Caroline F. Ianniello (née Fleming)
Department of Biology, Boston University
Personal Website: carolineianniello.wixsite.com/caroline-ianniello
GitHub: https://github.com/Caroline-Ianniello
E-mail: caroline.ianniello@gmail.com
Cell: 203-909-1514

I. Education:

Boston University, Boston MA, Biology PhD Candidate, 2020-present (expected graduation September 2025)

Dissertation: Energy Flow in a Changing Ocean: Investigating the Behavior and Physiology of Coastal Marine Organisms in the Anthropocene
Co-advisors: Dr. Randi Rotjan, Dr. Justin McAlister

Boston University, Boston MA, Biology MS student, 2019-2020, transitioned to PhD fall 2020

Thesis: A Dynamic Energy Budget for the Temperate Coral *Astrangia poculata* in two symbiotic states
Co-advisors: Dr. Randi Rotjan, Dr. Justin McAlister

College of the Holy Cross, Worcester MA, Biology, B.S. *magna cum laude,* 2014-2018

Major: Biology, Ecology and Conservation Concentration
Minor: Art History and Museum Studies

University of Canterbury Frontiers Abroad Environmental Science Program, Aotearoa New Zealand, January – July 2017

Project: Aotearoa New Zealand Rocky Intertidal: Recovery and Resilience Following an Uplift Disturbance

II. Research Experience:

NOAA Northeast Fisheries Science Center, NSF INTERN Program, January – June 2025

- Conducted a causal analysis linking water quality to Atlantic menhaden abundance in Narragansett Bay using Dynamic Structural Equation Models and Generalized Additive Models

Dr. Randi Rotjan, Marine Ecology Lab, Boston University Department of Biology, September 2019-present

- Synthesized 100 years of literature on carbon and energy budgets in scleractinian corals; identified research priorities for conservation, including quantifying autotrophy/heterotrophy contributions and developing predictive models.
- Experimentally tested how light and nutrient availability affect symbiotic and aposymbiotic *A. poculata* physiology using a long-term experiment
- Developed a Dynamic Energy Budget (DEB) model for *A. poculata*, a facultatively symbiotic coral, using physiological data collected under varied light and food conditions.
- Conducted a large-scale fully factorial experiment to assess physiological responses of *A. poculata* to urban and climate stressors (temperature, nutrients, *E. coli,* and starvation)

Dr. Erik Muller, Mathematical Modeling Evolving Seas Research Exchange, University of California Santa Barbara, October 2021

- Learned principles of Dynamic Energy Budget (DEB) Theory and applied the theory to *Astrangia poculata*, a facultatively symbiotic coral
- Used MATLAB for DEB model manipulation

Dr. Justin McAlister, Marine Organismal Biology Lab, College of the Holy Cross Oct. 2014-May 2018

- Investigated the impacts of variable food regimes on the phenotypic plasticity of the purple sea urchin *Lytechinus variegatus*
- Visualized and conducted ANOVA and t-test to quantify morphological changes over time

III. Written Communication:

Publications:

In press:

1. Templer, P., Atherton, K. F., Conrad-Rooney, E., Ho, H., Hutyra, L. R., **Ianniello, C. F.,** Kashian, D. R., Levy, J. I., Meshoulam, D., & Urban, M. C. (2024). Strengthening graduate education and addressing environmental challenges through solutions-oriented partnerships and interdisciplinary training. Sustainable Earth Reviews, 7(1), 3. https://doi.org/10.1186/s42055-024-00074-x
2. **Ianniello, C. F.**, Beery, G., Chen, T.-H. (Denny), Deyle, E., Heiger-Bernays, W., Motter, I., McAlister, J. S., & Rotjan, R. D. (2025). Stress in the City: Disentangling multi-stressor effects on an urbanized coral in a changing ocean. *Marine Pollution Bulletin*, *216*, 117918. https://doi.org/10.1016/j.marpolbul.2025.117918
3. **Fleming C**, Raguin VC. The inflammatory print culture of the reformation. *Lutheran Forum*, Pentecost, Summer 2018, pp. 58-64.
4. **Ianniello CF**, McAlister JS, Ferrier-Pages C, Rotjan RD. 2025. Examining energy flow in scleractinian corals: efforts to trace energetic pathways in symbiotic, mixotrophic systems. *Accepted. Coral Reefs.*

In prep

1. **Ianniello CF**, Grace S, Hyde K, Large SI, McManus CM, Smith L, Rotjan RD, Deyle E. Foraging for answers: Understanding the impacts of water quality on Atlantic Menhaden abundance in Narragansett Bay. *In prep* for *ICES Journal of Marine Science.*
2. **Ianniello CF**, Bouchie D, Band Orange J, Emmanuel ZA, Lloyd K, Warner B, Bove C, McAlister JS, Rotjan RD. Unraveling coral symbiosis: physiological responses to light and nutrient variability in a facultative system. In prep for Marine Ecology Progress Series.
3. **Ianniello CF**, McAlister JS, Muller EM, Nisbet R, Rotjan RD. A Dynamic Energy Budget for the northern star coral Astrangia poculata: modeling and parameterizing facultative symbiosis. of *Astrangia poculata. In prep* for *Ecological Modelling.*
4. **Ianniello CF**, Yu C, Rotjan RD. Evaluating the impacts of heterotrophic and autotrophic inputs to the post-fragmentation growth of *Astrangia poculata. In prep* for *Journal of Experimental Biology*.
5. Trumble IF, **Ianniello CF**, Rotjan RD. Testing assumptions of colony translocation dynamics across neighboring polyps in a facultatively-symbiotic model coral. *In prep* for *Journal of Experimental Biology*.
6. Borbee, E., Changsut, I., McAlister, J.S., Davies, S., **Ianniello, C.F.,** Roberson, L., Rotjan, R.D., Schickle, A., Sneed, J.M., Fuess, L., Warner, J.F., Babonis, L.S. and K.H. Sharp. Development of methods for spawning, fertilization, larval husbandry, and settlement in the temperate coral Astrangia poculata. *In prep* for *PloS Biology*.

IV. Specialized Skills and Technical Proficiencies:

Software, Programming, and Statistical Methods:

Open access GitHub: https://github.com/Caroline-Ianniello

R software:

- Data wrangling, cleaning and visualization (packages: ggplot2, tidyverse, Rmisc)
- ANOVA and t-tests
- Linear and generalized linear models (LM, GLM; packages: lmer)
- Linear mixed-effects models
- Principal Components Analysis (PCA; package stats)
- Survival analysis
- Dynamic Structural Equation Modeling (DSEM; package dsem)
- Generalized Additive Models (GAM; package: mgcv)
- Spatial analyses and map creation (e.g., GIS-style visualizations)

MATLAB software:

- Data cleaning and visualization
- Dynamic Energy Budget Modeling (AddMyPet)

Research & Reporting:

- Stakeholder-driven reporting
- Fisheries government regulations
- Technical scientific writing
- Collaborative project design

Field and Lab Techniques:

- Water sampling
- Aquarium water quality testing
- Quadrat sampling
- Coral physiology (respiration, photosynthetic efficiency, lipid, protein, carbohydrate, and chlorophyll extraction)

Soft Skills:

- Project management
- Leadership
- Mentoring
- Oral and written science communication
- Budget tracking

V. Oral Communication:

2025 Invited panelist in a "Meet the Funded" panel, Boston University Foundation Relations (August 2025).

2025 Emmanuel Z, **Ianniello C**, Butkevich M, Foster I, Zhao A, Bove C, McAlister JS, Rotjan RD (2025, January). Investigating the energetic contribution of symbiosis in a temperate coral. Poster presentation at the Society of Integrative and Comparative Biology in Atlanta, GA.

2024 Ianniello C. (2024, July). Understanding Critical Thresholds of Coral Energetics in a Time of Crisis. Invited summer seminar series oral presentation at Ursinus College in Collegeville, PA.

2024 Ianniello C, Deyle E, Hyde K, Large S, Smith L, Rotjan R, McManus CM (2024, August). Understanding the impacts of water quality on Atlantic Menhaden presence in an urbanized estuary. Oral presentation at Ecological Society of America, Long Beach, CA.

2024 Ianniello C, Deyle E, Hyde K, Large S, Smith L, Rotjan R, McManus CM (2024, June). Understanding the impacts of nutrient pollution on Atlantic Menhaden presence in an urbanized estuary. Oral presentation at the NOAA Northeastern Fishery Science Center Seaside Chat.

2024 Ianniello C, Motter I, Beery G, McAlister J, Heiger-Bernays W, Rotjan R (2024, January). Understanding the impacts of nutrient pollution on an urban coral in an era of global change. Oral presentation at the Society of Integrative and Comparative Biology, Seattle, WA.

2023 Beery G, Motter I, McAlister J, Heiger-Bernays W, Rotjan R, **Fleming C** (2023, May). Analyzing the effects of ubiquitous urban pollutants on the metabolic physiology of Astrangia poculata, a temperate coral. Oral presentation at the Benthic Ecology Meeting, Miami, FL.

2022 Fleming C, Motter I, Beery G, McAlister J, Heiger-Bernays W, Rotjan R (2022, October). Nutrient or pollutant? Disentangling the effects of nitrogen on urbanized corals in a changing ocean. Poster presentation at the National Science Foundation National Research Traineeship Conference, virtual.

2022 Fleming C, McAlister J, Muller E, Rotjan R. (2022, January). Building a Dynamic Energy Budget for the northern star coral *Astrangia poculata*: modeling and parameterizing facultative symbiosis. Oral presentation at the Society for Integrative and Comparative Biology in Phoenix, AZ.

2021 Fleming C, McAlister J, Heiger-Bernays W, Beery G, Newsom G, Motter I, Rotjan. R (2021, November). Examining metabolic consequences of toxicological exposures in resilient urban corals under global change stressors. Poster presentation at the Society for Environmental Toxicology and Chemistry, virtual.

2021 Fleming C, (2021, October). Exploring the energetic physiology and ecotoxicological resilience of the temperate coral *Astrangia poculata* under global change. Invited guest lecture oral presentation for the Coral Reefs course at University of California Santa Barbara in Santa Barbara, California.

2021 Fleming C, McAlister J, Heiger-Bernays W, Rotjan. (2021, May). Examining metabolic consequences of toxicological exposures in resilient urban corals under global change stressors. Oral presentation at the Boston University Urban Program Spring Symposium, virtual.

2021 Fleming C, McAlister J, Heiger-Bernays W, Rotjan. R (2021, May). Examining metabolic consequences of toxicological exposures in resilient urban corals under global change stressors. Poster presentation at the Temperate Coral Conference, virtual.

2021 Fleming C, McAlister J, Muller E, Rotjan R. (2021, May). Building a Dynamic Energy Budget for the northern star coral *Astrangia poculata*: modeling and parameterizing facultative symbiosis. Poster presentation at the Global Dynamic Energy Budget Symposium, virtual.

2019 Fleming, C. (2019, August). Building a dynamic energy budget for *Astrangia poculata*. Oral presentation presented at the annual Astrangia Coral Workshop in Bristol, Rhode Island.

2018 Fleming, C. (2018, August). Coral curation and cabinets of curiosity at the Harvard Museum of Natural History. Oral presentation presented at the annual Astrangia Coral Workshop in Bristol, Rhode Island.

2018 Fleming C, Aprea CJ, McAlister JS. (2018, January). Examining the effects of timing of food exposure on the expression of feeding structure plasticity. Poster presentation at the annual meeting of the Society for Integrative and Comparative Biology, San Francisco, California.

2017 Fleming C, Goldstein SJ. (2017, September). New Zealand Rocky Intertidal: Recovery and Resilience Following an Uplift Disturbance. Invited oral presentation for the Schaeffer Family Seminar Series at College of the Holy Cross in Worcester, Massachusetts.

2017 Fleming C, Goldstein SJ. (2017, July). New Zealand Rocky Intertidal: Recovery and Resilience Following an Uplift Disturbance. Poster session presented at the bi-annual North American Echinoderm Conference in Worcester, Massachusetts.

VI. Honors, awards, grants:

Total funds awarded to date: $244,061.86

2025:

- BU Biology Department Travel Award (USD $300)

2024:

- NSF INTERN Supplemental Funding Request (USD $37,280)
- Warren McLeod Annual Fellowship (USD $35,500)
- Charlotte Magnum Student Support Award, Society of Integrative and Comparative Biology (USD $350)
- BU Biology Graduate Student Organization Travel Award (USD $738)

2023:

- Spring BU URBAN Travel Award (USD $999.86)
- Finalist, Best Student Presentation, Society for Integrative and Comparative Biology
- BU Biology Teaching Fellow Mentor (USD $1,000)

2022:

- Charlotte Magnum Student Support Award, Society of Integrative and Comparative Biology (USD $350)
- Spring BU URBAN Research Award (USD $5,631.96)
- Fall BU Department of Biology Travel Award (USD $240)
- Fall 2022 URBAN Travel Award (USD $500)

2021:

- Fall BU URBAN Research Award (USD $1,500)
- Spring BU URBAN Travel Award (USD $2,492)
- Spring BU URBAN Research Award (USD $1,500)
- BU Initiative on Cities Early-Stage Urban Research Award (USD $10,000)
- BU Department of Biology Macchi Award for Regulatory Biology (USD $1,000)
- BU Biology Teaching Fellow Mentor (USD $1,000)

2020:

- Spring BU Biology Teaching Fellow Mentor (USD $1,000)
- Fall BU Biology Teaching Fellow Mentor (USD $1,000)
- Fall BU College of Arts and Science Dean's Fellowship

2019:

- NSF Graduate Research Fellowship (USD $138,000)
- NSF Research Coordination Network Evolving Seas Travel Grant (USD $2,681)
- Marine Technology Society Graduate Scholarship (USD $2,000)

2018:

- NSF Graduate Research Fellowship Honorable Mention
- College of the Holy Cross Remarkable Vision Award
- College of the Holy Cross Rev. John W. Flavin, S.J., Award Honorable Mention
- Charlotte Magnum Student Support Award, Society of Integrative and Comparative Biology (USD $350)

VII. Professional experience:

- Curatorial Assistant, Harvard Museum of Natural History, Museum of Comparative Zoology (MCZ), Harvard University (January 2018- March 2020)

VIII. Leadership & Service

- BU Society for Women in Marine Science Secretary (September 2023- present)
- Mentor, Rotjan Lab (September 2021-present)
    - Itasca Motter (2021-22): Impacts of anthropogenic and global stressor on the local urban coral *Astrangia poculata*
    - Grace Beery (BA/MS thesis 2022-23): Determining the metabolic response of an urban temperate coral, *Astrangia poculata,* to nitrogen pollution
    - Emmanuel Smirnakis (BU Academy honors thesis 2023): Effects of Two Species of Excess Dissolved Inorganic Nitrogen on the Physiological Health of Astrangia Poculata in the Context of Anthropogenic Environmental Stressors
    - Marius Siscar (Fall 2022): Generating Red Channel Value data for *Astrangia poculata* exposed to nitrogen pollution
    - Calvin Yu (Honors thesis 2022-23): Growth and symbiosis in temperate coral *Astrangia poculata* in response to light and food availability
    - Grace Newsom (Honors thesis 2022-23): Understanding the interactions of symbiosis and growth rate of the temperate coral *Astrangia poculata*
    - Julia Band Orange (Spring 2024): Investigating energetic dynamics of *Astrangia poculata* to varying light and food conditions.
    - Atlas Emmanuel (Fall 2024): Investigating the energetic contribution of symbiosis in a temperate coral.
    - Delaney Foster (Honors thesis 2024-25): Exploring Coral Coloration and Symbiont Density: Investigating the Relationship Between Red Channel Values, Chlorophyll Concentration, and Symbiont Health in *Astrangia poculata*
    - Finn Hoebelheinrich (BU Academy honors thesis 2024-25): Relationships between biomass and symbiotic state under different food and light treatments in *Astrangia* poculata.
- BU Biology Department Graduate Student Liaison (October 2022-2023)
- Student Conference Volunteer, Society of Integrative and Comparative Biology Conference (January 2018, 2022, 2024)
- Boston University Academy Lab Tour, Boston University (Spring 2020, 2021, 2022, 2024)
- Brookline High School Urban Biogeoscience and Environmental Health outreach event, (November 2021)

- BU URBAN Biogeoscience Program Social Committee (2020-2022)
- College of the Holy Cross Women in Science Day panel member (March 2020)
- Co-Chair, XChrom Club for the Empowerment of Women in Science, College of the Holy Cross (July 2016-May 2018)
    - Co-Chair in the club's founding year, co-created & coordinated a mentorship program between Worcester Technical High School female students from under-represented minorities and female Holy Cross students.
    - Personally mentored two Worcester Technical High School students interested in STEM, assisting with homework, college applications, and conducting lab demonstrations.
    - Lead science demonstrations at Girls Inc. of Worcester approximately twice a month to engage and educate middle and high school women interested in STEM.
    - Organized a trip to the Boston Museum of Science (MOS) for fifty high school mentees and Holy Cross mentors in April 2018. Worked closely with MOS education staff to design an all-day STEM curriculum.
- Director of High School Outreach, Women Science Day at Holy Cross (April 2018)
    - Lead efforts to recruit and designed interactive STEM activities for over 200 high school students from underserved populations in Worcester for the first annual Women in Science Day at Holy Cross.

IX. Media and Online Presence:

- 7-day Twitter takeover for NSF Research Coordination Network Evolving Seas
- Blog post for NSF Research Coordination Network Evolving Seas
- 'Things I Wish I Knew' Boston University URBAN Biogeoscience and Environmental Health Promotional Video
- Blog post for Society of Women in Marine Science

X. Scientific Society Memberships:

- Ecological Society of America
- Society for Women in Marine Science
- Society of Integrative and Comparative Biology

XI. Personal Interests:

- Gardening
- Hiking
- Indie rock concerts
- Museums
- Reading (historical fiction)