

CORINNA BREUSING, Ph.D.

University of Rhode Island
Graduate School of Oceanography
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EDUCATION

Kiel University / GEOMAR Helmholtz Center for Ocean Research Ph.D. Biological Oceanography, <i>summa cum laude</i>	Kiel, Germany 2016
Kiel University / GEOMAR Helmholtz Center for Ocean Research M.Sc. Biological Oceanography	Kiel, Germany 2012
Kiel University B.Sc. Biology	Kiel, Germany 2010

RESEARCH EXPERIENCE

Marine Research Associate University of Rhode Island; Mentor: Roxanne Beinart	Narragansett, RI Since 2022
Postdoctoral Researcher University of Rhode Island; Mentor: Roxanne Beinart Project: Chemosynthetic symbioses in deep-sea hydrothermal vent snails <i>Molecular biology and next-generation sequencing:</i> <ul style="list-style-type: none">• Preparation of Illumina shotgun metagenomic libraries• Nanopore long-read sequencing• DNA/RNA extraction, PCR and Sanger sequencing <i>Bioinformatic data analyses, bioinformatic programming and work with high-performance computing clusters/servers:</i> <ul style="list-style-type: none">• Metagenome assembly, binning and annotation• Pangenome generation and phylogenomic reconstruction• Genetic marker design for population genomic analyses• Metatranscriptome assembly and annotation, differential gene expression analyses• 16S rRNA amplicon variant analyses• Programming in Perl/Python/Bash	Narragansett, RI 2018 – 2021
German Research Foundation Postdoctoral Fellow Monterey Bay Aquarium Research Institute; Mentor: Robert Vrijenhoek Project: Chemosynthetic symbioses in deep-sea clams and tubeworms <i>Molecular biology and next-generation sequencing:</i> <ul style="list-style-type: none">• Preparation of 16S rRNA amplicon sequencing libraries	Moss Landing, CA 2016 – 2018

- Preparation of RAD tag sequencing libraries
- Preparation of HiC/Chicago proximity ligation sequencing libraries
- Nanopore long-read sequencing
- DNA extraction, PCR and Sanger sequencing

Bioinformatic data analyses, bioinformatic programming and work with high-performance computing clusters/servers:

- SNP marker design for population genomic analyses
- 16S rRNA amplicon variant analyses
- High-contiguity metagenome assembly and binning
- Programming in Perl/Bash

Research Assistant

Bremen, Germany
2016

Max Planck Institute for Marine Microbiology; Mentor: Nicole Dubilier

Project: Chemosynthetic symbioses in deep-sea hydrothermal vent mussels

Bioinformatic data analyses, bioinformatic programming and work with high-performance computing clusters/servers:

- SNP marker design for population genomic analyses
- Programming in Perl/Python/Bash

Graduate Researcher

Kiel, Germany
2012 – 2016

GEOMAR Helmholtz Center for Ocean Research; Mentor: Thorsten Reusch

Project: Population genomics of deep-sea hydrothermal vent mussels

Molecular biology:

- DNA/RNA extraction, PCR and Sanger sequencing
- Fluidigm SNP type assay preparation and analysis

Bioinformatic data analyses, bioinformatic programming and work with high-performance computing clusters/servers:

- Transcriptome assembly and annotation
- SNP and microsatellite marker design for population genomic analyses
- Larval dispersal modelling
- Programming in Perl/Python/Bash

Summer Intern

Moss Landing, CA
2014

Monterey Bay Aquarium Research Institute; Mentor: Robert Vrijenhoek

Project: Population genetics of Western Pacific hydrothermal vent mussels

Molecular biology:

- DNA/RNA extraction, PCR and Sanger sequencing

Bioinformatic data analyses and bioinformatic programming:

- Sequence analyses and genetic marker design
- Programming in Perl/Bash

PUBLICATIONS

*Peer-reviewed Articles (*Authors contributed equally)*

- Breusing C***, Johnson SB*, Mitarai S, Beinart RA, Tunnicliffe V. (2021) Differential patterns of connectivity in Western Pacific hydrothermal vent metapopulations: A comparison of biophysical and genetic models. *Evol. Appl.*, doi: 10.1111/eva.13326.
- Ücker M, Ansorge R, Sato Y, Sayavedra L, **Breusing C**, Dubilier N. (2021) Deep-sea mussels from a hybrid zone on the Mid-Atlantic Ridge host genetically indistinguishable symbionts. *ISME J.*, 15, 3076–3083.
- Breusing C***, Johnson SB*, Tunnicliffe V, Clague D, Vrijenhoek RC, Beinart RA. (2020) Allopatric and sympatric drivers of speciation in *Alviniconcha* hydrothermal vent snails. *Mol. Biol. Evol.*, 37(12), 3469–3484.
- Breusing C**, Schultz DT, Sudek S, Worden AZ, Young CR. (2020) High-contiguity genome assembly of the chemosynthetic gammaproteobacterial endosymbiont of the cold seep tubeworm *Lamellibrachia barhami*. *Mol. Ecol. Resour.*, 20(5), 1432–1444.
- Breusing C**, Mitchell J, Delaney J, Sylva SP, Seewald JS, Girguis PR, Beinart RA. (2020) Physiological dynamics of chemosynthetic symbionts in hydrothermal vent snails. *ISME J.*, 14(10), 2568–2579.
- Breusing C**, Franke M, Young CR. (2020) Intra-host symbiont diversity in eastern Pacific cold seep tubeworms identified by the *16S-V6* region, but undetected by the *16S-V4* region. *PLoS ONE*, 15(1), e0227053.
- Knöbel L, **Breusing C**, Bayer T, Sharma V, Hiller M, Melzner F, Stuckas H. (2020) Comparative de novo assembly and annotation of mantle tissue transcriptomes from the *Mytilus edulis* species complex (*M. edulis*, *M. galloprovincialis*, *M. trossulus*). *Mar. Genomics*, 51, 100700.
- Hinzke T, Kleiner M, **Breusing C**, Felbeck H, Häsler R, Sievert SM, et al. (2019) Host-microbe interactions in the chemosynthetic *Riftia pachyptila* symbiosis. *mBio*, 10(6), e02243-19.
- Breusing C**, Johnson SB, Vrijenhoek RC, Young CR. (2019) Host hybridization as a potential mechanism of lateral symbiont transfer in deep-sea vesicomid clam. *Mol. Ecol.*, 28, 4697–4708.
Selected as cover article.
- Manel S, Loiseau N, Andrello M, Fietz K, Díaz D, Forcada A, ..., **Breusing C**, et al. (2019) Long-distance benefits of Marine Reserves: myth or reality? *Trends Ecol. Evol.*, 34, 342–354.
- Utermann C, Parrot D, **Breusing C**, Stuckas H, Staufenberger T, Blümel M, et al. (2018) Combined genotyping, microbial diversity and metabolite profiling studies on farmed *Mytilus* spp. from Kiel Fjord. *Sci. Rep.*, 8, 7983.
- Breusing C**, Vrijenhoek RC, Reusch TBH. (2017) Widespread introgression in deep-sea hydrothermal vent mussels. *BMC Evol. Biol.*, 17, 13.
- Stuckas H, Knöbel L, Schade H, **Breusing C**, Hinrichsen H-H, Bartel M, et al. (2017) Combining hydrodynamic modelling with genetics: can passive larval drift shape the genetic structure of Baltic *Mytilus* populations? *Mol. Ecol.*, 26, 2765–2782.
- Breusing C**, Biastoch A, Drews A, Metaxas A, Jollivet D, Vrijenhoek RC, et al. (2016) Biophysical and population genetic models predict the presence of "phantom" stepping stones connecting Mid-Atlantic Ridge vent ecosystems. *Curr. Biol.*, 26, 2257–2267.

Breusing C, Johnson SB, Tunnicliffe V, Vrijenhoek RC. (2015) Population structure and connectivity in Indo-Pacific deep-sea mussels of the *Bathymodiolus septemdierum* complex. *Conserv. Genet.*, 16, 1415–1430.

Sayavedra L, Kleiner M, Ponnudurai R, Wetzel S, Pelletier E, Barbe V, ..., **Breusing C**, et al. (2015) Abundant toxin-related genes in the genomes of beneficial symbionts from deep-sea hydrothermal vent mussels. *eLife*, 4, e07966.

Articles in review

Breusing C, Genetti M, Russell SL, Corbett-Detig RB, Beinart RA. (2021) Host-symbiont population genomics provide insights into partner fidelity and habitat adaptation at deep-sea hydrothermal vents. *In review at PNAS*

Breusing C, Castel J, Yang Y, Broquet T, Sun J, Jollivet D, et al. (2021) Global 16S rRNA diversity of provannid snail endosymbionts from Indo-Pacific deep-sea hydrothermal vents. *In review at Environmental Microbiology Reports*

Perez M*, **Breusing C***, Angers B, Beinart RA, Won YJ, Young CR. (2021) Extreme genomic makeover: evolutionary history and niche adaptation of maternally-transmitted clam symbionts. *In review at Proceedings of the Royal Society B*

Hauer MA, **Breusing C**, Trembath-Reichert E, Huber JA, Beinart RA. (2021) Geography, not lifestyle, explains the population structure of free-living and host-associated deep-sea hydrothermal vent snail symbionts. *In review at The ISME Journal*

PRESENTATIONS

Breusing C, Genetti M, Russell SL, Corbett-Detig RB, Beinart RA. Host-symbiont population genomics provide insights into partner fidelity and habitat adaptation at deep-sea hydrothermal vents. *Invited talk at the Wellcome Sanger Institute / Aquatic Genomics Project (Hinxton, UK), October 2021 (remote)*

Breusing C, Genetti M, Russell SL, Corbett-Detig RB, Beinart RA. Host-symbiont population genomics provide insights into transmission mode and habitat adaptation in deep-sea hydrothermal vent snails. *Invited talk at the International Symposium on Marine Science and Engineering for Young Scientists and Postgraduates (Hong Kong, China), July 2021 (remote)*

Breusing C, Mitchell J, Delaney J, Sylva SP, Seewald JS, Girguis PR, Beinart RA. High-pressure shipboard experiments provide insights into the physiological dynamics of chemosynthetic vent snail symbionts. *Talk at the Rhode Island Microbiome Symposium (Kingston, RI, USA), January 2020*

Breusing C. Evolutionary genetics and physiology of mollusk-bacteria symbioses from deep-sea chemosynthetic environments. *Invited talk at Kiel University (Kiel, Germany), August 2019*

Breusing C, Mitchell J, Delaney J, Girguis PR, Beinart RA. Does symbiont metabolism drive niche differentiation in *Alviniconcha* hydrothermal vent snails? *Poster at the GRS/GRC Animal-Microbe Symbioses (Mt. Snow, VT, USA), June 2019*

Breusing C. Evolution and physiology of mollusk-bacteria symbioses from deep-sea chemosynthetic environments. *Campus talk at the University of Rhode Island (Narragansett, RI, USA), March 2019*

Breusing C, Johnson S, Young CR, Vrijenhoek RC. Which mechanism causes symbiont switches in deep-sea vesicomyid clams? *Poster at the 15th Deep-Sea Biology Symposium (Monterey, CA, USA), September 2018*

Breusing C. Population genetics and connectivity in deep-sea hydrothermal vent mussels. *Campus talk at the Monterey Bay Aquarium Research Institute (Moss Landing, CA, USA), September 2017*

Breusing C, Johnson S, Young CR, Vrijenhoek RC. Symbiont heterogeneity in deep-sea tubeworms from the eastern Pacific Ocean. *Talk at the 6th Chemosynthesis-Based Ecosystems Symposium (Woods Hole, MA, USA), August 2017*

Hinzke T, Kleiner M, **Breusing C,** Schweder T, Markert S. Diving deep into chemosynthesis: Physiological interactions in the *Riftia* symbiosis. *Poster at the 6th Chemosynthesis-Based Ecosystems Symposium (Woods Hole, MA, USA), August 2017*

Breusing C. Cryptic diversity and host-symbiont specificity in Pacific deep-sea tubeworms. *Invited talk at the National Oceanography Center (Southampton, UK), September 2016*

Utermann C, **Breusing C,** Stuckas H, Staufenberger T, Labes A, Tasdemir D. Metabolite profiling of Baltic blue mussel (*Mytilus* sp.) hybrids and their associated microbes. *Poster at the 9th Joint Natural Products Conference (Copenhagen, Denmark), July 2016*

Breusing C. Population connectivity and hybridization of vent mussels from the Mid-Atlantic Ridge. *Invited talk at the Station Biologique de Roscoff (Roscoff, France), November 2015*

Breusing C, Biastoch A, Drews A, Metaxas A, Jollivet D, Sayavedra L, et al. Population connectivity and dispersal of vent mussels from the Mid-Atlantic Ridge. *Talk at the 14th Deep-Sea Biology Symposium (Aveiro, Portugal), September 2015*

Palgan D, Jamieson JW, **Breusing C,** Devey CW. Role of hydrothermal systems in development of the oceans. Where to find them on the seafloor? *Poster at the Sustainable Ocean Development Symposium (New York City, NY, USA), September 2015*

Breusing C. Population connectivity and dispersal of vent mussels from the Mid-Atlantic Ridge. *Invited talk at the Senckenberg Natural History Collections Dresden (Dresden, Germany), August 2015*

Breusing C. Population connectivity and dispersal of vent mussels from the Mid-Atlantic Ridge. *Campus talk at Kiel University (Kiel, Germany), June 2015*

Breusing C, Biastoch A, Metaxas A, Melzner F, Reusch TBH. Population connectivity and speciation of vent mussels from the Mid-Atlantic Ridge: An interdisciplinary approach. *Poster at the World Congress of Malacology (Ponta Delgada, Azores), July 2013*

GRANTS, AWARDS & PROPOSALS

Schmidt Ocean Institute Proposal Track "Ocean Science – Falkor 2021"
Funded research cruise (estimated value of \$1,800,000); PI: C. Breusing, R.

2023

Beinart (URI); Co-PIs: J. McDermott (Lehigh), J. Resing (NOAA-PMEL), A. Gartman (USGS), V. Ferrini (LDEO)	
German Research Foundation Postdoctoral Fellowship (\$91,896); PI: C. Breusing	2016 – 2018
Helmholtz Doctoral Prize for Earth and Environment , one out of six prizes in Germany (\$19,330)	2016
Petersen Doctoral Prize , one out of four prizes in Germany (\$2,850)	2016
Helmholtz Graduate School for Ocean System Science and Technology Fellowship , one out of three fellowships in the biological sciences (\$79,600)	2012 – 2016
Monterey Bay Aquarium Research Institute Summer Intern Scholarship (\$6,000)	2014
Best Student Poster Prize at the World Congress for Malacology (\$350)	2013
Germany Scholarship , one out of ~100 stipends at Kiel University (\$4,100)	2011 – 2012

TEACHING & MENTORING

Western Washington University Paper discussion with biology students (remote)	2021
Deep-Sea Biology Society Volunteer for graduate/undergraduate student mentoring group (remote)	2020
Harvard Extension School Co-instructor "Deep-Sea Biology", spring class (remote)	2020, 2021
Boston College Paper discussion with biology students (remote)	2020
University of Rhode Island Guest lectures in marine biology and geoscience classes Co-mentor of one undergraduate and one graduate student	2019 – present
Max Planck Institute for Marine Microbiology Member in PhD thesis committee meeting (remote)	2019, 2020
Monterey Bay Aquarium Research Institute Co-mentor of one graduate student	2018
Kiel University Co-instructor "Computational and Comparative Genomics"	2016
GEOMAR Helmholtz Center for Ocean Research Co-instructor "Marine Molecular Ecology"	2015

PROFESSIONAL ACTIVITIES & DEVELOPMENT

Laboratory Co-management (2019 – present)

University of Rhode Island

Proposal Reviewer (2016 – present)

National Science Foundation, Research Grants Council of Hong Kong

Participant in Time Management and Leadership Coaching (2015 – 2016)

Kiel University

Participant in Transferrable Skills Course "Career and Leadership" (2015)

Helmholtz Association

Journal Reviewer (2014 – present)

Applied and Environmental Microbiology, BMC Evolutionary Biology, Deep-Sea Research Part I & II, Environmental Microbiology, Evolutionary Applications, The ISME Journal, Journal of Experimental Marine Biology and Ecology, Marine Biodiversity, Marine Biology, Molecular Ecology, Molecular Ecology Resources, PeerJ, PLoS ONE, Proceedings of the Royal Society B, Scientific Reports

Co-organizer of Graduate Student Symposium "DokMa" (2013)

GEOMAR Helmholtz Center for Ocean Research

CONTRIBUTIONS TO DIVERSITY, EQUITY, INCLUSION & SOCIAL JUSTICE

URGE (Unlearning Racism in Geoscience)

2021

Member in URI's URGE pod "Making Waves"

Social Justice & Inclusion Microcredential

2020

Training with the Office of Community, Equity and Diversity at the University of Rhode Island to advance anti-oppression in the workplace

URI Society for Women in Marine Science Symposium

2020

Moderator for session "Writing Grants for Private Funding"

University of Rhode Island "Inclusive Course Design Program"

2020

Training in creating an inclusive classroom

University of Rhode Island "Safe Zone Workshop"

2020

Training in issues affecting the LGBTQ+ community

Skype a Scientist

2020 – present

Volunteer to connect with classrooms around the world

University of Rhode Island "Black Lives Matter" Book Club

2020

Discussion of anti-racist literature

Mentorship

2018 – present

Advised and trained two female PhD students

Volunteer for Deep-Sea Biology Society student mentoring program

Cape Verde Summer School 2015
 Worked with West African students to develop environmental management plans for Cape Verde

EXPERIENCE AT SEA

R/V <i>Falkor</i> ; Chief Scientist: Corinna Breusing, Roxanne Beinart (planned) Characterization of hydrothermal ecosystems in the Galapagos spreading center Deep-sea submergence vehicle: ROV <i>SuBastian</i>	2023 30 days
R/V <i>Thomas G. Thompson</i> ; Chief Scientist: Roxanne Beinart (planned) Larval ecology and population genomics of Western Pacific vent snails Deep-sea submergence vehicle: ROV <i>Jason</i>	2022 30 days
R/V <i>Endeavor</i> ; Chief Scientist: Corinna Breusing Testing of novel instrumentation for deep-sea research	2019 7 days
R/V <i>Western Flyer</i> ; Chief Scientist: Sebastian Sudek Analysis of benthic and pelagic microbial diversity in the Pacific Ocean Deep-sea submergence vehicle: ROV <i>DocRicketts</i>	2018 3 days
R/V <i>Western Flyer</i> ; Chief Scientist: Victoria Orphan Monitoring of whalefall and cold seep communities in the Monterey Canyon Deep-sea submergence vehicle: ROV <i>DocRicketts</i>	2017 3 days
R/V <i>Western Flyer</i> ; Chief Scientist: David Clague Genetic analyses of hydrothermal vent communities in the Northeast Pacific Deep-sea submergence vehicle: ROV <i>DocRicketts</i>	2016 10 days
R/V <i>Western Flyer</i> ; Chief Scientist: Robert Vrijenhoek Taxonomic and genetic studies on vent and seep animals in the Gulf of California Deep-sea submergence vehicle: ROV <i>DocRicketts</i>	2015 10 days