Amanda M. Bachmann

CONTACT INFORMATION

Graduate Research Assistant
NEUP Fellow
University of Illinois, Urbana-Champaign
Nuclear, Plasma, and Radiological Engineering

mobile: (813) 495-5698
e-mail: amandab7@illinois.edu

RESEARCH INTERESTS

Advanced nuclear reactors and fuel cycles, nuclear non-proliferation nuclear fuel cycle analysis, scientific computation.

PHD

University of Illinois Urbana-Champaign, NUCLEAR ENGINEERING **Aug 2020 – Present**

- Anticipated Graduation: August 2023
- Advisor: Dr. Madicken Munk
- GPA: 3.94/4.0

MS

University of Tennessee, Knoxville, NUCLEAR ENGINEERING **Aug 2019 – Aug 2020**

- Empirical Modeling of Used Nuclear Fuel Radiation Emissions for Safeguards Purposes
- Advisor: Professor Jamie B. Coble
- GPA: 3.96/4.0

BS

University of Tennessee, Knoxville, NUCLEAR ENGINEERING **Aug 2015 – May 2019**

- Minors: Material Science & Engineering; Nuclear Decommissioning & Environmental Management
- GPA: 3.91/4.0

RESEARCH EXPERIENCE

University of Illinois at Urbana-Champaign, Urbana, IL **Aug 2020 – Present**
NEUP Fellow, Advanced Reactors and Fuel Cycles Group
Investigating impacts of the transition to HALEU-fueled advanced reactors on the nuclear fuel cycle

University of Tennessee, Knoxville, Knoxville, TN **Aug 2019 – Aug 2020**
Graduate Research Assistant, Coble Research Lab
Developed multivariate models of used nuclear fuel signatures for used in nonproliferation safeguards

Oak Ridge National Laboratory, Oak Ridge, TN **May 2019– Aug 2019**
NESLS Intern, Radiation Transport High Performance Computing Methods and Applications Team
Investigated differences in Doppler broadening of cross section data in SHIFT Monte Carlo code

University of Tennessee, Knoxville, Knoxville, TN **Oct 2015 – May 2019**
Undergraduate Research Assistant, Coble Research Lab
Generated a database for use as a nonproliferation safeguard for electrochemical reprocessing
Created simulated multidimensional isotopic data for the use of radiation signatures to infer used nuclear fuel characteristics for use as a nonproliferation safeguard
Collected data for Equipment Condition Monitoring of motors and batteries

OTHER EXPERIENCE

Duke Energy, Huntersville, NC **May – Aug 2018**
Nuclear Generation Intern, Reactor Engineering **May – Aug 2017**
Modified administrative and operating procedures to enhance procedure use and adherence
Created VBA programs to simplify the reactor head tensioning procedure and reduce outage time
Performed procedures to manage reactivity in a multi-unit plant

University of Tennessee, Knoxville, Knoxville, TN **Jan 2017 – Dec 2017**
Supplemental Instruction Leader, Student Success Center
Organized and planned review material for twice-weekly supplemental isntruction sessions for students of a General Chemistry class

University of Tennessee, Knoxville, Knoxville, TN **Jan – Jun 2016**
Pre-College Programs Counselor, College of Engineering Office of Diversity Programs
Supervised student learning in multiple engineering disciplines

Honors and Awards

Masters Graduate Research Excellence Award, UTK Nuclear Engineering Dept.	**2020**
ANS Student Sections Commendations, ANS Student Sections Committee	**2020**
U.S. WIN Region II Leadership Award, U.S. WIN Region II	**2019**
Outstanding Student Ambassador, UTK Nuclear Engineering Dept.	**2018 – 2020**
Best Presentation International Safeguards Division, ANS Student Conference	**2019**
Best Presentation Nuclear Nonproliferation Division, ANS Student Conference	**2018**
Outstanding Undergraduate Research Assistant, UTK Nuclear Engineering Dept.	**2017**
Girl Scout Gold Award, Girl Scouts of America	**2015**

Scholarships Awarded

UIUC NPRE Barclay G. Jones Scholarship *$5,000*	**2021**
UIUC Grainger College of Engineering SURGE Fellowship *$5,000*	**2020**
ANS Oak Ridge/Knoxville Section Graduate Student Scholarship *$1,000*	**2020**
NEUP Fellowship *$161,000*	**2020**
NEUP Fellowship *$155,000*	**2019**
NEUP Scholarship *$7,500*	**2017**
NRC Scholarship *$5,000*	**2015**
UTK Volunteer Scholarship *$72,000*	**2015**

Journal Publications

[1] **A. M. Bachmann**, R. Fairhurst-Agosta, Z. Richter, N. Ryan, and M. Munk. Enrichment dynamics for advanced reactor HALEU support. *EPJ Nuclear Sciences & Technologies*, 7:22, 2021. Publisher: EDP Sciences. URL: https://www.epj-n.org/articles/epjn/abs/2021/01/epjn210024/epjn210024.html, doi:10.1051/epjn/2021021

[2] **A. M. Bachmann**, J. B. Coble, and S. E. Skutnik. Comparison and uncertainty of multivariate modeling techniques to characterize used nuclear fuel. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 991:164994, Mar. 2021. URL: http://www.sciencedirect.com/science/article/pii/S0168900220313917, doi:10.1016/j.nima.2020.164994

Refereed Conference Proceedings

[3] **A. M. Bachmann**, J. B. Coble, and S. E. Skutnik. Elemental and Isotopic Concentration Tracking for Electrochemical Reprocessing Safeguards. In *Proceedings of the 2018 Advances in Nuclear Nonproliferation Technology and Policy Conference*, pages 121–124, Orlando, FL, Nov. 2018. URL: https://www.ans.org/pubs/proceedings/article-44678/

[4] S. E. Skutnik, J. B. Coble, **A. M. Bachmann**, M. P. Cooper, N. Gilliam, and J. T. Mitchell. A Signatures-Based Approach to Electrochemical Reprocessing Safeguards Modeling & Evaluation. In *Proceedings of the 2018 Advances in Nuclear Nonproliferation Technology and Policy Conference*, pages 117–120, Orlando, FL, Nov. 2018. URL: https://www-ans-org.proxy2.library.illinois.edu/pubs/proceedings/article-44677/

Refereed Conference Abstracts

[5] **A. M. Bachmann**. Modeling Material Requirements of the Transition to HALEU Fueled Reactors. In *Proceedings of the Technical Workshop on Fuel Cycle Simulation 2021*, Virtual, June 2021

[6] **A. M. Bachmann** and K. D. Huff. Comparing HALEU Demand Aong Advanced Reactor Fuel Cycle Transitions. In *Proceedings of the 2021 ANS Virtual Annual Meeting*, volume 124, pages 134–137, Virtual Meeting, June 2021. URL: https://www.ans.org/pubs/transactions/article-49551/

[7] **A. M. Bachmann** and K. D. Huff. Enriched Uranium Supply Requirements for the Transition to Advanced Reactors. In *Proceedings of the American Nuclear Society 2021 National Student Conference*, Virtual, Apr. 2021

[8] **A. M. Bachmann**, J. B. Coble, and S. E. Skutnik. Multivariate modeling of nuclear fuel characteristics for safegaurds purposes. In *Proceedings of the American Nuclear Society 2020 National Student Conference*, Raleigh, NC, Mar. 2020. Cancelled due to COVID-19

[9] **A. M. Bachmann**, N. Gilliam, M. Cooper, and J. Mitchell. Detection of the Diversion of Special Nuclear Material in a Pyroprocessing Facility. In *Proceedings of the American Nuclear Society 2019 National Student Conference*, Richmond, VA, Apr. 2019

[10] N. Gilliam, S. E. Skutnik, J. B. Coble, **A. M. Bachmann**, M. P. Cooper, and J. T. Mitchell. Source Term Development and Radiological Signature Analysis for Simulation in Electrochemical Reprocessing Safeguards. In *Transactions of the American Nuclear Soceity Winter Meeting*, volume 119, pages 92–95, Orlando, FL, Nov. 2018. Publisher: American Nuclear Society. URL: http://epubs.ans.org/?a=44162

[11] **A. M. Bachmann**, J. Mitchell, M. Cooper, and N. Gilliam. Investigating Isotopic Concentration Variability in Used Nuclear Fuel. In *Proceedings of the American Nuclear Society 2018 National Student Conference*, Gainesville, FL, Apr. 2018

[12] **A. M. Bachmann**, J. B. Coble, and S. E. Skutnik. Multivariate Anaysis of Radiation Signatures to Infer Used Nuclear Fuel Characterisitcs. In *Proceedings of the American Nuclear Society 2017 National Student Conference*, Pittsburg, PA, Apr. 2017

Technical Reports

[13] S. G. Dotson, **A. M. Bachmann**, Z. M. Richter, N. R. Panczyk, N. S. Ryan, A. C. Balla, and E. R. Fanning. Economic and Carbon Impacts of Potential Illinois Nuclear Plant Closures: The Cost of Closures. Technical Report UIUC-ARFC-2021-02, University of Illinois at Urbana-Champaign, Urbana, IL, May 2021. URL: github.com/arfc/2021-04-nm-illinois

Other Publications

[14] **A. Bachmann**. Empirical Modeling of Used Nuclear Fuel Radiation Emissions for Safeguards Purposes. Master's thesis, University of Tennessee Knoxville, Aug. 2020. URL: https://trace.tennessee.edu/utk_gradthes/6272/

Other Media

[15] Season 3 Episode 29: Bad Bites, Cat Personalities and Amanda Bachmann on Nuclear Science - The Science Pawdcast, Sept. 2021. URL: https://bunsenbernerbmd.buzzsprout.com/413041/9245459-season-3-episode-29-bad-bites-cat-personalities-and-amanda-bachman-on-nuclear-science

[16] **A. Bachmann**, A. Balla, and J. Shehee. Webinar summary: The role of nuclear in Illinois, Apr. 2021. URL: https://www.ans.org/news/article-2788/webinar-summary-the-role-of-nuclear-in-illinois/

Invited Talks

UIUC Women in Nuclear Women's History Month Speaker Series — **Mar 3, 2022**
U.S. WIN Region III Conference, Virtual *Academia Panel* — **Aug 19, 2021**
U.S. DOE *Atomic Wings Lunch and Learn panel* — **Feb 10, 2020**
Y-12 National Secutiry Complex *Introduce a Girl to Engineering* — **Feb 21, 2019**
U.S. WIN *National Conference Breakout session panel*, — **July 25, 2017**

Engineering Teaching

University of Tennessee, Knoxville
Dept. of Nuclear Engineering, Teaching Assistant
NE 542, Radioactive Waste Management — **Spring 2020**
NE 402, Nuclear Engineering Lab — **Fall 2019**

Guest Lectures

University of Illinois Urbana-Champaign, NPRE Dept — March 21, 2022
NPRE 247, Modeling Energy Systems
Nuclear Fuel Cycle
University of Illinois Urbana-Champaign, NPRE Dept — April 26, 28, 30, 2021
NPRE 412, Nuclear Power Economics and Fuel Management
Nuclear Nonproliferation Safeguards

Scientific Computing Skills

Languages — Python
Databases — HDF5
Test Frameworks — nose
Version Control — git
Other Tools — LaTeX, MatLab, Cyclus, MCNP, ORIGAMI, ORIGEN

Professional Service

Member, Nuclear Engineering Student Delegation **2021**
Member, NPRE Graduate Student Advisory Committee, UIUC **2021**
Student Director, Board of Directors, ANS **2021–Present**
DEI Co-Chair; Sponsorshp Chair, 2022 ANS Student Conference **2021-2022**
Member, Diversity and Inclusion Committee, ANS **2020–Present**
Member, Scholarship and Policy Coordiantion Committee, ANS **2020–Present**
Co-Vice Chair, Student Sections Committee, ANS **2019–2021**
Twitter Lead, Communications Committee, U.S. WIN **2018–Present**
Member, NEED Committee, ANS **2018–2020**
Member, Region II Conference Planning Committee, U.S. WIN **2018–2019**
President, UTK Chapter, U.S. WIN **2018–2019**
Member, Alpha Nu Sigma Honor Society, ANS **2017**

Volunteer Work

Rules Judge, Tennessee Science Bowl **Febs 2017–2020**
Troop Leader, Girl Scouts of the Southern Appalachians **2016–2019**

Workshops & Short Courses

Nonproliferation and International Safeguards Summer Course Pacific Northwest National Laboratory **Jun 2021**
Week-long course that includes lectures on safeguards topics, such as state level evaluation and environmental sampling, and table-top exercises, such as Design Information Verification and drawing conclusions about an example state's nuclear fuel cycle and facilities

Consortium for Monitoring, Technology, and Verification Nuclear Engineering Summer School University of Michigan, Ann Arbor **May-Aug 2020**
12 week summer lecture series, focusing on aspects of nuclear nonproliferation safeguards, gamma and neutron detector systems, and experimental data analysis

Developing Future Faculty Facilitating Undergraduate Evidence-Based Learning Seminar University of Tennessee, Knoxville **Jan–March 2020**
Six module seminar on disciplinary exploration of teaching and learning practices employed in undergraduate STEM courses
Center for the Integration of Research, Teaching, and Learning (CIRTL) certified seminar to explore methods and applications of Teaching as Research

Consotium for Montoring, Technology, and verification Workshop on Fuel Cycle Facility Monitoring University of Wisconsin-Madison **Oct 2019**
Two day workshop on research performed on Fuel Cycle Facility Monitoring and best approaches to future work, hosted by the Consortium for Monitoring, Technology, and Verification

TRANSFORM Training Workshop 2019 Oak Ridge National Laboratory **Sept 2019**
Two day course on the basics of Modelica, Dymola, and the TRANSFORM library, with exercises on how to use the resources to build a pressurized water reactor model

Best Practices in Modeling and Simulation of Nuclear Materials for Nuclear Safeguards Practitioners and Early Career Professionals Oak Ridge National Laboratory **Aug 2019**
Four day course on modeling and simulation of used nuclear fuel using ORIGEN and ORIGAMI and their applications to safeguards
Hands on experience in using INDEPTH, a reverse depletion code, and the requirements of an IAEA Design Information Questionnaire