

Stephen M. Techtmann

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Expertise and Interests

The use of genomics and metagenomics elucidate the response of microbes to anthropogenic activity and environmental change in order to understand the mechanisms of microbial ecology, evolution, and physiology.

Education

- 2004 – 2009 Ph.D., Molecular and Cell Biology, Institute of Marine and Environmental Technology, University of Maryland, Baltimore
Dissertation Title: A Genomic and Biochemical Characterization of Carbon Monoxide-Utilizing Thermophilic Bacteria
PhD Advisor: Frank Robb
- 2000 – 2004 B.S. with honors in Biochemistry and Molecular Biology, University of Maryland, Baltimore County

Professional Experience

- 2015 – Present Assistant Professor of Environmental Microbiology Michigan Technological University
- 2012 – 2015 Postdoctoral Research Associate, with Terry Hazen, Department of Civil and Environmental Engineering, University of Tennessee
- 2009 – 2012 Postdoctoral Fellow with Ernest Maynard, Department of Biochemistry and Molecular Biology, Uniformed Services University, Bethesda MD

Publications (In Review)

Olesen S.W.; Vora S.; **Techtmann S.M.**; Fortney, J.L.; Bastidas-Oyanedel, J., Rodríguez, J.; Hazen T.C.; Alm E.J. The Abundance Distribution of 16S rRNA Sequences as a Measure of Microbial Community Dynamics *in review* PLoS ONE

Publications (Accepted – 14 total, 6 lead-author, H-index: 7 – Google Scholar)

Brewer, S.S. [†]; **Techtmann, S.M.**; Mahmoudi, N.; Niang, D. [†]. Pfiffner, S.M.; Hazen, T.C. Co-extraction of DNA and PLFA from soil samples *Journal of Microbiological Methods*, Volume 115, August 2015, Pages 64-66, ISSN 0167-7012,

Smith, M.B; Rocha. A.M.; Oleson, S.W.; Paradis, C.; Smillie, C.S.; Campbell. J.H.; Fortney, J.L.; Mehlhorn, T.L.; Lowe. K.A.; Earles, J.E.; Phillips, J.; **Techtmann, S.M.**; Joyner, D.C.; Preheim, S.P.; Sanders, M.S.; Mueller, M.A; Brooks, S.; Watson, D.B.; Wu, L; Zhang, P.; He, Z.; Zhou, J.; Adams, M.W.W.; Lancaster,

- A.; Poole, F.; Adams, P.D.; Arkin, A.P.; Fields, M.; Alm, E.J.; Hazen, T.C. (2015) Natural bacterial communities as quantitative biosensors. 6.3 (2015): e00326-15.
- Techtmann, S.M.**; Fortney, J.L.; Ayers, K.A.; Linley, T.D.; Pfiffner, S.M.; Hazen, T.C. (2015) The Unique Chemistry of Eastern Mediterranean Water Masses Selects for Distinct Microbial Communities by Depth. PLoS ONE 10(3): e0120605. doi:10.1371/journal.pone.0120605
- Mahmoudi, N.; Robeson, M.S.; Castro, H.; Fortney, J.L.; **Techtmann, S.M.**; Joyner, D.C.; Paradis, C.; Pfiffner, S.M.; Hazen, T.C. (2015) Microbial community composition and diversity in Caspian Sea sediments. FEMS Microbial Ecology Dec 2014 DOI: 10.1093/femsec/fiu013
- Hazen, T.C.; Rocha, A.M.; **Techtmann S.M.** (2013) Advances in monitoring environmental microbes. Current Opinions in Biotechnology 24 (3), 526-533.
- Sambuughin, N; Swietnicki, W; **Techtmann, S.**; Matrosova, V; Wallace, T; Goldfarb, L; Maynard, E. (2012) KBTBD13 Interacts with Cullin 3 to form a functional Ubiquitin Ligase Biochem Biophys Res Commun 421(4):743-9
- Techtmann, S.M.**; Lebedinsky, A.V.; Colman, A.S.; Sokolova, T.G.; Woyke, T.; Goodwin, L; Robb, F.T. (2012) Evidence for Horizontal Gene Transfer of Anaerobic Carbon Monoxide Dehydrogenases. Front. Microbio. - Evolutionary and Genomic Microbiology 3:132
- Techtmann, S.M.**; Ghirlando, R.; Kao, S.; Strebel, K; Maynard, E. (2012) Hydrodynamic and Functional Analysis of HIV-1 Vif Oligomerization, Biochemistry. 2012 Feb 27.
- Techtmann S.M.**, Colman A.S., Murphy M.B., Schackwitz W., Goodwin L., Robb F.T. (2011) Regulation of multiple carbon monoxide consumption pathways in anaerobic bacteria. Front. Microbio. - Evolutionary and Genomic Microbiology 2: 147 Epub 2011 Jul 11
- Techtmann S.M.**, Robb, F.T. (2010) Archaeal-like Chaperonins in Bacteria. Proc Natl Acad Sci U S A. 107(47):20269-74. Epub 2010 Nov 5.
- Techtmann, S.M.**, Colman, A.S., Robb, F.T. (2009) "That Which Does Not Kill Us Only Makes Us Stronger": The Role of Carbon Monoxide in Thermophilic Microbial Consortia, Environmental Microbiology 11(5); 1027 - 1037
- Robb, F.T., Gonzalez, J.M., Sokolova, T.G., **Techtmann, S.M.**, Chernyh N., Lebedinski, A., Tallon, L.J., Jones, K., Wu, M., Eisen, J.A. (2005) Primary Energy Metabolism in Geothermal Environments The Role of Carbon Monoxide. In Geothermal Biology and Geochemistry in Yellowstone Nation Park, ed. W.P. Inskeep and T.R. McDermott, pp. 163-170. Bozeman, MT: Montana State University Thermal Biology Institute

Genome Announcements

† Undergraduate author

- Stelling, S.C.†; **Techtmann, S.M.**; Alshibli, N.†; Utturkar, S.; Brown, S.D.; Hazen, T.C. Draft Genome Sequence of *Thalassotalea* sp. strain ND16A isolated from Eastern Mediterranean sea water collected from a depth of 1,055 meters *Genome Announcements* 2(6):e01231-14, doi:10.1128/genomeA.01231-14

Harris, A.[†]; **Techtmann, S.M.**; Stelling, S.C.[†]; Alshibli, N.[†]; Utturkar, S.; Brown, S.D.; Hazen, T.C. Draft Genome Sequence of *Pseudoalteromonas* sp. strain ND6B an oil-degrading isolate from Eastern Mediterranean sea water collected at a depth of 1,210 meters *Genome Announcements* 2(6):e01212-14, doi:10.1128/genomeA.01212-14

Selected abstracts and invited talks (Total – 64, Invited – 15, Contributed – 49)

*Presenting Author [†]Undergraduate

- Techtmann S.M.*** (September 2015) Environmental Systems Biology of Oil Biodegradation. *Department of Environmental Engineering Michigan Tech University* (Invited)
- Techtmann S.M.*** (April 2015) Environmental Controls on Marine Microbial Community Structure and Oil Biodegradation. *Oak Ridge National Lab – Biological/Environmental Sciences Directorate Microbial Group Meeting.* (Invited)
- Techtmann, S.M.***, K.A. Ayers, J.L. Fortney, D.C. Joyner, S. M. Pfiffner, T.C. Hazen (August 2014) The Structure and Function of the Eastern Mediterranean Microbial Community is Strongly Stratified by Water Mass, *International Society for Microbial Ecology 15*, Seoul, South Korea (Contributed)
- Techtmann, S.M.***, K. Ayers, J.L. Fortney, D.C. Joyner, S.M. Pfiffner, T.C. Hazen (May 2014) The Eastern Mediterranean Microbial Community is Strongly Stratified by Water Mass *American Society for Microbiology Annual Meeting*, Boston, MA (Contributed)
- N. Alshibli*[†], **S. M. Techtmann**, Y. M. Piceno, L. M. Tom, G. L. Andersen and T. C. Hazen. (April 2014). 16S rRNA Microarray Analysis of Microbial Communities in Hydrocarbon-Containing Deep-Sea Environments. University of Tennessee Exhibition of Undergraduate Research and Creative Achievement (EURECA) **Winner of UT EURECA Undergraduate Research Award**
- Techtmann S.M.*** (October 2013) Oil Biodegradation by Deep-Sea Microbes in the Eastern Mediterranean. *Oak Ridge National Lab – Biological/Environmental Sciences Directorate Microbial Group Meeting.* (Invited)
- Techtmann S.M.*** and J.L. Fortney. (July 2013) Crude oil Biodegradation in Marine Environments. Tools for Bioremediation of Crude Oil Contamination. *Azerbaijani Ministry of the Environment*, Baku Azerbaijan. (Invited)
- Techtmann, S.M.*** (June 2013) Hydrocarbon Degrading Bacteria in the Warm Oligotrophic Deep Eastern Mediterranean. *Second International Battelle symposium on Bioremediation and Sustainable Environmental Technologies*, Jacksonville, FL (Invited)
- Techtmann, S.M.***, J.L. Fortney, D.C. Joyner, A.M. Rocha, T.D. Linley, and T.C. Hazen. (May 2013) Hydrocarbon Degrading Bacteria in the Warm Oligotrophic Deep Eastern Mediterranean. *American Society for Microbiology Annual Meeting*, Denver CO (Contributed)

- Techtmann, S.M.***, and T.C. Hazen. (March 2013) Can Mother Nature Take a Punch? The Science of the the Big Gulf Oil Spill. *Harden Valley Academy*, Knoxville, TN. (Invited)
- Techtmann, S.M.*** (Feb 2013) Hydrocarbon Degrading Bacteria in the Warm Oligotrophic Deep Eastern Mediterranean. *University of Tennessee Environmental Engineering Seminar Series*, (Invited)
- Techtmann, S.M.***, R. Ghirlando, E.L. Maynard. (March 2011) A Hydrodynamic Analysis of the Human Cullin 5 – HIV-1 Vif Ubiquitin Ligase Complex. *Biophysical Society Meeting*, Baltimore, MD, (Contributed)
- Techtmann, S.M.*** (December 2010) A Biophysical Analysis of HIV-1 Vif Human Cul5 Complex Assembly *Uniformed Services University Department of Biochemistry and Molecular Biology Seminar Series* (Invited)
- Techtmann S.M.*** (March 2010) HIV-1 interactions with Human Cul5. *Uniformed Services University Department of Biochemistry and Molecular Biology Seminar Series* Bethesda, MD (Invited)
- Techtmann, S.M.***, T.J. Lin, A.S. Colman, and F.T. Robb. (May 2009) Regulation of Key Carbon Monoxide Oxidation Pathways by Multiple CO-sensing Regulators from *Carboxydotherrmus hydrogenoformans*. *American Society for Microbiology General Meeting*, Philadelphia, PA, (Contributed)
- Techtmann, S.M.***, T.J. Lin, A.S. Colman, and F.T. Robb. (April 2009) Regulation of Key Carbon Monoxide Oxidation Pathways by Multiple CO-sensing Regulators from *Carboxydotherrmus hydrogenoformans*. *University of Maryland Biotechnology Institute, Graduate Student Research Day*. (Invited)
- Techtmann, S.M.***, T.J. Lin, A.S. Colman, and F.T. Robb. (September 2008) Distinct Regulation of Carbon Monoxide Oxidation Pathways to Carbon Fixation and Energy Conservation in Anaerobic Bacteria from Kamchatkan Hot Springs. *Extremophiles Conference*, Cape Town, South Africa. (Contributed)
- Techtmann, S.M.*** and F.T. Robb. (July 2008) The Genome Sequence of *Thermosinus carboxydivorans* str Nor1: Linking Hydrogenogenic Carboxydotrophy to Metal Reduction. *Workshop on Genomes of Carbon Monoxide Utilizing Thermophiles*. Seville, Spain. (Invited)
- Techtmann, S.M.*** A.S. Colman, L. Meincke, J. Eisen and F.T. Robb. (March 2008) The Genome Sequence of *Thermosinus carboxydivorans* str Nor1: Linking Hydrogenogenic Carboxydotrophy to Metal Reduction. *DOE Joint Genome Institute Users Meeting*, Walnut Creek, CA. (Contributed)
- Techtmann S.M.***, A Colman, D Newby, J Barnes, D Maeder, F Robb*. (September 2006) Regulation of hydrogen production by a thermophile oxidizing carbon monoxide to CO₂ anaerobically. *Extremophiles Conference* Brest, France. (Contributed)
- Techtmann, S.M.***, D. Newby, J. Barnes, K. Epting, J. Lacy, H. Silverman, A. Colman, and F.T. Robb. (July 2006) Life in Hot Carbon Monoxide with Hydrogen Production, *Society for Industrial Microbiology Annual Meeting*, Baltimore, MD. (Invited)
- Techtmann, S.M.***, E.J. Jackson, and F.T. Robb. (August 2005) CO Sensing via CooA in *Carboxydotherrmus hydrogenoformans* and Related Thermophiles *International*

Workshop on Biodiversity, Biochemistry, Molecular Biology and Biogeochemistry of Thermophiles Petropavlovsk-Kamchatski, Russia. (Invited)

Funding

2000 – 2004 Beckton Dickinson Scholar at University of Maryland, Baltimore County – Full Scholarship, *value approx. \$100,000*

Honors and Awards

2014 Trainee on University-National Oceanographic Laboratory System (UNOLS) Chief Scientist Training Cruise, *\$1800*

2008 Travel Award, International Society of Extremophiles to attend the 2008 Extremophiles Conference, Cape Town South Africa

2008 Rita Colwell Graduate Travel Award, University of Maryland, Biotechnology Institute to attend the 2008 Extremophiles Conference, Cape Town, South Africa

2008 Student Travel Award, American Society for Microbiology to attend the 2008 ASM General Meeting

2004 Alumni Award in Biochemistry, Univ. of Maryland, Baltimore County

2004 Outstanding Biochemistry Student, Univ. of Maryland, Baltimore County

Teaching

2015 Guest Lecture for ENVE 655 Environmental Systems Biology – Lectured on current tools used in environmental systems biology and their limitations.

2010 – 2011 Developed and taught Advanced Chemistry for Senior High School students at Covenant Life School, Gaithersburg, MD (Fall and Spring Semester)

2001 – 2004 Chemistry Tutor, University of Maryland, Baltimore County

Service and Outreach

2015 – Present Ad hoc reviewer for NSF Low Temperature Geochemistry Program.

2012 – Present Reviewer for *Environmental Science and Technology*, *FEMS Microbial Ecology*, *Frontiers in Microbiology*, *Extremophiles Journal*, *BMC Microbiology*, and *Ecological Indicators*

2013 Session chair “Marine Oil Spills,” Second International Battelle symposium on Bioremediation and Sustainable Environmental Technologies, Jacksonville, FL

2013-2014 Science Lab Volunteer, Farragut Intermediate School, Farragut, TN

2013-2015 Outreach presentation on deep-sea microbial communities to classes at both Hardin Valley Academy (Farragut, TN) and Cedar Bluff Middle School (Knoxville, TN)

2009 - 2012 Member of the Scientific Advisory Committee, Covenant Life School

- 2009 – 2012 Member of the Career Development and Seminars Committee,
Postdoctoral Fellows Association, Uniformed Services University
- 2008 Chair of the Steering Committee: University of Maryland
Biotechnology Institute Graduate Student Retreat.
- 2008 President: Center of Marine Biotechnology Graduate Student
Association, Baltimore, MD

Mentorship

Undergraduate and Graduate Students (20)

- 2015 – Present Timothy Butler – Undergraduate Biological Sciences
- 2015 – Present Amber Dwyer – Undergraduate Biomedical Engineering
- 2015 – Present Andrew Baldwin – Undergraduate Bioinformatics
- 2014 – 2015 Shane Hagen – Undergraduate Civil and Environmental
Engineering
- 2014 – 2015 Kendall Whitt – Undergraduate Microbiology
- 2014 – 2015 Erika Yongst – Undergraduate Microbiology
- 2013 – 2015 Charles Paradis – Graduate, Earth and Planetary Sciences
- 2014 – 2015 Katie Fitzgerald – Post-Baccalaureate Microbiology
- 2013 – 2014 Kristen Corrier – Undergraduate, Environmental Studies
- 2013 Jace Natzke – Undergraduate, Microbiology
- 2013 Sophie Dillik – Summer Intern – Chemistry, Smith College 2013-
- 2013 – 2014 Austin Harris – Undergraduate, Microbiology
- 2013 – Present Sheridan Brewer – Undergraduate, Microbiology
- 2013 - 2014 Savannah Stelling– Undergraduate, Microbiology
- 2012 - Present Jiang Liu – Graduate, Microbiology
- 2013 Shital Chauhan – Undergraduate, Biochemistry and Molecular
Biology
- 2013 Amer Aqqad – Undergraduate, Chemical Engineering
- 2013 – 2014 Noor Alshibli – Undergraduate, Biochemistry and Molecular
Biology
- 2009 Joseph Wagman – Graduate student, Emerging infectious disease
- 2009 Annakay Ragalan – Undergraduate, Biology
- 2008-2009 Yuko Ueno – Post baccalaureate, Molecular biology
- 2008 Daniel Mays – Undergraduate, Biology
- 2007-2008 T. Jennifer Lin – Postbaccalaureate, Microbiology
- 2005-2008 Elizabeth Jackson – Undergraduate, Biology

Middle and High School Teachers (3)

- 2005-2007 Christina Baldwin – High school teacher, Biology
- 2005-2007 Meghan Milanches – Middle school teacher, Biology
- 2005 John Hendrix – High school teacher, Biology

Selected Field Experience

- 2015 Keweenaw Waterway and Lake Superior
- 2014 R/V Atlantic Explorer, Western Atlantic Ocean (Barbados to
Bermuda transect) (9 days)
- 2013 M/V Svetlomer II, Southern Caspian Sea (20 days)

2012	M/V Fugro Navigator, Eastern Mediterranean (14 days)
2012 – 2014	Oak Ridge Field Research Center, Groundwater sampling at contaminated DOE site
2007	Southern Florida, coastal, estuarine, and inland waters
2007	Gulf of California, coastal waters
2007	Gerlach NV and Surprise Valley CA, hot springs sample collection and in situ measurements
2003, 2005	Uzon Caldera, Kamchatka Russia, hot spring sample collection and in situ measurements