

Samantha A. Labb
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Accomplished fourth year radiochemistry PhD Candidate, providing a wealth of experience and a passion for learning

EDUCATION

Colorado State University | Fort Collins, CO **Expected Graduation Date: May 2023**
Environmental and Radiological Health Sciences | PhD in Health Physics and Radiochemistry

Salisbury University | Salisbury, MD **August 2014 - May 2018**
Richard A. Henson School of Science & Technology | B.S. in Chemistry with Mathematics Minor

HONORS & ORGANIZATIONS

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| • Health Physics Society Ad-hoc Member | December 2019 |
| • American Nuclear Society Member | December 2019 |
| • Health Physics Society Member | December 2019 |
| • Health Physics Society Student Chapter (Treasurer) | January 2019 |
| • American Chemical Society Member | December 2015 |
| • Salisbury University Club Field Hockey | September 2015 |
| • Phi Eta Sigma National Freshman Honor Society | September 2015 |
| • Salisbury University Chemistry Society | September 2014 |

SKILLS

Programs

- Microsoft Word, Excel, PowerPoint, ChemDraw, SciFinder, Mathematica, Gaussian, ProSpartan, RStudio, Prism

Instruments

- Positive-Pressure Glove Box, NMR Spectroscopy (^1H , ^{13}C), IR Spectroscopy, UV-Vis Spectroscopy, Flash Chromatography, Powder X-Ray Diffraction, Liquid Scintillation Counting, GM Counter, Alpha Spectrometry, Gamma Spectroscopy

Laboratory Techniques

- Multi-step Synthesis, Chromatography, Radioanalytical Techniques, Chemical Separations

RESEARCH EXPERIENCE

Los Alamos National Laboratory **June 2021-Present**
Graduate Seaborg Fellow
Supervisor: Dr. Evelyn Bond and Dr. Todd Bredeweg

Characterization of a Novel Sodium Bismuthate PAN Resin

Performing chromatographic studies of an extraction chromatographic resin coated with an oxidizing agent to facilitate the separation of americium from curium for fuel cycle and weapons diagnostics applications while also learning proper regulatory, national security, and safety protocols.

Colorado State University **August 2018-Present**
Graduate Research Assistant, Health Physics & Radiochemistry Program
Advisor: Dr. Ralf Sudowe

Comparison of Actinide Behavior on Free and Pre-packed DGA Resin

January 2022-Present

Probing how the actinides U, Pu, Am, and Cm behave differently on the commercially available DGA-Normal resin available in the free and vacuum-packed forms through batch contact and chromatographic studies to show the disagreement in experimental results between the two forms.

Performance of a Water-soluble BTzBP Ligand for Lanthanide and Actinide Separations **January 2022-Present**
Studying the solvent extraction behavior of the N-donor BTzBP ligand with cationic groups synthesized during my undergraduate career for its ability to separate Eu from Am towards the successful separation of lanthanides and actinides. The application of the ligand in extraction chromatographic systems are also being explored.

Electron Linear Accelerator Production and Purification of Sc-47 from TiO₂ Targets **June 2019-August 2019**
Supervisors: Dr. Derek R. McLain, Dr. David Rotsch, Argonne National Laboratory
Assisted in the investigation of the reconstitution of TiO₂ targets after irradiation and subsequent Sc-47 separation in an effort to achieve recycling of the target material for increased cost efficiency.

Separation of Americium in Higher Oxidation States from Curium **August 2018-Present**
Collaboration with Aude Bombard and Steffen Happel, TrisKem International
Characterizing a novel resin consisting of polyacrylonitrile beads coated in the solid NaBiO₃ oxidizing agent for its ability to separate Am from Cm. In addition, the behavior of U, Pu, and Np is also being characterized in view of developing simplified nuclear waste reprocessing schemes. The speciation, oxidation, and ion exchange mechanisms between NaBiO₃ and Am are being investigated to achieve a greater understanding of fundamental solution chemistry.

Argonne National Laboratory
Senior Research Aide, Strategic Security Science Division **June 2018 - August 2018**
Supervisors: Dr. Derek R. McLain, Jodi Canaday

Improving the Recovery of Ba from Sr Resin Columns Using Chelating Agents
Investigated the use of several common chelating agents to strip barium from Sr resin columns in an effort to eliminate variation in Ba recovery and overall uncertainty when determining the age of Cs-137 source material.

Evolution Craft Brewery
Quality Control/Assurance Chemist **July 2017 - May 2018**
Supervisor: John Scheckells
Researched the chemistry involved in the brewing process and proposed quality measurement strategies to aid in the development of a quality control program within the brewery.

Salisbury University
Undergraduate Researcher, Chemistry Department. **June 2015 - May 2018**

Synthesis and Study of Phosphorus-Iron Carbonyl Compounds (January 2018-May 2018)
Supervisor/Advisor: Dr. David Rieck
Explored the synthesis and mechanisms of reactions between iron carbonyls and phosphines and characterized the resulting products, which would later be studied for their complexation abilities by future undergraduate students.

Nuclear Energy: Yesterday, Today, and Tomorrow? (2017)
Supervisors/Advisors: Dr. Seth J. Friese, Dr. James Buss
Helped facilitate the collaboration between Salisbury University's Chemistry Department and Honors Program for the development of a nuclear chemistry course available to students within the honors program. The course highlights the history, general chemistry concepts, economics, and politics that contribute to the role nuclear energy plays today and the role it might play in the future.

Synthesis of a Water-Soluble BTzBP Ligand for An(III)/Ln(III) Separations (June 2015-May 2018)
Supervisor/Advisor: Dr. Seth J. Friese
Synthesized and characterized the first water-soluble ligand of the BTzBP class that would be applied to selective minor actinide separation from the lanthanides through N-donor interactions in view of the recycling of nuclear waste and the closure of the nuclear fuel cycle.

EMPLOYMENT HISTORY

Quality Control Chemist | Evolution Craft Brewery, Salisbury, MD **June 2017-May 2018**

- Compiled laboratory test data and performed appropriate analyses
- Became familiar with working in an industrial setting
- Established a better understanding of OSHA regulations and good manufacturing practices

- Analytical Chemistry Lab Assistant** | Salisbury University, Salisbury, MD **January 2017 – May 2018**
- Assisted in the laboratory of Professor Mindy Howard
 - Calibrated analytical equipment and performed routine instrument maintenance
 - Participated in the full relocation and redesign of the analytical classroom and course
- Organic Chemistry Lab Assistant** | Salisbury University, Salisbury, MD **August 2015 – May 2018**
- Assisted in the laboratory of Professor Mindy Howard
 - Worked with up to 4 other assistants to maintain a safe, high-quality work and learning environment
- General Chemistry Teaching Assistant** | Salisbury University, Salisbury, MD **August 2015 – June 2017**
- Assistant for Dr. Seth J. Friese
 - Implemented general and organic chemistry knowledge when grading labs, quizzes, and exams
 - Collaborated with faculty and actively contributed new ideas on teaching methods

AWARDS

- Environmental and Radiological Health Sciences Student Travel Award **March 2022**
- Graduate Student Council and the Associated Student of CSU Travel Grant **March 2022**
- CSU Graduate Student Council Q3 Supply Grant **February 2022**
- 2nd Place Poster Presentation Award, CSU CVMBS Research Day **January 2022**
- 1st Place Oral Presentation Award, CRMCHPS **May 2021**
- Roy G. Post Scholarship for Nuclear Waste Management **February 2021**
- 3rd Place Oral Presentation Award, CSU CVMBS Research Day **January 2021**
- Health Physics Society Dade W. Moeller Scholarship **May 2020**
- Reginald L. Gotchy, Ph.D. and David E. McCurdy, Ph.D. Scholarship **May 2020**
- 2nd Place Oral Presentation Award, CRMCHPS **May 2020**
- American Nuclear Society James R. Vogt Radiochemistry Scholarship **March 2020**
- 2020 G.T. Seaborg Institute Research Fellowship **February 2020**
- Japan Student Services Organization (JASSO) Scholarship **August 2019**
- 3rd Place Oral Presentation Award, CRMCHPS **April 2019**
- Colorado State University Graduate Student Scholarship **September 2018**
- Henson Undergraduate Research Grant **April 2019**
- Salisbury University Green Fund Grant **May 2016**
- 1st Place Poster Presentation Award, UMBC Undergraduate Research Symposium **October 2015**
- National Science Foundation: Bridges for SUCCESS Research Grant **June 2015**

PUBLICATIONS

- Labb, S.A.; *et. al.* "Synthesis of a Water-Soluble, Soft Donor BTzBP Ligand for An(III)/Ln(III) Separation for Nuclear Waste Treatment," *Synlett.*, 31(14), p. 1384-1388 (2020).
- Labb, S.A.; Sorcic, A.; Tsai, Y.; McLain, D.R. "Improving the Recovery of Ba from Sr Resin Columns Using Chelating Agents," *J Radioanal. Nucl. Chem.*, 321(3), p. 867-874 (2019).

PRESENTATIONS

- Labb, S.A.; Sudowe, R. ; Bombard, A. "A Novel Sodium Bismuthate Resin for the Separation of Americium and Curium for Nuclear Waste Reprocessing" platform presentation at the Mountains and Plains Education and Research Center Research Day, Denver, CO, April 14, 2022.
- Labb, S.A.; Bombard, A.; Bond, E.M.; Sudowe, R. "Characterization of a Sodium Bismuthate PAN Resin for the Separation of Americium from Curium" oral presentation at the 12th International Conference on Methods and Applications of Radioanalytical Chemistry (MARC), April 4, 2022.

- Labb, S.A.; Sudowe, R. "Closing the Nuclear Fuel Cycle: Minor Actinide Separations" poster presentation at the 23rd Annual College of Veterinary Medicine and Biomedical Science Research Day, January 22, 2022.
- Labb, S.A.; Sudowe, R. "Separation of Americium and Curium for Neutron Capture Cross Section Measurements" oral presentation at the 66th Annual Health Physics Society Conference, July 26, 2021.
- Labb, S.A.; Sudowe, R. "Minor Actinide Separations for Nuclear Waste Recycling" poster presentation at the 2021 Waste Management Symposia, March 9, 2020.
- Labb, S.A.; Sudowe, R. "Separation of Americium in Higher Oxidation States from Curium for Nuclear Waste Recycling" oral presentation at the 22nd Annual College of Veterinary Medicine and Biomedical Science Research Day, January 30, 2020.
- Labb, S.A.; Sudowe, R. "Efficient Am and Cm Separation for Neutron Capture Cross Section Measurements" oral presentation at the 2020 Central Rocky Mountain Chapter Meeting of the Health Physics Society, Fort Collins, CO, May 2020.
- Labb, S.A.; Sudowe, R. "Chemical Separations of the Minor Actinides: Towards a Closed Nuclear Fuel Cycle," oral presentation at the 21st Annual College of Veterinary Medicine and Biomedical Science Research Day, January 25, 2020.
- Labb, S.A.; McLain, D.R. "Improving the Recovery of Ba from Sr Resin Columns Using Chelating Agents," poster presentation at the Radiobioassay and Radiochemical Measurements Conference, Santa Fe, NM, October 2019.
- Labb, S.A. "Nuclear Forensics: Age Dating of Radioactive Cs-137 Sources," oral presentation at the Salisbury University Physical Science Seminar, Salisbury, MD, October 2019.
- Labb, S.A. "Careers and Research in Radiochemistry," guest lecture at Salisbury University Nuclear Chemistry Course, Salisbury, MD, October 2019.
- Labb, S.A. "The Current State of Fukushima Prefecture 8 Years Post-Accident," guest lecture at Salisbury University Nuclear Chemistry Course, Salisbury, MD, October 2019.
- Labb, S.A.; Witter, P.; Mueller, R.; Brown, M; Kelly, M. "CSU/Fukushima University Ambassador Program" oral presentation at Colorado State University Health Physics Seminar, Fort Collins, CO, October 2019.
- Labb, S.A.; Sudowe, R. "Separation of Americium from Curium Using Sodium Bismuthate and Copper(III) Periodate," oral presentation at Central Rocky Mountain Chapter Meeting of the Health Physics Society, Fort Collins, CO, April 2019.
- Labb, S.A.; Sudowe, R. "Separation of Americium from Curium Using Sodium Bismuthate," poster presentation at Mountains and Plains Education and Research Center Research Day, Broomfield, CO, April 2019.
- Labb, S.A.; Rieck, D.F. "Synthesis of $(\text{Fe}(\text{CO})_4\mu_2\text{-PC}_6\text{H}_6)_3$: A Journey Begins," poster presentation at Salisbury University Chemistry Department Research Day, Salisbury, MD, May 2018.
- Labb, S.A.; Friese, S.J. "Synthesis of a Tetra-aza Ligand for An(III)/Ln(III) Separations," oral presentation at Salisbury University Student Research Conference, Salisbury, MD, April 2018.
- Labb, S.A.; Friese, S.J. "Closing the Nuclear Fuel Cycle: Synthesis of a Tetra-aza Ligand," oral presentation at National Conference on Undergraduate Research, Oklahoma City, OK, April 2018.
- Labb, S.A.; Stadler, R.; Friese, S.J. "Synthesis of a Tetra-aza Ligand for the Separation of Lanthanides from Actinides," oral presentation at Salisbury University Student Research Conference, Salisbury, MD, April 2017.
- Labb, S.A.; Friese, S.J. "Solving Nuclear Waste: A Molecular Approach," poster presentation at Northeast Regional Honors Conference, Pittsburgh, PA, April 2017.
- Labb, S.A.; Cheng, Y.; Friese, S.J. "Tetra-aza Ligands for An(III)/Ln(III) Separations," poster presentation at University of Maryland Baltimore County Undergraduate Research Symposium in the Chemical and Biological Sciences, Baltimore, MD, October 2015.

References available upon request