TRINITY L. HAMILTON

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Department of Biological Sciences
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PROFESSIONAL PREPARATION

Montana State University	Ph.D.	Chemistry & Biochemistry	2012
Montana State University	B.S.	Chemistry & Biochemistry	2006
Montana State University	B.S.	Biology	2003

APPOINTMENTS

UNIVERSITY OF CINCINNATI 2015 - present
Assistant Professor
Department of Biological Sciences

THE PENNSYLVANIA STATE UNIVERSITY 2012 - 2014
NASA Astrobiology Institute Postdoctoral Fellow
Department of Geosciences

MAX PLANCK INSTITUTE FOR MARINE MICROBIOLOGY 2013
Visiting Scientist
Microsensor Group

MONTANA STATE UNIVERSITY 2006 - 2012
PhD Research Assistantship
Department of Chemistry and Biochemistry
Defining the ecological interactions that drove the evolution of biological nitrogen fixation

PUBLICATIONS

2015

Therien, J.B., Artz, J.H., Poudel, S., **Hamilton, T.L.**, Liu, Z., Noone, S.M., Adams, M.W.W., King, P.W., Bryant, D.A., Boyd, E.S., Peters, J.W. Draft genome and targeted transcriptional analysis provides insights into H2 metabolism in *Clostridium pasteurianum* (strain W5). *In review. Journal of Bacteriology.*

Harrold, Z.R., Skidmore, M., **Hamilton, T.L.**, Desch, L., Amada, K., van Gelder, W., Roden, E., Boyd, E.S. Aerobic and anaerobic thiosulfate oxidation by a cold-adapted, subglacial chemoautotroph. *In revision. Applied and Environmental Microbiology.*

Hamilton, T.L., Bryant, D.A., Macalady, J.L. (2015) The role of biology in planetary evolution: Cyanobacterial primary production in low oxygen Proterozoic oceans. *Accepted. Environmental Microbiology.* (doi: 10.1111/1462-2920.13118)

Telling, J., Boyd, E.S., Bone, N., Jones, E., Tranter, M., J.L., MacFarlane, Martin, P., Wadham, J., LaMarche-Gagnon, G., Skidmore, M.L., **Hamilton, T.L.**, Hill, E., Jackson, M., Hodgson, D.A. (2015) Rock

comminution as a source of hydrogen for subglacial ecosystems. *Nature Geoscience.* 8: 851–855. (doi: 10.1038/ngeo2533)

Mansor, M. **Hamilton, T.L.**, Fantle, M., Macalady, J.L. Metabolic diversity and ecological niches of *Achromatium* populations revealed with single-cell genomic sequencing. *Frontiers in Microbiology* **6**:822 . (doi: 10.3389/fmicb.2015.00822)

Havig, J., McCormick, M.L., **Hamilton, T.L.**, Kump, L.R. (2015) The behavior of biologically important trace elements across the oxic/euxinic transition of meromictic Fayetteville Green Lake, New York, USA. *Geochimica et Cosmochimica Acta.* **165**:389-406. (doi: 10.1016/j.gca.2015.06.024)

Hamilton, T.L., Jones, D.S., Schaperdoth, I., Macalady, J.L. (2015) Metagenomic insights into S(0) precipitation in a terrestrial subsurface lithoautotrophic ecosystem. *Frontiers in Microbiology* **5**:756. (doi: 10.3389/fmicb.2014.00756)

Boyd, E.S., Garcia Costas, A.M., **Hamilton, T.L.**, Mus, F., Peters, J.W. (2015) Evolution of molybdenum nitrogenase during the transition from anaerobic to aerobic metabolism. *Journal of Bacteriology.* (doi: 10.1128/JB.02611-14)

Lincoln, S.A., **Hamilton, T.L.**, Juárez, A.G.V, Schedlerb, M., Macalady, J.L., Müller, R., Freeman, K.H. (2015) Draft genome sequence of the piezotolerant, crude oil-degrading bacterium *Rhodococcus qingshengii* strain TUHH-12. *GenomeA* **3**:e00268-15. (doi: 10.1128/genomeA.00268-15)

2014

Boyd, E.S., **Hamilton T.L.**, Swanson, K.D., Howells, A.E., Baxter, B.K., Meuser, J.E., Posewitz, M.C., Peters, J.W. (2014). [FeFe]-Hydrogenase abundance and diversity along a vertical redox gradient in Great Salt Lake, USA. *International Journal of Molecular Sciences* **15**:21947-21966. (doi: 10.3390/ijms150x000x)

Thiel T., **Hamilton, T.L.**, Tomsho, L.P., Burbans, R., Gay, S.E., Ramaley, R.F., Schuster, S.C., Steinke, L.A., Bryant, D.A. (2014) Draft genome sequence of the moderately thermophilic bacterium Schleiferia thermophila strain Yellowstone (*Bacteroidetes*). *GenomeA* **2**:4. (doi: 10.1128/genomeA.00860-14)

Thiel T., **Hamilton, T.L.**, Tomsho, L.P., Burbans, R., Gay, S.E., Schuster, S.C., Ward, D.M., Bryant, D.A. (2014) Draft genome sequence of the filamentous anoxygenic phototrophic bacterium *Chloroflexus* sp. strain MS-G (*Chloroflexi*). *GenomeA* **2**:5. (doi: 10.1128/genomeA.00872-14)

Boyd, E.S., **Hamilton, T.L.**, Havig, J.R., Skidmore, M., Shock, E.S. (2014) Chemolithotrophic primary production in a subglacial ecosystem. *Applied and Environmental Microbiology.* 80: 6146-6132. (doi: 10.1128/AEM.01956-14)

Hamilton, T.L., Bovee R.J., Thiel, V., Sattin S.R., Mohr, W., Schaperdoth, I., Vogl K., Gilhooly III, W.P., Lyons, T.W., Tomsho, L.P., Schuster, S.C., Overmann, J., Bryant D.A., Pearson, A., Macalady, J.L. (2014) Coupled reductive and oxidative sulfur cycling in the phototrophic plate of a meromictic lake. *Geobiology*. 12: 451-468. (doi: 10.1111/gbi.12092)

Hamilton, T.L., Koonce, E., Howells, A., Havig, J.R., Jewell, T., de la Torre, J., Peters, J.W., Boyd, E.S. (2014) Competition for ammonia influences the structure of chemotrophic communities in geothermal springs. *Applied and Environmental Microbiology* 80: 653-661. (doi: 10.1128/AEM.02577-13)

2013

Macalady, J.L., **Hamilton, T.L.**, Grettenberger, C.L., Jones, D.S., Tsao, L.E., Burgos, W.D. (2013) Energy, ecology and the distribution of microbial life. *Philosophical Transactions of the Royal Society B* 368: 1622. (doi: 10.1098/rstb.2012.0383)

Boyd, E.S., **Hamilton, T.L.**, Wang, J., He, L., Zhang, C.L. (2013) The role of tetraether lipid composition in the adaptation of thermophilic archaea to acidity. *Frontiers in Terrestrial Microbiology* 4: 62. (doi: 10.3389/fmicb.2013.00062)

Hamilton, T.L., Peters. J.W., Skidmore, M.L., Boyd, E.S. (2013) Molecular evidence for an active endogenous microbiome beneath glacial ice. *The ISME Journal* 7: 1402-1412. (doi: 10.1038/ismej.2013.31)

2012

Duffus, B.R., **Hamilton, T.L.**, Shepard, E., Boyd, E.S., Peters, J.W., Broderick, J. B. (2012) Radical AdoMet Enzymes in Complex Inorganic Metal Cluster Biosynthesis. *Biochimica et Biophysica Acta (BBA)-Proteins and Proteomics* 1824: 1254-1263. (doi: 10.1016/j.bbapap.2012.01.002)

2011

Peters, J.W., Boyd, E.S., and **Hamilton, T.L.**, Rubio, L. (2011) Chapter 4: Biochemistry of Mo-Nitrogenase. In *Nitrogen Cycling in Bacteria: Molecular Analysis*. Ed. J.W.B. Moir. Norfolk: Caister Academic Press. (ISBN: hisb978-1-904455-86-8)

Boyd, E.S., **Hamilton, T. L.**, Peters. J.W. (2011) An alternative path for the evolution of biological nitrogen fixation. *Frontiers in Microbiology* 2: 205. (doi: 10.3389/fmicb.2011.00205)

Hamilton, T.L., Vogl, K., Bryant, D.A., Boyd, E.S., Peters, J.W. (2011) Environmental constraints define the distribution, composition, and evolution of chlorophototrophs in thermal features of Yellowstone National Park. *Geobiology* 10: 236-249. (doi: 10.1111/j.1472-4669.2011.00296.x)

Hamilton, T.L., Jacobson, M., Ludwig, M., Boyd, E.S., Bryant, D.A., Dean, D.R., Peters, J.W. (2011) Differential accumulation of *nif* structural gene mRNA in *Azotobacter vinelandii*. *Journal of Bacteriology* 193: 4534-4536. (doi: 10.1128/JB.05100-11)

Hamilton, T.L., Ludwig, M., Dixon, R., Boyd, E.S., Dos Santos, P., Setubal, J.C., Bryant, D.A., Dean, D.R., Peters, J.W. (2011) Transcriptional profiling of nitrogen fixation in *Azotobacter vinelandii*. *Journal of Bacteriology* 193: 4477-4486. (doi: 10.1128/JB.05099-11) ****Journal Highlight, Microbe, October, 2011****

Boyd, E.S., Lange, R.K., Mitchell, A.C., Havig, J.R., **Hamilton, T.L.**, Lafrenière, M.J., Shock, E.L., Peters, J.W., Skidmore, M. (2011). Diversity, abundance, and potential activity of nitrifying and denitrifying microbial assemblages in a subglacial ecosystem. *Applied and Environmental Microbiology* 77: 4778-4787. (doi: 10.1128/AEM.00376-11)

Hamilton, T.L., Boyd, E.S., Lange, R.K., Peters, J.W. (2011) Biological nitrogen fixation in acidic high temperature geothermal springs in Yellowstone National Park, Wyoming. *Environmental Microbiology* 13: 2204-2215. (doi: 10.1111/j.1462-2920.2011.02475.x)

Hamilton, T.L., Boyd, E.S., Peters, J.W. (2011) Environmental constraints underpin the phylogenetic diversity of *nifH* in the Yellowstone Geothermal Complex. *Microbial Ecology* 10: 236-249. (doi: 10.1007/s00248-011-9824-9)

Boyd, E.S., Anbar, A.D., Miller, S., **Hamilton, T.L.**, Lavin, M., Peters, J.W. (2011) A late methanogen origin for molybdenum-dependent nitrogenase. *Geobiology* 9: 221-232. (doi: 10.1111/j.1472-4669.2011.00278.x)

Boyd, J.M., Endrizzi, J.A., **Hamilton, T.L.**, Downs, D.M., Peters, J.W. (2011) FAD binding by ApbE protein from *Salmonella enterica*: a new class of FAD binding proteins. *Journal of Bacteriology* 193: 887-895. (doi: 10.1128/JB.00730-10)

2010

Boyd, E.S., **Hamilton, T.L.**, Spear, J.R., Lavin, M., Peters, J.W. (2010) [FeFe]-hydrogenase In Yellowstone National Park: Evidence for dispersal limitation and phylogenetic niche conservation. *The ISME Journal* 4: 887-895. (doi: 10.1038/ismej.2010.76)

2008

Sarma, R, Barney, B.M., **Hamilton, T.L.**, Jones, A., Seefeldt, L.C., Peters, J.W. (2008) Crystal structure of the L protein of *Rhodobacter sphaeroides* light-independent protochlorophyllide reductase with MgADP bound: a homologue of the nitrogenase Fe protein. *Biochemistry* 47: 13004-13015. (doi: 10.1021/bi801058r)

2007

Taylor, R.M., Maaty, W.S., Lord. C.I., **Hamilton, T**., Burritt, J.B., Bothner, B., Jesaitis, A.J. (2007) Cloning, sequence analysis and confirmation of derived gene sequences for three epitope-mapped monoclonal antibodies against human phagocyte flavocytochrome b. *Molecular Immunology* 44: 625-637. (doi: 10.1016/j.molimm.2005.10.022)

INVITED SEMINARS

University of Kentucky, Department of Biology, November 2015
The Pennsylvania State University, Ecology Program, April 2015
University of Cincinnati, Department of Biological Sciences, February 2014
Colorado School of Mines, Department of Chemistry and Geochemistry, December 2013

PUBLISHED ABSTRACTS

Hamilton T.L.*, Klatt, J. M., Bird, L.M., Freeman, K.H., de Beer, D., Macalady, J.L. (2014) A Metabolically Versatile Cyanobacterium and the Low-Oxygen Proterozoic World. Mineralogical Magazine, 77(5), 902.

Hamilton, T.L.*, Bird, L.M., Freeman, K.H., Macalady, J.L. (2013) 2-Methyl Hopanoid Production and Anoxygenic Photosynthesis: A Model Early Earth Cyanobacteria Isolated from a Proterozoic Ocean Analog. Mineralogical Magazine, 77(5) 1249.

RESEARCH FIELD SITES

Yellowstone National Park, WY, USA
Green Lake, Fayetteville, NY, USA
Little Salt Spring, North Port, FL
Robertson Glacier, Alberta, Canada
Cascade Range, Pacific Northwest, USA
Beartooth Pass, MT, USA
Daniel Boone National Forest, KY, USA
Lake Erie, Ohio, USA

GRANTS AND AWARDS

2013 - present NASA Astrobiology Institute Postdoctoral Fellow 2013
2013 - 5th International Conference on Polar and Alpine Microbiology travel grant $1200
2013 - ASM Career Development Grant for Postdoctoral Women $1200
2012 - Women in Science and Engineering Travel Grant $500
2012 - Montana Institute on Ecosystems Graduate Fellow-Spring $2000
2011 - Poster award winner, Thermophiles
2011 - Journal Highlights of Microbe
2011 - Poster award winner, Origins 2011
2011 - NAI Summer School Scholar, Santander, Spain
2011 - Invited Speaker, Gordon Research Seminar, Bioinorganic Chemistry
2010 - Timothy Swager Travel Grant 2010 $1000
2008 - NSF IGERT Fellowship $30000/year, 2 year appointment
2008 - MT INBRE Travel Award 2008 $500
2005 - MT INBRE Summer Undergraduate Award 2005 $4500
2004 - MT INBRE Undergraduate Research Program $750 per semester, 2 year appointment

PROFESSIONAL ASSOCIATIONS

American Geophysical Union (AGU)
American Society for Microbiology (ASM)
Ecological Society of America (ESA)

TEACHING

Penn State University
- Geosc 598 - Metagenomics Seminar
- Geosc 021 - Earth & Life
- Abiol 590 - Astrobiology Seminar

Montana State University - Thermal Biology Institute
- LRES 557 - Thermal Biology in Yellowstone National Park
- BIOL 591 - Examining Life in Extreme Environments

Montana State University
- Anatomy and Physiology, General Chemistry I and II, Introduction to Astrobiology

SYNERGISTIC ACTIVITIES

AbSciCon co-convener - AbSciCon 2015 “Phototrophic Life and Earth’s Redox Evolution”
Session co-convener - Goldschmidt 2014 “From Genes to Geochemistry”
Goldschmidt student workshop panel speaker - Goldschmidt 2014 “What’s life got to do with it: Integrating Microbiology and Geochemistry”
Session co-convener - Goldschmidt 2013 “Phototrophic Life and Earth's Redox Evolution”
AbGradCon 2011 co-organizer

EDUCATION AND PUBLIC OUTREACH

Pennsylvania State University - Shake, Rattle, and Rocks
Montana State University - MSU Science Zone
Montana State University - Women in Science

EDITORIAL SERVICE

Review Editor, *Frontiers in Extreme Microbiology*, 2014-present
Guest Associate Editor, Frontiers in Microbiological Chemistry and Geomicrobiology, Special Topic: Origin and Evolution of Photosynthesis

PEER REVIEW

NASA Exobiology, NASA EPSCoR, Ohio Water Resources, Scientific Reports, PNAS, Applied and Environmental Microbiology, PLOS ONE, Frontiers in Microbiology, Chemical Geology, FEMS Microbiology, Journal of Applied Microbiology, Marine Environmental Research, Astrobiology, Microbial Ecology, International Journal of Astrobiology, BioScience, Geomicrobiology Journal

PROFESSIONAL CONTACTS

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State College, PA 16802
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jlm80@psu.edu

Dr. John W. Peters
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Montana State University
Bozeman, Montana 59717
Tel: 406-994-7213
john.peters@chemistry.montana.edu

Dr. Eric S. Boyd
631A Leon Johnson
Montana State University
Bozeman, Montana 59717
Tel: 406-994-7046
eboyd@montana.edu

Dr. Donald Bryant
403C Althouse Laboratory
Pennsylvania State University
University Park, PA 16802
Tel: 814-865-1992
dab14@psu.edu