

JACOB R. WALDBAUER

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APPOINTMENTS

2012-Present **University of Chicago, Department of the Geophysical Sciences**
Associate Professor (untenured) (2021-present)
Neubauer Family Assistant Professor (2012-2020)
Committee on Microbiology (2016-present)

EDUCATION & EXPERIENCE

2010-2011 **California Institute of Technology, Geological & Planetary Sciences**
Postdoctoral Fellow in Geobiology
Advisors: Jess F. Adkins & Alex L. Sessions

2010 **Massachusetts Institute of Technology/Woods Hole Oceanographic Institution**
Joint Program in Oceanography
Ph.D. in Chemical Oceanography
Advisors: Sallie W. Chisholm & Roger E. Summons

2001-2004 **Stanford University, Geological & Environmental Sciences**
Lab Manager, Stable Isotope Biogeochemistry
Supervisor: C. Page Chamberlain

2001 **Dartmouth College**
A.B. in Physics & Astronomy *summa cum laude*

AWARDS & HONORS

2016-2019 Simons Foundation Early Career Investigator in Marine Microbial Ecology and Evolution

2013-2015 Alfred P. Sloan Research Fellowship

2012-2017 Neubauer Family Faculty Fellowship

2011 National Academy of Sciences Cozzarelli Prize

2010-2011 Beckman Institute Postdoctoral Fellowship

2010-2011 Stanback Postdoctoral Fellowship in Environmental Science & Engineering

2007-2009 National Science Foundation Graduate Research Fellowship

2004-2007 National Defense Science & Engineering Graduate Fellowship

SELECTED PROFESSIONAL ACTIVITIES & SERVICE

2021 Theme Co-Chair, "Geobiology: life in geological processes", Goldschmidt 2021

2020-21 Participating Lab, NSF OCB Ocean Metaproteome Intercomparison Study

2020 Invited speaker, "New and Emerging Tools in Geobiology", Geobiology Gordon Research Conference

2019 Environmental Geology & Geochemistry invited seminar, Princeton University

2019 Microbiology invited seminar, Cornell University

- 2018 Co-Convener, “Advances in Understanding the Role of Microbes and Animals in Governing Biogeochemical Fluxes at Local and Global Scales”, Goldschmidt Conference 2018
- 2018 Working group, “Microbial Communities to Mitigate Climate Change”, Marine Biological Laboratory
- 2017 Theme Co-Chair, “Geo-omics meets Organic Geochemistry”, Goldschmidt 2017
- 2015 NSF ECOGEO Research Coordination Network workshop, University of Hawaii
- 2014 Co-Organizer, Midwest Geobiology Symposium
- 2014 Working group, “Linking Marine Microbes and the Molecules of Dissolved Organic Matter”, Moore Foundation/Microsoft Research
- 2013 Instructor, Environmental Virology workshop, University of Arizona
- 2012 Biomarker Workshop, Agouron Institute
- Ongoing Reviewer for *PNAS*, *Nature*, *Science*, *Geology*, *Organic Geochemistry*, *ISME Journal*, *Nature Communications*, *Geochimica et Cosmochimica Acta*, *Journal of Proteome Research*, *Limnology & Oceanography*, *Nature Geoscience*, *mSystems*, *FEMS Microbiology Letters*, *BioEssays*, *Environmental Microbiology*, *Chemical Geology*, *Molecular Ecology*, *PeerJ*, *Paleobiology*, *Scientific Reports*
- Ongoing Ad hoc reviewer/panelist for NSF Biological Oceanography, Chemical Oceanography, Low Temperature Geochemistry & Geobiology; NASA Exobiology, Astrobiology; ACS Petroleum Research Fund

TEACHING & MENTORING

Courses Taught

- GEOS 23800: Global Biogeochemical Cycles
- GEOS 26600: Geobiology
- GEOS 33825: Topics in Microbial Biogeochemistry

Graduate Student Primary Advisees

- Gwendolyn Gallagher (Ph.D. in progress)
- Samuel Miller (Ph.D. 2018; then Postdoc, UChicago Medicine)
- Xiufeng Ma (Ph.D. 2018; then Data Scientist, Octane Lending)

Other Lab Group Members

- Lichun Zhang (Lab Manager, 2013-present)
- Angela Boysen (Postdoctoral Fellow, 4/2021-present)
- Julia Dürschlag (Postdoctoral Scholar, 4/2021-present)
- Amy Zimmerman (Research Scientist, 2018-2021; then Computational Scientist, PNNL)
- Adriana Rizzo (Technician, 2016-2017; then Graduate Student, Penn State Geosciences)
- Michael Kang (Technician, 2012-2013; then Medical Student, UChicago Medicine)

Thesis Committees

- Aric Mine, Mark Anderson, Gabriel Vargas, Xike Nie, Xi Chen, Andy Heard, Justin Podowski, Maria Hernández Limón (Geophysical Sciences), Sean Gibbons (Biophysics)

Undergraduate Researchers

- Adriana Rizzo, Kat Stevanovich, Marcus Trybula, Jacob Britz, John Lotus, Hannah Eastman (UChicago), Michael Mulligan (Notre Dame)

PUBLICATIONS

* as corresponding author † as co-first author ° trainee/lab member

- Gallagher, G.E.° and **Waldbauer, J.R.*** (in review) Proteorhodopsin expression and survival strategies of a photoheterotrophic *Vibrio* under carbon and nitrogen limitation. *mSystems*.
- Luxem, K.E., Krapiel, A.M.L., Zhang, L.°, **Waldbauer, J.R.**, and Zhang, X. (2020) Carbon substrate re-orders relative growth of a bacterium using Mo-, V-, or Fe-nitrogenase for N₂ fixation. *Environmental Microbiology* 22: 1397-1408.
- Zimmerman, A.E.°, Howard-Varona, C., Needham, D.M., John, S., Worden, A.Z., Sullivan, M.B., **Waldbauer, J.R.**, and Coleman, M.L. (2020) Metabolic and biogeochemical consequences of viral infection in aquatic systems. *Nature Reviews Microbiology* 18: 21-34.
- Waldbauer J.R.*†**, Coleman M.L.*†, Rizzo A.I.°, Campbell K.L., Lotus J.M.°, and Zhang, L.° (2019) Nitrogen sourcing during viral infection of marine cyanobacteria. *Proceedings of the National Academy of Sciences* 116: 15590-15595.
- Zimmerman, A.E.°, Bachy, C., Ma, X.°, Roux, S., Jiang, H.B., Sullivan, M.B., **Waldbauer, J.R.**, and Worden, A.Z. (2019) Closely-related viruses of the marine picoeukaryotic alga *Ostreococcus lucimarinus* exhibit different ecological strategies. *Environmental Microbiology* 21: 2148-2170.
- Leavitt, W.D., Venceslau, S., **Waldbauer, J.R.**, Smith, D., Pereira, I.A.C., and Bradley, A.S. (2019) Proteomic and isotopic response of *Desulfovibrio vulgaris* to DsrC perturbation. *Frontiers in Microbiology* 10.3389/fmicb.2019.00658.
- Miller, S.E.°, Rizzo A.I.° and **Waldbauer, J.R.*** (2018) Postnovo: Post-Processing Enables Accurate and FDR-Controlled De Novo Peptide Sequencing. *Journal of Proteome Research*. 17: 3671-3680.
- Ma, X.°, Coleman, M.L. and **Waldbauer, J.R.*** (2018) Distinct molecular signatures in dissolved organic matter produced by viral lysis of marine cyanobacteria. *Environmental Microbiology* 20: 3001-3011.
- Waldbauer, J.R.***, Zhang, L.°, Rizzo, A.I.° and Muratore, D. (2017) diDO-IPTL: A Peptide-Labeling Strategy for Precision Quantitative Proteomics. *Analytical Chemistry* 89: 11498-11504.
- Schwartz, M., **Waldbauer, J.R.**, Zhang, L.° and Pan, T. (2016) Global tRNA misacylation induced by anaerobiosis and antibiotic exposure broadly increases stress resistance in *Escherichia coli*. *Nucleic Acids Research* 44: 10292-10303.
- Moran, M.A., Kujawinski, E.B., Stubbins, A., Fatland, R., Aluwihare, L.I., Buchan, A., Crump, B.T., Dorrestein, P.C., Dyhrman, S.T., Hess, N., Longnecker, K., Medeiros, P.M., Niggeman, J., Obernosterer, I., Repeta, D.J. and **Waldbauer, J.R.** (2016) Deciphering Ocean Carbon in a Changing World. *Proceedings of the National Academy of Sciences* 113: 3143-3151.
- Waldbauer, J.R.†**, Rodrigue, S.†, Coleman, M.L. and Chisholm, S.W. (2012) Transcriptome and proteome dynamics of a light-dark synchronized bacterial cell cycle. *PLoS ONE* 7: e43432.
- Waldbauer, J.R.**, Newman, D.K. and Summons, R.E. (2011) Microaerobic steroid biosynthesis and the molecular fossil record of Archean life. *Proceedings of the National Academy of Sciences* 108: 13409-13414.
Paper awarded 2011 NAS Cozzarelli Prize in Class I (Physical and Mathematical Sciences)

- Waldbauer, J.R.**, Sherman, L.S., Sumner, D.Y. and Summons, R.E. (2009) Late Archean molecular fossils from the Transvaal Supergroup record the antiquity of microbial diversity and aerobiosis. *Precambrian Research* 169: 28-47.
- Frias-Lopez, J., Thompson, A.W., **Waldbauer, J.R.** and Chisholm, S.W. (2009) Use of stable isotope labeled cells to identify active grazers of picocyanobacteria in ocean surface waters. *Environmental Microbiology* 11: 512-525.
- Sherman, L.S., **Waldbauer, J.R.** and Summons, R.E. (2007) Improved methods for isolating and validating indigenous biomarkers in Precambrian rocks. *Organic Geochemistry* 38: 1987-2000.
- Martínez, A., Bradley, A.S., **Waldbauer, J.R.**, Summons, R.E. and DeLong, E.F. (2007) Proteorhodopsin photosystem gene expression enables photophosphorylation in a heterologous host. *Proceedings of the National Academy of Sciences* 104: 5590-5595.
- Knoll, A.H., Summons, R.E., **Waldbauer, J.R.** and Zumberge, J.E. (2007) The Geological Succession of Primary Producers in the Oceans. In *The Evolution of Primary Producers in the Sea*, P.G. Falkowski and A.H. Knoll, eds. Academic Press, p. 133-163.
- Newsome, S.D., Etnier, M.A., Kurle, C.M., **Waldbauer, J.R.**, Chamberlain, C.P. and Koch, P.L. (2007) Historic decline in primary productivity in the western Gulf of Alaska and eastern Bering Sea: isotopic analysis of northern fur seal teeth. *Marine Ecology Progress Series* 332: 211-224.
- Hayes, J.M. and **Waldbauer, J.R.** (2006) The carbon cycle and associated redox processes through time. *Philosophical Transactions of the Royal Society B* 361: 931-950.
- Summons, R.E., Bradley, A.S., Jahnke, L.L. and **Waldbauer, J.R.** (2006) Steroids, triterpenoids and molecular oxygen. *Philosophical Transactions of the Royal Society B* 361: 951-968.
- Sjostrom, D.J., Hren, M.T., Horton, T.W., **Waldbauer, J.R.**, and Chamberlain, C.P. (2006) Stable isotopic evidence for a pre-late Miocene elevation gradient in the Great Plains–Rocky Mountain region, USA. In *Tectonics, Climate, and Landscape Evolution*, S.D. Willett, N. Hovius, M.T. Brandon and D.M. Fisher, eds. Geological Society of America Special Paper 398, p. 309-320.
- Chamberlain, C.P., **Waldbauer, J.R.**, Fox-Dobbs, K., Newsome, S.D., Koch, P.L., Smith, D.R., Church, M.E., Chamberlain, S.D., Sorenson, K.J. and Risebrough, R. (2005) Pleistocene to recent dietary shifts in California condors. *Proceedings of the National Academy of Sciences* 102: 16707-16711.
- Chamberlain, C.P., **Waldbauer, J.R.** and Jacobson, A.J. (2005) Strontium, hydrothermal systems and steady-state chemical weathering in active mountain belts. *Earth and Planetary Science Letters* 238: 351-366.
- Waldbauer, J.R.** and Chamberlain, C.P. (2005) Influence of Uplift, Weathering and Base Cation Supply on Past and Future CO₂ Levels. In *A History of Atmospheric CO₂ and Its Effects on Plants, Animals, and Ecosystems*, J.R. Ehleringer, T.E. Cerling and M.D. Dearing, eds. Springer Verlag, p. 166-184.
- Abruzzese, M.J., **Waldbauer, J.R.** and Chamberlain, C.P. (2005) Oxygen and hydrogen isotopes of freshwater chert as indicators of past climate and hydrologic regime. *Geochimica et Cosmochimica Acta* 69: 1377-1390.
- Graham, S.A., Chamberlain, C.P., Yongjun, Y., Ritts, B.D., Hanson, A.D., Horton, T.W., **Waldbauer, J.R.**, Poage M.A. and Feng, X. (2005) Stable isotope records of Cenozoic climate and topography, Tibetan plateau and Tarim basin. *American Journal of Science* 305: 101-118.

Horton, T.W., Sjostrom, D.J., Abruzzese, M.J., Poage, M.A., **Waldbauer, J.R.**, Hren, M.T., Wooden, J. and Chamberlain, C.P. (2004) Spatial and temporal variation of Cenozoic surface elevation in the Great Basin and Sierra Nevada. *American Journal of Science* 304: 862-888.

Rubenstein, D.R., Chamberlain, C.P., Holmes, R.T., Ayres, M.P., **Waldbauer, J.R.**, Graves, G.R. and Tuross, N.C. (2002) Linking the breeding and wintering ranges of a neotropical migrant songbird using stable isotopes. *Science* 295:1062-1065.

Waldbauer, J.R. and Gazzaniga, M.S. (2001) The divergence of neuroscience and law. *Jurimetrics* 41: 357-364.