

# Kathryn A. Mummah

PHD CANDIDATE IN NUCLEAR ENGINEERING & ENGINEERING PHYSICS

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## EDUCATION

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### 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

## RESEARCH AND WORK EXPERIENCE

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### Los Alamos National Laboratory

Los Alamos, NM

Graduate Research Assistant, NEN-1 Safeguards Science & Technology

Jan. 2021 - **PRESENT**

- Generating synthetic nuclear fuel cycle models, building tool to convert simulations into nuclear material accounting reports
- Identifying novel signatures of diversion through comprehensive analysis of nuclear material accounting reports

### UW-Madison Department of Engineering Physics

Madison, WI

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

Sept. 2017 - **PRESENT**

- Developing software to model the lifecycle of nuclear materials within Cyclus for nuclear nonproliferation applications
- Reviewing 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

### 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

Visiting Student Guest, NEN-5 Systems Design & Analysis

May 2017 - Aug. 2017

### 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

### Idaho National Laboratory

Idaho Falls, ID

Intern, Fuels Modeling & Simulation

May 2016 - Aug. 2016

## PAPERS AND PRESENTATIONS

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### JOURNAL ARTICLES

- [1] **Mummah, K. A.**, Taylor, S., Ding, M., Blank, L., Crespo Montañés, C., and O'Shaughnessy, E. **Jul. 2022**, "A holistic framework of the benefits of utility-scale solar," *Submitted, in revisions*,

### 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] **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.

- [9] Calice, M., Brossard, D., Edwards, M., Gruder, S., **Mumma, K.**, 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.
- [8] **Mumma, K.** 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] **Mumma, K.**, 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.
- [6] **Mumma, K. A.** **Jun. 2019**, "Material Diversion Analysis Within a Fuel Cycle Simulator," presented at the 2019 Technical Workshop of Fuel Cycle Simulation, Champaign, IL.
- [5] Mougnot, B., **Mumma, K.**, 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] Mougnot, B., **Mumma, K.**, 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](https://resources.inmm.org/system/files/annual_meeting_proceedings/2018/a161_2.pdf).
- [3] Mougnot, B., **Mumma, K.**, 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] **Mumma, 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] **Mumma, 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

- [1] Henzl, V., **Mumma, 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] **Mumma, K.** **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] **Mumma, K. A.**, Mougnot, 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] **Mumma, 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] **Mumma, 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 MEETINGS

- [8] **Mumma, 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] **Mumma, 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] **Mumma, K.** 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/wineskjpbj6x/mtv2021/#>.
- [5] **Mumma, 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 Safeguards," presented at the 2019 NNSA University Program Review, Raleigh, NC.
- [3] **Mummah, K.**, Mougnot, B., and Wilson, P. P. **Jun. 2018**, ``Progress on Studying Gas Centrifuge Cascade Behavior 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 International Safeguards," presented at the 2018 Consortium for Verification Technology (CVT) Workshop, Ann Arbor, MI, United States.
- [1] **Mummah, K. A.**, Mougnot, 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.

## HONORS & AWARDS

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### RECENT AWARDS

2022	<b>American Nuclear Society Presidential Citation</b>
2022	<b>Best Presentation in Nuclear Technology &amp; Society, ANS 2022 Student Conference</b>
2022	Semi-finalist, <b>Fulbright U.S. Student Program</b>
2020	First place, <b>Institute of Nuclear Materials Management J.D. Williams Student Paper Award</b>

### RECENT SCHOLARSHIPS AND FELLOWSHIPS

2019-20,21,22,23	Graduate Fellow, <b>Nuclear Nonproliferation International Safeguards Program (NNIS)</b>
2022-23	<b>ANS Robert A. Dannels Memorial Scholarship</b>
2021-22	<b>ANS Graduate Scholarship</b>
2020-21	<b>ANS Michael J. Lineberry Memorial Scholarship</b>
2018	Summer Research Fellow, <b>Glenn T. Seaborg Institute</b>
2017-18,19	Graduate Fellow, <b>Consortium for Verification Technology</b>
2017-18,19	<b>ANS Fuel Cycle and Waste Management Division Randall Scholar</b>

## SERVICE AND LEADERSHIP

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### PROFESSIONAL AFFILIATIONS AND SERVICE

Since 2013	Student Member, <b>American Nuclear Society</b>
Since 2015	Member, <b>Women in Nuclear</b>
Since 2015	Student Member, <b>Society of Women Engineers</b>
Since 2018	Student Member, <b>Institute of Nuclear Materials Management</b>

### American Nuclear Society (ANS)

Chair, Student Sections Committee (SSC)	<i>June 2021 - PRESENT</i>
Treasurer, Decommissioning & Environmental Sciences Division	<i>June 2022 - PRESENT</i>
Executive Committee, Fuel Cycle and Waste Management Division	<i>June 2021 - PRESENT</i>
Referee/Reviewer	<i>2019 - PRESENT</i>
Student Conference Judge	<i>2022 - PRESENT</i>
Chair, Liaison Subcommittee of the Student Sections Committee	<i>Apr. 2021 - June 2023</i>
Executive Committee, Young Members Group	<i>June 2019 - June 2022</i>
Vice Chair, Student Sections Committee	<i>June 2019 - June 2021</i>
Executive Committee, Nuclear Nonproliferation Policy Division	<i>June 2018 - June 2021</i>
Committee Member, Diversity and Inclusion Committee	<i>July 2018 - June 2021</i>
Student Director, ANS Board of Directors	<i>June 2017 - June 2019</i>
Chair, Commendations Subcommittee of the Student Sections Committee	<i>June 2016 - Jan. 2021</i>
Committee Member, Local Sections Committee	<i>June 2016 - June 2019</i>

### ACADEMIC SERVICE

#### American Nuclear Society, University of Wisconsin-Madison Student Section

Member	<i>Aug. 2017-May 2022</i>
Governor	<i>May 2018 - Dec 2018</i>
Advocacy co-chair	<i>Jun. 2017 - Nov. 2017</i>

## **University of Wisconsin-Madison Department of Engineering Physics**

Department Representative to the College of Engineering Graduate Advisory Committee

*Aug. 2018 - Nov. 2022*

Chair, Student Advisory Committee

*Apr. 2019-Jan. 2022*

## **Catalysts for Science Policy**

Member

*June 2019 - June 2022*

## **American Nuclear Society, University of Illinois Student Section**

Member

*Aug. 2013 - May 2017*

President

*Apr. 2015 - Apr. 2016*

Internal Vice President

*Apr. 2014 - Apr. 2015*

Freshman President

*Oct. 2013 - Apr. 2014*

## **Women in Nuclear, University of Illinois Student Section**

Cofounder

*Aug. 2015*

Member

*Aug. 2015 - May 2017*

## **OTHER SERVICE**

### **Generation Atomic**

Advisory Board Member

*July 2020 - Jan. 2023*

### **Rethinking Nuclear/Friends of Fission Midwest Chapter**

Science Advisor

*2018 - 2022*