

William J. Brazelton

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Professional Preparation

University of Minnesota	Genetics and Cell Biology	B.S. 2002
University of Washington	Biological Oceanography	M.S. 2005
University of Washington	Biological Oceanography and Astrobiology	Ph.D. 2010

Appointments

Assistant Professor	University of Utah	2013 to present
Postdoctoral Researcher	East Carolina University	2012 to 2013
Postdoctoral Fellow	NASA Astrobiology Institute	2010 to 2012

Teaching

BIOL 3270/5270 (3 cr) Microbial Ecosystems Self-designed course, enrollment of 22 with first offering	Spring 2015, 2018
BIOL 2010 (3 cr) Evolution and Diversity of Life Core BIOL course with enrollment of ~170, co-taught with Sarah Bush	Fall 2015-2017

Mentorship

Current postdoctoral researcher: Katrina Twing.
Current graduate students: Shahrzad Motamedi, Christopher Thornton, Julia McGonigle.
Current undergraduates: Lizethe Pendleton.
Past undergraduates: Alex Hyer, Cody Dangerfield, Michaela Lemen, LeAundra Jeffs, Mac Pierce, Emily Dart, Ethan Powell.

University Service

Current Doctoral Committees: Sunayna Dasgupta (Civil and Environmental Engineering), Casey Duncan (Geology and Geophysics), Jie Ma (Mathematics), Pratibha Sapkota (Civil & Environmental Engineering).
Past Doctoral Committees: Ananda Bhattacharjee (Civil & Environmental Engineering), Ky-Phuong Luong (Biology), Steven Esquivel (Biology).
Department of Biology Committees: Graduate Admissions, Biology Undergraduate Research Program, Honors, Curriculum Reform Task Force.
University Committees: UROP reviews, Special UROP Award Selection Committee, 2016-2017

Other Scholarly Activities

Manuscript reviewer for *Applied and Environmental Microbiology*, *Astrobiology*, *Environmental Microbiology*, *FEMS Microbial Ecology*, *Frontiers in Microbiology*, *Geobiology*, *ISME Journal*, *Microbial Ecology*, *mBio*, *Nature Communications*, *PLoS ONE*, *PNAS*
Proposal reviewer for NSF, NSF-GRFP, NASA, C-DEBI, Deep Carbon Observatory
Invited participation in C-DEBI workshops 2012, 2015
Invited participation in Deep Carbon Observatory meetings 2013, 2015
Co-organizer of NASA Serpentinization Systems Science "Workshop Without Walls", 2016

Project Management

The Brazelton lab has multiple ongoing projects that link field expeditions with metagenomic analyses. Four examples of current projects are listed here:

1. NASA Astrobiology Institute Rock-Powered Life Team. My lab is coordinating efforts to generate and analyze metagenomic sequences of microbial communities inhabiting subsurface rocks collected by various drilling projects associated with the 'Rock-Powered Life' team, a member of the NASA Astrobiology Institute (CAN-7). Funding: \$600,712 (2015-2020) as Co-Investigator.

2. Investigating the Lost City as an Ultramafic Urban Center of the Seafloor, Fueled by Energy and Carbon from the Mantle. I will be the co-Chief Scientist (with Chief Scientist Susan Lang, U. South Carolina) on an oceanographic expedition to sample the Lost City deep-sea hydrothermal vent field in September-October 2018. Funding: \$259,579 (2015-2018) as Co-Principal Investigator.

3. Adaptation, Mitigation, and Biophysical Feedbacks in the Changing Bonneville Salt Flats. NSF-Dynamics of Coupled Natural and Human Systems Program. In collaboration with PI Brenda Bowen (Dept. of Geology and Geophysics), my lab is leading microbial diversity analyses of samples collected from the salt flats and integrating the data with geochemical and hydrological data collected by Bowen and collaborators. Funding: \$84,592 (2016-2020) as Senior Personnel.

4. Impact of Human and Food Animal Wastes on Antimicrobial Gene Abundance and E. coli Susceptibility Patterns: A Watershed Approach. Collaboration with James VanDerslice (Dept. of Family and Preventative Medicine) and Windy Tanner (Dept. of Internal Medicine). My lab's role in this project is to conduct metagenomic sequencing, assembly, and annotation of water samples collected from watersheds associated with discharge of human and animal wastes. We will use the metagenomic data to assess whether waste discharges are selecting for the spread of antibiotic resistance genes in natural watersheds. Funding: \$414,000 (2017-2018) shared with Co-Investigators.

Selected Publications

Dangerfield, C.D., Nadkarni, N.M., **Brazelton, W.J.** (2017) Canopy soil bacterial communities altered by severing host tree limb. *PeerJ* 5:e3773. doi: 10.7717/peerj.3773.

Brazelton WJ, Thornton CN, Hyer A, Twing KI, Longino AA, Lang SQ, Lilley MD, Früh-Green GL, Schrenk MO. (2017) Metagenomic identification of active methanogens and methanotrophs in serpentinite springs of the Voltri Massif, Italy. *PeerJ* 5:e2945 doi: 10.7717/peerj.2945

Schrenk, M.O., **W.J. Brazelton**, S.Q. Lang (2013) Serpentinization, carbon, and deep life. *Reviews in Mineralogy and Geochemistry*. 75:575-606. doi: 10.2138/rmg.2013.75.1

Brazelton, W.J., B. Nelson, M.O. Schrenk (2012) Metagenomic evidence for H₂ oxidation and H₂ production by serpentinite-hosted subsurface microbial communities. *Frontiers in Extreme Microbiology*. 2:268. doi: 10.3389/fmicb.2011.00268.

Brazelton, W.J., K.A. Ludwig, M.L. Sogin, E.N. Andreishcheva, D.S. Kelley, C-C. Shen, R. L. Edwards, J.A. Baross (2010) Archaea and bacteria with surprising microdiversity show shifts in dominance over 1000-year time scales in hydrothermal chimneys. *Proceedings of the National Academy of Sciences USA*. 107: 1612-1617. doi:10.1073/pnas.0905369107.

Brazelton, W.J. and J.A. Baross (2009) Abundant transposases encoded by the metagenome of a hydrothermal chimney biofilm. *The ISME Journal*. 3: 1420-1424.

Additional Peer-Reviewed Publications

- Lang SQ, Früh-Green GL, Bernasconi SM, **Brazelton WJ**, Schrenk MO, McGonigle JM (2018) Abiotic formate fuels sulfate reducers but not methanogens at Lost City hydrothermal field. *Scientific Reports* 8:755. doi:10.1038/s41598-017-19002-5
- Amador, E.S., Bandfield, J.L., Kelley, D.S., **Brazelton, W.J.** (2017) The Lost City Hydrothermal Field as a spectroscopic and astrobiological Analog for Nili Fossae, Mars. *Astrobiology* 17(11): 1138-1160. doi: 10.1089/ast.2016.1606.
- Fuchsman, CA., Collins, R.E., Rocap, G., **Brazelton, W.J.** (2017) Effect of the environment on horizontal gene transfer between bacteria and archaea. *PeerJ* 5:e3865. doi: 10.7717/peerj.3865.
- Crespo-Medina, M., Twing, K.I., Sánchez-Murillo, R., **Brazelton, W.J.**, McCollom, T.M., Schrenk, M.O. (2017) Methane dynamics in a tropical serpentinizing environment: the Santa Elena Ophiolite, Costa Rica. *Frontiers in Microbiology*. doi: 10.3389/fmicb.2017.00916.
- Twing, K.I., **Brazelton, W.J.**, Kubo, M.D.Y., Hyer, A.J., Cardace, D., Hoehler, T.M., McCollom, T.M., Schrenk, M. O. (2017). Serpentinization-influenced groundwater harbors extremely low diversity microbial communities adapted to high pH. *Frontiers in Microbiology* 8, 308. doi: 10.3389/fmicb.2017.00308.
- Morill, P.L., **W.J. Brazelton**, L. Kohl, A. Rietze, S.M. Miles, H. Kavanagh, M.O. Schrenk, S.E. Ziegler, S.Q. Lang (2014) Investigations of potential microbial methanogenic and carbon monoxide utilization pathways in ultra-basic reducing springs associated with present-day continental serpentinization: the Tablelands, NL, CAN. *Frontiers in Microbiology*. 5: 613. doi: 10.3389/fmicb.2014.00613.
- Brazelton, W.J.**, P.L. Morrill, N. Szponar, M.O. Schrenk (2013) Bacterial communities associated with subsurface geochemical processes in continental serpentinite springs. *Applied and Environmental Microbiology*. 79(13):3906. doi: 10.1128/AEM.00330-13.
- Méhay, S., G.L. Früh-Green, S.Q. Lang, S.M. Bernasconi, **W.J. Brazelton**, M.O. Schrenk, P. Schaeffer, P. Adam (2013) Record of archaeal activity at the serpentinite-hosted Lost City Hydrothermal Field. *Geobiology*. 11: 570–592. doi: 10.1111/gbi.12062
- Anderson, R. E., **W.J. Brazelton**, J.A. Baross (2013) The deep virosphere: assessing the viral impact on microbial community dynamics in the deep subsurface. *Reviews in Mineralogy & Geochemistry*, 75, 649–675. doi:10.2138/rmg.2013.75.20
- Szponar, N., **W.J. Brazelton**, M.O. Schrenk, D.M. Bower, A. Steele, P.L. Morrill (2013) Geochemistry of a continental site of serpentinization, the Tablelands Ophiolite, Gros Morne National Park: A Mars analogue. *Icarus*. 224: 286-296.
- Stüeken, E. E., R.E. Anderson, J.S. Bowman, **W.J. Brazelton**, J. Colangelo-Lillis, A.D. Goldman, S.M. Som, J.A. Baross (2013) Did life originate from a global chemical reactor? *Geobiology*. 11: 101–126. doi: 10.1111/gbi.12025
- Biddle, J. F., J.B. Sylvan, **W.J. Brazelton**, B.J. Tully, K.J. Edwards. C.L. Moyer, J.F. Heidelberg, W.C. Nelson (2012) Prospects for the study of evolution in the deep biosphere. *Deep Subsurface Microbiology*. 2: 265. doi: 10.3389/fmicb.2011.00285.
- Anderson, R.E., **W.J. Brazelton**, J.A. Baross (2011) Is the genetic landscape of the deep biosphere affected by viruses? *Frontiers in Extreme Microbiology*. 2:219.
- Brazelton, W.J.**, M.P. Mehta, D.S. Kelley, J.A. Baross (2011) Physiological differentiation within a single-species biofilm fueled by serpentinization. *mBio*. 2, e00127-11.
- Fuchsman, C.A., J.B. Kirkpatrick, **W.J. Brazelton**, J.W. Murra, J.T. Staley (2011) Metabolic strategies of free-living and aggregate associated bacterial communities inferred from biological and chemical profiles in the Black Sea suboxic zone. *FEMS Microbial Ecology*. DOI: 10.1111/j.1574-6941.2011.01189.x

- Anderson, R.E., **W.J. Brazelton**, J.A. Baross (2011) Viral metagenomics and CRISPR spacer analyses reveal a unique viral assemblage at a deep-sea hydrothermal vent in the Main Endeavour Field, Juan de Fuca Ridge. *FEMS Microbial Ecology*. 77: 120-133.
- Brazelton, W.J.** and J.A. Baross (2010) Metagenomic comparison of two *Thiomicrospira* lineages inhabiting contrasting deep-sea hydrothermal environments. *PloS One*. 5(10): e13530.
- Brazelton, W.J.**, M.L. Sogin, J.A. Baross (2010) Multiple scales of diversification within natural populations of archaea in hydrothermal chimney biofilms. *Environmental Microbiology Reports*. 2(2): 236-242.
- Brazelton, W.J.** and W.T. Sullivan III (2009) Understanding the 19th century origins of disciplines: lessons for astrobiology today? *International Journal of Astrobiology*. 8(4): 257-266.
- Brazelton, W. J.**, M.O. Schrenk, D.S. Kelley, J.A. Baross (2006) Methane- and sulfur- metabolizing microbial communities dominate in the Lost City Hydrothermal Field ecosystem. *Applied and Environmental Microbiology* 72: 6257-6270.
- Kelley, D. S., J.A. Karson, G.L. Früh-Green, D. Yoerger, T.M. Shank, D.A. Butterfield, J.M. Hayes, M.O. Schrenk, E. Olson, G. Proskurowski, M. Jakuba, A. Bradley, B. Larson, K. Ludwig, D. Glickson, K. Buckman, A.S. Bradley, **W.J. Brazelton**, K. Roe, M.J. Elend, A. Delacour, S.M. Bernasconi, M.D. Lilley, J.A. Baross, R.E. Summons, S.P. Sylva (2005) A Serpentinite-Hosted Ecosystem: The Lost City Hydrothermal Field. *Science*. 307:1428-1434.
- Kathir P, M. LaVoie, **W.J. Brazelton**, N.A. Haas, P.A. Lefebvre, C.D. Silflow (2003) Molecular map of the *Chlamydomonas reinhardtii* nuclear genome. *Eukaryotic Cell* 2(2):362-79.
- Brazelton, W.J.**, C.D. Amundsen, C.D. Silflow, P.A. Lefebvre (2001) The bld1 mutation identifies the *Chlamydomonas* osm-6 homolog as a gene required for flagellar assembly. *Current Biology* 11(20):1591-4.

Other Publications

- Brazelton, W.J.** (2017) Quick Guide: Hydrothermal vents. *Current Biology* 27(11): R450-452. doi: 10.1016/j.cub.2017.02.022.
- Roylance, J.P, Chan, M.A., **Brazelton, W.J.** (2017) Red Hill Hot Spring mineralogy and hydrothermal microbial environments near Monroe, Sevier county, Utah. *Geology and Resources of the Wasatch: Back to Front*. Utah Geological Association Guide Book Publication 46.
- Früh-Green, G.L., Orcutt, B.N., Green, S.L., Cotterill, C., and the **Expedition 357 Scientists**, 2016. *Atlantis Massif Serpentinization and Life*. Proceedings of the International Ocean Discovery Program, 357: College Station, TX (International Ocean Discovery Program). doi: 10.14379/iodp.proc.357.2017.
- Domagal-Goldman, S. D., Wright, K. E., **et al.** (2016). The Astrobiology Primer v2.0. *Astrobiology* 16(8): 561-653.
- Johnson, H. P. and **LEXEN Scientific Party** (2003) Probing for life in the ocean crust with the LEXEN program. *Eos, Transactions American Geophysical Union*, 84(12), 109-112.

General Audience articles:

- http://www.deepseavoyage.research.pdx.edu/dailyupdates_073008.php
<http://oceanexplorer.noaa.gov/explorations/05lostcity/background/microbial/microbial.html>
<http://www.lostcity.washington.edu/mission/journals/journal5-5.html>

Recent Conference Presentations

- Six members of the Brazelton lab** presented posters and talks at the Astrobiology Science Conference in Mesa, AZ in April 2017
- Brazelton, W.J.** et al. (2017) Metagenome-enabled explorations of ecosystems supported by serpentinization. DCO International Science Meeting. St. Andrews, Scotland. March 2017.

- Brazelton, W.J.**, et al. (2015) Metagenomic Investigations of Serpentinization-Powered Microbial Ecosystems. Astrobiology Science Conference. Chicago, IL. June 2015.
- Brazelton, W.J.** (2015) Invited Presentation: Introduction to Serpentinite-Hosted Microbial Ecosystems. Deep Carbon Observatory, Deep Life Meeting. Lisbon, Portugal, May 2015.
- Brazelton, W.J.** (2014) Biogeography of serpentinite-hosted microbial ecosystems. Gordon Research Conference on Marine Microbes. Waltham, MA, June 2014.
- Brazelton, W.J.**, M.O. Schrenk (2014) Metagenome-enabled investigations of carbon and hydrogen fluxes within the serpentinite-hosted subsurface biosphere. DOE Joint Genome Institute User Meeting. Walnut Creek, CA. April 2014.
- Brazelton, W.J.** (2014) Invited Presentation: Biogeography of serpentinite-hosted ecosystems. Invited Presentation at University of Southern California Marine and Environmental Biology seminar. February 2014.
- Brazelton, W.J.**, et al. (2013) Invited Presentation: Microbial carbon cycling in Lost City hydrothermal chimneys and other serpentinite-hosted ecosystems. American Geophysical Union Fall Meeting. December 2013.
- Brazelton, W.J.**, et al. (2013) Invited Presentation: Plenty to eat, nothing to breathe: challenges to life in serpentinite habitats. American Geophysical Union Fall Meeting. December 2013.
- Brazelton, W.J.**, et al. (2013) Biogeography of serpentinite-hosted ecosystems. Goldschmidt Conference. September 2013.