

## Brooke L. Weigel, Ph.D.

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### EDUCATION

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- **Ph.D. in Evolutionary Biology** (August 2021)  
The University of Chicago, Committee on Evolutionary Biology  
*Advisor:* Dr. Cathy Pfister  
*Dissertation title:* The diversity and functional role of microbial communities associated with the bull kelp, *Nereocystis luetkeana*
- **M.S. in Marine Biology** (May 2016)  
The University of North Carolina Wilmington, Department of Biology & Marine Biology  
*Advisor:* Dr. Patrick Erwin  
*Master's thesis title:* Spatial and temporal variation in the microbiome of the intertidal sponge, *Hymeniacidon heliophila*
- **B.A. in Biology and Environmental Studies** (May 2013)  
St. Olaf College, Northfield, MN  
*summa cum laude* with Distinction in Biology

### PROFESSIONAL APPOINTMENTS

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- National Science Foundation Postdoctoral Research Fellow in Biology (2023 – Present)
- Postdoctoral Researcher, Friday Harbor Labs, University of Washington (2021 – 2023)
- PhD Candidate, The University of Chicago (2016 – 2021)
- Master's Student, The University of North Carolina Wilmington (2014 – 2016)
- Fish Ecology Intern, Smithsonian Environmental Research Center (2013)
- EPA Greater Research Opportunities Fellow, Pacific Coastal Ecology Branch (2012)
- NSF REU Student in Reykjavík, Iceland, Montana State University (Summer 2011)
- Stream Ecology Field Assistant, UC Berkeley Angelo Coast Range Reserve (Summer 2010)

### PUBLICATIONS

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#### Publications in Preparation

1. **Weigel, B.L.**, Castillo, G., Young, J.N., Kodner, R.B. *In Prep.* Diverse snow algal communities from the North Cascades increase photosynthetic rates with elevated light and CO<sub>2</sub> levels.
2. Molnar, N., **Weigel, B.L.**, Fales, R.J., Pfister, C.A. *In Prep.* Warming seawater temperature increases microbial invasion of a foundational canopy kelp species.
3. **Weigel, B.L.**, Janusson, C.V., Lemay, M.A., Paulay, G., Turner, T.L., Thacker, R.W. *In Prep.* Biodiversity of marine sponges (Porifera) in the Northeast Pacific Ocean.

#### Peer-Reviewed Publications (16 total, 10 first author)

1. Turner, T.L., Rouse, G.W., **Weigel, B.L.**, Janusson, C., Lemay, M.A., Thacker, R.W. 2024. *Accepted to Zootaxa*. Taxonomy and phylogeny of the family Suberitidae (Porifera: Demospongiae) in California.

2. \*Fales, R.J., \***Weigel, B.L.**, Carrington, E., Berry, H.D., Dethier, M.N. 2023. Interactive effects of temperature and nitrogen on the physiology of kelps (*Nereocystis luetkeana* and *Saccharina latissima*). *Frontiers in Marine Science*. doi: 10.3389/fmars.2023.1281104  
**\*Equal contributions (co-first author)**
3. **Weigel, B.L.**, Small, S.L., Berry, H.D., Dethier, M.N. 2023. Effects of temperature and nutrients on microscopic stages of the bull kelp (*Nereocystis luetkeana*, Phaeophyceae). *Journal of Phycology*. doi: 10.1111/jpy.13366
4. Miranda, K.K., **Weigel, B.L.**, Fogarty, E.C., Veseli, I.A., Giblin, A.E., Eren, A.M., Pfister, C.A. 2022. The diversity and functional capacity of microbes associated with coastal macrophytes. *mSystems*. doi: 10.1128/msystems.00592-22
5. **Weigel, B.L.**, Miranda, K.K., Fogarty, E.C., Watson, A.R., Pfister, C.A. 2022. Functional insights into the kelp microbiome from metagenome assembled genomes. *mSystems*. doi: 10.1128/msystems.01422-21
6. Ramirez-Puebla, S.T., **Weigel, B.L.**, Jack, L., Schlundt, C., Pfister, C.A., Mark Welch, J.L. 2022. Spatial organization of the macroalgal microbiome at micron scales. *Microbiome* 10: 52: doi: 10.1186/s40168-022-01235-w
7. Miranda, K.K., **Weigel, B.L.**, McCoy, S.J., Pfister, C.A. 2021. Differential impacts of alternate primary producers on carbon cycling. *Ecology*. doi:10.1002/ecy.3455
8. Davies, S.W., Putnam, H.M., Ainsworth, T.D., Baum, J.K., Bove, C.B., Crosby, S.C., Côté, I.M., Duploux, A., Fulweiler, R.W., Griffin, A.J., Hanley, T.C., Hill, T.M., Humanes, A., Mangubhai, S., Metaxas, A., Parker, L.M., Rivera, H.E., Silbiger, N.J., Smith, N.S., Spalding, A.K., Traylor-Kowles, N., **Weigel, B.L.**, Wright, R.M., Bates, A. 2021. Promoting inclusive metrics of success and impact to dismantle a discriminatory reward system in science. *PLoS Biology* 19(6): e3001282
9. **Weigel, B.L.** and Pfister, C.A. 2021. Oxygen metabolism shapes microbial settlement on photosynthetic kelp blades compared to artificial kelp substrates. *Environmental Microbiology Reports* 13 (2): 176-184. doi:10.1111/1758-2229.12923
10. **Weigel, B.L.** and Pfister, C.A. 2021. The dynamics and stoichiometry of dissolved organic carbon release by kelp. *Ecology* 102 (2): e03221. doi:10.1002/ecy.3221
11. **Weigel, B.L.** 2020. Sea cucumber intestinal regeneration reveals deterministic assembly of the gut microbiome. *Applied and Environmental Microbiology* 86 (14): e00489-20
12. **Weigel, B.L.**, Welter, J.R., and P.C. Furey. 2020. Invertebrate grazing and epilithon assemblages control benthic nitrogen fixation in an N-limited river network. *Freshwater Science* 39 (3) doi: 10.1086/710023
13. Pfister, C.A., Altabet, M.A., and **B.L. Weigel**. 2019. Kelp beds and their local effects on seawater chemistry, productivity, and microbial communities. *Ecology* 100: 10. doi: 10.1002/ecy.2798
14. **Weigel, B.L.** & Pfister, C.A. 2019. Successional dynamics and seascape-level patterns of microbial communities on the canopy-forming kelps *Nereocystis luetkeana* and *Macrocystis pyrifera*. *Frontiers in Microbiology* 10: 346. doi:10.3389/fmicb.2019.00346
15. **Weigel, B.L.** & Erwin, P.M. 2017. Effects of reciprocal transplantation on the microbiome and putative nitrogen cycling functions of the intertidal sponge, *Hymeniacidon heliophila*. *Scientific Reports* 7: 43247
16. **Weigel, B.L.** & Erwin, P.M. 2016. Intraspecific variation in microbial symbiont communities of the sun sponge, *Hymeniacidon heliophila*, from intertidal and subtidal habitats. *Applied and Environmental Microbiology* 82: 650-658. doi: 10.1128/AEM.02980-15

## Science Communication Publications

1. **Weigel, B.L.** and Pfister, C.A. 2020. Quantifying dissolved organic carbon release by canopy-forming kelps. *Bulletin of the Ecological Society of America: In Press*.doi:10.1002/bes2.1814
2. **Weigel, B.L.** 2017. Digest: Floral ambush in the sun: Evolution of flower-dwelling and UV-white reflectance in crab spiders. *Evolution*: doi:10.1111/evo.13294

## RESEARCH GRANTS

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- **2023** – Climate Science Research Acceleration Grant, University of Washington-Seattle Program on Climate Change (\$6,800)  
*Project title:* Impacts of climate change on snow algal communities in the North Cascades
- **2022** – NSF Postdoctoral Research Fellowship in Biology (\$138,000)  
*Project title:* Linking diversity and environmental change to the productivity of snow algal communities
- **2020** – Grants-in-Aid of Research, Phycological Society of America (\$1,000)  
*Project title:* The functional role of microbial symbionts associated with photosynthetic blades of the bull kelp, *Nereocystis luetkeana*
- **2019** – Climate Change Initiative Grant, University of Chicago (\$5,000)  
*Project title:* The functional role of microbial communities in kelp forests
- **2018** – Hinds Evolutionary Biology Research Award, University of Chicago (\$2,500)  
*Project title:* From macro to micro: characterizing interactions between giant canopy-forming kelp and their microbial symbionts
- **2017** – Marine Research Lerner Gray Grant, American Museum of Nat. History (\$2,400)  
*Project title:* Using the deposit feeding sea cucumber *Sclerodactyla briareus* as a novel system to examine environmental influences on colonization of the gut microbiome
- **2017** – Early Career Grant, National Geographic Society (\$5,000)  
*Project title:* The kelp microbiome and carbon cycling in Pacific Northwest kelp forests
- **2017** – Grants-in-Aid of Research, Phycological Society of America (\$946)  
*Project title:* The microbiome of the canopy-forming kelps, *Nereocystis* and *Macrocystis*, from the outer Olympic Peninsula to the Puget Sound
- **2014** – Advanced Dive Training Grant, Women Divers Hall of Fame (\$500)

## FELLOWSHIPS AND AWARDS

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- **2023-25** – National Science Foundation Postdoc Research Fellowship in Biology
- **2020-21** – William Rainey Harper Fellowship, University of Chicago
- **2019** – Dean’s Council Biological Sciences Division Travel Award, University of Chicago
- **2019** – Booth Prize for Excellence in Graduate Student Teaching, University of Chicago
- **2017-19** – GAANN Quantitative Ecology Fellowship, U.S. Department of Education
- **2016** – NSF Graduate Research Fellowship, Honorable Mention
- **2015** – Friday Harbor Labs Summer Scholarship to attend Invertebrate Zoology
- **2015** – Ralph W. Brauer Fellowship for Independent Research, UNC Wilmington
- **2015** – NSF Graduate Research Fellowship, Honorable Mention
- **2014-16** – Owen Graham Kenan Graduate Scholarship Award at UNCW
- **2011-13** – EPA Greater Research Opportunities Undergraduate Fellowship
- **2010-13** – S-STEM Biologists for the Future Scholarship Program

## TEACHING EXPERIENCE

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- **Instructor – Changing Global Oceans (Spring 2024), Northeastern University Three Seas Masters-level course at Friday Harbor Labs on San Juan Island, WA**  
In spring 2024, I will be teaching a short course for the Three Seas study abroad program. The course will take place at Friday Harbor Labs, where I will teach students about climate change in marine ecosystems and students will complete individual research projects focused on organismal responses to ocean warming.
- **Instructor – Island Biology in the Bahamas (Jan. 2023), St. Olaf College course at the Gerace Research Center Field Station on San Salvador Island, Bahamas**  
Co-taught a month-long study abroad course focused on island biology and ecology, including biodiversity surveys, instruction in research methods, lectures, and field trips. Students conducted independent research projects on tropical and marine ecology.
- **Teaching Assistant – Microbiomes Across Environments (Sept. 2019), University of Chicago course at the Marine Biological Lab in Woods Hole, MA**  
Taught undergraduate students to perform microbiome research, including field-based experimental design, and Illumina library prep and 16S rRNA gene sequencing. Developed an introductory bioinformatics pipeline for students to analyze and visualize complex data.
- **Teaching Assistant – Marine Ecology (Winter 2019), University of Chicago**  
Assisted with a lecture-based survey course in marine ecology. Helped students prepare for exams and worked individually with students to develop a research paper.
- **Teaching Assistant – Marine Invertebrates of Woods Hole (Sept. 2017), University of Chicago course at the Marine Biological Lab in Woods Hole, MA**  
Teaching assistant for an intensive 3-week long field course aimed at describing invertebrate biodiversity in Woods Hole, MA. Mentored students in developing independent research projects with local marine invertebrates.
- **Teaching Assistant – Microbiology Lab (4 semesters, 2014-2016), University of North Carolina Wilmington**  
Designed pre-lab lectures, led lab activities, wrote exams over 4 semesters with lab sections of 20-30 students, and mentored students during semester-long projects to identify unknown microbial isolates with biochemical tests and DNA sequencing approaches.

## TEACHING RECOGNITION

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- **Booth Prize for Excellence in Graduate Student Teaching (2019)**  
The University of Chicago teaching award given to only 4 graduate students annually across the entire University; nominated by students and faculty.

## PEDAGOGICAL TRAINING

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- **Chicago Center for Teaching College Teaching Certificate (2021)**  
Completed professional development programming aimed at developing effective, inclusive, and student-centered pedagogical approaches. Reflected critically on my teaching experiences and engaged in a teaching consultation for constructive feedback.
- **Completed *Critical Pedagogy in the University Classroom* (Fall 2020)**  
Examined the relationships among power, oppression, society, education, discrimination, and transformative change. Engaged in a robust dialogue about ways to use pedagogy as a tool to challenge and transform societal and systemic injustices.

- **Completed *Course Design and College Teaching* (Fall 2019)**  
Learned how to develop and design an inclusive and well-conceived course, based in meaningful learning objectives, with teaching methods and assessments aligned with those objectives. Practiced reflecting critically on my teaching practices and developed new inclusive and student-centered approaches to teaching in the university classroom.
- **Inclusive Assessment in STEM workshop (Spring 2019)**  
Engaged in a workshop about ways to make the STEM classroom more accessible to students of diverse backgrounds and perspectives and co-authored a concrete list of actions that can be taken by STEM educators to implement these strategies.

## MENTORING EXPERIENCE

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- Guadalupe Castillo, NSF-Funded Research Experience for Post-Baccalaureate Students at Western Washington University (Summer 2023)
- Dr. Robin Fales, PhD Student at the University of Washington (2022 – 2023)
- Naomi Hi'iaka Vliet, NSF-Funded Research Experience for Undergraduates at Friday Harbor Labs (Summer 2022)
- Nichos Molnar, Ecology & Evolution Undergraduate Fellow at the University of Chicago (Summer 2022)
- Sadie Small, Kelp Conservation Research Technician at Friday Harbor Labs (2022)
- Khashiff Miranda, Ecology & Evolution Undergraduate Fellow at the University of Chicago (2017 – 2021)
- Sativa Volbrecht, Undergraduate Student at the University of Chicago (2019 – 2020)
- Olivia Cattau, Undergraduate Student at the University of Chicago (2018)
- Kentré Horton, Benjamin Deloso, Hunter Lewis, Abigail Thompson: Undergraduate Students at the University of North Carolina-Wilmington (2014 – 2016)

## CONFERENCE AND SYMPOSIUM PRESENTATIONS

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- **Weigel, B.L.**, Small, S.L., Fales, R.J., Berry, H.D., Dethier, M.N. Effects of ocean warming across the life cycle of the bull kelp, *Nereocystis luetkeana*. Oral presentation at the Western Society of Naturalists Conference, 2022 November 12; Oxnard, CA.
- **Weigel, B.L.**, Fales, R.J., Murie, K.A., Carrington, E., Dethier, M.N. Combined effects of heat stress and nitrogen limitation on the physiology of bull kelp, *Nereocystis luetkeana*. Virtual oral presentation at the Western Society of Naturalists Conference, 2020 November 13.
- **Weigel, B.L.**, Pfister, C.A., Mark Welch, J.L., Ramirez-Puebla, S.T. The role of microbial symbionts in kelp forest ecosystems. Virtual oral presentation at the Western Society of Naturalists Conference, 2020 November 07.
- **Weigel, B.L.**, Pfister, C.A., Mark Welch, J.L., Ramirez-Puebla, S.T. Altabet, M.A. Bacterial communities and nutrient cycling associated with bull kelp blades. Oral presentation at the Western Society of Naturalists Conference, 2019 November 02; Ensenada, Mexico.
- **Weigel, B.L.** From macro to micro: Giant kelp bacterial communities. Oral presentation at the Microbiome Research Symposium, 2019 April 16; University of Chicago.
- **\*Weigel, B.L.** Characterizing microbial communities associated with giant kelps. Oral presentation at the Darwinian Sciences Department Retreat, 2018 Sept. 28; University of Chicago at Promontory Point in Chicago, IL.  
*\*Selected for Best Graduate Student Oral Presentation*

- **Weigel, B.L.**, Pfister, C.A., Altabet, M.A. Epiphytic microbial communities and nutrient cycling associated with blades of the canopy-forming kelp, *Nereocystis luetkeana*. Oral presentation at the Phycological Society of America & International Society of Protistologists Meeting, 2018 July 29 - Aug. 2; Vancouver, Canada.
- **Weigel, B.L.** and Pfister, C.A. The microbiome of the canopy-forming kelps, *Nereocystis* and *Macrocystis*, from the outer Olympic Coast to the Puget Sound. Oral presentation at the Salish Sea Ecosystem Conference, 2018 April 4-6; Seattle, WA.
- **Weigel, B.L.** and Erwin, P.M. Turning the tide: Effects of reciprocal transplantation on the microbiome of the intertidal sponge *Hymeniacidon heliophila*. Oral presentation at the 45th Annual Benthic Ecology Meeting, 2016 March 16-19; Portland, ME.
- **\*Weigel, B.L.** and Erwin, P.M. Structural differences in the microbial symbiont community of a marine sponge from intertidal and subtidal habitats. Oral presentation at the 44th Annual Benthic Ecology Meeting, 2015 March 4-7; Quebec City, Canada.  
\*Selected for Best Graduate Student Oral Presentation

### INVITED RESEARCH SEMINARS

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- **Feb 2024** – Fairfield University Biology Department, Fairfield, CT
- **Jan 2024** – Hopkins Marine Station, Stanford University, Pacific Grove, CA
- **July 2023** – Shannon Point Marine Center, Western Washington University, Anacortes, WA
- **May 2023** – University of California-Davis Bodega Marine Laboratory, Bodega Bay, CA
- **Dec 2022** – NOAA Northwest Fisheries Science Center, Seattle, WA
- **March 2022** – Salish Sea Seminar Series, Western Washington University, Bellingham, WA
- **Nov 2021** – Friday Harbor Laboratories, Friday Harbor, WA
- **April 2021** – Friday Harbor Laboratories, Friday Harbor, WA
- **Sept 2020** – The Canadian Museum of Nature, Ottawa, Canada
- **June 2020** – Bamfield Marine Science Center, British Columbia, Canada
- **Jan 2019** – Division of Microbial Ecology at the University of Vienna, Vienna, Austria
- **July 2018** – Friday Harbor Laboratories, Friday Harbor, WA

### PROFESSIONAL MEMBERSHIPS AND ACADEMIC SERVICE

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- Grant Review Panelist for California Sea Grant, Ocean Protection Council & California Department of Fish and Wildlife's "Accelerating Kelp Research and Restoration in California"
- Peer Reviewer: Ecology, Journal of Phycology, Journal of Applied Phycology, Frontiers in Microbiology, Frontiers in Marine Science, Climate Change Ecology, Microbial Ecology, FEMS Microbiology Ecology, Environmental Microbiology, Journal of Eukaryotic Microbiology, Marine and Freshwater Research
- Organized the Friday Harbor Labs Marine Science Seminar Series (Summer 2022)
- Served on the Phycological Society of America's Norma J. Lang Fellowship Committee (2019)
- Gamma Alpha Graduate Society Chicago Chapter (House Manager from 2018-2020, Vice President from 2020-present)

### RECENT OUTREACH ACTIVITIES

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- Stories in Marine Biology: Seminar and Discussion with 150 undergraduates at UW-Seattle interested in marine biology (2024)

- Snow School Science Fair: Volunteered at a middle school science fair where students presented alpine ecosystem projects from field trips to Mt. Baker (2023)
- “Conversation en español” at Friday Harbor Labs: led a weekly informal meeting in Spanish to promote inclusivity of Spanish speakers and practice language skills (2022)
- Lead organizer for the annual Friday Harbor Labs Open House: coordinating science outreach and family friendly activities for 500+ visitors to Friday Harbor Labs (2022)
- Tribal Canoe Journeys visit to Friday Harbor Labs, sharing kelp research (2021)
- Working group to develop an anti-racism training course for graduate students (2020)
- Zoom interactions with K-12 students to discuss marine biology careers (2020)
- Letters to a Pre-Scientist, wrote letters throughout the year to K-12 pen pals (2018-2020)
- Makah Tribe High School Internship Program, field excursions to engage Makah students in fieldwork and ecological science on their traditional land of Tatoosh Island (2018-19)
- Girls in STEAM day, discussing science careers with middle school girls underrepresented in science, Homewood Science Center on the South Side of Chicago (2017-19)
- Clallam Bay School, classroom lesson on kelp life history (2018)
- Science Olympiad at the University of Chicago, Experimental Design and Ecology (2017)
- Outreach with local Illinois fish and aquatic invertebrates, Homewood Science Center (2017)

## **TECHNICAL TRAINING AND CERTIFICATIONS**

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- **Photosynthesis Workshop:** LI-COR 6800 Photosynthesis Training Course, Lincoln, NE (2023)
- **SCUBA diving:** completed >250 dives, AAUS Scientific Diver (2015 certified, 2021-2023 AAUS diver at the University of Washington), PADI Divemaster (2014), Rescue Diver (2010), Ice Diver (2010), Advanced Open Water (2008)
- **First Aid & CPR:** Completed Diving First Aid for Professional Divers (2021)
- **Computational Training:** Scientific Computing for Biologists Course - R, Python and Unix programming (2017, University of Chicago); Quantitative Approaches Bootcamp (2016, Woods Hole, MA); International Symposium on Sponge Microbiology Bioinformatics Workshop (2014, Baltimore, MD)