

Katherine L. Childers

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Education

Ph.D. Nuclear Chemistry | Michigan State University

2015 - Present

B.S Chemistry with Honors | Otterbein University

2011-2015

Minor Physics, Honors Cum Laude

Professional Experience

Graduate Research Assistant

2015 - Present

*National Superconducting Cyclotron Laboratory
Michigan State University*

Thesis Advisor: Dr. Sean Liddick

Thesis Topic: Validation of the β -Oslo method: An indirect method for constraining neutron-capture cross sections.

- Participation in planning and execution of experiments at multiple facilities with large scale detector arrays to measure β -decay and neutron-capture cross sections.
- Quantitative analysis of data to determine neutron-capture cross sections via direct and indirect methods.

National Laboratory Practicum

2019

Los Alamos National Laboratory

Mentor: Dr. Aaron Couture

- Quantitative analysis of direct neutron-capture data.

Graduate Teaching Assistant

2015 - 2016

Michigan State University, Chemistry Department

CEM 141: General Chemistry, CEM 142: General and Inorganic Chemistry

- Taught recitation sections of 30 students, where students work on problem sets in small groups.
- Proctored and graded exams.
- Held office hours to mentor and aid students needing extra assistance.

Undergraduate Teaching Assistant

2013 - 2015

Otterbein University, Chemistry Department

Organic Chemistry Lab I and II

- Prepared reagents and set up materials needed for lab.
- Wrote and graded weekly pre-lab tests.
- Assisted professor during lab.
- Proctored and graded exams.

Undergraduate Research assistant

2013 - 2015

Otterbein University, Chemistry Department

Thesis Advisor: Dr. Robin Grote

Honors Thesis topic: Investigating the synthesis of heterocycles via gold catalyzed cyclizations and cyclo-dehydrating reactions.

- Performed synthesis of compounds in an organic chemistry research laboratory.
- Purified compounds via column chromatography and rotary evaporation.
- Characterized compounds via NMR spectroscopy.

Technical Skills and Expertise

Acquisition and analysis of large multivariable data sets

Radiation detectors: NaI, Si, HPGe, BaF₃

Digital and analog data acquisition systems; identification of failure modes and mitigation procedures

Software and Programming Languages: C++, ROOT, GEANT4, CorelDraw, LISE++ (production and transportation of rare isotopes), SRIM (ranges of ions in matter), TALYS (statistical reaction code)

Workshops and Training

Radiation Detection for Nuclear Security
Summer School

Pacific Northwest National Laboratory June 2019

7th Workshop on Nuclear Level Density and Gamma Strength

Oslo, Norway, May 2019

Russbach School on Nuclear Astrophysics

Russbach, Austria, March 2018

Exotic Beams Summer School

Michigan State University, July 2016

Nuclear Chemistry Summer School

Brookhaven National Laboratory, Summer 2014

Relevant Coursework

Nuclear Chemistry, Computation in Nuclear Chemistry, Radiation Detectors, Nuclear Security, Nuclear Structure, Quantum Mechanics, Statistical Mechanics

Awards and Fellowships

Nuclear Science and Security Consortium Graduate Fellow

2019

MSU Chemistry Recruiting Fellowship

2015

Otterbein Cardinal Science Scholar Award

2011 - 2014

Otterbein University President's Scholar Award

2011 - 2015

Otterbein Music Participation Award

2011 - 2013

Otterbein Athletic Bands Award

2011 - 2014

Leadership and Outreach

NSCL/FRIB Open House Volunteer (~4000 visitors)

2016 - 2018

NSCL Graduate Organization - Curriculum Committee Graduate Representative

2016 - 2017

Physics of Atomic Nuclei (PAN) Summer Program Volunteer

2016 - 2017

Battle of the Chemistry Clubs Volunteer

2016 - 2018

Professional Affiliations

American Physics Society (APS)

American Physics Society – Division of Nuclear Physics (DNP)

American Chemical Society (ACS)

Publications

- “Discovery of mirror symmetry violation in bound nuclear ground states”, D. E. M. Hoff, A. M. Rogers, S. M. Wang, P. C. Bender, K. Brandenburg, K. Childers, J. A. Clark, A. C. Dombos, E. R. Doucet, S. Jin, R. Lewis, S. N. Liddick, C. J. Lister, Z. Meisel, C. Morse, W. Nazarewicz, H. Schatz, K. Schmidt, D. Soltesz, S. K. Subedi, and S. Waniganeththi, **Nature** 580, 52, 2020.

Presentations

Contributed Talks

- “Constraining the cross section of $^{82}\text{Se}(n,\gamma)^{83}\text{Se}$ to validate the β -Oslo Method.” *APS Division of Nuclear Physics Meeting*, Arlington VA, October 2019.
- “Validation of an indirect method for constraining neutron-capture cross sections” *American Chemical Society National Meeting and Exposition*, San Diego, CA, August 2019.
- “Constraining the cross section of $^{82}\text{Se}(n,\gamma)^{83}\text{Se}$ to validate the β -Oslo Method.” *7th Workshop on Nuclear Level Density and Gamma Strength*, Oslo, Norway, May 2019.
- “Constraining the cross section of $^{82}\text{Se}(n,\gamma)^{83}\text{Se}$ to validate the β -Oslo Method.” *5th Joint Meeting of the Nuclear Physics Divisions of the APS and JPS*, Waikoloa, HI, October 2018.
- “Constraining the cross section of $^{82}\text{Se}(n,\gamma)^{83}\text{Se}$ to be used in a validation of the β -Oslo Method.” *15th Russbach School on Nuclear Astrophysics*, Russbach, Austria, March 2018.
- “Constraining the cross section of $^{82}\text{Se}(n,\gamma)^{83}\text{Se}$ to validate the β -Oslo Method.” *APS Division of Nuclear Physics Meeting*, Pittsburgh PA, October 2017.
- “Validity of the Generalized Brink-Axel Hypothesis in ^{238}Np .” *National Superconducting Cyclotron Laboratory Weekly Research Discussion*, East Lansing MI, November 2016.

Posters

- “Validation of the β -Oslo method: An indirect method for constraining neutron-capture cross sections.” *Nuclear Science and Security Consortium Fall Workshop and Advisory Board Meeting*, Livermore CA, October 2019.
- “Constraining the cross section of $^{82}\text{Se}(n,\gamma)^{83}\text{Se}$ to validate the β -Oslo Method.” *Nuclear Structure 2018*, East Lansing, MI, August 2018.
- “Measuring the β -decay of ^{83}As to constrain the cross section of $^{82}\text{Se}(n,\gamma)^{83}\text{Se}$.” *15th Symposium on Radioactive Ion Beam Studies for Stewardship Science and Application*, Knoxville TN, June 2018.
- “Measuring the β -decay of ^{83}As to constrain the cross section of $^{82}\text{Se}(n,\gamma)^{83}\text{Se}$.” *SSAA Center for Excellence Workshop*, Los Alamos NM, March 2018.
- “Measuring the β -decay of ^{83}As to constrain the cross section of $^{82}\text{Se}(n,\gamma)^{83}\text{Se}$.” *Stewardship Science Academic Programs Symposium*, North Bethesda MD, February 2018.
- “Measuring the β -decay of ^{83}As to infer the cross section of $^{82}\text{Se}(n,\gamma)$.” *Exotic Beam Summer School*, East Lansing MI, July 2016.

- “Measuring the β -decay of ^{83}As to infer the cross section of $^{82}\text{Se}(n,\gamma)$.” *RIBSS Center Scientific Advisory Committee Meeting*, Knoxville TN, June 2016.
- “Oxadiazoles as biofilm and bacterial growth inhibitors.” *ACS National Meeting*, Denver CO, March 2015.