

JACOB P. BEAM

Postdoctoral Research Scientist

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EDUCATION

2015 PhD

Ecology and Environmental Sciences, Department of Land Resources and Environmental Sciences, Montana State University, Bozeman, MT

Thesis: Geobiological Interactions of Archaeal Populations in Acidic and Alkaline Geothermal Springs of Yellowstone National Park

Advisor: Dr. William P. Inskeep

2008 BS

Biological Sciences with focus on Microbiology, Department of Biology, Indiana University Southeast, New Albany, IN

Research Project: Insertional Mutagenesis in Moderately Halophilic Bacteria

Advisor: Dr. Gretchen Kirchner

APPOINTMENTS

2015- Postdoctoral Research Scientist at Bigelow Laboratory for Ocean Sciences, East Boothbay, ME

2008-2015 Graduate student researcher in the Department of Land Resources and Environmental Science, Montana State University Bozeman, MT.

2003-2008 Undergraduate research assistant in the Department of Biology, Indiana University Southeast.

FELLOWSHIPS

2008-2014 Geobiological Systems: National Science Foundation – Integrative Graduate Education and Research Traineeship (IGERT) Fellowship.

PROFESSIONAL DEVELOPMENT

2013 Internship. Morphological identification of thermophilic Thaumarchaeota in acidic geothermal ecosystems. University of Vienna, Vienna, Austria. Sponsors: Prof. Dr. Michael Wagner and Dr. Markus Schmid.

2010 Workshop on oxygen microsensors. Unisense A/S, Aarhus, Denmark. Sponsor: Dr. Lars Larsen

PUBLICATIONS (IN REVIEW)

*Jay, Z.J., **J.P. Beam***, M. Dlakić, D.B. Rusch, M.A. Kozubal, and W.P. Inskeep*. Novel microbial lineages endemic to geothermal iron oxide mats fill important gaps in the evolutionary history of *Archaea*. In review (*Nature Microbiology*). *equal contribution

J.P. Beam, J. J. Scott, S. M. McAllister, C.S. Chan, J. McManus, F. J. R. Meysman, and D. Emerson. A biological source of marine sedimentary iron oxides. In review (*ISME J*).

PUBLICATIONS (PRE-PRINT)

J.P. Beam, J.J. Scott, S.M. McAllister, C.S. Chan, J. McManus, F.J.R. Meysman, and D. Emerson. (2017) A biological source of marine sedimentary iron oxides. *bioRxiv*
doi:10.1101/108621

PUBLICATIONS (PEER REVIEWED)

12. Moran, J.J., L.M. Whitmore, Z.J. Jay, R.deM. Jennings, **J.P. Beam**, H.W. Kruezer, M.A. Kozubal, and W.P. Inskeep. (2017) Dual stable isotopes of CH₄ from Yellowstone hot-springs suggest hydrothermal processes involving magmatic CO₂. *Journal of Volcanology and Geothermal Research*. In press 10.1016/j.volgeores.2017.05.011
11. Meslé, M.M., **J.P. Beam**, Z.J. Jay, B. Bodle, E. Bogenschutz, and W.P. Inskeep. (2017) Hydrogen peroxide cycling in high-temperature acidic geothermal springs and potential implications for oxidative stress response. *Frontiers in Marine Science: Marine Biogeochemistry* **4**:130. doi:10.3389/fmars.2017.00130
10. Jennings, R.deM., Moran, J.J., Jay, Z.J., **J.P. Beam**, Kozubal, M.A., Whitmore, L.M., Kreuzer, H.W., and W.P. Inskeep. (2017) Integration of Metagenomic and Stable Carbon Isotope Evidence Reveals the Extent and Mechanisms of Carbon Dioxide Fixation in High-Temperature Microbial Communities. *Frontiers in Microbiology: Extreme Microbiology* **3**:8. doi:10.3389/fmicb.2017.00088
9. Jay, Z.J., **J.P. Beam**, M.A. Kozubal, R.deM. Jennings, D.B. Rusch, and W.P. Inskeep. (2016) The distribution, diversity and function of predominant Thermoproteales in high-temperature environments of Yellowstone National Park. *Environmental Microbiology* **18**:12 4755-4769. doi:10.1111/1462-2920.13366.

8. **J.P. Beam**, H.C. Bernstein, Z.J. Jay, M.A. Kozubal, R.deM. Jennings, S.G. Tringe, and W.P. Inskeep. (2016b) Succession and assembly of iron oxide microbial mat communities in acidic geothermal springs. *Frontiers in Microbiology: Microbiological Chemistry and Geomicrobiology* **7**:25 doi: 10.3389/fmicb.2016.00025.
7. **J.P. Beam**, Z.J. Jay, M.C. Schmid, D.B. Rusch, M. Romine, R.deM. Jennings, M.A. Kozubal, S.G. Tringe, M. Wagner, and W.P. Inskeep. (2016a) Ecophysiology of an uncultivated lineage of Aigarchaeota from an oxic terrestrial hot spring filamentous 'streamer' community. *ISME J* **10**: 210-224 doi:10.1038/ismej.2015.83.
6. Inskeep, W.P., Z.J. Jay, R.E. Macur, S. Clingenpeel, A. Tenney, D. Lovalvo, **J.P. Beam**, M.A. Kozubal, W.C. Shanks, L.A. Morgan, J. Kan, Y. Gorby, S. Yooseph, and K. Nealson. (2015) Geomicrobiology of sublacustrine thermal vents in Yellowstone Lake: geochemical controls on microbial community structure and function. *Frontiers in Microbiology* **6**:1044 doi:10.3389/fmicb.2015.01044.
5. Jay, Z.J., **J.P. Beam**, A. Dohnalkova, R. Lohmayer, B. Bodle, B. Planer-Friedrich, M. Romine, and W.P. Inskeep. (2015) *Pyrobaculum yellowstonensis* str. WP30 respire on elemental sulfur and/or arsenate in circumneutral sulfidic geothermal sediments of Yellowstone National Park. *Applied and Environmental Microbiology* **81**: 5907-5916 doi:10.1128/AEM.01095-15.
4. **J.P. Beam**, Z.J. Jay, M.A. Kozubal, and W.P. Inskeep. (2014) Niche specialization of novel Thaumarchaeota to oxic and hypoxic acidic geothermal springs of Yellowstone National Park. *ISME J* **8**: 938-951 doi:10.1038/ismej.2013.193.
3. *Bernstein, H.C., **J.P. Beam***, M.A. Kozubal, R.P. Carlson, and W.P. Inskeep (2013). *In situ* Analysis of Oxygen Consumption and Diffusive Transport in High-temperature Acidic Iron-Oxide Mats. *Environmental Microbiology* **15**(8): 2360-2370 doi: 10.1111/1462-2920 *equal contribution
2. Kozubal, M.A., M. Romine, R.deM. Jennings, Z.J. Jay, S.G. Tringe, D.B. Rusch, **J. P. Beam**, L.A. McCue, and W.P. Inskeep. (2013) Geoarchaeota: a new candidate phylum in the Archaea from high-temperature acidic iron mats in Yellowstone National Park, *ISME J* **7**: 622-634 doi: 10.1038/ismej.2012.132
1. Kozubal, M.A., R.E. Macur, Z. J. Jay, **J. P. Beam**, S.A. Malfatti, S.G. Tringe, B.D. Kocar, T. Borch, and W.P. Inskeep. (2012) Microbial iron cycling in acidic geothermal springs of Yellowstone National Park: integrating molecular surveys, geochemical processes, and isolation of novel Fe-active microorganisms, *Frontiers in Microbiology* **3**: 109. doi:10.3389/fmicb.2012.00109

INVITED PRESENTATIONS

2016 **J.P. Beam**. Biological iron oxidation in marine sediments. Woods Hole Oceanographic Institute, Falmouth, MA.

2016 **J.P. Beam**, S. George, J.J. Scott, D.T. Johnston, P. Girguis, and D. Emerson. Bioturbation stimulates microbial iron oxidation and mineralization in coastal marine sediments. Northeast Geobiology Symposium, Harvard University, Cambridge, MA.

2016 **J.P. Beam** Microbial iron oxidation: The hot, the cold, and the salty. Bigelow Laboratory for Ocean Sciences Seminar Series East Boothbay, ME.

2015 **J.P. Beam** Walking in an Archaeal Wonderland: Ecological Roles of Novel Populations in Hot Springs of Yellowstone National Park. Bigelow Laboratory for Ocean Sciences, East Boothbay, ME.

2015 **J.P. Beam** Succession and Assembly of Iron Oxide Microbial Mat Communities in Acidic Geothermal Springs, Thermal Biology Institute Seminar Series, Montana State University, Bozeman, MT.

2014 **J. P. Beam** Walking in an Archaeal Wonderland: Discoveries from Yellowstone National Park Hot Springs, Indiana University Southeast, New Albany, IN.

2014 **J. P. Beam**, Z. J. Jay, H. C. Bernstein, S. C. Jay and W. P. Inskeep. Succession of Iron Oxide Microbial Mats in Acidic Geothermal Springs, Geological Society of America Rocky Mountain and Cordilleran Joint Meeting, Bozeman, MT.

2011 **J. P. Beam**, H. C. Bernstein, M. A. Kozubal, R. P. Carlson, and W. P. Inskeep, Distribution and activity of iron-oxidizing microorganisms in acidic geothermal environments, Goldschmidt Conference, Prague, Czech Republic *Mineralogical Magazine*, Vol. 75 (3), p. 503.

PRESENTATIONS, POSTERS, and ABSTRACTS (FIRST AUTHOR ONLY)

2016 **J.P. Beam**, S. George, J.J. Scott, and D. Emerson. Bioturbation stimulates microbial iron oxidation and mineralization in coastal marine sediments. Geobiology Gordon Research Conference, Gavelston, TX, USA. *Poster*

2015 **J. P. Beam**, Z. J. Jay, R. deM Jennings, H. C. Bernstein, M. A. Kozubal, S. G. Tringe, J. J. Moran, R. Brown, M. Lipton, M. F. Romine, J. K. Fredrickson, and W. P. Inskeep. Assembly, Succession, and Activity of Iron Oxide Microbial Mat Communities in Acidic Geothermal Springs. Department of Energy-Joint Genome Institute Users Meeting, Walnut Creek, CA, USA, March 2015. *Poster*

2014 **J.P Beam**, Z. J. Jay, M. R. Romine, S. G. Tringe, T. G. del Rio, D. B. Rusch, M. C. Schmid, M. Wagner, and W. P. Inskeep. *In situ* ecophysiology of an uncultivated lineage of Aigarchaeota from an oxic terrestrial hot spring filamentous ‘streamer’ community, American Geophysical Union Conference, San Francisco, CA, USA. *Poster*

2013 **J. P. Beam** Ecology of Thaumarchaeota Inhabiting Terrestrial Geothermal Environments in Yellowstone National Park. Division of Microbial Ecology ‘Results Seminar’, University of Vienna, Vienna, Austria. *Presentation*

2013 **J.P. Beam** Novel thermoacidophilic Thaumarchaeota inhabit iron oxide and sulfur sediment habitats of Yellowstone National Park. Department of Land Resources and Environmental Sciences Student Research Colloquium, Montana State University, Bozeman, MT. *Presentation*.

2012 **J. P. Beam**, H. C. Bernstein, Z. J. Jay, M. A. Kozubal, R. deM. Jennings, and W. P. Inskeep. Biogeophysical interactions control the formation of iron oxide microbial biofilms in acidic geothermal outflow channels of Yellowstone National Park. American Geophysical Union Conference, San Francisco, CA, USA. *Poster*

2012 **J. P. Beam** Z. J. Jay, M. A. Kozubal, and W. P. Inskeep, Distribution and ecophysiology of novel, non-ammonia-oxidizing thaumarchaea in Yellowstone National Park, International Society of Microbial Ecology, Copenhagen, Denmark, August 2012. *Poster*

2011 **J. P. Beam**, Z. J. Jay, M. A. Kozubal, and W. P. Inskeep, Distribution and ecophysiology of novel thermophilic thaumarchaea in Yellowstone National Park, Thermophiles Conference 2011, Big Sky, MT, USA. *Poster*

2010 **J. P. Beam**, M. A. Kozubal, Z. J. Jay, H. C. Bernstein, and W. P. Inskeep, 2010, *In situ* microbial iron oxidation in acidic geothermal environments, Goldschmidt Conference, Knoxville, TN, USA *Geochimica et Cosmochimica Acta*, v. 74, i. 11, Supplement 1, p. A64. *Poster*

MENTORING

2017 Lindsey Benedict, undergraduate researcher (Bigelow REU intern).

2016 Tianzeng (Echo) Chen undergraduate researcher (Colby College semester student).

2016 Megan Harder, undergraduate researcher (Bigelow REU intern).

2016 Yannik Büchi, undergraduate researcher (Bigelow REU intern).

2014-2015 Brynna Bodle, undergraduate researcher (Montana State).

2013-2014 Eric Bogenschutz, undergraduate researcher (Montana State).

2011-2013 Laura Whitmore, undergraduate researcher (Montana State).

2011-2013 Conner Bailey, undergraduate researcher (Montana State).

2010 Stuart Baker, undergraduate researcher (Montana State).

2010 Riley Kack (8th grade student, Chief Joseph Middle School).

TEACHING

2013 Graduate teaching assistant, Aqueous Geochemistry LRES 555 (Montana State).

RESEARCH CRUISES

2016 R/V Sikuliaq UNOLS Chief Scientist Training Cruise Honolulu, HI to San Diego, CA.

2008 Yellowstone Lake ROV hydrothermal vent sampling Yellowstone National Park, WY.

SERVICE AND OUTREACH

Reviewer *PLoS ONE*, *Geomicrobiology Journal*, *Environmental Microbiology*, *Environmental Microbiology Reports*, *ISME J*

2017 Tour group presentation AVEC Math & Science Gifted & Talented program

2017 Half day mentoring group of Maine high school students

2016 Open house hands-on DNA lab demonstrations for young children and adults

2016 Tour group presentation AAAS “Dialogue on science, ethics, and religion”

2016 Full day mentoring Maine high school students

2011 Thermophiles Conference tour guide Cistern Spring, Yellowstone National Park

2011 Gardiner/Bozeman High School Advanced Placement Biology Class tour of Norris Geyser Basin, Yellowstone National Park

2009-2011 Graduate student perspective tour guide of Mammoth Hot Springs, Yellowstone National Park.

POPULAR MEDIA

2016 R/V Sikuliaq Chief Scientist Training Cruise Blog; “Ode to mud”.

http://csw2016_3.unols.org/csw.unols.org/ode-to-mud/index.html

2013 Integrative Graduate Education and Research Traineeship (IGERT) Video and Poster Competition. Biogeophysical interactions control the formation of iron oxide mat microbial communities in acidic geothermal springs. <http://posterhall.org/igert2013/posters/331>

2011 Montana Science Radio: “Nerdpsyched” Radio Show (aired on 11/20/2011) KGLT Public Radio <http://nerdpsyched.blogspot.com/2011/11/stream-jake-beams-show.html>

PROFESSIONAL SOCIETIES

2012-present International Society of Microbial Ecology.

2012-present American Geophysical Union.

2010-present American Geochemical Society.

CERTIFICATES

2016 Limited Master-Launch Tender