

Sawyer J. Balint

Ph.D. Candidate | NSF GRFP Fellow

Fulweiler Lab | Boston University Department of Earth and Environment



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Curriculum Vitae

RESEARCH FOCUS

I study past and present changes in estuarine biogeochemistry due to human activity and the development of new analytical techniques to make estuarine research more accessible. My current research uses modelling and mass spectroscopy to examine historical changes to nutrient loading in urbanized estuaries and how nutrient cycling in these systems will be impacted in the future by climate change.

EDUCATION

Ph.D. Candidate

Boston University Department of Earth and Environment

Boston, MA

2023-present

- *Advisor:* Robinson W. Fulweiler
- *GPA:* 4.0

Bachelor of Science in Environmental Science with Honors

Brown University Department of Environmental Studies and Science

Providence, RI

2016-2020

- *Senior Thesis:* "Quantifying the Impact of Atmospheric Nitrogen Deposition in Narragansett Bay, RI"
- *Advisor:* Meredith G. Hastings
- *GPA:* 3.88

RESEARCH EXPERIENCE

NSF Graduate Research Fellowship Program Fellow

Boston University Department of Earth and Environment

Boston, MA

2023-present

Advisor: Robinson W. Fulweiler

- Modelling using Bayesian, frequentist, and machine learning tools
- Development of novel instrumentation for benthic gas flux

This work has resulted in three coauthor publications in *Limnology and Oceanography Letters*, *Proceedings of the National Academy of Sciences*, and *Science*.

Oak Ridge Institute for Science and Education Fellowship

U.S. EPA Atlantic Coastal Environmental Sciences Division

Narragansett, RI

2021-2023

Advisor: Autumn Oczkowski

- Estuarine biogeochemistry, water quality monitoring, and method development
- Utilization of stable N and C isotopes to understand estuarine N cycling
- Historical investigation of nutrient dynamics using sediment cores

This work resulted in two first-author publications in *Rapid Communications in Mass Spectrometry* and *Marine Ecology Progress Series* and three coauthor publications in *Science of the Total Environment*, *Coral Reefs*, and *Chemosphere*.

Voss Undergraduate Research Fellow
Brown U. Department of Earth, Environmental, and Planetary Sciences

Providence, RI
2019-2020

Advisor: Meredith G. Hastings

- Estuarine biogeochemistry and atmospheric chemistry
- Dry atmospheric deposition of ammonia/ammonium in Narragansett Bay quantified using relaxed eddy accumulation techniques.
- Influence of precipitation on N cycling in Narragansett Bay investigated using nitrate isotopes.

This work resulted in a first-author publication in *Estuaries and Coasts*, a second-author publication in *Geophysical Research Letters*, and a second author publication in *Journal of Geophysical Research*.

Fieldwork Assistant
Brown U. Department of Ecology and Evolutionary Biology

Providence, RI
2017-2019

Advisor: Stephen Porder

- Terrestrial biogeochemistry with a focus on nutrient cycling in tropical rainforests
- Collaborated with graduate students and postdoctoral research associates on experimental design and sample analysis.
- Traveled to Bahía, Brazil to examine the effect of water and nutrient limitation on nitrogen fixation in tropical legumes in support of a manuscript that was published in *Biotropica*.

PUBLICATIONS

Manuscripts submitted or in review:

Manuscripts published in peer-reviewed journals:

1. Wilson, E, **Balint, S.**, Fulweiler, R. W. Plants are a Powerful Proxy for Global Tidal Marsh Methane Fluxes. *Proceedings of the National Academy of Sciences*. 123 (29), e2530848123 (2026). DOI: 10.1073/pnas.2530848123
2. Fulweiler, R. W., Rinehart, S. A., Taylor, J. M., Kelly, M. C., Berberich, M. E., Ray, N. E., Oczkowski, A., **Balint, S.**, Benavides, M., Church, M. J., Loeks, B., Newell, S. E., Olofsson, M., Oppong, J. C., Roley, S. S., Vizza, C., Wilson, S. T., Chowdury, S., Groffman, P., Scott, T. J., Marcarelli, A. M. Global importance of nitrogen fixation across inland and coastal waters. *Science*. 388:1205-1209 (2025). DOI:10.1126/science.adt1511
3. **Balint, S.**, Schwartz, M., Gray, A., Cranston, T., Fulweiler, R.W., Ederington-Hagy, M., McKinney, R., Oczkowski, A. Three centuries of biogeochemical change in a temperate embayment as revealed by sediment core stable isotopes, radiometric dating, and historical ecology. *Marine Ecology Progress Series*. 757:37-52 (2025). DOI:10.3354/meps14807
4. Fulweiler, R. W., Berberich, M. E., Rinehart, S. A., Taylor, J. M., Kelly, M. C., Ray, N. E., Oczkowski, A., **Balint, S.**, J., Geisser, A. H., Mahoney, C. R., Benavides, M., Church, M. J., Loeks, B., Newell, S. E., Olofsson, M., Oppong, J. C., Roley, S. S., Vizza, C., Wilson, S. T., Groffman, P., Scott, T. J., Marcarelli, A. M. A global dataset of nitrogen fixation rates across inland and coastal waters. *Limnology and Oceanography Letters*. 10: 412-429 (2025). DOI: 10.1002/LOL2.10459
5. **Balint, S.**, Schwartz, M., Linnekogel, S., Cromratie, S., Fowler, D., & Burkemper, L. Experimental assessment of EAIRMS normalization methodologies for environmental stable isotopes. *Rapid Communications in Mass Spectrometry*. 38(17):e9837 (2024). DOI:10.1002/RCM.9837
6. Samperio-Ramos, G., Hernández-Sánchez, O., Camacho-Ibar, V. F., Pajares, S., Gutiérrez, A., Sandoval-Gil, J. M., Reyes, M., De Gyves, S., **Balint, S.**, Oczkowski, A., Ponce-Jahen, S. J., Cervantes, F. J. Ammonium loss microbiologically mediated by Fe(III) and Mn(IV) reduction along a coastal lagoon system. *Chemosphere*. 349:

7. Mejias-Rivera, C.L., Armstrong, R.A., **Balint, S.**, García-Troche, E., McKinney, R.A., Morell, J.M., Oczkowski, A., Courtney, T.A. Localized inshore warming, acidification, and elevated particulate organic matter across a coupled mangrove, seagrass, and coral reef ecosystem in La Parguera, Puerto Rico. *Coral Reefs*. 42:1313-1327 (2023). DOI:10.1007/s00338-023-02435-y
8. Joyce, E. E., **Balint, S.**, Walters, W., Lichiheb, N., Heuer, M., Myles, L., Heikes, B., & Hastings, M. G. Discerning the concentration and bi-directional flux of ammonia in an urban estuary using the relaxed eddy accumulation method. *Journal of Geophysical Research: Biogeosciences*. 128, e2023JG007414 (2023). DOI:10.1029/2023JG007414
9. Hedgespeth, M., Taylor, D., **Balint, S.**, Schwartz, M., & Cantwell, M. Ecological characteristics impact PFAS concentrations in a U.S. North Atlantic food web. *Science of Total Environment*. 880:163302 (2023). DOI: 10.1016/j.scitotenv.2023.163302.
10. **Balint, S.**, Joyce, E., Pennino, S., Oczkowski, A., McKinney, R., & Hastings, M. G. Identifying Sources and Impacts of Precipitation-Derived Nitrogen in Narragansett Bay, RI. *Estuaries and Coasts*. 45:1287-1304 (2022), DOI:10.1007/s12237-021-01029-7
11. Joyce, E. E., **Balint, S.**, & Hastings, M. G. (2022) Isotopic evidence that alkyl nitrates are important to aerosol nitrate formation in the Equatorial Pacific. *Geophysical Research Letters*. 49:e2022GL099960 (2022). DOI:10.1029/2022GL099960

Data reports and other publications:

12. Pimenta, A., Hanson, A., Cobb, D., Schwartz, M., Coiro, L., McKinney, R., Roxanne, J., **Balint, S.**, Oczkowski, A. (2023). Water Quality Data for Narragansett Bay, RI (USA) from 2014 to 2022. *Zenodo*. DOI:10.5281/zenodo.10403214

CONFERENCE PRESENTATIONS

Invited keynote

1. **Balint, S.** (2023). A data-driven approach to improving accuracy and precision of EA-IRMS analyses. *2023 North American IRMS User's Meeting*

Presentations

2. **Balint, S.**, Fulweiler, R.W. (2026). Precipitation variability masks the efficacy of nutrient reductions in Narragansett Bay, RI. *New England Estuarine Research Society*
3. **Balint, S.**, Stoffel, Hagy, J., Fulweiler, R.W. (2025). Spectral analysis of dissolved oxygen data shows the response of metabolism to managed nutrient reductions. *Coastal and Estuarine Research Federation*
4. **Balint, S.**, Stoffel, Hagy, J., Fulweiler, R.W. (2025). Ecosystem metabolism in Narragansett Bay, RI explored using the continuous wavelet transform. *New England Estuarine Research Society Spring Meeting*
5. **Balint, S.**, Oviatt, C., Stoffel, H., Fulweiler, R.W. (2024). Two decades of net ecosystem metabolism in Narragansett Bay, RI reflects an estuary under change. *New England Estuarine Research Society Spring Meeting*
6. **Balint, S.**, Oczkowski, A., Schwartz, M., Potter, M., Pimenta, A., Hanson, A., McKinney, R., Fulweiler, R.W. (2023). Discerning the biogeochemical response of temperate estuaries to increasing temperature and

precipitation through stable isotopes. *Coastal Estuarine Research Federation Meeting*.

7. **Balint, S.,** Hagy, J., Mudahy, A. L., Oczkowski, A. (2023). The development of automated benthic flux chambers for high temporal resolution measurement of sediment oxygen demand. *New England Estuarine Research Society Spring Meeting*
8. **Balint, S.,** Schwartz, M., Gray, A., McKinney, R., Oczkowski, A. (2022). Sediment cores and historical accounts reveal dramatic changes in the ecology and nutrient loading in a temperate, urbanized embayment. *New England Estuarine Research Society Fall Meeting*
9. **Balint, S.,** Potter, M., Davis, S., Oczkowski, A., Fulweiler, R.W., Oviatt, C. (2022). Temperature-induced changes in estuarine nutrient cycling observed through stable isotopes in mesocosms. *Estuarine, Coastal, and Shelf Science Meeting*
10. **Balint, S.,** Potter, M., Davis, S., Oczkowski, A., Fulweiler, R.W., Oviatt, C. (2022). Temperature-induced changes in estuarine nutrient cycling observed through stable isotopes in mesocosms. *New England Estuarine Research Society Spring Meeting*
11. **Balint, S.,** Joyce, E., Pennino, S., Oczkowski, A., McKinney, R., & Hastings, M. G. (2022). Identifying Sources and Impacts of Precipitation-Derived Nitrogen in Narragansett Bay, RI. *Joint Aquatic Sciences Meeting*
12. **Balint, S.,** Joyce, E., Pennino, S., & Hastings, M. G. (2019). Investigation of the importance of atmospheric deposition on nutrient cycling in a major northeastern US estuary. *American Geophysical Union Fall Meeting*
doi:10.26300/jyrh-wt98

Coauthor presentations

13. Fulweiler, R.W., Adhikari, O., **Balint, S.,** Bouchie, D., Champlin, L., Chowdhury, S., Geisser, A., Hagy, M., Jacobs, I., Kelly, M., Mahoney, C., Ray, N., Wilson, E. (2026). It's a gas: reviewing the current state of our knowledge and future directions of biogenic gas fluxes across the land-ocean continuum. *Association for the Sciences of Limnology and Oceanography – International Society of Limnology Joint Meeting*
14. Adhikari, O., **Balint, S.,** Geisser, A., Fulweiler, R.W. (2026). Macroalgae decomposition stimulates benthic methane emissions. *New England Estuarine Research Society Spring Meeting*
15. Mahoney, C., **Balint, S.,** Ederington-Hagy, M.C., Viellard, A.M., Fulweiler, R.W. (2026). Bay-wide seasonal dynamics of water column nitrogen fixation in Narragansett Bay, RI. *New England Estuarine Research Society Spring Meeting*
16. Mahoney, C., **Balint, S.,** Ederington-Hagy, M.C., Viellard, A.M., Fulweiler, R.W. (2025). Environmental Controls on Coastal Nitrogen Fixation: A Year-Long Study in Narragansett Bay. *New England Estuarine Research Society Spring Meeting*
17. Mahoney, C., **Balint, S.,** Viellard, A.M., Ederington-Hagy, M.C., Fulweiler, R.W. (2024). Re-examining water column nitrogen fixation in an anthropogenically impacted temperate estuary. *Ocean Sciences Meeting*
18. Hagy, J. D., **Balint, S.,** Berry, W., Hanson, A., Oczkowski, A., Schwarz, M., Degnan, J., & Belaval, M. (2023). Detecting improved ecological health of Wickford Harbor, Rhode Island, resulting from septic to sewer conversions. *National Water Quality Monitoring Council Conference*
19. Schwartz, M., Oczkowski, A., Hanson, A., **Balint, S.** (2023). Observations of Wickford Harbor, RI before and During Nonpoint Source Nutrient Reductions. *New England Estuarine Research Society Spring Meeting*

20. Joyce, E. E., **Balint, S.**, Walters, W., Heikes, B., & Hastings, M. G. (2022) Atmospheric Nitrogen Deposition in the Narragansett Bay Region, RI, USA. *Joint Aquatic Sciences Meeting*
21. Hedgespeth, M. L., Taylor, D., Morales-McDevitt, M., **Balint, S.**, Schwartz, M., & Cantwell, M. (2022). Per- and Polyfluoroalkyl Substances (PFAS) in Archived Marine Biota from Rhode Island, USA. *SETAC North American 43^d Annual Meeting*
22. Schwartz, M., Oczkowski, A., Hanson, A., **Balint, S.**, & McKinney, R. (2022). Characterizing Wickford Harbor, RI Before and During Nonpoint Source Nutrient Reductions. *New England Estuarine Research Society Spring Meeting*
23. Oczkowski, A., Hanson, A., Cappiello Cosme, I., Huertas, E., Katz, D., Schwartz, M., **Balint, S.**, & Molina, M. (2022). Contaminants play a key role in understanding ecosystem function in tropical urban estuaries. *Estuarine, Coastal, and Shelf Science Meeting*
24. Oczkowski, A., Hanson, A., Cappiello Cosme, I., Huertas, E., Katz, D., Schwartz, M., **Balint, S.**, & Molina, M. (2022). Could nitrogen fixation be an important source of nitrogen in tropical urban estuaries? *Joint Aquatic Sciences Meeting*

FELLOWSHIPS AND AWARDS

2025	Ketchum Prize Best Graduate Oral Presentation	New England Estuarine Research Society
2024	Warren McLeod Award \$12,800	Boston University
2023	NSF Graduate Research Fellowship Program \$147,000	National Science Foundation
2023	Dean's Fellowship \$38,253	Boston University
2022	Rising Star Award Peer-to-peer recognition	U.S. EPA
2021	Oak Ridge Institute for Science and Education Fellowship \$96,000	U.S. EPA
2020	Academic All-American Award Student-athlete academic achievement	Intercollegiate Sailing Association
2020	Departmental Honors Sc.B with Honors	Brown University
2019	Academic All-American Award Student-athlete academic achievement	Intercollegiate Sailing Association
2019	Voss Undergraduate Research Fellowship \$6,000	Brown University
2019	Undergraduate Teaching and Research Award \$3,250	Brown University

SERVICE

Journal Reviewer

Geophysical Research Letters	2026
Journal of Archeological Science	2025
Marine Ecology Progress Series	2023
Limnology and Oceanography	2024

Conference Session Co-Chair

Coastal and Estuarine Research Federation Biannual Meeting	2025
New England Estuarine Research Society Fall Meeting	2022
Conference Planning Committee	
New England Estuarine Research Society Spring Meeting	2025

PROFESSIONAL AFFILIATIONS

2025-present	Aquatic Nitrogen Fixation Research Coordination Network
2023-present	Coastal Estuarine Research Federation
2023-present	New England Estuarine Research Society

COURSES AND CERTIFICATIONS

2023	Responsible Conduct of Research Program for Doctoral Candidates and Post-Docs: Physical Science	Collaborative Institutional Training Initiative
2023	Wilderness First Responder 70-hour intensive field course	Wilderness Medical Associates
2022	IsoCamp 2-week lecture and lab stable isotope application course	University of New Mexico

REFERENCES

Robinson W. Fulweiler | Professor

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 Boston University, Boston, MA
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Autumn Oczkowski | Research Ecologist

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Meredith G. Hastings | Professor

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