

Sean P Jungbluth, Ph.D.

Professional Preparation

University of Wisconsin at Madison, Biology and Bacteriology, B.S. 2003-2007

- University of Wisconsin at Waukesha, General Education
- University of Wisconsin at Whitewater, Computer Science and Pre-Business
- University of Queensland, Australia, Marine Science and Biology
- Kampala University, Uganda, Public Health

University of Hawaii at Manoa, Department of Oceanography and Hawaii Institute of Marine Biology, Ph.D 2008-2014

University of Hawaii, Department of Oceanography, Postdoctoral Research Associate 2014-2015

University of Southern California, Department of Earth Sciences, Postdoctoral Research Associate 2015-2016

- UNOLS Deep-Submergence Chief Scientist Training

US Department of Energy, Lawrence Berkeley National Laboratory, Joint Genome Institute, Computational Biologist Postdoctoral Fellow 2017-2019

Appointments

Research Affiliate, National Oceanographic and Atmospheric Association, Atlantic Oceanographic Meteorological Laboratory, Miami, FL 2024-present

Research Scientist, Mississippi State University, Northern Gulf Institute, Starkville, MS 2024-present

Research Faculty, Estuary and Ocean Science Center, Tiburon, CA 2023-present

Adjunct Professor of Biology, San Francisco State University, Department of Biology, San Francisco, CA 2022-present

Research Scientist, US Department of Energy, Lawrence Berkeley National Laboratory, Environmental Genomics & Systems Biology Division, Berkeley, CA 2021-present

Affiliate Scientist, University of California, Department of Bioengineering, Berkeley, CA 2019-present

Data Scientist, US Department of Energy, Lawrence Berkeley National Laboratory, Environmental Genomics & Systems Biology Division, Berkeley, CA 2019-2021

Postdoctoral Fellow in Computational Biology, US Department of Energy, Lawrence Berkeley National Laboratory, Joint Genome Institute, Walnut Creek, CA 2017-2019

Postdoctoral Research Associate, University of Southern California, Department of Earth Sciences, Los Angeles, CA 2015-2016

Postdoctoral Research Associate, University of Hawaii, Department of Oceanography, Honolulu, HI 2014-2015

Graduate Research Assistant, University of Hawaii, Department of Oceanography, Hawaii Ocean Time-Series, Honolulu, HI 2012-2013

Graduate Research Assistant, University of Hawaii, Hawaii Institute of Marine Biology and Department of Oceanography, Kaneohe, HI & Honolulu, HI 2008-2014

Research Scientist, Lucigen Corporation, Middleton, WI. 2007-2008

Publications

- (33) Park H, Joachimiak M, **Jungbluth S**, Yang Z, Riehl B, Canon R, Arkin A, Dehal P. (in press) A bacterial sensor taxonomy across Earth ecosystems for machine learning applications. *mSystems*.
- (32) Kesapragada M, Canon RS, **Jungbluth SP**, Joachimiak MP, Arkin AP, Dehal PS. (2022) Generative model for Pseudomonad genomes. *NeurIPS 2022: Learning Meaningful Representations of Life* doi: 10.13140/RG.2.2.10081.38249.
- (31) Chivian D, **Jungbluth SP**, Dehal PS, Wood-Charlson E, Canon RS, Allen BH, Clark MM, Gu T, Land ML, Price GA, Riehl WJ, Sneddon MW, Sutormin R, Zhang Q, Cottingham RW, Henry CS, Arkin AP. (2022) Metagenome-assembled genome extraction and analysis from microbiomes using KBase. *Nature Protocols* 18: 208-238.
- (30) Bowers RM, Nayfach S, Schulz F, **Jungbluth SP**, Ruhl IA, Sheremet A, Lee J, Goudeau D, Eloë-Fadrosh EA, Stepanauskas R, Malmstrom RR, Kyrpides NC, Dunfield PF, Woyke T. (2021) Dissecting the dominant hot spring microbial populations based on community-wide sampling at single-cell resolution. *The ISME Journal* 16: 1337-1347.
- (29) Köstlbacher S, Collingro A, Halter T, Schulz F, **Jungbluth SP**, Horn M. (2021) Pangenomics reveals alternative environmental lifestyles among chlamydiae. *Nature Communications* 12: 4021.
- (28) Marlow JJ, Hoer D, **Jungbluth SP**, Reynard LM, Gartman A, Chavez MS, El-Nagggar MY, Tuross N, Orphan VJ, Girguis PR. (2021) Carbonate-hosted microbial communities are prolific and pervasive methane oxidizers at geologically diverse marine methane seep sites. *Proceedings of the National Academy of Sciences USA* 118: e2006857118.
- (27) Nayfach S, Roux S, Seshadri R, Udway D, Varghese N, Schulz F, Wu D, Paez-Espino D, Chen IM, Huntemann M, Palaniappan K, Ladau J, Mukherjee S, Reddy TBK, Nielsen T, Kirton E, Faria JP, Edirisinghe JN, Henry CS, **Jungbluth SP**, Chivian D, Dehal P, Wood-Charlson EM, Arkin AP, Tringe SG, Visel A; IMG/M Data Consortium, Woyke T, Mouncey NJ, Ivanova NN, Kyrpides NC, Eloë-Fadrosh EA. (2020) A genomic catalog of Earth's microbiomes. *Nature Biotechnology* 39: 499-509.
- (26) Jarett JK, Džunková M, Schulz F, Roux S, Paez-Espino D, Eloë-Fadrosh E, **Jungbluth SP**, Ivanova N, Spear JR, Carr SA, Trivedi CB, Corsetti FA, Johnson HA, Becraft E, Kyrpides N, Stepanauskas R, Woyke T. (2020) Insights into the dynamics between viruses and their hosts in a hot spring microbial mat. *The ISME Journal* 14: 2527-2541.

- (25) Schulz F, Roux S, Paez-Espino D, **Jungbluth SP**, Walsh DA, Denev VJ, McMahon KD, Konstantinidis KT, Eloe-Fadrosh EA, Kyrpides NC, Woyke T. (2020) Giant virus diversity and host interactions through global metagenomics. *Nature* 578: 432-436.
- (24) Marlow JJ, Colocci I, **Jungbluth SP**, Weber NM, Gartman A, Kallmeyer. (2020) Mapping metabolic activity at single cell resolution in intact volcanic fumarole sediment. *FEMS Microbiology Letters* 367: fnaa031.
- (23) Magnabosco C, Biddle JF, Cockell CS, **Jungbluth SP**, Twing KI. (2019) Biogeography, ecology, and evolution of deep life. In: Orcutt BN, Daniel I, Dasgupta R (ed). *Deep Carbon: Past to Present*. Cambridge University Press [Book Chapter]
- (22) Boyd JA*, **Jungbluth SP***, Leu AO, Evans PN, Woodcroft BJ, Chadwick GL, Orphan VJ, Amend JP, Rappé MS, Tyson GW. (2019) Divergent methyl-coenzyme M reductase genes in a deep-subseafloor Archaeoglobi. *The ISME Journal* 13: 1269-1279. (*co-first authors)
- (21) Carr SA, **Jungbluth SP**, Eloe-Fadrosh EA, Stepanauskas R, Woyke T, Rappé MS, Orcutt BN. (2019) Carboxidotrophy potential of uncultivated Hydrothermarchaeota from the subseafloor crustal biosphere. *The ISME Journal* 13: 1457-1468.
- (20) Chen, I-MA, Chu K, Palaniappan K, Pillay M, Ratner A, Huang J, Huntemann M, Varghese N, White JR, Seshadri R, Smirnova T, Kirton E, **Jungbluth SP**, Woyke T, Eloe-Fadrosh EA, Ivanova NN, Kyrpides NC. (2019) IMG/M v.5.0: an integrated data management and comparative analysis system for microbial genomes and microbiomes. *Nucleic Acids Research* 47(D1): D666-D677.
- (19) Anatharaman K, Hausmann B, **Jungbluth SP**, Kantor RS, Lavy A, Warren LA, Rappé MS, Pester M, Loy A, Thomas BC, Banfield JF. (2018) Expanded diversity of microbial groups that shape the dissimilatory sulfur cycle. *The ISME Journal* 12: 1715-1728.
- (18) McVeigh D, Skarke AE, Dekas A, Borrelli C, Hong W-L, Marlow J, Pasulka A, **Jungbluth SP**, Barco RA, Djurhuus A. (2018) Characterization of benthic biogeochemistry and ecology at three methane seep sites on the Northern US Atlantic Margin. *Deep-Sea Research Part II* 150: 41-56.
- (17) Teehara KB, **Jungbluth SP**, Acosta TE, Hellebrand E, Misra AK, Onac PB, Pflitsch A, Smith SM, Rappé MS, Telus M, Schorghofer N. (2017) Cryogenic minerals in Hawaiian lava tubes: A geochemical and microbiological exploration. *Geomicrobiology Journal* 35: 227-241.
- (16) Bowers RM, Kyrpides NC, Stepanauskas R, Harmon-Smith M, Doud D, Reddy TBK, Schulz F, Jarett J, Rivers AR, Eloe-Fadrosh EA, Tringe SG, Ivanova NN, Copeland A, Clum A, Becraft ED, Malmstrom RR, Birren B, Podar M, Bork P, Weinstock GM, Garrity GM, Dodsworth JA, Yooseph S, Sutton G, Glöckner FO, Gilbert JA, Nelson WC, Hallam SJ, **Jungbluth SP**, Ettema TJG, Tighe S, Konstantinidis KT, Liu W-T, Baker BJ, Rattei T, Eisen JA, Hedlund B, McMahon KD, Fierer N, Knight R, Finn R, Cochrane G, Karsch-Mizrachi I, Tyson GW, Rinke C, The Genome Standards Consortium, Lapidus A, Meyer F, Yilmaz P, Parks DH, Eren AM, Schriml L, Banfield JF,

- Hugenholtz P, Woyke T. (2017) Minimum information about a single amplified genome (MISAG) and a metagenome-assembled genome (MIMAG) of bacteria and archaea. *Nature Biotechnology* 35: 725-731.
- (15) Momper L, **Jungbluth SP**, Lee M, Amend JP. (2017) Energy and carbon metabolisms in a deep terrestrial subsurface fluid microbial community. *The ISME Journal* 11: 2319-2333.
- (14) Marlow J, Borrelli C, **Jungbluth SP**, Hoffman C, Marlow H, Girguis P, AT-36 Team. (2017) Telepresence is a potentially transformative tool for field science. *Proceedings of the National Academy of Sciences USA* 114: 4841-4844.
- (13) **Jungbluth SP**, Glavina del Rio T, Tringe SG, Stepanauskas R, Rappé MS. (2017) Genomic comparisons of a bacterial lineage that inhabits both marine and terrestrial deep subsurface systems. *PeerJ* 5:e3134.
- (12) **Jungbluth SP**, Amend JP, Rappé MS. (2017) Metagenome sequencing and 98 microbial genomes from Juan de Fuca Ridge flank subsurface fluids. *Scientific Data* 4:170037.
- (11) Nigro OD, **Jungbluth SP**, Lin H-T, Hsieh C-C, Miranda J, Schvarcz C, Rappé MS, Steward GF. (2017) Viruses in the oceanic basement. *mBio* 8: e02129-16.
- (10) Robador A, LaRowe, DE, **Jungbluth SP**, Lin H-T, Rappé MS, Nealson KH, Amend JP. (2016) Nanocalorimetric characterization of microbial activity in deep subsurface oceanic crustal fluids. *Frontiers in Microbiology* 7: 454.
- (9) **Jungbluth SP**, Bowers RM, Lin H-T, Cowen JP, Rappé MS. (2016) A novel microbial assemblage inhabits fluids within mid-ocean ridge flank subsurface basalt. *The ISME Journal* 10: 2033-2047.
- (8) Robador A, **Jungbluth SP**, LaRowe DE, Bowers RM, Amend JP, Rappé MS, Cowen JP. (2015) Activity and phylogenetic diversity of sulfate-reducing microorganisms in low-temperature subsurface fluids within the upper oceanic crust. *Frontiers in Microbiology* 5: 748.
- (7) Biddle JF, **Jungbluth SP**, Lever MA, Rappé MS. (2014) Life in the ocean crust. In: Kallmeyer J (ed). *Life in Extreme Environments: The Deep Biosphere*. DeGruyter. [Book Chapter; No Peer-Review]
- (6) Böttjer D, **Jungbluth SP**, Boiteau R, Burkhardt B, De Leo F, Bruno BC. (2014) Career choices in marine and environmental sciences: navigating a sea of options. *Oceanography* 27(4): 37-43. [No Peer-Review]
- (5) Lin H-T, Cowen JP, Olson EJ, Lilley MD, **Jungbluth SP**, Wilson ST, Rappé MS. (2014) Dissolved hydrogen and methane in the oceanic basaltic biosphere. *Earth and Planetary Science Letters* 405: 62-73.
- (4) **Jungbluth SP**, Lin H-T, Cowen JP, Glazer BT, Rappé MS. (2014) Phylogenetic diversity of

microorganisms in subseafloor crustal fluids from boreholes 1025C and 1026B along the Juan de Fuca Ridge flank. *Frontiers in Microbiology* 5: 119.

- (3) **Jungbluth SP**, Johnson LGH, Cowen JP, Rappé MS. (2013). Data report: microbial diversity in sediment near Grizzly Bare Seamount from Holes U1363B and U1363G. Proceedings of the Integrated Ocean Drilling Program 327: pp. 1-27.
- (2) **Jungbluth SP**, Grote J, Lin H-T, Cowen JP, Rappé MS. (2013). Microbial diversity within basement fluids of the sediment-buried Juan de Fuca Ridge flank. *The ISME Journal* 7(1): 161-172.
- (1) Fisher AT, Tsuji T, Petronotis K, Wheat CG, Becker K, Clark JF, Cowen J, Edwards K, Jannasch H, IODP Expedition 327 and **Atlantis Expedition AT18-07 Shipboard Parties** (2012). IODP Expedition 327 and Atlantis Expedition AT18-07: Observatories and Experiments on the Eastern Flank of the Juan de Fuca Ridge. *Scientific Drilling* 13: 4-11.

Fellowships, Honors & Awards

<i>Candidatus</i> Pyrohabitans jungbluthii species namesake designation honorific award for genomic discovery of Archaea phylum “Hydrothermarchaeota” (citations: Jungbluth et al., 2017, <i>Scientific Data</i> ; Adam et al., 2022, <i>Science Advances</i>)	2022
Department of Energy Joint Genome Institute Computational Biology Postdoctoral Fellowship	2017
Center for Dark Energy Biosphere Investigations (C-DEBI) Graduate Student Fellowship (\$64,000)	2012-2014
Consortium for Ocean Leadership U.S. Science Support Program Schlanger Ocean Drilling Fellowship (\$28,000)	2010-2011

Refereed Competitive Grants

“Metagenomics of Viral and Microbial Communities Inhabiting Warm, Anoxic Fluids of the Sediment-Buried Deep Ocean Crust”, supported by the DOE Joint Genome Institute Community Sequencing Program (Lead-PI M. Rappé; Co-PIs G. Steward, S. Jungbluth, O. Nigro).	2015
“Promoting Scientific Collaborations, Networking and Professional Development Among C-MORE’s Next-Generation”, supported by the Center for Microbial Oceanography: Research and Education (C-MORE) EDventures Program (Co-funded with C-MORE Professional Development Organizing Committee; \$22,486)	2012
“Metagenomics, Metatranscriptomics, and Single-Cell Genomics of Microbial Communities Inhabiting Juan de Fuca Ridge Flank Borehole Fluids”, supported by the Center for Dark Energy Biosphere Investigations (C-DEBI) Research Support	2011

Program (Co-funded with M Rappé; \$45,494)

Invited Seminars/Talks

February 2024: Harnessing genome binning for a journey into the depths of hidden microbial diversity. **Stanford University - Environmental Microbial Genomics Course**, Stanford, CA.

September 2022: Submarines, Supercomputers, Software, and Sequence Data: Aquatic Ecology Enabled by Computational Biology. **San Francisco State University - Estuary & Ocean Science Center**, Tiburon, CA.

February 2022: Beyond amplicons: genome binning and its role in re-shaping the tree of life. **Stanford University - Environmental Microbial Genomics Course**, Stanford, CA.

February 2020: Beyond amplicons: genome binning and its role in re-shaping the tree of life. **Stanford University - Environmental Microbial Genomics Course**, Stanford, CA.

October 2019: Hunting for life in sub-seafloor volcanoes and the explosive growth of microbiology as a data science. **San Francisco State University - Estuary & Ocean Science Center**, Tiburon, CA.

September 2019: Omics-based discovery of novel environmental microbes and bioinformatic applications. **Bayer Crop Science**, Sacramento, CA.

January 2019: Microbial genomics of marine and terrestrial biomes and opportunities for collaborative science. **Lawrence Berkeley National Laboratory Environmental Genomics & Systems Biology Division Seminar**, Berkeley, CA.

July 2017: Illuminating the phylogenetic breadth and metabolic potential of microbial life with thousands of archaeal metagenome-assembled genomes. **Archaea: Ecology, Metabolism & Molecular Biology – Gordon Research Conference**, Waterville Valley, NH.

January 2016: Investigating novel microbial life in the deep igneous oceanic crust. **University of Southern California Department of Earth Sciences Paleoenvironmental Seminar**, Los Angeles, CA.

October 2014: Juan de Fuca Ridge flank basement fluid microbiology. **C-DEBI Networked Speaker Series**. Honolulu, HI. [broadcast online]

September 2014: Microbial diversity in anoxic, subseafloor basaltic fluids. NASA Astrobiology Institute Seminar, **University of Hawaii**, Honolulu, HI.

December 2012: Microbial diversity within Juan de Fuca ridge basement fluids sampled from oceanic borehole observatories. **American Geophysical Union Annual Meeting**, San Francisco, CA.

Professional Service

Panelist, 2024: NASA Astrobiology: Habitable Worlds

Member: Pool of Experts (PoE) of the United Nations Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects

Member, 2023-2024: United Nations Ocean Decade Vision 2023 Plan - Working Group 2

Editorial Board Member, 2024-2027: ISME Communications

Panelist, 2020: NSF Understanding the Rules of Life: Microbiome Theory and Mechanisms

Journal/Proposal Referee: Applied and Environmental Microbiology | Biofilms and Microbiomes | Bioinformatics | BMC Genomics | Computational and Structural Biotechnology | Environmental Microbiology | Estuarine, Coastal and Shelf Science | FEMS Microbiology Ecology | Frontiers in Microbiology | ISME Communications | ISME Journal | Journal of Microbiological Methods | Limnology & Oceanography | Microbial Ecology | Microbiome Journal | mSystems | National Aeronautics and Space Administration (Astrobiology: Habitable Worlds) | National Science Foundation (Biological Oceanography; CAREER; Marine Geology and Geophysics) | Nature Biotechnology | PeerJ | PLoS ONE | Scientific Data | Scientific Reports

Co-organizer and co-moderator, 2013: C-MORE Networking Workshop at Association for Limnology and Oceanography (ASLO) Aquatic Sciences Meeting, New Orleans, LA

Co-organizer and co-moderator, 2012: C-MORE Careers in Ocean Sciences Workshop, Honolulu, HI

Participant, 2010-2016, C-DEBI, NSF-funded science and technology center of excellence, University of Southern California

Participant, 2009-2011: DEBI RCN workshops on various topics (Borehole Observatories, Sediment Microbiology, Ocean Crustal Processes) and at various locations (Kona, HI, Chapel Hill, NC, Bremen, Germany)

Participant, 2008-2015, C-MORE, NSF-funded science and technology center of excellence, University of Hawaii at Manoa

Science-Focused Community Service

Lecturer and Activity Lead, 2013-2015: Ongoing contributions to the education of K-12 students and educators on Oahu, Maui, Molokai, and Hawaii, sponsored by various organizations [C-DEBI, National Aeronautics and Space Administration (NASA), and Center for Microbial Oceanography: Research and Education (C-MORE)]

Judge, 2015-2014: Hawaii State Science and Engineering Fair