

Sarah J. Tucker

Curriculum Vitae

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Education

- **PhD in Marine Biology** 2022
University of Hawai‘i at Mānoa
 - Dissertation: “Phylogenetic and functional characteristics that underlie the spatiotemporal distributions of marine bacteria and phytoplankton across a coastal to open-ocean model system”
 - Specialization: Ecology, Evolution, and Conservation Biology (EECB)
 - Advisor: Dr. Michael S. Rappé
- **B.A. in Biological Sciences** 2013
Smith College
 - Thesis: “A biogeographic comparison of cuticle thickness, claw resistance to breakage, and genetic variation in the invasive European green crab *Carcinus maenas*”
 - Graduation Honors: Highest Honors in Biological Sciences
 - Minor: Environmental Science and Policy

Professional Positions

- **Post-Doctoral Scientist** 2024–Present
Marine Biological Laboratory, Laboratory of Dr. A. Murat Eren
 - Studies of diel multi-omic data to reveal translational regulation in marine microbiomes; co-development of open-source ‘omic analysis tools in *anvi’o* including pangenome graphs, structure-informed pangenomes, and analyses of transfer RNA transcripts; mentoring of master and PhD students.
- **Arctic Research & Communications Fellow** 2023–2024
NOAA Global Ocean Monitoring & Observing Program (GOMO)
 - Participated in high-level strategy, budgetary, and policy decisions regarding US and international Arctic ocean observing systems; led the production of the 2023 Arctic Report Card; coordinated field research activities through the Interagency Arctic Research Policy Committee.
- **Graduate Research Assistant** 2016–2022
Hawai‘i Institute of Marine Biology (HIMB), Laboratory of Dr. Michael S. Rappé
 - Co-led the Kāne‘ohe Bay Time-series and synthesis of multi-annual time-series microbiome data to reveal coastal and offshore ecotypes of SAR11 clades; conducted high-throughput dilution-to-extinct cultivation experiments and comparative genome analyses of new SAR11 isolates; co-developed microbial bioindicators of environmental variability with the He‘eia National Estuarine Research Reserve; mentored undergraduate students.

- **Research Technician & Lab Manager** 2015–2016
Smith College, Laboratory of Dr. Laura A. Katz
 - Investigated the biogeography of planktonic ciliate communities off the coast of New England; trained undergraduate scientists in molecular approaches and mentored thesis projects; managed laboratory equipment and ordering.
- **Researcher** 2013–2015
Indonesian Biodiversity Research Center, Udayana University
 - Worked with fish collectors and local NGOs to examine the diversity of grouper species in Indonesian fisheries; described two new species of grouper *Epinephelus craigi* and *Epinephelus kupangensis*; trained scientists of all career levels in molecular biology.
- **Undergraduate Research Assistant** 2009–2013
Smith College, Laboratory of Dr. L. David Smith
 - Examined foraging performance, predator-prey dynamics, and haplotype diversity of the highly invasive European green crab; aquarium husbandry.

Competitive Grants & Fellowships

Funding of >\$20,000 is highlighted first w/ dollar amount.

- **Simons Foundation Postdoctoral Research Fellow-** \$270,000 2024
- **NOAA John A. Knauss Marine Science & Policy Fellow-** \$71,500 2023
- **NOAA Margaret A. Davidson Fellow-** \$115,315 2020
- **NSF Graduate Research Fellow-** \$138,000 2017
- **U.S. Department of State Fulbright Research Fellow to Indonesia-** \$30,000 2013

Additional Competitive Grants & Awards

- **ARCS Foundation Orton and Elmore Merit Award in Marine Biology** 2022
- **HIMB Colonel Willys E. Lord, DVM and Sadina L. Lord Scholarship** 2018–2021
- **HIMB Wayne & Anita Baldwin Scholarship** 2020
- **Research Corporation of the University of Hawai‘i Graduate Fellowship** 2020
- **EECB Hampton and Meredith Carson Fellowship** 2018, 2020
- **Merit Achievement Award in Marine Biology Graduate Program** 2020
- **ARCS Foundation Scholar in Conservation Biology** 2019
- **EECB Maybelle Roth Fellowship** 2019
- **C-MĀIKI Research Grant** 2018
- **UH Graduate Student Organization Grant** 2018
- **American Institute for Indonesian Studies Research Fellowship** 2015
- **Smith College McKinley Honors Fellow** 2012
- **Smith College AEMES Scholar** 2009–2011

Publications

**indicates equal contributions, ^indicates mentee author*

Upcoming

16. Hensch A[^], **Tucker SJ**, Trigodet F, Eren AM. Synteny-aware microbial pangenomes reveal blueprints of genomic variation. *In prep for Nat Biotech*.
15. Ramfelt O, **Tucker SJ**, Freel KC, Eren AM, Rappé MS. Magnimaribacterales marine bacteria genetically partition across the nearshore to open-ocean in the tropical Pacific Ocean. *In revision at mSystems*. doi:10.1101/2025.06.17.660167.

Peer-reviewed

14. **Tucker SJ**^{*}, Fuessel J^{*}, Freel KC^{*}, Kiefl E, Freel EB, Ramfelt O, Sullivan CE, Gajigan AP, Mochimaru H, Souza MR, Quinn M[^], Ratum C[^], Tran LL, Miller SE, Trigodet F, Lolans K, Morrison HG, Fallon B, Huettel B, Pan T, Rappé MS, Eren AM. 2025. A high-resolution diel survey of surface ocean metagenomes, metatranscriptomes, and transfer RNA transcripts. *Scientific Data*. 12: 1913. doi:10.1038/s41597-025-06166-3.
13. Freel KC, **Tucker SJ**, Freel EW, Stingl U, Giovannoni SJ, Eren AM, Rappé MS. 2025. New SAR11 isolate genomes and global marine metagenomes resolve ecologically relevant units within the *Pelagibacterales*. *Nature Communications*. doi:10.1038/s41467-025-67043-6.
12. **Tucker SJ**, Freel KC, Eren AM, Rappé MS. 2025. Habitat-specificity in SAR11 is associated with a few genes under high selection. *ISME J*. wraf216. doi:10.1093/ismejo/wraf216.
11. **Tucker SJ**, Rii YM, Freel KC, Kotubetey K, Kawelo AH, Winter KB, Rappé MS. 2025. Seasonal and spatial transitions in phytoplankton assemblages spanning estuarine to open ocean waters of the tropical Pacific. *Limnol Oceanogr*. 70:1693–1708. doi:10.1002/lno.70075.
10. Ramfelt O, Freel KC, **Tucker SJ**, Nigro OD, Rappé MS. 2024. Isolate-anchored comparisons reveal evolutionary and functional differentiation across SAR86 marine bacteria. *ISME J*. 18:wrae227. doi:10.1093/ismejo/wrae227.
9. **Tucker SJ**, Freel KC, Sullivan CS, Monaghan EA, Ramfelt O, Rii YM, Rappé MS. 2021. Spatial and temporal dynamics of SAR11 marine bacteria sampled across a nearshore to offshore transect in the tropical Pacific Ocean. *PeerJ*. 9:e12274. doi:10.7717/peerj.12274.
8. Frable BW, **Tucker SJ**, Walker HJ. 2019. A new species of grouper, *Epinephelus craigi* (Perciformes), from the South China Sea. *Ichthyological Research*. 66:215. doi:10.1007/s10228-018-0669-9.
7. Amend AS, Cobian GM, Laruson AJ, Remple K, **Tucker SJ**, Poff KE, Antaky C, Borak A, Jones CA, Kuehu D, Lensing BR, Pejhanmehr, Richardson D, Riley PP. 2019. Phytobiomes are compositionally nested from the ground up. *PeerJ*. 7:e6609. doi:10.7717/peerj.6609.
6. **Tucker SJ** & Craig MT. 2018. *Epinephelus kupangensis*. The IUCN Red List of Threatened Species. doi:10.2305/IUCN.UK.2018-2.RLTS.T118360435A118360443.en.
5. DiBattista J, Wakefield CB, Moore GI, Bunce, M, Williams AJ, O'Malley JM, Humphreys RL, Halafihi T, Williams A, Green MA, Graham K, **Tucker SJ**, Cruz E, Newman SJ. 2018. Genomic and life-history discontinuity reveals gene flow from tropical to temperate waters for a deep-water grouper. *Ecological Genetics and Genomics*. 9:23–33. doi:10.1016/j.egg.2018.09.001.
4. **Tucker SJ**, McManus GB, Katz LA, Grattepanche JD. 2017. Distribution of abundant and active planktonic ciliates in coastal and slope waters off New England. *Frontiers in Microbiology*. 8:2178. doi:10.3389/fmicb.2017.02178.
3. Burhanuddin AI, Hardianty S, Tassakka ACM, Cahyani NKD, **Tucker SJ**. 2017. New record of the golden grouper *Saloptia powelli*. *Journal of Ichthyology*. 57:337–340. doi:10.1134/S0032945217020035.
2. Badger M[^], **Tucker SJ**, Grattepanche JD, Katz LA. 2017. Rapid turnover of ciliate commu-

nity members in New England tide pools. *Aquatic Microbial Ecology*. 80:43–54.
doi:10.3354/ame01839.

1. **Tucker SJ**, Kurniasih EM, Craig MT. 2016. A new species of grouper (*Epinephelus*) from the Indo-Pacific. *Copeia*. 104:658–662. doi:10.1643/CI-16-398.

Select Presentations

- **Tucker SJ**. (2025). “From Arctic ocean observing networks to tropical time-series.” Helmholtz Institute for Functional Marine Biodiversity. (Invited)
- **Tucker SJ**, Freel KC, Eren AM, Rappé MS (2024). “A mosaic of metabolic traits underlie the parapatric speciation of SAR11 ecotypes.” International Symposium on Microbial Ecology, Cape Town, South Africa. (Poster)
- Weinberg L, Hinzman L, Hoy EE, Joseph R, **Tucker SJ**, (2023). “Building collaborations to advance Arctic research: an update on the US Arctic Research Plan.” American Geophysical Union, California, USA. (Oral)
- **Tucker SJ**, Freel KC, Kawelo AH, Kotubetey K, Winter KB, Rii YM, Rappé MS. (2021). “Characterizing phytoplankton communities across steep biogeochemical gradients in He‘eia, Hawai‘i.” Coastal & Estuarine Research Federation Conference, Virtual. (Oral)
- **Tucker SJ**, Freel KC, Sullivan CS, Monaghan EA, Ramfelt O, Hoffman E, Rii YM, Rappé MS. (2020). “Population dynamics of SAR11 marine bacteria across a temporally-sampled nearshore to open ocean transect.” Ocean Sciences Meeting, San Diego, USA. (Oral)

Teaching Experience

- **Strategies and Techniques for Analyzing Microbial Population Structures** 2025
Marine Biological Laboratory
 - As a teaching assistant and lecturer, I developed and delivered interactive course material focused on the analysis of and statistical approaches in microbial metatranscriptomics. I supported graduate students from diverse biological fields to understand course materials and implement bioinformatic pipelines from their own research goals.
- **He‘eia National Estuarine Research Reserve Educational Program** 2020–2022
Hawai‘i Institute of Marine Biology
 - Designed educational materials to depict the vital role phytoplankton play in aquatic food webs.
- **Research Experiences in Marine Sciences Program** 2017
University of Hawai‘i at Mānoa
 - As a Course-Based Undergraduate Research Experiences (CURE) program, I co-taught place-based, inquiry-driven marine sciences through laboratory and field investigations to local high school students and recent graduates. This is a four-credit, "early-admit" college course (OCN196). I also developed an experiential education module for the course on marine microbial ecology.
- **Workshops and short courses on molecular tools in biodiversity research** 2013-2015
Indonesian Biodiversity Research Center

- Taught workshops on genetic analyses, biodiversity surveys such as those conducted through the Autonomous Reef Monitoring Structures (ARMS) Program, and grouper fish identification for senior and junior scientists. I trained >20 researchers in molecular biology laboratory techniques.

- **Coral Reef Ed-Ventures Program** 2013
Smith College in partnership with Hol Chan Marine Reserve

- Taught a 2-week summer program on coral reef biology and marine conservation for >100 K-12 Belizean students with 4 other teachers.

- **January Science Teaching Fellowship Program** 2010, 2012
Smith College

- Received training in approaches to science teaching, classroom management, and curriculum-development that culminated in a one-week teaching placement at local public schools.

Science Communication & Outreach

- **NOAA Arctic Report Card Coordinating Editor** 2023

- Coordinated the production of the 2023 Arctic Report Card, a peer-reviewed publication with 12 essays contributed by 82 authors and 13 countries. The release of the report is accompanied by a video, press panel and release event at AGU, communication products, a stakeholder engagement event, and a Congressional briefing- all activities I provided leadership in. The media coverage was estimated at 478 million viewers and 445 individual media stories, including major outlets such as NPR, NYT, Fox, ABC, and BBC.

- **NOAA Global Ocean Monitoring & Observing (GOMO) Program** 2023

- Wrote 6 news articles on GOMO's work, which were featured in the NOAA Educational Annual Report and the highly trafficked climate.gov site.
- Led a cross-office team and engaged with top NOAA leadership to design new websites.

- **Expert Is In Science Communicator**, Smithsonian Natural History Museum 2023

- **SymbioSEAS Artist**, Hawai'i Sea Grant 2019

- **Nerd Nite Honolulu Speaker** 2018, 2019

- **Fall in Love with Science**, Bernice Pauahi Bishop Museum 2018

- **Contributing Writer**, Ka Leo 2018

- **Film production**, Smith College 2013

Science Coordination & Policy Leadership

- **Marine Microbial Observatories for the Future** 2025

- Co-organized a UN Decade sponsored event to advance 'omics-based marine biodiversity monitoring and develop recommendations for sustainable, policy-relevant microbial observations. Immediate outcomes include the writing of a perspective piece.

- **Interagency Arctic Research Policy Committee (IARPC)** 2023

- Led the IARPC Field Operations Community of Practice to coordinate federal research activities in the Arctic and oversaw implementation and tracking of relevant activities from the Arctic Research Plan.

- Produced the 2023 Planned Research Vessel Movements in the Arctic Matrix and led the dissemination of this information to top levels of federal government, local and Indigenous communities within Alaska, and scientific communities.

- **NOAA Global Ocean Monitoring and Observing Program** 2023

- Worked closely with the US Arctic Observing Network and NOAA’s Arctic Executive Committee to develop an analysis of capabilities and needs within the existing Arctic observing networks in support of key policy areas such as food security, Indigenous community resilience, and economic and national security.
- Responded to NOAA leadership and Congressional queries with regards to NOAA’s strategic research and policy interests in the Arctic.

Service

Professional Service

- **Journal Reviewer**
 - *Nature Microbiology, mSystems, Journal of Geophysical Research - Oceans, Thalassas*
- **Grant Proposal Reviewer**
 - NOAA Coastal Resilience Grants, Virginia SeaGrant Graduate Fellowship, NOAA Arctic Research Program
- **Contributor to the open-source software anvi’o** 2025–Present

Institutional Service

- **Habitat Restoration Volunteer**, He‘eia National Estuarine Research Reserve 2019–2022
- **Founder**, Moku o Lo‘e Student Association, University of Hawai‘i at Mānoa 2018–2019
- **Chair & Officer**, SciComm Hawai‘i, University of Hawai‘i at Mānoa 2016–2022

Students Mentored

- **PhD**
 - Helmholtz Institute for Functional Marine Biodiversity (HIFMB): Alexander Henoeh (dissertation)
- **Masters**
 - Hawai‘i Pacific University: Annie Deck (thesis)
- **Undergraduate**
 - Hawai‘i Pacific University: Ciara Ratum (thesis)
 - University of Hawai‘i at Mānoa: Evelyn Hoffman, Rachel Ouye, Han Quach
 - Smith College: Mary Badger (thesis), Doris Juarez
 - Indonesian Biodiversity Research Center: Afrita Ida Utami (thesis), Dhyan Syahban (thesis), Irene Farfar (thesis)
- **High School**
 - Research Experiences in Marine Science: Chase Sawyer, Mariko Quinn, Damien Mercado, Brendan Wong