
Alia N. Al-Haj

Smithsonian Environmental Research Center
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EDUCATION

- Ph.D.** **Boston University**, Earth and Environment, May 2022
Advisor: Dr. Robinson “Wally” Fulweiler
Dissertation: Carbon and nitrogen cycling in vegetated coastal ecosystems
- MS** **University of Virginia**, Environmental Science, May 2014
Thesis: Sustainable seagrass restoration in the Virginia coastal bays
Advisor: Dr. Karen McGlathery and Dr. Patricia Wiberg
- BS** **University of Virginia**, Biology, December 2010
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EMPLOYMENT

- 2022 – Present** **Postdoctoral Research Ecologist**, Smithsonian Environmental Research Center, Global Change Ecology
- 2018 - 2021** **Research Assistant**, Boston Univ. Dept. of Earth and Environment, Fulweiler Lab – “Benthic-Pelagic Coupling and Harmful Algal Blooms in Narragansett Bay”
- 2020** **Teaching Fellow**, Boston Univ. Dept. of Earth and Environment
- 2014 - 2017** **Laboratory Technician/Manager**, Boston Univ. Dept. of Earth and Environment, Fulweiler Lab – Coastal Ecology and Biogeochemistry
- 2014-2016** **Faculty**, UVA in the Bahamas Marine Biology and Coral Reef Ecology
- 2011-2014** **Research Assistant**, Univ. of Virginia Dept. of Environmental Sciences
- 2011-2013** **Teaching Assistant**, Univ. of Virginia Dept. of Environmental Sciences
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PUBLICATIONS

- Stevens, J.T.E., N.E. Ray, **A.N. Al-Haj**, R.W. Fulweiler, P.R. Chowdhury. Oyster aquaculture enhances sediment microbial diversity – Insights from a multi-omics study. In Press: *Aquaculture Environment Interactions*.
- Graham, O.J., A. Al-Haj, E.C. Arrington, E.R. Arsenault, C.C. Barbosa, K. Bice, E. Brahmstedt, et al. 2023. Better Together: Early Career Aquatic Scientists Forge New Connections at Eco-DAS XV. *Limnology & Oceanography Bulletin* 32(3): 119 – 121.
<https://doi.org/10.1002/lob.10585>.
- Malerba, M.E., D.A. Friess, M. Peacock, A. Grinham, P. Taillardat, J.A. Rosentreter, J. Webb, N. Iram, **A.N. Al-Haj**, P.I. Macreadie. 2022. Methane and nitrous oxide emissions complicate the climate benefits of teal and blue carbon wetlands. *One Earth* 5(12): 1336-1341.
- Al-Haj, A.N.**, T. Chidsey, R.W. Fulweiler. 2022. Two temperate seagrass meadows are negligible sources of methane and nitrous oxide. *Limnology & Oceanography* 67: S193-S207.

- Ray, N.E., **A.N. Al-Haj**, T.J. Maguire, M.C. Henning, R.W. Fulweiler. 2021. Coastal silicon cycling amplified by oyster aquaculture. *Marine Ecology Progress Series* 673: 29 – 41.
- Mazur, C.I., **A.N. Al-Haj**, N.E. Ray, I. Sanchez-Viruet, R.W. Fulweiler. 2021. Low denitrification rates and variable benthic nutrient fluxes characterize Long Island Sound sediments. *Biogeochemistry* 154: 37 – 62. <https://doi.org/10.1007/s10533-021-00795-7>
- Elizando, E., J.C. Carey, **A.N. Al-Haj**, A. Lugo, R.W. Fulweiler. 2021. High productivity makes mangroves potentially important players in the tropical silicon cycle. *Frontiers in Marine Science*. <https://doi.org/10.3389/fmars.2021.652615>
- Rosentreter, J.A., **A.N. Al-Haj**, R.W. Fulweiler, P. Williamson. 2021. Methane and nitrous oxide emissions complicate coastal blue carbon assessments. *Global Biogeochemical Cycles*. doi:10.1029/2020GB006858.
- Wilson, S.T., **A.N. Al-Haj**, H.M. Benway, D. Bianchi, A. Bourbonnais, B.X. Chang, L. Farias, C. Frey, R.W. Fulweiler, J.D. Kessler, H.K. Marchant, J. Milucka, N.E. Ray, D.L. Valentine, T.S. Weber, S. Yang. 2020. Ideas and perspectives: A strategic assessment of methane and nitrous oxide measurements in the marine environment. *Biogeosciences* doi:10.5194/bg-2020-270.
- Ray, N.E., **A.N. Al-Haj**, R.W. Fulweiler. 2020. Sediment biogeochemistry along an oyster aquaculture chronosequence. *Marine Ecology Progress Series* 646: 13-27.
- Al-Haj, A.N.** & R.W. Fulweiler. 2020. A synthesis of methane emissions from shallow vegetated coastal ecosystems. *Global Change Biology* 26(5): 2988-3005. <https://doi.org/10.1111/gcb.15046>
- Aoki, L. R., K.J. McGlathery, P.L. Wiberg, **A.N. Al-Haj**. 2020. Depth Affects Seagrass Restoration Success and Resilience to Marine Heat Wave Disturbance. *Estuaries and Coasts* doi:10.1007/s12237-019-00685-0.
- Ray, N.E., T.J. Maguire, **A.N. Al-Haj**, M.C. Henning, R.W. Fulweiler. 2019. Low Greenhouse Gas Emissions from Oyster Aquaculture. *Environ. Sci. Technol.* 53: 9118–91270.
- Zakem, E.J., **A.N. Al-Haj**, M.J. Church, G.L. van Dijken, S. Dutkiewicz, S.Q. Foster, R.W. Fulweiler, M.M. Mills, M.J. Follows. 2018. Ecological control of nitrite in the upper ocean. *Nature Communications* 9: 1206.

Submitted & In Review

- Chidsey, T.J., **A.N. Al-Haj**, R.W. Fulweiler. Quantifying sandy beach greenhouse gas fluxes with and without eelgrass wrack. In Review: *Marine Ecology Progress Series*.

In Prep

- Al-Haj, A.N.** and R.W. Fulweiler. Sediment biogeochemistry in seagrass ecosystems. In prep: *Marine Ecology Progress Series*.
- Musfika M., **A.N. Al-Haj**, S.Q. Foster, J. Angell, R.W. Fulweiler. Linking trace gas fluxes and microbial community structure in temperate estuaries. In prep: *Limnology & Oceanography*
- Momyer, V., **A.N. Al-Haj**, R.W. Fulweiler. Linking microbial communities and greenhouse gas concentrations in Boston groundwater wells. In prep: *Applied & Environmental Microbiology*.

FELLOWSHIPS

- 2017-2020** **Martin Luther King Jr. Fellowship**, Boston University, provides three years of tuition and fees, a stipend of \$28,340.00 per year.
- 2020** **Graduate Research Abroad Fellowship**, Boston University, provides stipend support for summer graduate research in Lismore, Australia.

RESEARCH AWARDS

- 2023-2026** **Department of Energy Biological and Environmental Research**, DE-SC0024327, Co-PI, “Understanding and Modeling Current and Future “Hot Moments” in Coastal Wetlands”
- 2020** **Joint Genome Institute Community Science Program New Investigator Proposal**, running samples and bioinformatics guidance on “Relating microbial community function to methane emissions in temperate seagrass meadows”
- 2020** **Biogeoscience Summer Research Award** (\$500), “Determining the impact of organic matter species on methane emissions from sediments in eelgrass meadows”
- 2020** **Biogeoscience Outstanding Graduate Student Presentation Award**, Biogeoscience Symposium 2020
- 2019** **Linnology & Oceanography Research Exchange** Room, board, and travel funds to work with Damien Maher at Southern Cross University in Lismore, Australia on “Building a methane budget for a subtropical seagrass ecosystem”. Award not completed due to impacts of COVID-19.
- 2017** **Grant-in-Aid of Research** (\$500), Sigma Xi, “Quantifying Porewater Sulfate, Sulfide, and Methane Concentrations in Eelgrass Meadows along a Nitrogen Loading Gradient in Massachusetts”
- 2017** **Joshua A. Nickerson Conservation Fellowship** (\$3000), National Park Service Cape Cod National Seashore, Atlantic Research and Learning Center, and Friends of the Cape Cod National Seashore, “Quantifying Greenhouse Gas Emissions from Seagrass Meadows over a Nutrient Gradient in the Cape Cod National Seashore”
- 2013** **Department of Environmental Sciences outstanding first year graduate student in ecology** (\$100), Department of Environmental Sciences UVa
- 2013** **Moore Research Award** (\$5,000), Department of Environmental Sciences UVa, “Sustainable Seagrass Restoration in the Virginia coastal bays.”
- 2012** **Exploratory Research Award** (\$1,500), Department of Environmental Sciences UVa, “Sustainable Seagrass Restoration in the Virginia coastal bays.”

PRESENTATIONS AND SEMINARS

Invited Talks

Al-Haj, A.N. 2023. Coastal vegetation mitigation of and response to global change. *Department of Biodiversity, Earth, and Environmental Science Seminar Series*. Philadelphia, PA.

Al-Haj, A.N. & R.W. Fulweiler. 2021. Talking Blue Carbon. *Online Conversations for Equity, Action, and Networking (OCEAN)*. Boston, MA.

Conference Presentations

Al-Haj, A.N., R. Rich, G.L. Noyce. 2023. Warming and sea level rise impacts on methane biogeochemistry differ in brackish and freshwater marshes. Coastal and Estuarine Research Federation Biennial Meeting 2023. Portland, OR.

Al-Haj, A.N., R. Rich, J. Kwong, E. Yu, G.L. Noyce. 2022. Interactive effects of salinity, warming, and sea level rise on methane emissions and porewater biogeochemistry of a sedge dominated marsh. American Geophysical Union Meeting Fall 2022. Chicago, IL.

Al-Haj, A.N. & R.W. Fulweiler. 2022. *In situ* measurements of nitrogen and phosphorus cycling in temperate seagrass meadows. Ocean Sciences Meeting 2022. Virtual.

Al-Haj, A.N., Chidsey, T., R.W. Fulweiler. 2021. Methane and nitrous oxide emissions to the atmosphere are low from two temperate seagrass dominated ecosystems. American Geophysical Union Meeting Fall 2021. New Orleans, LA.

Chidsey, T., **A.N. Al-Haj,** R.W. Fulweiler. 2021. N₂O emissions from temperate seagrass meadows are highly variable. New England Estuarine Research Society Virtual Meeting, Spring 2021.

Al-Haj, A.N. & R.W. Fulweiler. 2020. Environmental drivers of carbon emissions from temperate eelgrass meadows. New England Estuarine Research Society Virtual Meeting, Spring 2020.

Al-Haj, A.N. & R.W. Fulweiler. 2020. Are methane emissions from eelgrass meadows accurately represented in the Verified Carbon Standard Methodology?. Biogeoscience Symposium 2020. Boston, MA.

Al-Haj, A.N. & R.W. Fulweiler. 2020. Closing the carbon budget of temperate eelgrass meadows: How much does methane matter?. *Zosterapalooza 2020*. Boston, MA.

Al-Haj A.N. & R.W. Fulweiler. 2020. Methane fluxes from temperate eelgrass meadows. Ocean Sciences Meeting 2020. San Diego, CA. (Poster)

Al-Haj A.N. & R.W. Fulweiler. 2019. Quantifying methane emissions from seagrass meadows in the Cape Cod National Seashore. *Zosterapalooza 2019*. Boston, MA.

Al-Haj A.N. & R.W. Fulweiler. 2019. A review of methane emissions from vegetated coastal ecosystems. *Department of Earth and Environment Grad Talks Spring 2019*. Boston, MA.

Al-Haj A.N. & R.W. Fulweiler. 2018. Quantifying methane emissions from seagrass meadows in the Cape Cod National Seashore. *Cape Cod National Seashore Symposium 2018*. Eastham, MA.

Zakem, E.J., **A.N. Al-Haj,** M. J. Church, G. van Dijken, S. Dutkiewicz, S.Q. Foster, R. W. Fulweiler, M. M. Mills, M. Follows. 2018. Ecological control of nitrite in the upper ocean. *ASLO Ocean Sciences Meeting 2018*. Portland, OR.

Ray, N.E., **A.N. Al-Haj,** M. Babu, M. Henning, V. Momyer, E. Scott, R.W. Fulweiler. 2018. Oyster Aquaculture Alters Estuarine Silica Pools and Fluxes. *ASLO Ocean Sciences Meeting 2018*. Portland, OR. (Poster)

- Mazur, C.I., I. Sanchez-Viruet, **A.N. Al-Haj**, R.W. Fulweiler. 2018. Biogenic Gas Fluxes Across the Sediment-Water Interface Along a Gradient of Anthropogenic Stressors. *ASLO Ocean Sciences Meeting 2018*. Portland, OR. (Poster)
- Ray, N.E., M.C. Henning, **A.N. Al-Haj**, T.J. Maguire, R.W. Fulweiler. 2017. Oysters as a high protein, low greenhouse gas food: Emissions of N₂O and CH₄ from oyster aquaculture. Boston University Biology Graduate Student Association Symposium. Boston, MA.
- Ray, N.E., M.C. Henning, **A.N. Al-Haj**, T.J. Maguire, R.W. Fulweiler. 2017. Oysters as a high protein, low greenhouse gas food: Emissions of N₂O and CH₄ from oyster aquaculture. Boston University Biogeoscience Symposium. Boston, MA.
- Ray, N.E., **A.N. Al-Haj**, R.W. Fulweiler. 2016. *In situ* measurements of nitrogen cycling across an oyster aquaculture chronosequence. *ALSO Ocean Sciences Meeting 2016*. New Orleans, LA. (Poster)
- Ray, N.E., M.C. Henning, **A.N. Al-Haj**, R.W. Fulweiler. 2016. N₂O and CH₄ fluxes from oyster aquaculture. New England Estuarine Research Society Fall 2016 Meeting. Block Island, RI.
- Ray, N.E., **A.N. Al-Haj**, R.W. Fulweiler. 2016. *In situ* measurements of nitrogen cycling across an oyster aquaculture chronosequence. Boston University Biogeoscience Symposium. Boston, MA.
- Al-Haj, A.N.**, K.J. McGlathery, P.L. Wiberg, A.C. Shwarzschild. 2014. Determining the potential for propagation of *Zostera marina* into unrestored areas of the Virginia Coastal Bays. *Virginia Sea Grant 2014 Project Participants' Symposium*. Richmond, VA. (Poster).
- Al-Haj, A.N.**, K.J. McGlathery, P.L. Wiberg, A.C. Shwarzschild. 2013. Sustainable Seagrass Restoration in the Virginia Coastal Bays: modeling distribution based on light, temperature, and sediment characteristics. *22nd Biennial Conference of the Coastal and Estuarine Research Federation 2013*. San Diego, CA.
- Al-Haj, A.N.**, K.J. McGlathery, P.L. Wiberg, A.C. Schwarzschild. 2012. Sustainable Seagrass Restoration in the Virginia Coastal Bays: assessment of sediment qualities. *2012 Benthic Ecology Meeting*. Norfolk, VA. (Poster)

TEACHING AND MENTORING

Summer 2022 – Present Research Mentor, Global Change Ecology, Smithsonian Environmental Research Center

- Marlene Ramirez Murillo, Research Experience for Undergraduates 2024: “Determining the impact of extreme events on soil greenhouse gas concentrations”
- Paige DiFronzo, Research Experience for Undergraduates 2023: “Nitrous oxide in freshwater and brackish estuarine ecosystems”
- Elaine Yu, Research Experience for Undergraduates 2022: “Determining the interactive impact of warming, sea level rise, and salinity on redox conditions in sedge dominated wetlands”
- Jonathan Kwong, Research Experience for Undergraduates 2022: “Determining the impact of warming, sea level rise, and salinity on sedge growth”

Fall 2020 Teaching Fellow, Department of Earth and Environment, Boston University

- EE144 B1 & B2 Oceanography Discussion Instructor

2016-Present Research Mentor, Department of Earth and Environment, Boston University

- Jennifer Soukup (2016 – 2018)
 - UROP (Spring 2017): “Assessing the spatial silica abundance among native and invasive plants in a New England salt marsh”;
 - UROP (Summer 2017): “The Role of Invasive *Phragmites australis* in Altering Salt Marsh Si Cycling”;
 - Senior Thesis (May 2018): “The Role of Invasive *Phragmites australis* in Altering Salt Marsh Silica Cycling”
- Victoria Momyer (2017 – 2020)
 - UROP (Fall 2017): “Assessing the Effects of Methanogenic Microbes and Arthropods on Urban Methane Fluxes from Subterranean Groundwater Wells”;
 - UROP (Spring 2018): “Assessing the Effects of Anthropogenic Natural Gas Sources on Urban Methane Fluxes from Subterranean Groundwater Wells”;
 - UROP (Spring 2019): “Assessing the Effects of Anthropogenic Natural Gas Sources on Urban Methane Fluxes from Subterranean Groundwater Wells”;
 - Biochemistry BA/MA Thesis “Methane Concentrations and Microbial Community Structure in Boston Groundwater Wells”
- Shuhui Liu (2017 – 2019), Independent Research Project
- Tony Pham (2018 – 2020)
 - UROP (Summer 2019) “The Coupling of the Carbon and Nitrogen Cycle: Black Carbon as a Nitrogen Transporter to Marine Systems”;
 - Biochemistry BA/MA Thesis “Black Carbon as a Nitrogen Transporter to Marine Systems”
- Tyler Chidsey (2019 – present),
 - “Determining greenhouse gas emissions from beach wrack”
- Kwetzpallin Mexica (2019 – 2020)
- Ved Ahuja (2019 – 2020)
- John Rezza (2019 – 2020)
- Halle Cooper (2019 – 2020)

2015-2019 Research Mentor, Upward Bound Math Science Summer Research Section

2014-2017 Faculty, UVA in the Bahamas: Coral Reef Ecology and Marine Biology [BIOL 3660/EVSC 3660]

- Taught sections on marine plants

2011-2013 Teaching Assistant, Department of Environmental Sciences, Univ. of Virginia

- Instructor, Practical Concepts in Environmental Sciences [EVSC 1020], Fall 2013, Spring 2013, Fall 2012, Spring 2012, Fall 2011

2012-2014 Research Mentor, Department of Environmental Sciences, Univ. of Virginia

- Arianna Sherman, (2012-2013), Univ. of Virginia
- Billy Spady, (2012), Northampton High School

- Kendall Combs, (2013-2014), Univ. of Virginia
- Martin Volaric, (2013-2014), Univ. of Virginia
- Bridget Shayka, (2014), Univ. of Virginia

PROFESSIONAL ACTIVITIES AND AFFILIATIONS

Member of:

- 2013 – Present** Coastal and Estuarine Research Federation (CERF)
2016 – Present New England Estuarine Research Society (NEERS)
2019 – Present Association for the Sciences of Limnology & Oceanography (ASLO)
2018 – Present Ecological Society of America (ESA)
2021 – Present Geological Society of America (GSA)
2021 – Present American Geophysical Union (AGU)
2017 – Present Society for Women in Marine Science member (SWMS)
2018 – 2022 Co-lead of Boston University SWMS Chapter (BU SWMS)
2020 – 2022 Vice-chair Boston University Department of Earth & Environment Graduate Student Association (GSA)
2020 – 2022 Boston University Earth & Environment Diversity & Inclusion Committee Member

Peer Reviewer for Scientific Journals:

- 2022** Global Change Biology; Nature Communications; PLoS One; Science of the Total Environment
2021 Estuarine, Coastal & Shelf Science; JGR Biogeoscience; Estuaries & Coasts
2020 Science of the Total Environment; Biogeosciences; Estuaries & Coasts
2018 Biogeochemistry; Marine Ecology Progress Series
2017 Conservation Biology

Other Activities:

- 2024- Present** CERF International Committee member
2017 – 2020 Blue Lobster Bowl, Volunteer Grader
2021 Quahog Bowl, Volunteer Grader