

Thomas Edward Hanson
Professor, Marine Biosciences

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ORCID ID: [0000-0002-1967-5986](https://orcid.org/0000-0002-1967-5986) Researcher ID: [G-9386-2016](https://orcid.org/G-9386-2016)

EDUCATION

1998 University of California, Davis Microbiology Ph.D.
1992 University of Wisconsin, Madison Bacteriology B.S.

PROFESSIONAL APPOINTMENTS

2017-	University of Delaware, Delaware Biotechnology Institute	Associate Director
2014-	University of Delaware, College of Earth, Ocean and Environment	Professor
2013-2016	University of Delaware, School of Marine Science and Policy	Associate Director
2009-2014	University of Delaware, College of Earth, Ocean and Environment	Associate Professor
2007-	University of Delaware, Department of Biological Sciences	Joint Appointment
2003-2009	University of Delaware, College of Marine and Earth Studies	Assistant Professor
1998-2002	The Ohio State University, Department of Microbiology	Postdoctoral Fellow

HONORS AND DISTINCTIONS

2015 Distinguished Lecturer in Microbiology, Miami University (Ohio)
2010 Deutscher Akademischer Austausch Dienst Research Visit Grant
2005 NSF CAREER Award
 Sulfur oxidation in *Chlorobium tepidum*, a model phototrophic bacterium
1998 University Postdoctoral Fellowship, The Ohio State University, Columbus
1994 Jastro Shields Graduate Research Award, University of California, Davis
1993 Jastro Shields Graduate Research Award, University of California, Davis
1991 Hilldale Undergraduate Research Award, University of Wisconsin, Madison

ADVISORS

Postdoctoral: F. Robert Tabita, The Ohio State University, Columbus
Doctoral: John C. Meeks, University of California, Davis

PROFESSIONAL AFFILIATIONS

The American Society for Microbiology
The American Association for the Advancement of Science

PUBLICATIONS

*-denotes manuscripts with University of Delaware undergraduate co-authors

** -denotes manuscripts with my students or postdocs as lead authors

2019 Norambuena J, **Hanson TE**, Barkay T, Boyd JM. Superoxide dismutase and pseudocatalase increase tolerance to Hg(II) in *Thermus thermophilus* HB27 by maintaining the reduced bacillithiol pool. *mBio*. pii: e00183-19 10.1128/mBio.00183-19

Marnocha CL, Sabanayagam CR, Modla S, Powell DH, Henri PA, Steele A, **Hanson TE**, Webb SM, Chan CS. Insights into the mineralogy and surface chemistry of extracellular biogenic S(0) globules produced by *Chlorobaculum tepidum*. *Front Microbiol*. 10.3389/fmicb.2019.00271

- 2018 **Hiras J, Sharma SV, Raman V, Tinson RAJ, Arbach M, Rodrigues DF, Norambuena J, Hamilton CJ, **Hanson TE**. Physiological studies of *Chlorobiaceae* suggest that bacillithiol derivatives are the most widespread thiols in bacteria. *mBio*. 9(6). pii: e01603-18. 10.1128/mBio.01603-18.
- Waite DW, Vanwonterghem I, Rinke C, Parks DH, Zhang Y, Takai K, Sievert SM, Simon J, Campbell BJ, Hanson TE, Woyke T, Klotz MG, Hugenholtz P. Erratum: Addendum: Comparative Genomic Analysis of the Class Epsilonproteobacteria and Proposed Reclassification to Epsilonbacteraeota (phyl. nov.). *Front Microbiol*. 9:772. 10.3389/fmicb.2018.00772
- **Hilzinger JM, Raman V, Shuman KE, Eddie BJ, **Hanson TE**. Differential RNA sequencing implicates sulfide as master regulator of S(0) metabolism in *Chlorobaculum tepidum* and other green sulfur bacteria. *Appl Environ Microbiol*. 84:e01966-17 10.1128/AEM.01966-17
- Norambuena J, Wang Y, **Hanson T**, Boyd JM, Barkay T. Low-molecular-weight thiols and thio redoxins are important players in Hg(II) resistance in *Thermus thermophilus* HB27. *Appl Environ Microbiol*. 84:e01931-17 10.1128/AEM.01931-17
- Waite DW, Vanwonterghem I, Rinke C, Parks DH, Zhang Y, Takai K, et al. Addendum: Comparative genomic analysis of the class *Epsilonproteobacteria* and proposed reclassification to Epsilonbacteraeota (phyl. nov.) *Front Microbiol*. 9:772 10.3389/fmicb.2018.00772
- 2017 Quasem I, Achille AN, Caddick BA, Carter TA, Daniels C, Delaney JA, et al. Peculiar citric acid cycle of hydrothermal vent chemolithoautotroph *Hydrogenovibrio crunogenus*, and insights into carbon metabolism by obligate autotrophs. *FEMS Microbiol Lett*. 364:fnx148 10.1093/femsle/fnx148
- Waite DW, Vanwonterghem I, Rinke C, Parks DH, Zhang Y, Takai K, et al. Comparative genomic analysis of the class *Epsilonproteobacteria* and proposed reclassification to Epsilonbacteraeota (phyl. nov.). *Front Microbiol*. 8:682 10.3389/fmicb.2017.00682
- 2016 **Levy AT, Lee KH, **Hanson TE**. *Chlorobaculum tepidum* modulates amino acid composition in response to energy availability, as revealed by a systematic exploration of the energy landscape of phototrophic sulfur oxidation. *Appl Environ Microbiol*. 82:6431-6439 10.1128/AEM.02111-16
- *Penido ES, Bennett AJ, **Hanson TE**, Seyfferth AL. Biogeochemical impacts of silicon-rich rice residue incorporation into flooded soils: Implications for rice nutrition and cycling of arsenic. *Plant Soil* 399:75-87. 10.1007/s11104-015-2682-3
- Hanson TE**, Bonsu E, Tuerk A, Marnocha CL, Powell DH, Chan CS. *Chlorobaculum tepidum* growth on biogenic S(0) as the sole photosynthetic electron donor. *Environ Microbiol*. 18:2856-2867. 10.1111/1462-2920.12995
- **Rossmassler K, **Hanson TE**, Campbell BJ. Diverse sulfur metabolisms from two subterranean sulfidic spring systems. *FEMS Microbiol Lett*. 363(16) 10.1093/femsle/fnw162
- **Marnocha CL, Levy AT, Powell DH, Hanson TE, Chan CS. Mechanisms of extracellular S0 globule production and degradation in *Chlorobaculum tepidum* via dynamic cell-globule interactions. *Microbiol*. 162:1125-1134 10.1099/mic.0.000294
- **Shuman KE, **Hanson TE**. A sulfide:quinone oxidoreductase from *Chlorobaculum tepidum* displays unusual kinetic properties. *FEMS Microbiol Lett*. 363(12) 10.1093/femsle/fnw100
- Hanson TE. Back to the future: function-first metagenomics returns to the fore. *Environ Microbiol*. 18:1094-1095 10.1111/1462-2920.13260

- Wang L, Lim CK, Dang H, **Hanson TE**, Klotz MG. D1FHS, the type strain of the ammonia-oxidizing bacterium *Nitrosococcus wardiae* spec. nov.: enrichment, isolation, phylogenetic, and growth physiological characterization. *Front Microbiol.* 7:512 10.3389/fmicb.2016.00512
- 2015 *Findlay AJ, Bennett AJ, **Hanson TE**, Luther GW 3rd. Light-dependent sulfide oxidation in the anoxic zone of the Chesapeake Bay can be explained by small populations of phototrophic bacteria. *Appl Environ Microbiol.* 81:7560-7569 10.1128/AEM.02062-15
- 2014 Findlay, A.J., Gartman, A., MacDonald, D.J., **Hanson, T.E.**, Shaw, T.J., and G.W. Luther III. Distribution and size fractionation of elemental sulfur in aqueous environments: The Chesapeake Bay and Mid-Atlantic Ridge. *Geochim Cosmochim Acta* 142:334-338
10.1016/j.gca.2014.07.032
- Kirchman, D.L., **Hanson, T.E.**, Cottrell, M.T., Hamdan, L.J. Metagenomic analysis of organic matter degradation in methane-rich Arctic Ocean sediments. *Limnol Oceanog* 59:548-559
10.4319/lo.2014.59.2.0548
- Ruocco, M.H.W., Chan, C.S., **Hanson, T.E.**, and T.M. Church. Characterization and distribution of selenite reduction products in cultures of the marine yeast *Rhodotorula mucilaginosa*-13B. *Geomicrobiol J* 31:769-778 10.1080/01490451.2014.888909
- 2013 **Hanson, T.E.**, Luther, G.W. 3rd, Findlay, A.J., Macdonald, D.J., and D. Hess. Phototrophic sulfide oxidation: environmental insights and a method for kinetic analysis. *Front Microbiol* 4:382 10.3389/fmicb.2013.00382
- **Eddie, B.J., and **T.E. Hanson**. *Chlorobaculum tepidum* TLS displays a complex transcriptional response to sulfide addition. *J Bacteriol* 195:399-408 10.1128/JB.01342-12
- Hanson, T.E.**, B.J. Campbell, K.M. Kalis, M.A. Campbell, and M.G. Klotz. Nitrate ammonification by *Nautilia profundicola* AmH: experimental evidence consistent with a free hydroxylamine intermediate. *Front Microbiol* 4:180 10.3389/fmicb.2013.00180
- Kirchman, D.L., and **T.E. Hanson**. Bioenergetics of photoheterotrophic bacteria in the oceans. *Environ Microbiol Rep* 5:188-199 10.1111/j.1758-2229.2012.00367.x
- 2012 **Bahrou, A.S., P.R. Ollivier, **T.E. Hanson**, E. Tessier, D. Amouroux, and T.M. Church. Volatile dimethyl polonium produced by aerobic marine microorganisms. *Environ Sci Technol* 46:11402-11407 10.1021/es3006546
- Hanson, T.E.**, B.E. Alber, and F.R. Tabita. Phototrophic CO₂ fixation: recent insights into ancient metabolisms. pp. 225-251 In *Functional Genomics and Evolution of Photosynthetic Systems.*, edited by R.L. Burnap and W.F.J. Vermaas. Amsterdam: Springer Netherlands.
10.1007/978-94-007-1533-2_9
- Kan, J., **T.E. Hanson**, and F. Chen. Synchronicity between population structure and proteome profiles: a metaproteomic analysis of Chesapeake Bay bacterial communities. pp. 637-644 In *Handbook of Molecular Microbial Ecology I: Metagenomics and Complementary Approaches*, edited by F.H. de Bruijn. Hoboken, N. J.: John Wiley & Sons, Inc.
10.1002/9781118010518.ch68
- Krepski, S.T., **T.E. Hanson**, and C.S. Chan. Isolation and characterization of a novel biomineral stalk-forming iron-oxidizing bacterium from a circumneutral groundwater seep. *Environ Microbiol* 14:1671-1680 10.1111/j.1462-2920.2011.02652.x
- **Rossmassler, K., A.S. Engel, K.I. Twing, **T.E. Hanson**, and B.J. Campbell. Drivers of epsilonproteobacterial community composition in sulfidic caves and springs. *FEMS Microbiol Ecol* 79:421-432 10.1111/j.1574-6941.2011.01231.x

- 2011 Klotz, M.G., D.A. Bryant, and **T.E. Hanson**. The microbial sulfur cycle. *Front Microbiol* 2:241 10.3389/fmicb.2011.00241
- *Luther, G.W., 3rd, A.J. Findlay, D.J. Macdonald, S.M. Owings, **T.E. Hanson**, R.A. Beinart, and P.R. Girguis. Thermodynamics and kinetics of sulfide oxidation by oxygen: a look at inorganically controlled reactions and biologically mediated processes in the environment. *Front Microbiol* 2:62 10.3389/fmicb.2011.00062
- **Ollivier, P.R., A.S. Bahrou, T.M. Church, and **T.E. Hanson**. Aeration controls the reduction and methylation of tellurium by the aerobic, tellurite-resistant marine yeast *Rhodotorula mucilaginosa*. *Appl Environ Microbiol* 77:4610-4617 10.1128/AEM.00351-11
- *Rodriguez, J., J. Hiras, and **T.E. Hanson**. Sulfite oxidation in *Chlorobaculum tepidum*. *Front Microbiol* 2:112 10.3389/fmicb.2011.00112
- 2010 Campbell, B.J., S.W. Polson, **T.E. Hanson**, M.C. Mack, and E.A. Schuur. The effect of nutrient deposition on bacterial communities in Arctic tundra soil. *Environ Microbiol* 12:1842-1854 10.1111/j.1462-2920.2010.02189.x
- Hanson, T.E.**, R.M. Morgan-Kiss, L.K. Chan, and J. Hiras. Beyond the genome: functional studies of phototrophic sulfur oxidation. *Adv Exp Med Biol* 675:109-121 10.1007/978-1-4419-1528-3_7
- Wenter, R., K. Hutz, D. Dibbern, T. Li, V. Reisinger, M. Ploscher, L. Eichacker, B. Eddie, **T. Hanson**, D.A. Bryant, and J. Overmann. Expression-based identification of genetic determinants of the bacterial symbiosis 'Chlorochromatium aggregatum'. *Environ Microbiol* 12:2259-2276 10.1111/j.1462-2920.2010.02206.x
- 2009 *Bains, G., A.S. Kumar, T. Rudrappa, E. Alff, **T.E. Hanson**, and H.P. Bais. Native plant and microbial contributions to a negative plant-plant interaction. *Plant Physiol* 151:2145-2151 10.1104/pp.109.146407
- Campbell, B.J., J.L. Smith, **T.E. Hanson**, M.G. Klotz, L.Y. Stein, C.K. Lee, D. Wu, J.M. Robinson, H.M. Khouri, J.A. Eisen, and S.C. Cary. Adaptations to submarine hydrothermal environments exemplified by the genome of *Nautilia profundicola*. *PLoS Genet* 5:e1000362 10.1371/journal.pgen.1000362
- **Chan, L.K., R.M. Morgan-Kiss, and **T.E. Hanson**. Functional analysis of three sulfide:quinone oxidoreductase homologs in *Chlorobaculum tepidum*. *J Bacteriol* 191:1026-1034 10.1128/JB.01154-08
- *,**Morgan-Kiss, R.M., L.K. Chan, S. Modla, T.S. Weber, M. Warner, K.J. Czymmek, and **T.E. Hanson**. *Chlorobaculum tepidum* regulates chlorosome structure and function in response to temperature and electron donor availability. *Photosynth Res* 99:11-21 10.1007/s11120-008-9361-7
- Wommack, K.E., S.R. Bench, J. Bhavsar, D. Mead, and **T. Hanson**. Isolation independent methods of characterizing phage communities 2: characterizing a metagenome. pp. 279-289 In *Bacteriophages - Methods and Protocols, Volume 2: Molecular and Applied Aspects*, edited by M.R.J. Clokie and A.M. Kropinski. New York, N. Y.: Humana Press. 10.1007/978-1-60327-565-1_16
- 2008 **Chan, L.K., R. Morgan-Kiss, and **T.E. Hanson**. Genetic and proteomic studies of sulfur oxidation in *Chlorobium tepidum* (syn. *Chlorobaculum tepidum*). pp. 363-379 In *Sulfur in Phototrophic Organisms*, edited by R. Hell, C. Dahl, T. Leustek and D. Knaff. New York, N.Y.: Springer. 10.1007/978-1-4020-6863-8_18

- **Chan, L.K., R. Morgan-Kiss, and **T.E. Hanson**. Sulfur oxidation in *Chlorobium tepidum* (syn. *Chlorobaculum tepidum*): genetic and proteomic analyses. pp. 117-126 In *Microbial Sulfur Metabolism*, edited by C. Dahl and C.G. Friedrich. New York, N.Y.: Springer. 10.1007/978-3-540-72682-1_10
- *,**Chan, L.K., T.S. Weber, R.M. Morgan-Kiss, and **T.E. Hanson**. A genomic region required for phototrophic thiosulfate oxidation in the green sulfur bacterium *Chlorobium tepidum* (syn. *Chlorobaculum tepidum*). *Microbiology* 154:818-829 10.1099/mic.0.2007/012583-0
- **Morgan-Kiss, R.M., A.G. Ivanov, S. Modla, K. Czymmek, N.P. Huner, J.C. Priscu, J.T. Lisle, and T.E. Hanson. Identity and physiology of a new psychrophilic eukaryotic green alga, *Chlorella* sp., strain BI, isolated from a transitory pond near Bratina Island, Antarctica. *Extremophiles* 12:701-711 10.1007/s00792-008-0176-4
- *,**Ollivier, P.R., A.S. Bahrou, S. Marcus, T. Cox, T.M. Church, and **T.E. Hanson**. Volatilization and precipitation of tellurium by aerobic, tellurite-resistant marine microbes. *Appl Environ Microbiol* 74:7163-7173 10.1128/AEM.00733-08
- Smith, J.L., B.J. Campbell, **T.E. Hanson**, C.L. Zhang, and S.C. Cary. *Nautilia profundicola* sp. nov., a thermophilic, sulfur-reducing epsilonproteobacterium from deep-sea hydrothermal vents. *Int J Syst Evol Microbiol* 58:1598-1602 10.1099/ij.s.0.65435-0
- Tabita, F.R., **T.E. Hanson**, S. Satagopan, B.H. Witte, and N.E. Kreel. Phylogenetic and evolutionary relationships of RubisCO and the RubisCO-like proteins and the functional lessons provided by diverse molecular forms. *Philos Trans R Soc Lond B Biol Sci* 363:2629-2640 10.1098/rstb.2008.0023
- Tabita, F.R., S. Satagopan, **T.E. Hanson**, N.E. Kreel, and S.S. Scott. Distinct form I, II, III, and IV RubisCO proteins from the three kingdoms of life provide clues about RubisCO evolution and structure/function relationships. *J Exp Bot* 59:1515-1524 10.1093/jxb/erm361
- 2007 Bench, S.R., **T.E. Hanson**, K.E. Williamson, D. Ghosh, M. Radosovich, K. Wang, and K.E. Wommack. Metagenomic characterization of Chesapeake Bay virioplankton. *Appl Environ Microbiol* 73:7629-7641 10.1128/AEM.00938-07
- Bidle, K.A., **T.E. Hanson**, K. Howell, and J. Nannen. HMG-CoA reductase is regulated by salinity at the level of transcription in *Haloferax volcanii*. *Extremophiles* 11:49-55 10.1007/s00792-006-0008-3
- Tabita, F.R., **T.E. Hanson**, H. Li, S. Satagopan, J. Singh, and S. Chan. Function, structure, and evolution of the RubisCO-like proteins and their RubisCO homologs. *Microbiol Mol Biol Rev* 71:576-599 10.1128/MMBR.00015-07
- Zhou, F., **T.E. Hanson**, and M.V. Johnston. Intact protein profiling of *Chlorobium tepidum* by capillary isoelectric focusing, reversed-phase liquid chromatography, and mass spectrometry. *Anal Chem* 79:7145-7153 10.1021/ac071147c
- 2005 Kan, J., **T.E. Hanson**, J.M. Ginter, K. Wang, and F. Chen. Metaproteomic analysis of Chesapeake Bay microbial communities. *Saline Systems* 1:7 10.1186/1746-1448-1-7
- 2004 Larimer, F.W., P. Chain, L. Hauser, J. Lamerdin, S. Malfatti, L. Do, M.L. Land, D.A. Pelletier, J.T. Beatty, A.S. Lang, F.R. Tabita, J.L. Gibson, **T.E. Hanson**, C. Bobst, J.L. Torres, C. Peres, F.H. Harrison, J. Gibson, and C.S. Harwood. Complete genome sequence of the metabolically versatile photosynthetic bacterium *Rhodospseudomonas palustris*. *Nat Biotechnol* 22:55-61 10.1038/nbt923

- Tabita, F.R., and **T.E. Hanson**. Anoxygenic phototrophic bacteria. pp. 225-543 In *Microbial Genomes*, edited by C.M. Fraser, T.D. Read and K.E. Nelson. Totowa, N. J.: Humana Press.
- 2003 **Hanson, T.E.**, and F.R. Tabita. Insights into the stress response and sulfur metabolism revealed by proteome analysis of a *Chlorobium tepidum* mutant lacking the Rubisco-like protein. *Photosynth Res* 78:231-248 10.1023/B:PRES.0000006829.41444.3d
- 2001 **Hanson, T.E.**, and F.R. Tabita. A ribulose-1,5-bisphosphate carboxylase/oxygenase (RubisCO)-like protein from *Chlorobium tepidum* that is involved with sulfur metabolism and the response to oxidative stress. *Proc Natl Acad Sci U S A* 98:4397-4402. 10.1073/pnas.081610398
- 2000 Yoon, K.S., **T.E. Hanson**, J.L. Gibson, and F.R. Tabita. Autotrophic CO₂ metabolism. pp. 349-358 In *Encyclopedia of Microbiology*, 2nd Edition, edited by J. Lederburg. San Diego: Academic Press Inc.
- 1999 Meeks, J.C., E. Campbell, K. Hagen, **T. Hanson**, N. Hitzeman, and F. Wong. Developmental alternatives of symbiotic *Nostoc punctiforme* in response to its plant partner *Anthoceros punctatus*. pp. 665-678 In *The Phototrophic Prokaryotes*, edited by G.A. Peschek, W. Loeffelhardt and G. Schmetterer. New York: Plenum Publishing Corp.
- 1998 **Hanson, T.E.**, K. Forchhammer, N. Tandeau de Marsac, and J.C. Meeks. Characterization of the *glnB* gene product of *Nostoc punctiforme* strain ATCC 29133: *glnB* or the P_{II} protein may be essential. *Microbiology* 144:1537-1547 10.1099/00221287-144-6-1537
- 1996 Hanson, R.S., and **T.E. Hanson**. Methanotrophic Bacteria. *Microbiol Rev* 60:439-471

EXTRAMURAL FUNDING HISTORY

Currently funded projects

W. M. Keck Foundation

2017-2020 \$1,000,000 P.I.: Jennifer Biddle Co-P.I.: T.E. Hanson, A. Marsh
Unlocking the black box of microbial epigenetics

National Science Foundation

2018-2020 \$694,574 P.I.: Karl Booksh Co-P.I.: J. Alacantara-Garcia,
T. Hanson, J. Rabolt,
R. Lobo

Program: Major Research Instrumentation

MRI: Acquisition of a Atomic Force Microscope (AFM)-Raman Microscope

2018-2023 \$19,000,000 P.I.: Kent Messer Co-P.I.: D. Sparks,
V. Kalavacharla,
H. Michael,
M. D'Souza, Y. Yan

Program: EPSCoR Research Infrastructure Improvement

RII Track 1: Water Security in Delaware's Changing Coastal Environment

Completed projects

National Science Foundation

2012-2018 #1144726 \$2,372,067 P.I.: K.H. Lee Co-P.I.: J. Song, K. Kiick,
T.E. Hanson, C. Wu

Program: Integrative Graduate Education and Research Training Program

IGERT: Systems Biology of Cells in Engineered Environments (SBE2)

2013-2016 #1244373 \$602,788 P.I.: T.E. Hanson Co-P.I.: C.S. Chan

Program: Systems and Synthetic Biology

S(0) Globule Metabolism in *Chlorobaculum tepidum*: Interdisciplinary Studies of a Novel

Microbe Mineral Interaction

- 2009-2012 #0919682 \$645,905 P.I.: T. E. Hanson Co-P.I.: G. W. Luther
Program: Metabolic Biochemistry
Sulfide toxicity and metabolism in *Chlorobaculum tepidum*.
- 2005-2011 #0447649 \$849,460 P. I.: T. E. Hanson Co-P. I.:
Program: Metabolic Biochemistry
CAREER: Sulfur oxidation in *Chlorobium tepidum*, a model phototrophic bacterium.
- 2007-2008 #0707507 \$126,204 P. I.: T. Epps Co-P. I.: T. E. Hanson
Program: Nanoscale: Exploratory Research
Reusable active nanostructured capture devices for proteomics and metabolomics
- 2004-2008 #0425199 \$600,000 P. I.: T. M. Church Co-P. I.: T. E. Hanson
Program: Chemical Oceanography
Volatile polonium and tellurium species in the marine environment
- 2005-2007 #0542283 \$100,330 P. I.: B. J. Campbell Co-P. I.: T. E. Hanson
Program: Ecosystem Studies
SGER: Microbial processes in tundra ecosystems under simulated climate change conditions
- 2005-2007 #0536982 \$20,682 P. I.: T. E. Hanson Co-P. I.:
Program: Microbial Observatories and Microbial Interactions and Processes
Collaborative Research: Environmental microbial proteomics: linking microbial diversity and function through protein characterization
- 2005-2006 \$25,000 P. I.: T. E. Hanson Co-P. I.:
Metaproteomics: studying natural microbial communities via protein identification
- University of Delaware EPSCoR Seed Grant Program**
- 2012-2013 \$49,981 P.I.: T. E. Hanson Co-P.I.: S. Rozovsky
Probing microbial sulfur metabolism with NMR spectroscopy

University of Delaware Research Foundation

- 2012-2013 \$45,000 P.I.: C. S. Chan Co-P.I.: T. E. Hanson
Biogenic elemental sulfur: integrating nanoscale imaging and molecular microbiology to understand an environmentally and biotechnologically important mineral

Subcontract from Clemson University (NSF Award MCB-1265410, P.I. Barbara Campbell)

- 2012-2014 \$106,523 P.I.: T.E. Hanson Co-P.I.:
Collaborative Research: Do Diverse Members of the Epsilonproteobacteria Employ a Novel Nitrate Reduction Pathway?

Delaware EPSCoR Environmental Frontiers Grant Program

- 2014-2015 \$44,478 P.I.: T.E. Hanson Co-P.I.: G.W. Luther III,
Microbial Geochemistry of Sulfide in the Chesapeake Bay C. Sabanayagam

TEACHING AND MENTORING

Graduate Advisees

Former

- 2012-2019 Katie Kalis M.S. and Ph. D. Marine Biosciences Program
Postdoctoral Scientist at UD
- 2013-2018 Jacob Hilzinger Ph. D. Marine Biosciences Program
Postdoctoral Scientist at UC-Berkeley
- 2011-2016 Amalie (Tuerk) Levy Ph.D. Chemical and Biomolecular Engineering

	Advisor of record: Prof. Kelvin Lee Research Scientist, Janssen Inc.		
2009-2016	Kevin Shuman	Ph. D.	Biological Sciences Assistant Director of STEM Initiatives, Wesley College
2009-2013	Daniel Hess	M. S.	Chemistry-Biology Interface Program Laboratory Manager, Organa Brands
2009-2013	Karen Rossmassler	Ph. D.	Marine Biosciences Program Postdoctoral Researcher, Max Planck Institute for Terrestrial Microbiology
2008-2013	Brian Eddie	Ph. D.	Marine Biosciences Program Research Biologist, Naval Research Laboratory
2007-2010	Ernest Bonsu	DNF	Biological Sciences Unknown
2006-2012	Jennifer Hiras	Ph. D.	Marine Biosciences Program Postdoctoral Researcher, DOE-Joint Bioenergy Insitute
2003-2008	Leong-Keat Chan	Ph. D.	Marine Biosciences Program Senior Technical Support Scientist, WaferGen
2006-2008	Andrew Bahrou	M. S.	Oceanography Program Co-advised with Prof. Tom Church Ph.D. student, Environmental Social Science, The Ohio State University
<i>Current</i>			
2019-	Alexa Bennett	Ph.D.	Bioinformatics and Systems Biology Admitted January 2019
2019-	Vadesse Lhilhi Noundou	Ph.D.	Biological Sciences Admitted January 2019
2019-	Austin Grant	Ph.D.	Microbiology Admitted September 2019

Postdoctoral Researchers

Former-last known position listed

2013-2016	Dr. Cassandra Marnocha	Biological Sciences, Niagara University Assistant Professor Co-advised with Clara Chan
2013-2015	Dr. Vidhyavathi Raman	Research Associate, Noble Research Institute
2007-2008	Dr. Lisa A. Waidner	Biology, University of West Florida Assistant Professor,
2006-2007	Dr. Rachael M. Morgan-Kiss	Microbiology, Miami University (Ohio) Associate Professor
2006-2008	Dr. Patrick R. L. Ollivier	Scientist, Bureau de Recherches Géologiques et Minières, France Co-advised with Prof. Tom Church

Current

2019-	Dr. Katie Kalis	Co-advised with Prof. Jen Biddle
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Undergraduate Research Supervision

*-denotes co-authorship on journal publication

Current

2018	Miranda Marini	Marine Science	MAST468, REU
2019	Alena Brown	Biology (Wesley College)	REU

Former-last known position listed

2018	Caitlin Dull	Biology-Shippensburg Univ. Senior at Shippensburg University	REU
2017	Conner McCrone	Marine Science Senior in Marine Science at UD	Volunteer
2016-2018	Sol Choi	Environmental Science Ph.D. Student, University of Minnesota, Plant and Microbial Biology	Volunteer, Thesis
2013-2016	*Alexa Bennett	Marine Science Sequencing Technician, MIDI Inc.	NSF REU, wage
2014-2015	Casey Smith	Environmental Science Technical Support Specialist, Siemens Scientific	NSF REU, MAST468
2011-2013	Julianna Letterie	Biological Science University of South Florida, Ph.D. student in Integrative Biology	BISC468, Wage
2011-2012	Mfon Ekanem	Biology (Lincoln Univ.) University of Maryland-Eastern Shore, Pharmacy School	NSF REU
*2010-2011	Shannon Owings	Chemistry Georgia Institute of Technology, Ph.D. student in Chemical Oceanography	Wage, SERS program
2009-2010	Jesse Rodriguez	Biological Science Post-Baccalaureate Research Education Program, University of Pennsylvania	EPSCoR/McNair Intern
*2009	Emily Alff	Environmental Science Assistant Plant Breeder, Star Roses and Plants/Conard-Pyle, Philadelphia, PA	MAST468, NSF REU
2009	Laura Treible	Environmental Science Ph.D. student, Marine Biology and Biological Oceanography, UNC-Wilmington	MAST468
2009	James Pittman	Environmental Science Water Resources Engineer, URS Corporation	MAST468
2008-2009	Yun-Fei Lou	Biological Sciences Environmental Health Specialist, Delaware Department of Health and Social Services	MAST468, Wage
2008	Amanda Barnard	Biological Sciences Graduate Student, UD-Biological Sciences	MAST468, EPSCoR Intern
*2006-2007	Sarah Marcus	Animal Sciences Veterinary School, Pacific University	REU (NSF-0425199), Wage
2006-2007	Glenn Christman	Biochemistry Limited Term Bioinformatics Researcher, UD-CEOE-Prof. Jennifer Biddle	MAST468
2005-2007	Michele Madorma	Animal Sciences Instructional Aide, Bernards Township School District, NJ	Wage, MAST468
*2005-2007	Timothy Weber	Mechanical Engineering Owner/Brewer, Twin Leaf Brewery, Asheville, NC	REU (NSF-0425199), Wage
*2005-2006	Talisha Cox	Biology (Lincoln Univ.) Operations officer, INFOCOMM Technologies, Ltd., Trinidad and Tobago	HHMI Intern
2005	Nolberto Figueroa	Biotech. (Univ. de Mayaguez)	REU (CMES)

		Research Technician, Amgen, Inc., Puerto Rico	
2004-2006	Jessica Martin	Animal Sciences	Thesis, EPSCoR Intern DVM, Veterinarian in private practice, Middletown, DE
2004-2006	Egle Burbaite	Biological Sciences	Wage, MAST468 Senior clinical research associate, Pharmaceutical Product Development, LLC
2004-2005	Steven Fatula	Environ Studies (Wesley Coll.)	BRIN/INBRE Intern JD, Partner-McCoy Fatula
2004	Joy Obazee	Biological Sciences	Wage QA Specialist II, BioMarin Pharmaceutical Inc., Novato, CA

Graduate Committees (UD unless noted)

*-denotes co-authorship on publications resulting from input to student's project

Current

CEOE	Christina Baughan	M.S.	Marine Bioscience
	Nanqing Zhou	Ph.D.	Marine Bioscience
Other	Priscilla Hempel	M. S.	Bioinformatics and Computational Biology

Former

2019	Sean McAllister	Ph.D.	Marine Bioscience
	Leandra Jeffs	M.S.	Marine Bioscience
	Cassandra Harris	M.S.	Marine Bioscience
2018	*Javiera Morales	Ph.D.	Microbiology-Biochemistry, Rutgers University
	Kaliopi Bousses	M.S.	Marine Bioscience
	Arkadiy Garber	M.S.	Geological Science
	Michael Fajardo	withdrawn	Bioinformatics and Computational Biology
2017	Annamarie Pasqualone	withdrawn	
	Daniel Nasko	Ph.D.	Bioinformatics and Computational Biology
	Sai Kalburge	Ph.D.	Biological Sciences
	Amy Schaefer	Ph.D.	Chemistry-Biochemistry
2016	Joe Russell	Ph.D.	Marine Biosciences
	Megan Carpenter	Ph.D.	Biological Sciences
	Véronique Oldham	Ph.D.	Oceanography
2015	*Alyssa Findlay	Ph. D.	Oceanography
	Brandy Menges	Ph. D.	Biological Sciences
2014	Fei Li	Ph. D.	Chemistry-Biochemistry
	Kaytee Pokrzywinski	Ph. D.	Marine Biosciences
	J. Bernard Lubin	Ph. D.	Biological Sciences
	Stephanie Schaefer	Ph. D.	Chemistry-Biochemistry
	Kevin Cabaniss	M. S.	Geological Sciences
2013	Alexander Barclay	M. S.	Marine Biosciences
2012	W. Brian Whitman	Ph. D.	Biological Sciences
2011	Maria Wilburn	M. S.	Oceanography
	Camille Jones	M. S.	Plant and Soil Sciences
	Jennifer Stewart	Ph. D.	Marine Biosciences
	Maeva Tureau	Ph. D.	Materials Science

	Sharath Srinivasiah	Ph. D.	Plant and Soil Sciences
2010	Kerry Falgowski	Ph. D.	Biological Sciences
	Ana Fuzyalova	Ph. D.	Chemistry-Biochemistry
	Brandon Lafferty	Ph. D.	Plant and Soil Sciences
	Mengqiang Zhu	Ph. D.	Plant and Soil Sciences
2009	Glenn Christman	M. S.	Marine Biosciences
	Tiffany Straza	Ph. D.	Marine Biosciences
2008	*Julie Smith	Ph. D.	Marine Biosciences
2007	*Shellie Bench	M. S.	Marine Biosciences
	Jeremy Dann	M. S.	Marine Biosciences
	Ann O'Brien	Ph. D.	Chemistry-Biochemistry
	Lisa Waidner	Ph. D.	Marine Biosciences
	*Feng Zhou	Ph. D.	Chemistry-Biochemistry
2006	Hila Elifantz	Ph. D.	Marine Biosciences
	Jungwha Kim	Ph. D.	Chemical Engineering
	Paul Ulrich	Ph. D.	Marine Biosciences

Graduate Courses Taught

2019	MAST625: Microbial Physiology and Diversity	3 credits	Enrollment: 7
	Co-instructors: none		
	MAST626: Microbial Molecular Genetics	3 credits	Enrollment: 8
	Co-instructors: none		
2018	MAST625: Microbial Physiology and Diversity	3 credits	Enrollment: 11
	BINF816: Systems Biology of Cells in Engineered Environments		
	Co-instructors: K. Hooper, T. Powers	3 credits	Enrollment: 8
2017	MAST625: Microbial Physiology and Diversity	3 credits	Enrollment: 9
	Co-instructors: none		
	BINF/MAST694: Systems Biology I	3 credits	Enrollment: 13
	Co-instructors: C. Wu, S. Polson		
2016	BINF/MAST694: Systems Biology I	3 credits	Enrollment: 13
	Co-instructors: L. Liao		
2015	MAST625: Microbial Physiology and Diversity	3 credits	Enrollment: 8
	Co-instructors: none		
	BINF/MAST694: Systems Biology I	3 credits	Enrollment: 17
	Co-instructors: C. Wu, L. Liao		
2014	BINF/MAST694: Systems Biology I	3 credits	Enrollment: 23
	Co-instructors: C. Wu		
	Demographics: 2 undergraduate + 17 graduate + 4 guest from SMSP, Animal Science, Plant and Soil Science, Computer Science, Bioinformatics and Computational Biology		
2013	MAST625: Microbial Physiology and Diversity	3 credits	Enrollment: 6
	Co-instructors: none		
	Demographics: 2 SMSP + 2 Geological Science + 2 Chemistry/Biochemistry		
	BINF694/ANFS667/MAST667: Systems Biology I	3 credits	Enrollment: 17

	Co-instructors: C. Wu, S. Golovan		
	Demographics: All graduate students from SMSP, Animal and Food Science, Computer Science, Biological Sciences, and Bioinformatics and Computational Biology		
2012	MAST698: Environmental/Systems Bioinformatics	3 credits	Enrollment: 6
	Co-instructors: A. Marsh		
	Demographics: 5 Animal Science + 1 Engineering		
	MAST821: Marine Biosciences Seminar	3 credits	Enrollment: 7
	Demographics: 7 CEOE		
2011	MAST625: Microbial Physiology and Diversity	3 credits	Enrollment: 6
	Co-instructors: none		
	Demographics: 3 Biological Sciences + 3 CEOE		
	CHEM667: Environmental Chemistry	3 credits	Enrollment: 9
	Co-instructors: T. Church (lead), M. Johnston, G. Luther		
	Demographics: 8 Chemistry/Biochemistry + 1 Geological Sciences		
2009	MAST625: Microbial Physiology and Diversity	3 credits	Enrollment: 12
	Co-instructors: none		
	Demographics: 9 Biological Sciences + 3 CMES		
	CHEM667: Environmental Chemistry	3 credits	Enrollment: 11
	Co-instructors: T. Church (lead), M. Johnston, G. Luther		
	Demographics: 9 Chemistry/Biochemistry + 2 Plant and Soil Science		
2007	MAST625: Microbial Physiology and Diversity	3 credits	Enrollment: 10
	Co-instructors: none		
	Demographics: 10 CMES		
	CHEM667: Environmental Chemistry	3 credits	Enrollment: 8
	Co-instructors: T. Church (lead), M. Johnston, G. Luther		
	Demographics: 6 Chemistry/Biochemistry + 1 Civil Engineering + 1 Plant and Soil Science		
2005	MAST821: Marine Biology Biochemistry Seminar	1 credit	Enrollment: 5
	Co-instructors: none		
	Demographics: 10 CMES		
	CHEM667: Environmental Chemistry	3 credits	Enrollment: 14
	Co-instructors: T. Church (lead), M. Johnston, G. Luther		
	Demographics: 10 Chemistry + 3 Biochemistry + 1 Natural Resources		
2004	MAST827: Microbial Physiology and Diversity	3 credits	Enrollment: 7
	Co-instructors: none		
	Demographics: 6 CMES + 1 Civil Engineering		
	MAST623: Physiology of Marine Organisms (Guest lecture)		
	Instructors: J. Boyer		
2003	MAST616: Methods in Molecular Biology (Guest lecture)		
	Instructors: S. C. Cary and K. E. Wommack		

Undergraduate Courses Taught

2019	MAST382: Introduction to Ocean Sciences	3 credits	Enrollment: 41
	Co-instructors: J. Biddle		
2018	MAST406: Technical Writing for the Marine Sciences		

	Co-instructors: none	3 credits	Enrollment: 9
2017	BISC300: Introduction to Microbiology Co-instructors: none	3 credits	Enrollment: 120
2016	MAST382: Introduction to Ocean Sciences Co-instructors: J. Biddle	3 credits	Enrollment: 41
2015	MAST382: Introduction to Ocean Sciences Co-instructors: J. Biddle	3 credits	Enrollment: 30
2014	MAST382: Introduction to Ocean Sciences Co-instructors: J. Biddle Demographics: 19 Environmental Science + 3 Marine Science + 1 Continuing Education + 1 Biochemistry + 1 Environmental Engineering + 1 Geological Sciences + 1 Mathematics + 1 Pre-Vet	3 credits	Enrollment: 28
2013	MAST482: Introduction to Ocean Sciences Co-instructors: K. Billups Demographics: 25 Environmental Science + 2 Marine Science + 2 Continuing Education + 1 Biochemistry + 1 Environmental Engineering	3 credits	Enrollment: 31
2012	MAST482: Introduction to Ocean Sciences Co-instructors: K. Billups Demographics: 25 Environmental Science + 2 Marine Science + 2 Continuing Education + 1 Biochemistry + 1 Environmental Engineering	3 credits	Enrollment: 31
2011	MAST482: Introduction to Ocean Sciences Co-instructors: K. C. Wong Demographics: 16 Environmental Science + 1 Pre-Vet + 2 Biological Sciences + 2 Geology + 3 Marine Science + 1 Mechanical Engineering	3 credits	Enrollment: 25
2009	MAST 482: Introduction to Ocean Sciences Co-instructors: K. C. Wong Demographics: 12 Environmental Science + 4 Geology + 3 Engineering + 2 Earth Science Education + 2 Biological Sciences + 2 University Studies + 1 Physics	3 credits	Enrollment: 26
2008	MAST 482: Introduction to Ocean Sciences Co-instructors: K. C. Wong Demographics: 11 Environmental Science + 1 Geology + 1 Chemistry + 2 Biological Sciences + 1 Philosophy	3 credits	Enrollment: 16
2007	MAST 482: Introduction to Ocean Sciences Co-instructors: K. C. Wong Demographics: 5 Civil Engineering + 4 Environmental Science + 2 Geology	3 credits	Enrollment: 11
2006	MAST 482: Introduction to Ocean Sciences Co-instructors: K. C. Wong Demographics: 12 Environmental Science + 2 Earth Science Education + 1 Geology + 1 Political Science + 1 Wildlife Conservation	3 credits	Enrollment: 17
2005	MAST 482: Introduction to Ocean Sciences Co-instructors: K. C. Wong Demographics: 6 Environmental Science + 2 Chemistry + 2 Geology + 1 Geography + 1 Ag and Nat Resources + 1 Biochemistry + 1 Biological Sciences + 1 Earth Science Education + 1 Environmental Engineering	3 credits	Enrollment: 16

PROFESSIONAL ACTIVITIES AND SERVICE

Journal Editorial Positions

- 2015-2017 Editorial Panelist for Career Development Q&A column, Microbe
2013- Editorial Board, Applied and Environmental Microbiology
2011-2018 Specialty Chief Editor, Microbial Physiology and Metabolism, Frontiers in Microbiology
2010- Associate Editor, Microbial Physiology and Metabolism, Frontiers in Microbiology

Advisory Boards

- 2011- Biotechnology Degree Program, Delaware Technical and Community College
2010-2013 NSF ATE SITE SMART Grant, Delaware Technical and Community College
2010-2013 Scientific Advisory Board, Lithos Biofuels Inc.

Meeting Chair

- 2014 Chair, Gordon Research Conference: The Molecular Basis of Microbial One Carbon Metabolism
2012 Vice-Chair, Gordon Research Conference: The Molecular Basis of Microbial One Carbon Metabolism

Meeting Session Chair

- 2018 Physiology, Metabolism, and Sensory Transduction. 16th International Symposium on Phototrophic Prokaryotes. University of British Columbia, Vancouver, Canada
Putting C1-Metabolizing Microbes to Work. Gordon Research Conference: The Molecular Basis of Microbial One Carbon Metabolism. Grand Summit Hotel at Sunday River, ME
2015 Nitrogen and Sulfur Metabolism in the Environment. Gordon Research Conference: Applied and Environmental Microbiology. Mount Holyoke College, South Hadley, MA
2013 Environments of Early Earth II, Gordon Research Conference: Geobiology – Microbe-mineral interactions, biomineralization and the rock record, Ventura, CA
2009 Sulfur Transferases and Biosynthesis, EMBO-FEMS Workshop on Microbial Sulfur Metabolism, Tomar, Portugal
2008 C-1 Metabolism, Ecology, Physiology and the Environment. Gordon Research Conference: The Molecular Basis of Microbial One Carbon Metabolism, Bates College, ME
2006 Genomics and Proteomics. International Symposium on Microbial Sulfur Metabolism International Symposium on Microbial Sulfur Metabolism, Muenster, Germany

Invited Seminars and Meeting Presentations

- 2019 Adaptation to the energy landscape in photoautotrophic bacteria. 8th Federation of European Microbiology Societies Congress. Glasgow, Scotland
Small genomes from specialized organisms still deliver large implications. Department of Biological Sciences. University of Alberta, Edmonton, Canada. Host: Rebecca Case
The Delaware Microbiome Project. Osher Lifelong Learning Institute. Host: Pam Meitner
2017 Surprising revelations from studying S(0) metabolism in *Chlorobaculum tepidum*. MicroSeminar-the Free Web-based Microbiology Seminar Series. Host: Jennifer Biddle. Seminar available at: <https://youtu.be/rF4EBe1WPs8>
Coupling classical and modern techniques to study environmentally relevant microbial physiology. Department of Geosciences, Weber State University, Ogden, UT. Host: Carie Frantz
2016 Physiology of the green sulfur bacteria in the lab and the field: intriguing new metabolites and organisms. UD, Department of Plant and Soil Sciences, Host: Jung-Youn Lee

- Insights into the utilization of S(0) to drive photosynthetic growth in *Chlorobaculum tepidum*. Gordon Research Conference: The Molecular Basis of Microbial One Carbon Metabolism, Waterville Valley Resort, VT
- Science Café: Microbes, Earth and Humankind. UD Center for Science, Ethics, and Public Policy. Host: Tom Powers
- Frontiers Editorial Summit on Open Science for Sustainability, resulting in two web video pieces: <https://videopress.com/v/RsUAN40B> <https://vimeo.com/181643459>
- 2015 Phototrophic sulfur oxidation: complex physiology in 'simple' microbes. **Distinguished Lecturer in Microbiology**. Miami University, Department of Microbiology, Host: Rachael Morgan-Kiss
- Physiology of the green sulfur bacteria in the lab and the field: intriguing new metabolites and organisms. Salisbury University, Biology Department, Host: Mark Holland
- Interviewed as an expert for *Wired* magazine online article on a Science article. <http://www.wired.com/2015/06/gives-beach-smell-sulfur-making-algae/>
- 2014 New insights into elemental sulfur metabolism in *Chlorobaculum tepidum*. Rutgers University, Department of Microbiology and Biochemistry, Host: Max Haggblom
- Sulfide biogeochemistry in the anoxic zone of the Chesapeake Bay. University of Delaware, DENIN Environmental Frontiers seminar series, Host: Jeanette Miller
- No matter where you go, that's where you are: a non-marine microbiologist adapts to life in a marine program. 114th American Society for Microbiology General Meeting, Special Interest Symposium – Careers in Microbiology, Convener: Eleanor Jennings
- 2013 Culture independent and dependent microbial analyses from the Bahamas to the Arctic. University of Florida, Biology Colloquium, Host: Michelle Mack
- 2012 It's a Microbial World. Osher Lifelong Learning Institute. Host: Pam Meitner
- Probing microbial physiology with sequencing: from hot springs to the Arctic via the Bahamas. Stroud Water Research Center. Host: Jinjun Kan
- Probing microbial physiology with sequencing: from hot springs to the Arctic via the Bahamas. UD, Bioinformatics Seminar Series. Host: Cathy Wu
- 2010 Sulfur oxidation in the *Chlorobi*: from metabolites to networks. Max Planck Institute for Terrestrial Microbiology, Marburg, Germany. Host: Rolf Thauer
- Sulfur oxidation in the *Chlorobi*: from metabolites to networks. Max Planck Institute for Marine Microbiology, Bremen, Germany. Host: Nicole Dubilier
- Sulfur oxidation in the *Chlorobi*: from metabolites to networks. University of Hamburg, Hamburg, Germany. Host: Mirjam Perner
- Reduced sulfur compound oxidation driving C1 assimilation in green phototrophic bacteria: complex physiology in "simple" organisms. Gordon Research Conference: The Molecular Basis of Microbial One Carbon Metabolism, Bates College, ME
- 2009 Anaerobic sulfur oxidation in *Chlorobaculum tepidum*: genes, metabolites and linkages to light harvesting. Chemistry-Biology Interface Seminar Series, University of Delaware, Host: John Koh
- It's a Microbial World, Delaware Technical and Community College, NIH-INBRE sponsored seminar series Host: Carrie Rust
- 2008 Microbial RubisCO: an evolving story that touches on sulfur. Ecology and Evolutionary Biology Program, University of Pennsylvania, Host: Yevgeniy Raynes

- Microbial RubisCO: an evolving story that touches on sulfur.
Department of Biology, University of Louisville, Host: Martin Klotz
- Anaerobic sulfur oxidation: genetic analysis in a non-traditional model system
Department of Biochemistry and Microbiology, Rutgers University, Host: Tamar Barkay
- 2007 Anaerobic sulfur oxidation: genetics and proteomics in a non-traditional model system.
Department of Biological Sciences, University of Delaware, Host: Melinda Duncan
- 2006 Novel tellurite resistant microbes from Delaware salt marshes volatilize inorganic Te.
LCABIE, Université de Pau et de Pays d'Adour, Host: Remy Guyoneaud
- Anaerobic sulfur oxidation and RubisCO: more related than you might think.
Department of Plant and Soil Sciences, University of Delaware, Host: Harsh Bais
- Chan, L. K., Morgan-Kiss, R. M., and **T. E. Hanson**. Genetic and proteomic studies of sulfur oxidation in *Chlorobium tepidum*. International Symposium on Microbial Sulfur Metabolism, Muenster, Germany
- Hanson, T. E.**, Kan, J., O'Brien, A., Johnston, M. and F. Chen. Environmental proteomics: profiling complex microbial communities. American Geophysical Union, General Meeting, San Francisco, CA
- RubisCO-like proteins (RLP's): Diversity and links to energy metabolism in *Chlorobium tepidum*.
Gordon Research Conference: The Molecular Basis of Microbial One Carbon Metabolism, Oxford, United Kingdom
- 2005 Microbial physiology: from the lab to the field and back again.
Savannah River Ecology Laboratory, University of Georgia, Host: Chuanlun Zhang
- Physiology and genetics of anaerobic sulfur oxidation in *Chlorobium tepidum*.
Department of Chemistry-Biochemistry, University of Delaware, Host: Roberta Coleman
- 2004 Proteomics in the lab and the environment: challenges, pitfalls, and approaches
Center of Marine Biotechnology, University of Maryland, Host: Feng Chen
- 2003 The *Chlorobium tepidum* RubisCO-like protein: links to sulfur metabolism and oxidative stress.
Delaware Biotechnology Institute, University of Delaware, Host: Karl Steiner
- 2002 Unusual microbial RubisCO and RubisCO-like proteins. Gordon Research Conference: The Molecular Basis of Microbial One Carbon Metabolism, New London, CT
- 2001 Prospects for proteomics in microbial physiology and microbial ecology.
Corporate Remediation Group, E.I. du Pont de Nemours and Company, Host: E. Erin Mack
- 2000 **Hanson, T. E.** and F. R. Tabita. Microbial RubisCO: an evolving story. International Symposium on Photosynthetic CO₂-Assimilating Enzymes: RuBisCO and PEPC, Hyogo, Japan

Contributed Presentations

*-denotes University of Delaware undergraduate author on presentation

- 2018 Proteomes, promoters and operators in *Chlorobaculum tepidum* sulfur metabolism. 5th International Symposium on Microbial Sulfur Metabolism. Vienna, Austria
- 2016 C.L. Marnocha, D.H. Powell, C.R. Sabanayagam, A.T. Levy, **T.E. Hanson** and C.S. Chan. Elemental sulfur biomineralization and dissolution by the phototroph *Chlorobaculum tepidum*. Kavli Frontiers of Science Symposium, Potsdam, Germany.

- 2015 C.L. Marnocha, D.H. Powell, C.R. Sabanayagam, A.Tuerk, **T.E. Hanson** and C.S. Chan. Spatial relationships and physical dynamics of *Chlorobaculum tepidum* and S(0) globules. Geological Society of America General Meeting, Baltimore, MD.
- A. Tuerk, K.H. Lee, and **T. Hanson**. Novel insights into sulfur and energy metabolism and microbe-mineral interactions in a model phototrophic bacterium. Gordon Research Conference: Applied and Environmental Microbiology, South Hadley, MA.
- K. Shuman and **T.E. Hanson**. Physiological roles of three SQR homologs from *Chlorobaculum tepidum*. Gordon Research Conference: Applied and Environmental Microbiology, South Hadley, MA.
- 2014 K. Shuman and **T.E. Hanson**. Purification and characterization of SQRs from *Chlorobaculum tepidum*. Gordon Research Conference: Molecular Basis of Microbial One-Carbon Metabolism. Aug. 10-15, 2014. Mount Holyoke College, South Hadley, MA
- A. Tuerk, **T.E. Hanson**, and K. Lee. Proteomic study of zero-valent sulfur metabolism in *Chlorobaculum tepidum*. Gordon Research Conference: Molecular Basis of Microbial One-Carbon Metabolism. Aug. 10-15, 2014. Mount Holyoke College, South Hadley, MA
- 2013 Findlay, A., MacDonald, D. J., Gartman, A., Owings, S., **Hanson, T. E.**, and G. W. Luther, III. Investigation of abiotic and biotic pathways for sulfide oxidation in the Chesapeake Bay. American Chemical Society National Meeting and Exhibition, New Orleans, LA
- 2012 D.R. Hess, C.M. Paquette, D.F. Taber, and **T.E. Hanson**. Understanding the function and biosynthesis of chlorobiumquinone in *Chlorobaculum tepidum*. Gordon Research Conference: Molecular Basis of Microbial One-Carbon Metabolism. Aug. 5-10, 2012. Bates College, Lewiston, ME
- B. J. Eddie and **T.E. Hanson**. Transcriptomics guided analysis of sulfur oxidation in *Chlorobaculum tepidum*. Gordon Research Conference: Molecular Basis of Microbial One-Carbon Metabolism. Aug. 5-10, 2012. Bates College, Lewiston, ME
- K. Shuman and **T.E. Hanson**. Expression and purification of SQRs from *Chlorobaculum tepidum*. Gordon Research Conference: Molecular Basis of Microbial One-Carbon Metabolism. Aug. 5-10, 2012. Bates College, Lewiston, ME
- J. Letterie, J. Macalady, J. Overmann, and **T. Hanson**. A red *Chlorobi* from a Bahamian blue hole. Gordon Research Conference: Molecular Basis of Microbial One-Carbon Metabolism. Aug. 5-10, 2012. Bates College, Lewiston, ME
- K. Rossmassler, **T.E. Hanson**, and B.J. Campbell. Linking the diversity of the *aclB* and 16S rRNA genes in *Epsilonproteobacteria* from sulfidic caves and springs. Gordon Research Conference: Molecular Basis of Microbial One-Carbon Metabolism. Aug. 5-10, 2012. Bates College, Lewiston, ME
- K. Kalis, **T.E. Hanson**, M.G. Klotz, and B.J. Campbell. *Nautilia profundicola* and the proposed nitrate reduction pathway. Gordon Research Conference: Molecular Basis of Microbial One-Carbon Metabolism. Aug. 5-10, 2012. Bates College, Lewiston, ME
- 2010 Hiras, J., Y.-S. Choi, K.H. Lee, and **T.E. Hanson**. A structurally novel redox balancing thiol from *Chlorobaculum tepidum*. Gordon Research Conference: The Molecular Basis of Microbial One Carbon Metabolism, Bates College, ME
- Eddie, B.J. and **T.E. Hanson**. Responses of *Chlorobaculum tepidum* to elevated sulfide. Gordon Research Conference: The Molecular Basis of Microbial One Carbon Metabolism, Bates College, ME

- 2009 **Hanson, T. E.** L. K. Chan, J. Hiras, E. Bonsu, and B. Eddie. Experimentally refining a genome based model of sulfur oxidation in *Chlorobaculum tepidum*. EMBO FEMS Workshop on Microbial Sulfur Metabolism, Tomar, Portugal.
- Hiras, J., and **T. E. Hanson.** *Chlorobium tepidum* thiol metabolism: significant extracellular pools of thiols exist and thiol pool sizes are altered by sulfur oxidation defects. EMBO FEMS Workshop on Microbial Sulfur Metabolism, Tomar, Portugal.
- Eddie, B. J., Chan, L.-K., and **T. E. Hanson.** Responses of *Chlorobaculum tepidum* to elevated sulfide. 13th International Symposium on Phototrophic Prokaryotes, Montreal, Canada.
- Bonsu, E. O., Waidner, L., and **T. E. Hanson.** Genetic analysis of *Chlorobaculum tepidum* sulfur islands. 13th International Symposium on Phototrophic Prokaryotes, Montreal, Canada.
- Hanson, T. E.,** Hiras, J., Chan, L.-K., and R. M. Morgan-Kiss. Anaerobic sulfur oxidation in *Chlorobaculum tepidum*: genes, metabolites, and linkages to light harvesting. 13th International Symposium on Phototrophic Prokaryotes, Montreal, Canada.
- 2008 Bahrou, A., Ollivier, P., Church, T. M., and **T. E. Hanson.** Volatilization of Po by tellurite resistant marine microbes. Ocean Sciences Meeting sponsored by the American Society for Limnology and Oceanography, The Ocean Society, and the American Geophysical Union, Orlando, FL
- Hanson, T. E.,** Campbell, B. J., Schuur, T. and M. Mack. Structure and function studies of LTER plot soil microbial communities. Toolik Lake LTER Users Meeting, The Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA
- 2007 *Bahrou, A., Ollivier, P., Marcus, S., Church, T. M. and **T. E. Hanson.** Dimethyl telluride production by marine *Bacillus* spp. 107th American Society for Microbiology General Meeting, Toronto, CA
- Campbell B. J., **Hanson T. E.,** Mack M. and E. Schuur. Changes in bacterial community structure after nutrient fertilization in tundra ecosystems. 107th American Society for Microbiology General Meeting, Toronto, CA
- *Chan, L. K., Morgan-Kiss, R. M., Weber, T. S., and **T. E. Hanson.** Sulfide oxidation in the green sulfur bacterium *Chlorobium tepidum*. 107th American Society for Microbiology General Meeting, Toronto, CA
- *Hiras, J., Weber, T. S., and **T. E. Hanson.** Low molecular weight thiols in the green sulfur bacterium *Chlorobium tepidum*. 107th American Society for Microbiology General Meeting, Toronto, CA
- Kan, J., **Hanson, T.,** Wommack, E. and F. Chen. 2007. Seasonal synchronicity between microbial community DNA and proteomic patterns in the Chesapeake Bay. 4th Annual Microbial Observatories Workshop, Washington DC.
- Kokes, M., **Hanson, T. E.,** Mack, M., Schuur, E. A. G. and B. J. Campbell. Archaeal communities after nutrient fertilization in tundra ecosystems. 107th American Society for Microbiology General Meeting, Toronto, CA
- Morgan-Kiss, R. M., Chan, L. K., and **T. E. Hanson.** A defect in sulfur oxidation causes feed-back effects on photophysiology in the green sulfur bacterium, *Chlorobium tepidum*. 107th American Society for Microbiology General Meeting, Toronto, CA
- *Ollivier, P., Bahrou, A., Cox, T., Marcus, S., Church, T. and **T. E. Hanson.** Te-volatilizing microbes isolated from Delaware salt marshes. American Society for Limnology and Oceanography Aquatic Sciences Meeting, Santa Fe, NM

- 2006 Campbell, B. J., **Hanson T. E.**, Mack, M. and E. Schuur. Microbial community dynamics after nutrient fertilization in tundra ecosystems. 106th American Society for Microbiology General Meeting, Orlando, FL
- Hanson, T. E.**, Li, H., Satagopan, S., and F. R. Tabita. Putting roots on the RubisCO family tree: sequence, structural, and functional diversity in the RubisCO-like proteins and RubisCO. 12th International Symposium of Phototrophic Prokaryotes, Pau, France
- Helton, R. R., Ritalahti K. M., **Hanson T. E.**, Loffler F. E., and K. E. Wommack. Detection and analysis of prophage integrases in dechlorinating bacterial populations. 11th International Symposium on Microbial Ecology, Vienna, Austria
- Kan, J., **Hanson, T.**, Cary, C., Wommack, E., Hill, R., and F. Chen. Community proteomics, a new way to explore microbial functions in natural environments. American Society of Limnology and Oceanography Summer Meeting, Victoria, B. C., Canada
- Morgan-Kiss, R. M., Priscu, J. C. and **T. E. Hanson**. Phytoplankton diversity in the permanently ice covered lakes of the McMurdo Dry Valleys, Antarctica. Canadian Society for Microbiology General Meeting, London, Ontario, Canada
- O'Mara, K. J., Wang, K., Kan, J., Bench, S., **Hanson, T.**, Wommack, E., and F. Chen. Genetic diversity and seasonal patterns of cyanophage *psbA* gene in the estuarine environment revealed by a newly designed PCR primer set. American Society of Limnology and Oceanography Summer Meeting, Victoria, B. C., Canada
- Snellinger-O'Brien, A.M. Morgan-Kiss, R.M., **Hanson, T.E.**, and M.V. Johnston. Environmental proteomics study of elemental sulfur oxidation in anaerobic conditions. 54th American Society for Mass Spectrometry Conference on Mass Spectrometry, Seattle, WA
- 2005 Campbell, B. J., Cary, S. C., and **T. E. Hanson**. Functional and genomic studies of autotrophy in *Nautilia* sp. strain AmH. 105th American Society for Microbiology General Meeting, Atlanta, GA
- *Chan, L. K., Martin, J. L., Lawani, J. O., Burbaite, E. A., and **T. E. Hanson**. Studying sulfur oxidation in *Chlorobium tepidum* by in vitro transposition mutagenesis. 105th American Society for Microbiology General Meeting, Atlanta, GA
- Church, T. M., **Hanson, T. E.**, and D. Amouroux. Processes for the formation of volatile trace element species in the ocean: evidence using tellurite resistant microbes. American Society for Limnology and Oceanography, Summer Meeting, Santiago de Compostela, Spain
- Hanson, T. E.** and T. M. Church. Tellurite resistant microbes from a Delaware salt marsh. 105th American Society for Microbiology General Meeting, Atlanta, GA
- Kan, J., **Hanson, T.**, Campbell, B., Cary, C., Wommack, E., Hill, R., and F. Chen. Metaproteomics, a new way to explore microbial function in natural environments. Human Proteome Organization 4th Annual World Congress, Munich, Germany
- Kan, J., **Hanson, T.**, Wang, K., Campbell, B., Cary, C., Wommack, E., Hill, R. and F. Chen. Meta-proteomics, a new way to explore microbial processes in the ocean? International Marine Biotechnology Conference, St. John's, Newfoundland, Canada
- Wommack, K. E., Bench, S. R., and **T. E. Hanson**. How well do cultivated algal viruses reflect viroplankton genotypic diversity? 4th Algal Virus Workshop, Amsterdam, Netherlands
- 2004 Kan, J., **Hanson, T.**, Campbell, B., Cary, C., Wommack, E., Hill, R. and F. Chen. Metaproteomics, a new way to explore microbial processes in the ocean? NSF 3rd Microbial Observatories Workshop, Big Sky, MT

- 2003 Tabita, F. R., **Hanson, T. E.**, and J. Singh. Functional studies on the RubisCO-like protein and the reductive TCA cycle in *Chlorobium tepidum*. Satellite Meeting on Green Bacteria, 11th International Symposium on Phototrophic Prokaryotes, Tokyo, Japan
- 2002 **Hanson, T.E.** and F.R. Tabita. *Chlorobium tepidum* RubisCO-like protein: links to sulfur metabolism. EMBO Workshop on Green and Heliobacteria, Passau, Germany
- 2000 **Hanson, T.E.** and F.R. Tabita. A RubisCO homolog from *Chlorobium tepidum*: what does it do? Gordon Research Conference: The Molecular Basis of Microbial One Carbon Metabolism, New London, CT
- 1999 **Hanson, T.E.** and F.R. Tabita. A ribulose 1,5 bisphosphate carboxylase/oxygenase homolog from *Chlorobium tepidum*. 99th ASM General Meeting, Chicago, IL
- 1997 **Hanson, T. E.** and J. C. Meeks. Characterization of the *glnB* gene product of *N. punctiforme*: the P_{II} protein appears to be essential. IXth International Symposium on Photosynthetic Prokaryotes, Vienna, Austria
- 1995 **Hanson, T. E.** and J. C. Meeks. Cloning and preliminary characterization of the *glnB* gene from *Nostoc* sp. strain ATCC 29133. Vth Cyanobacterial Molecular Biology Workshop, Asilomar, CA
- 1994 **Hanson, T. E.** and J.C. Meeks. Characterization of the *glnB* gene and P_{II} Protein of *Nostoc* sp. strain ATCC 29133. VIIIth International Symposium on Phototrophic Prokaryotes, Urbino, Italy

Grant Review Panelist

- 2019 Delaware Biosciences Center for Advanced Technologies
NSF: Integrative Ecological Physiology (IOS)
- 2017 Delaware Biosciences Center for Advanced Technologies
- 2015 NASA: Astobiology
- 2014 NSF: Systems and Synthetic Biology (MCB), Physiological and Structural Systems (IOS)
- 2010 NSF: Metabolic Biochemistry
- 2009 DOE: Environmental Remediation Science Program
- 2007 NSF: Metabolic Biochemistry
DOE: Environmental Remediation Science Program
- 2006 NSF: Metabolic Biochemistry
- 2005 NSF: Metabolic Biochemistry
DOE: Natural and Accelerated Bioremediation Research Program
EPA: Science to Achieve Results Graduate Fellowship Program

Journal Article/Grant Proposal Reviews

- 2019 Journals: Applied and Environmental Microbiology, Frontiers in Microbiology
NSF-MCB
- 2018 Journals: Applied and Environmental Microbiology (3), Archives of Microbiology, Frontiers in Microbiology (9), mBio, Proceedings of the National Academy of Sciences
- 2017 Journals: Applied and Environmental Microbiology, Frontiers in Marine Science, Frontiers in Microbiology (3 edited, 1 reviewed), Journal of Geophysical Research Biogeosciences, mBio
- 2016 Journals: Applied and Environmental Microbiology (2), FEMS Microbiology Ecology, Frontiers in Microbiology (2), ISME Journal, Journal of Bacteriology, Nature
NSF-MCB (2)

- 2015 Journals: Applied and Environmental Microbiology (3), ISME Journal, Journal of Bacteriology, PLoS One, Science
NSF-IOS
- 2014 Journals: Applied and Environmental Microbiology (3), Journal of Bacteriology, Geobiology
DOE-Basic Energy Sciences
- 2013 Journals: Applied and Environmental Microbiology (4), Journal of Biotechnology, Ecosystems,
Technology Foundation STW (Netherlands)
- 2012 Journals: Journal of Bacteriology, Applied and Environmental Microbiology, Journal of
Geophysical Research – Biogeosciences, Waste and Biomass Valorization, Frontiers in
Microbiology, PLoS One, Microbiology
Fonds zur Förderung der wissenschaftlichen Forschung (Austrian NSF)
- 2011 Journals: Annals of Microbiology, Geobiology, Frontiers in Microbiology
- 2010 Journals: Proceedings of the National Academy of Sciences, FEMS Microbiology Letters, Journal
of the American Chemistry Society, Journal of Bacteriology, Aquatic Geochemistry, FEMS
Microbiology Ecology, Microbiology
European Research Commission-Starting Grant Panel
- 2009 Journals: Journal of Bacteriology (3), Environmental Microbiology (2), Geomicrobiology Journal,
Extremophiles, Photosynthesis Research, Proceedings of the National Academy of Sciences
Netherlands Genomics Initiative: Horizon Programme
- 2008 Journals: Communicative and Integrative Biology, Journal of Bacteriology
NSF: Microbial Observatories/Microbial Interactions and Processes, Metabolic Biochemistry
- 2007 Journals: Environmental Microbiology
NSF: Microbial Observatories/Microbial Interactions and Processes, Metabolic Biochemistry
- 2006 Journals: FEMS Microbiology Ecology
NSF: Metabolic Biochemistry
National Science Foundation of Switzerland
- 2005 Journals: FEMS Microbiology Ecology, Journal of Structural Biology
NSF: Microbial Observatories, Metabolic Biochemistry
NOAA: National Undersea Research Program
California Sea Grant College Program
Kearney Foundation of Soil Science
- 2004 Journals: FEMS Microbiology Ecology, Archives of Microbiology
NSF: Microbial Observatories, Metabolic Biochemistry
- 2003 NSF: Biological Oceanography
- 2002 Journals: Journal of Bacteriology

COLLEGE, UNIVERSITY, AND COMMUNITY SERVICE

Administrative Appointments

- 2017- Interim Associate Director, Delaware Biotechnology Institute
2013-2016 Associate Director, Marine Biosciences Program, School of Marine Science and Policy

Center/Program Affiliations

- Center for Critical Zone Research (<http://cczr.dbi.udel.edu/>)
Center for Environmental Genomics (<http://www.ceoe.udel.edu/CEG/>)

Center for Bioinformatics and Computational Biology (<http://bioinformatics.udel.edu/>)
Chemistry Biology Interface Program (http://www.udel.edu/chem/cbi/cbi/CBI_Home.html)

Committees

2019- CEOE: Promotion and Tenure
2017-2018 Pharmaceutical Science and DBI Futures
2017 Chemistry and Biochemistry: Faculty search
2016-2018 SMSP: Promotion and Tenure (Chaired in 2017)
2016 SMSP: Undergraduate Curriculum
Plant and Soil Science: Faculty search
2014 SMSP: Faculty cluster hire
2013-2019 SBE2-IGERT: Executive and Curriculum Committees
2013-2015 Bioinformatics and Computational Biology: Qualifying Exam
2013 Biological Sciences: Faculty search
2010-2011 SMSP Director Search Committee
2009-2012 CEOE Academic Council
2009- Bioinformatics and Computational Biology: Steering Committee
2009-2012 Bioinformatics and Computational Biology: Admissions Committee
2009 CMES: Strategic Planning Committee, Undergraduate Major Planning Committee
2008 Marine Microbial Ecology Faculty Search Committee, Marine Biosciences Program
2008 Geobiology Faculty Search Committee, Department of Geological Sciences
2005-2006 University of Delaware Educational Assessment Council
2003-present Delaware Biotechnology Institute Safety Committee

Guest Lectures and Presentations

2015 Speaker, DENIN Scholars Winter Retreat
2014 Faculty, Taking an Interest in Delaware's Estuary K-12 summer camp
see <http://www.ocean.udel.edu/TIDE/index.htm>
2013 Speaker, UD EPSCoR Undergraduate Summer Retreat
Speaker, UD EPSCoR Teacher Professional Development Program
Faculty, Taking an Interest in Delaware's Estuary K-12 summer camp
see <http://www.ocean.udel.edu/TIDE/index.htm>
2012 Faculty, Taking an Interest in Delaware's Estuary K-12 summer camp
see <http://www.ocean.udel.edu/TIDE/index.htm>
2011 DBI school group visit speaker
University of Delaware Coast Day, hands on activity: It's a Microbial World
Faculty, Taking an Interest in Delaware's Estuary K-12 summer camp
see <http://www.ocean.udel.edu/TIDE/index.htm>
2009 University of Delaware Coast Day, hands on activity: It's a Microbial World
Faculty, Taking an Interest in Delaware's Estuary K-12 summer camp

- see <http://www.ocean.udel.edu/TIDE/index.htm>
- 2008 Faculty, Taking an Interest in Delaware's Estuary K-12 summer camp
see <http://www.ocean.udel.edu/TIDE/index.htm>
Panelist, Peer Review of Grant Applications, Responsible Conduct of Research Workshop
- 2007 IdeA/EPSCoR Coalition Meeting and Congressional Delegation Visits
University of Delaware Coast Day, hands on activity: It's a Microbial World
CMES Graduate Recruiting Weekend-DBI presentation to prospective students
- 2006 University of Delaware Coast Day, hands on activity: It's a Microbial World
Delaware EPSCoR Teacher Training Workshop-Soil Microbial Biotechnology
EPSCoR Web Site Development-It's a Microbial World
see <http://www.epscor.dbi.udel.edu/outreach/science/article.php?id=1>
CMES Graduate Recruiting Weekend-DBI Tour and presentation to prospective students
CMES Booth Representative-Delaware Discovery Days
- 2005 University of Delaware Coast Day, hands on activity: It's a Microbial World
CMS Recruiting Weekend-DBI Tour and presentation to prospective students
CMS Booth Representative-Delaware Discovery Days
- 2004 Faculty Panelist, UNIV 603-The Academic Job Search, Instructor: Gabriele Bauer
University of Delaware Coast Day, hands on activity: Visualizing the Invisible
CMS Recruiting Weekend-DBI Tour and presentation to prospective students
- 2003 Faculty Panelist, UNIV 603-The Academic Job Search, Instructor: Gabriele Bauer
Johns Hopkins University Center for Talented Youth, It's a Microbial World
CMS Recruiting Weekend-DBI Tour and presentation to prospective students