

Dr. G. Robert Keepin Nonproliferation Science Summer School

Los Alamos National Lab

[Los Alamos, NM](#)

Jun. - Aug. 2017

Geologic Storage of Nuclear Spent Fuel

Swedish Royal Institute of Technology (KTH) & Swedish Nuclear Fuel and Waste Management Co. (SKB)

[Oskarshamn, Sweden](#)

June 2015