

ANNETTE SUMMERS ENGEL

UNIVERSITY OF TENNESSEE

DEPARTMENT OF EARTH AND PLANETARY SCIENCES

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EDUCATION

Ph.D. Geological Sciences	2004	The University of Texas at Austin, Austin, Texas Dissertation Advisor: P.C. Bennett
M.Sc. Biological Sciences	1999	University of Cincinnati, Cincinnati, Ohio Thesis Advisor: B.K. Kinkle
M.Sc. Geology	1997	University of Cincinnati, Cincinnati, Ohio Thesis Advisor: W. Huff
B.A. Geology	1995	Wittenberg University, Springfield, Ohio Senior Thesis Advisor: J.R. Ritter

PROFESSIONAL EXPERIENCE

- May 2016 – present. **Jones Professor of Aqueous Geochemistry**. University of Tennessee, Department of Earth and Planetary Sciences, Knoxville, Tennessee.
- August 2011 – May 2016. **Jones Associate Professor of Aqueous Geochemistry**. University of Tennessee, Department of Earth and Planetary Sciences, Knoxville, Tennessee.
- May 2010 – July 2011. **Associate Professor of Geomicrobiology**. Louisiana State University, joint appointment to the Dept Geology & Geophysics (primary department, 75%) and Dept. Biological Sciences (secondary department, 25%)
- 2004 –2010. **Assistant Professor of Geomicrobiology**. Louisiana State University, joint appointment to Dept Geology & Geophysics and Dept Biological Sciences (secondary)

RESEARCH INTERESTS

General: low-temperature aqueous geochemistry; geomicrobiology; microbial ecology

Specific research areas: groundwater and karst microbial ecology; microbiology of extreme environments; microbial effects on carbonate dissolution; sulfur and carbon biogeochemical cycles; dissolved organic matter cycling and processes; chemolithoautotrophic processes; microbial diversity of marine bivalve symbiotic associations; marine wetland biogeochemistry

AWARDS AND RECOGNITION OF SCHOLARLY ACHIEVEMENT

National

- **Fellow**, The Explorers Club (2015)
- Karst Waters Institute, Distinguished Service Award (2015)
- National Speleological Society **Science Award** (2014) <http://caves.org/committee/award/>
Citation: “The NSS Science Award recognizes an individual NSS member who has made significant contributions to the science of speleology.... Annette is described as tireless, enthusiastic, a great teacher, and an inspiration to her students....” From NSS News November 2014, 72(11):9.
- **Fellow** of the Geological Society of America (2012)

Citation: Engel "...has made important scientific contributions to the field of biogeochemistry of the subsurface environment, particularly in karst terrain. Her work has led to new insights into biological processing of chemical compounds in aphotic and hydrothermal settings and more recently along the Gulf Coast." From GSA Today July 2012, 22(7):13.

- **Fellow** of the National Speleological Society (2003) (<6% of the membership reaches Fellow status; nominated and elected by peers and committee)

University

- G.M. Hall Professorship for Extraordinary Service, Department of Earth and Planetary Sciences, Strong Hall New Building Committee, University of Tennessee (2014)
- UT Quest Scholar of the Week, October 7, 2013 <http://quest.utk.edu/scholar-of-the-week/>
- **Excellence in Research/Creative Achievement Award** (Junior level), College of Arts and Sciences, University of Tennessee (2013)
- G.M. Hall Professorship for Extraordinary Service, Department of Earth and Planetary Sciences, Graduate Program SACS Development, University of Tennessee (2013)
- Junior Class Student-Athlete Faculty Appreciation, The Thornton Center and Intercollegiate Athletes, University of Tennessee (2012)
- Honored (with nine other faculty) at LSU vs. Mississippi State football game (92,000+ in attendance) for 2010 Gulf of Mexico BP/Macondo Oil Spill Research Response, LSU Office of the Vice Chancellor for Research and Economic Development, Sept. 18, 2010. See photograph and summary (page 46) <https://sites01.lsu.edu/wp/ored/files/2013/09/ORED-Responding-to-the-Flow.pdf>
Citation: "So many of our researchers have participated in extensive research and service related to the disaster in the Gulf," said Doris Carver, interim vice chancellor of research and economic development. "These 10 faculty and staff members are representative of many from the LSU community who demonstrated a strong sense of public service, produced substantial research efforts and also demonstrated commitment above and beyond their normal research and teaching obligations. All of our faculty who worked hard to ensure that the oil would be cleaned, analyzed and mitigated are to be applauded." Originally printed here: <http://www.lsu.edu/ur/ocur/lsunews/MediaCenterNews/2010/09/item19517.html>
- Faculty Research Award from the College of Science, Louisiana State University, March 2010
- "2009 LSU Rainmaker", Louisiana St. Univ. Office of Research & Economic Development
- "2008 LSU Rainmaker", Louisiana St. Univ. Office of Research & Economic Development

Other Notable Awards

- Wayne Franklin Bowman Endowed Presidential Scholarship and Fellowship, University of Texas at Austin (2003-2004)
- **Charles A. and Anne Morrow Lindbergh Foundation Award** (1997-1998)
- **James G. Mitchell Award, National Speleological Society**, competitive award at national meeting for best speaker under 25 years of age (1996)

RESEARCH SUPPORT AND GRANT ACTIVITIES

Summary (August 2004 – January 2017):

Federal & Private funding	= \$3,389,431
Other Funding (State, University)	= \$ 642,036
Total Funding	= \$4,031,467

Current Support

- 1) \$849,057 **Gulf of Mexico Research Initiative RFP-IV** “*Coastal Waters Consortium*” Subcontract through Louisiana University Marine Consortium. N. Rabalais, lead PI. Total award, \$16M+, with 11 other co-PIs. 01/2015-12/2017.
- 2) \$794,388 **National Science Foundation** “*Dimensions: Collaborative Research: Functional diversity of chemosymbiosis in lucinid bivalves from coastal biomes*” Principal Investigator/Project Director. Total award \$1,627,102 with co-PIs Laurie Anderson, SD School of Mines and Technology, and Barbara Campbell, Clemson University. 01/01/14 – 12/31/18.

Previous Support (last 5 years)

- 1) \$25,000 **Cave Conservancy Foundation** “*Distribution and conservation of cave biodiversity in the Valley and Ridge*” Principal Investigator. With co-PIs M. Niemiller (Univ. KY), K. Zigler (Univ. South), Danté Fenolio (San Antonio Zoo), and K. Denise Kendall (Univ. KY) 01/01/14 – 12/31/15 (no-cost extension until 6/30/16). Completed.
- 2) \$551,797 **Gulf of Mexico Research Initiative RFP-I** “*The Effects of the Macondo Oil Spill on Coastal Ecosystems*” Subcontract from Louisiana Universities Marine Consortium, Nancy Rabalais lead PI. Total award \$12,185,000, with 11 other universities. 09/2011-12/2014. No cost extension through 12/31/15. Completed.
- 3) \$38,000 **Student Technology Fee Award** 2014-2015, College of Arts and Sciences, University of Tennessee “*ICS-2100 and software upgrade.*” 07/01/14 – 06/30/15. Completed.
- 4) \$149,834 **National Science Foundation** IOS-1041941 “*EAGER: Dual Symbiosis in Lucinid Bivalves*” Lead PI with L. Anderson (LSU). 8/1/10 – 7/31/12. Transfer to UTK \$107,732; no-cost extension through 07/2014. Completed.
- 5) \$39,000 **SARIF** and \$40,000 **College of Arts and Sciences** for *Fourier Transform Infrared Spectrophotometer and Chemical Imaging system*. Lead PI with five other faculty members across three departments (EPS, Microbiology, CEE) and two colleges (Arts and Sciences and Engineering). 10/2012 – 07/2013. Completed.
- 6) \$21,361 **Institute for a Secure and Sustainable Environment (ISSE)** Equipment Acquisition Opportunity, University of Tennessee. 04/2013 – 06/2013. Sole PI. Completed.
- 7) \$278,154 **National Science Foundation** (Geobiology & Low Temperature Geochemistry Program through ARRA) EAR-0844364 “*The Speciation and Behavior of Sulfur Gases in Biogeochemical Processes*” Lead PI with A. Prange and F.J. Hormes (CAMD, LSU). 7/1/09 – 6/30/13. Subcontract to UTK for years 3 & 4 for \$49,996. Completed.

LISTING OF RESEARCH PUBLICATIONS

Edited Books

- (4) **Engel, A.S.**, editor (2015) Microbial Life of Cave Systems. DeGruyter Publishing House series “Life in Extreme Environments.” 335 pp (14 chapters; 98 illustrations; 14 tables). <http://www.degruyter.com/view/product/212865>
- (3) Klimchouk, A., Sasowsky, I.D., Mylroie, J., Engel, S.A., **Engel, A.S.** (editors) (2014) Hypogene Cave Morphologies. Selected papers and abstracts of the symposium held

February 2 through 7, 2014, San Salvador Island, Bahamas. Karst Waters Institute Special Publication 18: Leesburg, Virginia, 111 p.

- (2) **Engel, A.S.**, Engel, S.A., Moore, P.J., and DuChene, H. (editors) (2011) Carbonate Geochemistry: Reactions and Processes in Aquifers and Reservoirs, Karst Waters Institute Special Publication 16: Leesburg, Virginia, 84 p.
- (1) **Engel, A.S.**, and Engel, S.A. (editors) (2009) Select Field Guides to Cave and Karst Lands of the United States. Karst Waters Institute Special Publication 15, Leesburg, VA, 184 p.

Published Shorter Works (last 5 years)

^G = Graduate student in my research group ^U = Undergraduate student in my research group
^{PD} = Postdoctoral research associate conducting research financed on my grants ^{CG} = collaborating graduate student from another institution
^{CU} = collaborating undergraduate student from another institution
^{CPD} = collaborating post-doctoral research associate from another institution † = corresponding author

Peer-reviewed Journals and Scholarly Book Chapters

- (60) Keenan, S.W. ^{G†}, **Engel, A.S.** (2017) Early diagenesis and recrystallization of bone. *Geochimica et Cosmochimica Acta*. 196: 209-223. DOI:10.1016/j.gca.2016.09.033.
- (59) Keenan, S.W. ^{G†}, **Engel, A.S.** (2017) Reconstructing diagenetic conditions of the Gray Fossil Site, Tennessee, USA. *Palaeogeography, Palaeoclimatology, Palaeoecology*. 471:48-57. <http://dx.doi.org/10.1016/j.palaeo.2017.01.037>
- (58) Yun, Y. [#], Wang, H. [†], Baiying, M., Xiang, X., Zhou, J., Qiu, X., Duan, Y., Engel, A.S. (2016) Impact of climate change and acidification on cave and karst bacterial communities of Central China. *Frontiers of Microbiology – Extreme Microbiology*. <https://doi.org/10.3389/fmicb.2016.01955/> #visiting student in my research group, 2017
- (57) Niemiller, M.L. [†], Zigler, K.S., Hart, P.B., Kuhajda, B.R., Armbruster, J.W., Ayala, B.N., **Engel, A.S.** (2016) First record of a stygobiotic fish (Percopsiformes: Amblyopsidae: *Typhlichthys*) from the Appalachians karst region in the eastern United States. *Subterranean Biology*. 20: 39-50. doi: 10.3897/subtbiol.20.9693.
- (56) Plenge, M.F. ^{CG†}, **Engel, A.S.**, Omelon, C.R., Bennett, P.C. (2016) Thermophilic archaeal diversity and methanogenesis from El Tatio Geysir Field, Chile. *Geomicrobiology Journal*. DOI:10.1080/01490451.2016.1168496.
- (55) Hutchins, B.T. ^{CG†}, **Engel, A.S.**, Nowlin, W.H., Schwartz, B.F. (2016) Chemolithoautotrophy supports subterranean food webs and affects regional diversity and long-term stability of stygobiont communities. *Ecology*. 97: 1530–1542. DOI: doi/10.1890/15-1129.1/.
- (54) Niemiller, M.L. ^{CDP†}, Zigler, K.S., Stephen, C.D.R. ^{CG}, Carter, E.T. ^{CG}, Paterson, A.T., Taylor, S.J., **Engel, A.S.** (2016) Vertebrate fauna in caves of eastern Tennessee within the Appalachians karst region, USA. *Journal of Cave and Karst Studies*. 78:1-24. DOI:10.4311/2015LSC0109.
- (53) Zigler, K.S. [†], Kuhajda, B.R., Ayala, B.N., Niemiller, M.L., **Engel, A.S.** (2015) First observation of Southern Cavefish (*Typhlichthys subterraneus*) east of the Cumberland Plateau. *Bulletin of the Georgia Speleological Society* 2015: 9-11.
- (52) Keenan, S.W. ^{G†}, **Engel, A.S.**, Roy, A., Bovenkamp, G.L. (2015) Evaluating the consequences of diagenesis and fossilization on bioapatite lattice structure and composition. *Chemical Geology*. 413: 18-27, doi:10.1016/j.chemgeo.2015.08.005

- (51) Brannen-Donnelly, K.^{G†}, **Engel, A.S.** (2015) Bacterial diversity differences along an epigenic cave stream reveal evidence for community dynamics, succession, and stability. *Frontiers in Microbiology, section Terrestrial Microbiology*. 6: 729, <http://dx.doi.org/10.3389/fmicb.2015.00729>.
- (50) Paterson, A.T., **Engel, A.S.** (2015) Predicting bacterial diversity in caves associated with sulfuric acid speleogenesis, in Engel, A.S. (ed.) *Microbial Life of Cave Systems*. Berlin: De Gruyter, 193-214.
- (49) **Engel, A.S.** (2015) Bringing microbes into focus for cave science: An introduction, in Engel, A.S. (ed.) *Microbial Life of Cave Systems*. De Gruyter, 1-22.
- (48) Turner, R.E.[†], Overton, E.B., Ashton, B.M.^{CPD}, Miles, M.S., McClenachan, G., Hooper-Bui, L., **Engel, A.S.**, Swenson, E.M., Lee, J.M., Milan, C.S., Gao, H. (2014) Distribution and recovery trajectory of Macondo (Mississippi Canyon 252) oil in Louisiana salt marshes. *Marine Pollution Bulletin*. <http://dx.doi.org/10.1016/j.marpolbul.2014.08.011>.
- (47) Headd, B.^{†G}, **Engel, A.S.** (2014) Congruency among bacterial communities from terrestrial sulfidic springs. *Frontiers in Microbiology, section Extreme Microbiology*. DOI:10.3389/fmicb.2014.00473.
- (46) Hooper-Bui, L.[†], Rabalais, N.N., **Engel, A.S.**, Turner, R.E., McClenachan, G., Robert, B., Overton, E.B., Justic, D., Strudivant, K., Brown, K., Conover, J. (2014) Overview of Research into the coastal effects of the Macondo Blowout from the Coastal Waters Consortium: A GoMRI Consortium. *International Oil Spill Conference Proceedings*. American Petroleum Institute. 1:604-617. <http://dx.doi.org/10.7901/2169-3358-2014.1.604>
- (45) **Engel, A.S.**[†], Gupta, A.^G (2014) Regime shift in sandy beach microbial communities following *Deepwater Horizon* oil spill remediation efforts. *PLoS One*. 9(7): e102934, DOI:10.1371/journal.pone.0102934.
- (44) **Engel, A.S.**[†], Bovenkamp, G.L.^{CPD}, Prange, A., Hormes, F.J. (2014) In situ speciation of sulfur vapors using X-ray absorption near edge structure spectroscopy. *Chemical Geology*. 380: 1-6. DOI:10.1016/j.chemgeo.2014.04.019.
- (43) Yin, J., Rekepalli, B., Patel, P., Drennen, C.^G, **Engel, A.S.**[†] (2014) Instrumenting genomic sequence analysis pipeline mothur on shared memory architecture. XSEDE '14 Proceedings of the 2014 Annual Conference on Extreme Science and Engineering Discovery Environment, ACM, New York, New York; DOI:10.1145/2616498.2616505.
- (42) Hutchins, B.^{†CG}, Schwartz, B., **Engel, A.S.** (2013) Environmental controls on organic matter production and transport across surface-subsurface and geochemical boundaries in the Edwards Aquifer, Texas, USA. *Acta Carsologica* 42/2-3: 245–259. DOI:10.3986/ac.v42i2-3.666.
- (41) Keenan, S.^{†G}, **Engel, A.S.**, Elsey, R.M. (2013) The alligator gut microbiome and implications for archosaur symbiosis. *Scientific Reports*. 3:2877. DOI:10.1038/srep02877.
- (40) **Engel, A.S.**[†], Paoletti, M.G., Beggio, M.^{CU}, Dorigo, L., Pamio, A., Gomiero, T., Furlan, C., Brilli, M., Bertoni, R., Dreon, A.L. (2013) Comparative microbial community composition from secondary carbonate (moonmilk) deposits: implications for the *Cansiliella servadeii* cave hydropetric food web. *International Journal of Speleology*. 42: 181-192. DOI:10.5038/1827-806X.42.3.2.
- (39) Paoletti, M.G.[†], Mazzon, L., Sanudo, I.Z., Simonato, M., Beggio, M., Dreon, A.L., Pamio, A., Brilli, M., Dorigo, L., **Engel, A.S.**, Tondello, A., Baldan, B., Concheri, G., Squartini, A.[†] (2013) A unique midgut-associated bacterial community hosted by the cave beetle

- Cansiliella servadeii* (Coleoptera: Leptodirini) reveals parallel phylogenetic divergences from universal gut-specific ancestors. *BMC Microbiology*. 13:129. DOI:10.1186/1471-2180-13-129.
- (38) Headd, B.^{†G}, **Engel, A.S.** (2013) Evidence for niche partitioning revealed by the distribution of sulfur oxidation genes collected from areas of a terrestrial sulfidic spring with differing geochemical conditions. *Applied and Environmental Microbiology*. 79: 1171-1182. DOI:10.1128/AEM.02812-12.
- (37) Gray, C.J.^G and **Engel, A.S.**[†] (2013) Microbial diversity and impact on carbonate geochemistry across a changing geochemical gradient. *The ISME Journal*. 7: 325:337. DOI:10.1038/ismej.2012.105.
- (36) **Engel, A.S.**[†], Johnson, L.R.^G, Porter, M.L.^{PD} (2013) Arsenite oxidase gene diversity among Chloroflexi and Proteobacteria from El Tatio Geysers Field, Chile. *FEMS Microbiology Ecology*. 83: 745–756. DOI: 10.1111/1574-6941.12030.
- (35) Lee, N.M., Liebl, W.E., **Engel, A.S.**, Porter, M.L. (2013) Cave biofilm metagenomics. In: Nelson K. (ed.) *Encyclopedia of Metagenomics*: Springer-Verlag Berlin Heidelberg, SpringerReference www.springerreference.com. DOI: 10.1007/978-1-4614-6418-1_718-2
- (34) Green-Garcia, A.M.^G and **Engel, A.S.**[†] (2012) Bacterial diversity of siliciclastic sediments in a *Thalassia testudinum* meadow and the implications for *Luciniscas nassula* chemosymbiosis. *Estuarine, Coastal and Shelf Science*. 112: 153-16. <http://dx.doi.org/10.1016/j.ecss.2012.07.010>.
- (33) Rossmassler, K.^{CG}, **Engel, A.S.**, Twing, K.^{CG}, Hanson, T.E, Campbell, B.J (2012) Drivers of *Epsilonproteobacteria* community composition in sulfidic caves and springs. *FEMS Microbiology Ecology*. 79:421-432. DOI:10.1111/j.1574-6941.2011.01231.x
- (32) **Engel, A.S.** (2012) Microbes, in Culver, D. and W. White, (eds.) Encyclopedia of Caves. 2nd Edition, p. 490-499. (peer-reviewed)
- (31) **Engel, A.S.** (2012) Chemoautotrophy, in Culver, D. and W. White, (eds.) Encyclopedia of Caves. 2nd Edition. p. 125-134. (peer-reviewed)
- (30) Lee, N.M., Meiginger, D.B., Aubrecht, R., Kovacic, L., Saiz-Jimenez, C. Baskar, S.R., Schleifer, K.-H., Liebl, W., Porter, M.L., **Engel, A.S.** (2012) Caves and karst environments, in Bell, E. (ed.) Life at Extremes: Environments, Organisms and Strategies for Survival. CAB International Publishing. p. 320-344. (peer-reviewed)

Other Publications

- (23) Keenan, S.W., Paterson, A.T., Niemiller, M.L., Slay, M.E., **Engel, A.S.** (2017) Observations of the first stygobiont snail (Hydrobiidae, *Fontigens* sp.) in Tennessee. Proceedings of the 17th International Congress of Speleology, July 23-29, Sydney, Australia. Extended abstract (6 pages).
- (22) **Engel, A.S.**, Niemiller, M.L., Zigler, K.S., Stephen, C.D.R., Carter, E.T., Paterson, A.T., Keenan, S.W., Taylor, S.J. (2017) Invertebrate and vertebrate cave fauna records for the Appalachian Valley and Ridge. Proceedings of the 17th International Congress of Speleology, July 23-29, Sydney, Australia. Extended abstract (6 pages).
- (21) **Engel, A.S.** (2013) The caves that microbes built – The frontier of cave and karst science, in Filippi, M. and Bosák, P. (eds.). Proceedings of the 16th International Congress of Speleology, July 21-28 Brno, Czech Republic. Vol. 1, p. 22-25. Extended abstract for invited plenary lecture.

- (20) **Engel, A.S.** (2013) Microbial processes in sulfidic hypogene karst, *in* Filippi, M. and Bosák, P. (eds.). Proceedings of the 16th International Congress of Speleology, July 21-28 Brno, Czech Republic. Vol. 1, p.391-394.

PUBLISHED DATASETS

The following are published datasets since August 2011 (having DOI, UDI, or other web link):

- 1) Engel, A.S. (2012) Bacterial community diversity of sandy beaches before and after the Deepwater Horizon oil spill in the Gulf of Mexico (113 experiments); NCBI BioProject Accession: PRJNA170912 <http://www.ncbi.nlm.nih.gov/bioproject/PRJNA170912>
- 2) Headd, B., and Engel, A.S. (2012) Bacterial community diversity of Rattlesnake spring outflow channel (30 experiments); NCBI BioProject Accession: PRJNA172872 <http://www.ncbi.nlm.nih.gov/bioproject/PRJNA172872>
- 3) Engel, A.S. (2012) Karst groundwater from Edwards Aquifer Targeted Locus (Loci); 8 experiment; NCBI BioProject Accession PRJNA82945 <http://www.ncbi.nlm.nih.gov/bioproject/PRJNA82945>
- 4) Keenan, S.W., and Engel, A.S. (2012) Alligator gastrointestinal tract Targeted Locus (Loci) (35 experiments): NCBI BioProject Accession PRJNA183679 <http://www.ncbi.nlm.nih.gov/bioproject/PRJNA183679>
- 5) Engel, A.S., Paoletti, M., Beggio, M., Dorigo, L., Pamio, A., Dreon, A.L., Furlan, C. and Squartini, A. (2013) Submissions to NCBI GenBank for 16S rRNA genes associated with uncultured bacterial clones from two different moonmilk cave sediment deposits, Italy, accession numbers EU431666 – EU431834 (169 sequences) and KC255251 – KC255375 (125 sequences); <http://www.ncbi.nlm.nih.gov/>
- 6) Engel, A.S. (2013) Submissions to NCBI GenBank for 16S rRNA genes associated with uncultured bacterial clones from El Tatio Geysir Field, Chile, accession numbers GU437233 – GU437738 (506 sequences); <http://www.ncbi.nlm.nih.gov/>
- 7) Gray, C.J., and Engel, A.S. (2013) Submissions to NCBI GenBank for 16S rRNA genes associated with uncultured bacterial clones from various wells in the Edwards Aquifer, Texas, accession numbers HM066203 to HM066729 (527 sequences); <http://www.ncbi.nlm.nih.gov/>
- 8) Engel, A.S. (2013) Submission to NCBI GenBank for *aioA* gene sequences (arsenite oxidase) retrieved from uncultured bacterial clones from El Tatio Geysir Field, Chile, accession numbers GU437739 – GU437822 (84 sequences); <http://www.ncbi.nlm.nih.gov/>
- 9) Headd, B., Engel, A.S. (2013) Terrestrial Sulfidic Springs Targeted Locus (Loci) (7 experiments); BioProject Accession: PRJNA204163 <http://www.ncbi.nlm.nih.gov/bioproject/PRJNA204163>
- 10) Headd, B., Engel, A.S., and Maas, B. (2013) Submission to NCBI GenBank for *soxB* gene sequences (sulfur oxidation pathways) retrieved from uncultured bacterial clones (411 sequences) from Rattlesnake Spring, Oklahoma, accession numbers JX471149 – JX471559; <http://www.ncbi.nlm.nih.gov/>
- 11) Engel, A.S. (2013) Coastal marshes (Louisiana) Targeted Locus (Loci) (83 experiments); BioProject Accession: PRJNA232457 <http://www.ncbi.nlm.nih.gov/bioproject/PRJNA232457>

- 12) Headd, B., Engel, A.S. (2014) Submissions to NCBI GenBank for 16S rRNA genes associated with uncultured bacterial clones from terrestrial sulfidic springs, various locations in the United States, accession numbers JX520968 – JX521805 (838 sequences); <http://www.ncbi.nlm.nih.gov/>
- 13) Engel, A.S., and Beeler, S. (2015) Fluorescence data supporting experimental study of marsh sediment microbial community degradation of *S. alterniflora*-derived dissolved organic matter. doi:10.7266/N7ZW1HVV
- 14) Engel, A.S., and Beeler, S. (2015) CWC: Bacterial diversity data supporting experimental study of marsh sediment microbial community degradation of *S. alterniflora*-derived dissolved organic matter. doi:10.7266/N7V40S4V
- 15) Engel, A.S. (2015) Coastal marsh (Louisiana) microcosm experiments Targeted Locus (Loci) (40 experiments); NCBI BioProject Accession PRJNA270760. <http://www.ncbi.nlm.nih.gov/bioproject/270760>
- 16) Brannen-Donnelly, K., and Engel, A.S. (2015) Bacterial diversity and succession along an epigenic cave stream (48 experiments); NCBI BioProject Accession PRJNA283038; <http://www.ncbi.nlm.nih.gov/bioproject/283038>
- 17) Engel, A.S. (2015) Coastal marshes (Louisiana) Targeted Locus (Loci) Raw sequence reads (499 experiments); NCBI BioProject Accession PRJNA300310; <http://www.ncbi.nlm.nih.gov/bioproject/PRJNA300310>
- 18) Engel, A.S. (2015) Bacterial community diversity on analog site sandy beaches before and after the Deepwater Horizon oil spill in the Gulf of Mexico, Grand Isle, Louisiana, and Dauphin Island, Alabama, 5-3-2010 to 5-20-2011. doi:10.7266/N7MK69TM
- 19) Engel, A. (2015) Marsh soil profiles of Carbon/Nitrogen and $\delta^{13}\text{C}$ / $\delta^{15}\text{N}$, Grand Isle, Port Sulphur, Terrebonne Bay, Louisiana, May-October 2013. Coastal Waters Consortium (CWC). doi:10.7266/N7DZ067D
- 20) Engel, A. (2015) CWC 2012-2014 Louisiana marsh sediment bacterial communities after the Deepwater Horizon oil spill. Coastal Waters Consortium (CWC). doi:10.7266/N7W37T8P
- 21) Engel, A.S., Doty, T.W. (2015) Coastal mangrove sediment and lucinid bivalve (*Phacoides pectinatus*) microbiomes (Florida) Targeted Locus (Loci) raw sequence reads targeted loci (78 experiments); NCBI BioProject Accession PRJNA300417; <http://www.ncbi.nlm.nih.gov/bioproject/PRJNA300417>
- 22) Engel, A.S., Goemann, A. (2015) Coastal seagrass sediment and lucinid bivalve (*Stewartia floridana*, *Luciniscia nassula*, *Ctena orbiculata*) microbiomes (Florida) Environment targeted loci raw sequence reads (71 experiments); NCBI BioProject Accession PRJNA302122; <http://www.ncbi.nlm.nih.gov/bioproject/302122>
- 23) Engel, A.S. (2016) Bacterial diversity data supporting study of changes in Louisiana marsh microbial communities after the Deepwater Horizon oil spill, May 2010-September 2011, August 2013. doi:10.7266/N7D21VH8
- 24) Engel, A.S. (2016) Sediment properties of Louisiana marshes, 2010-2011, 2013. Coastal Waters Consortium (CWC). doi: 10.7266/N7Q23X55
- 25) Engel, A. (2016) Field data supporting study of temporal changes in microbial diversity from Louisiana marsh sediment and water, October 2012. Coastal Waters Consortium (CWC). DOI: 10.7266/N70V89RN

- 26) Engel, A. (2016) Field data supporting study of temporal changes in microbial diversity from Louisiana marsh sediment and water, June 2012. Coastal Waters Consortium (CWC). DOI: 10.7266/N7S46PVP
- 27) Engel, A. (2016) Field data supporting study of temporal changes in microbial diversity from Louisiana marsh sediment, May 2013. Coastal Waters Consortium (CWC). DOI: 10.7266/N74M92GC
- 28) Engel, A. (2016) Field data supporting study of temporal changes in microbial diversity from Louisiana marsh sediment, October 2013. Coastal Waters Consortium (CWC). DOI: 10.7266/N7RB72JB
- 29) Engel, A. (2016). Field data supporting study of temporal changes in microbial diversity from Louisiana marsh sediment, May 2014. Coastal Waters Consortium (CWC). DOI: 10.7266/N7XW4GQG
- 30) Engel, A.S. (2016) Field data supporting study of temporal changes in microbial diversity from Louisiana marsh sediment and water, October 2014. Coastal Waters Consortium (CWC). DOI: 10.7266/N7ZK5DMW
- 31) Engel, A. and Paterson, A.T. (2016) June 2012 water column bacterial diversity data supporting changes in Louisiana marsh microbial communities after the Deepwater Horizon oil spill. Coastal Waters Consortium (CWC). doi:10.7266/N7QC01DH
- 32) Engel, A. and Paterson, A.T. (2016) October 2012 water column bacterial diversity data supporting changes in Louisiana marsh microbial communities after the Deepwater Horizon oil spill. Coastal Waters Consortium (CWC). doi:10.7266/N74F1NNW
- 33) Engel, A. and Paterson, A.T. (2016) June 2012 sediment bacterial diversity data supporting changes in Louisiana marsh microbial communities after the Deepwater Horizon Oil Spill. Coastal Waters Consortium (CWC). doi:10.7266/N7GT5K39
- 34) Engel, A. and Paterson, A.T. (2016) CWC: October 2012 sediment bacterial diversity data supporting changes in Louisiana marsh microbial communities after the Deepwater Horizon oil spill. Coastal Waters Consortium (CWC). doi:10.7266/N7C24TCW
- 35) Engel, A. (2016) Changes in Microbial Diversity Over Tidal Cycles (Analog Site, Dauphin Island Beach). Coastal Waters Consortium (CWC). DOI: 10.7266/N7HT2M7P

APPEARANCES & ARTISTIC CONTRIBUTIONS

- 2016: Starred in “Rocky Top” UT’s 30-second television half-time commercial, featuring cave research, produced by UT Office of Communications and Marketing
<http://tntoday.utk.edu/2016/08/29/rocky-top-heard-tennessee-ut-commercial-2/>
<https://www.youtube.com/watch?v=7qGrqkhY2FE>
- 2015: Photographs included with press for podcast interview about *Deepwater Horizon* research and high-performance computing, “NICS and XSEDE Advance an Investigation of the Gulf Coast Ecosystem” (reposed >12 other sites, including *Tennessee Today*)
<https://www.nics.tennessee.edu/gulf-coast-research>
- 2013: Photograph used for University of Tennessee News, “UT Professor Receives NSF Award to Investigate Mysterious Clams That Are Key to Biodiversity,” Posted October 2, 2013. <http://www.utk.edu/tntoday/2013/09/30/annette-engel-receives-nsf-award/>
- 2013: Photograph featured in the National Science Foundation Press Release, September 27, for Dimensions of Biodiversity awards http://www.nsf.gov/news/news_summ.jsp?cntn_id=129242
- 2013: Photographs featured in April 28, 2013, Knoxville News Sentinel
<http://www.knoxnews.com/news/2013/apr/28/ut-experts-bp-oil-spill-gone-from-deep-ocean-but/>

<http://www.bayoubuzz.com/louisiana-news/bp-oil-spill/item/429677-ut-experts-bp-oil-spill-gone-from-deep-ocean-but-remains-in-marshes>

- 2010: Photographs featured in the National Science Foundation Press Release, August, 16, 2010 “Gulf Oil Spill: NSF Awards Grant to Study Effects of Oil and Dispersants on Louisiana Salt Marsh Ecosystem”
http://www.nsf.gov/news/news_summ.jsp?cntn_id=117498&org=NSF&from=news
- 2009: Photographs of LSU Geology students in lab using equipment correctly, used for a training program made by HRP Associates, Inc., Connecticut.
- 2008: Photographs, Caves, by S.M. Walker (Lerner Publications Company), p. 37 & 39.
- 2008. Photograph, Biology, 8th Ed., Campbell and Reece (textbook). Benjamin Cummings.
- 2007: Photograph of students conducting lab research. Used for emergency preparedness tabletop CD-ROM exercise scenario builder, Center for Public Health Preparedness, DeKalb County Board of Health, Atlanta, Georgia.
- 2007. Reprinted photographs, Microbiology, 7/E, by Wiley et al. (college textbook), McGraw-Hill Publishers.
- 2006: Photograph, Cave Sleuths: Solving Science Underground, by L. Lindrop. (Twenty-first Century Books, Lerner Publishing Group), p. 72.
- 2005: Photographs, Illustreret Videnskab (Danish Science Magazine), “Bakterier bigger drypsteshuler”, NR 5/2004 (10/3 - 30/3), pp. 18-19.
- 2003: Photographs, Exploring Caves, by B.S. Lawson, a Discovery Links Intermediate book as part of set (Newbridge Educational Publishers, New York), p. 22.
- 2001-2002: With M.L. Porter; photograph included in traveling **Smithsonian Institution** Exhibit “Exploring Caves” associated with IMAX movie.
<http://www.sites.si.edu/exhibitions/Caves.pdf>
- 2001: Received “**Merit Award**” by the National Speleological Society for two photographs (“Come on in, there’s plenty of room!”, “Crystal Chandelier”, and “Lily Pad” with Megan Porter).

PARTICIPATION IN PROFESSIONAL MEETINGS, CONFERENCES, & WORKSHOPS

Original Work Presented and Published as Scientific Abstracts – past 3 years only

* = denotes presentation I gave or will give; underlined names are my current or former students or postdocs, ^G = graduate, ^U = undergraduate, ^{PD} = postdoctoral research; ^{CG} = collaborating graduate student from another university; ^{CPD} = collaborating post-doctoral researcher

2017

- (192) Paterson, A.T., Kolodny, O., Na’aman, I., Frumkin, **Engel, A.S.*** (2017) Environmental metagenomics of the chemolithoautotrophically based ecosystem of Ayalon Cave, Israel. International Congress of Speleology, Australia. July, 2017.
- (191) **Engel, A.S.***, Paterson, A.T., Niemiller, M.L. (2017) Biogeography of microbes from caves in the Interior Low Plateau and Appalachians karst regions. International Congress of Speleology, Australia. July, 2017.
- (190) **Engel, A.S.***, Niemiller, M.L., Zigler, K.S., Stephen, C.D.R.^{CG}, Carter, E.T.^{CG}, Paterson, A.T., Keenan, S.W., Taylor, S.J. (2017) Invertebrate and vertebrate cave fauna records for the Appalachian Valley and Ridge. International Congress of Speleology, Australia. July, 2017. Submitted extended abstract.

- (189) Keenan, S.W., Paterson, A.T., Niemiller, M.L., Slay, M.E., **Engel, A.S.*** (2017) Observations of the first stygobiont snail (Hydrobiidae, *Fontigens* sp.) in Tennessee. International Congress of Speleology, Australia. July, 2017. Submitted extended abstract.
- (188) Kokesh B.^{CG}, Anderson, L.C., **Engel, A.S.** (2017) Assessing the diversity of lucinid bivalves from coastal and anchialine habitats on San Salvador Island, the Bahamas. Society of Integrative and Comparative Biology Annual Meeting, New Orleans, LA.
- (187) Lim, S.J.^{CG}, **Engel, A.S.**, Anderson, L.A., Campbell, B.J. (2017) Novel co-symbiosis in the lucinid bivalve *Phacoides pectinatus*. American Society for Microbiology, New Orleans, LA.
- (186) Jiang, X.^{PD}, Paterson, A.T., **Engel, A.S.** (2017) Multi-year metagenomic assessment of coastal marsh microbial communities impacted by the Deepwater Horizon oil spill. Gulf of Mexico Oil Spill and Ecosystem Science Conference, New Orleans, LA February 6-10, 2017.
- (185) **Engel, A.S.***, Paterson, A.T., Boling, K., Roberts, B. (2017) Specificity of bacterial communities to dominant standing vegetation in coastal salt marshes, Port Sulphur, Louisiana. Gulf of Mexico Oil Spill and Ecosystem Science Conference, New Orleans, LA February 6-10, 2017. (oral presentation)

2016

- (184) Lim, S.J.^{CG}, Goemann, A.^G, **Engel, A.S.**, Anderson, L.C. & Campbell, B.J. (2016). Taxonomic, genetic and functional diversity of chemosymbiosis in lucinid bivalves from coastal biomes. American Society for Microbiology South Carolina Branch 2016 Fall Meeting. University of South Carolina Upstate, South Carolina. (**won best student oral presentation**)
- (183) Brown, T.^G, **Engel, A.S.**, Pfiffner, S.M. (2016) Diel fluctuations in natural organic matter quality in an oligotrophic cave system. American Geophysical Union, San Francisco, CA.
- (182) Johnson, H.M.^U, **Engel, A.S.**, Paterson, A. (2016) Compositional changes for hydrocarbon-degrading microorganisms in marsh sediment from Grand Isle, Louisiana, 2011-2014. Geological Society of America Abstracts with Programs, Denver, CO. Vol. 48, No. 7. doi: 10.1130/abs/2016AM-286077.
- (181) Kokesh, B.S.^{CG}, Anderson, L.C., **Engel, A.S.** (2016) Morphometric and ecological discrepancies of Lucinidae (Bivalvia) in various marine environments on San Salvador island, The Bahamas. Geological Society of America Abstracts with Programs, Denver, CO. Vol. 48, No. 7. doi: 10.1130/abs/2016AM-282275
- (180) **Engel, A.S.***, Paterson, A.T., Keenan, S.W. (2016) A little drop will do: Surprises from epikarstic drip water microbiology. National Speleological Society meeting, Ely, Nevada, July.
- (179) Keenan, S.W., Paterson, A.T., Niemiller, M.L., Slay, M., **Engel, A.S.** (2016) The first observations of a stygobiont snail (Hydrobiidae, *Fontigens* sp.) in Tennessee. National Speleological Society meeting, Ely, Nevada, July.
- (178) Lim, S.J.^{CG}, Goemann, A.^G, **Engel, A.S.**, Anderson, L.C. & Campbell, B.J. (2016). Diversity of chemosymbiosis in lucinid bivalves. Clemson Biological Sciences Annual Student Symposium. Clemson University, South Carolina.
- (177) Paterson, A.T., Iliffe, T.M., Bracken-Grissom, H., Pérez-Moreno, J.L., Gonzalez, B.C., **Engel, A.S.** (2016) Niche bacterial and archaeal community compositions as indicators of ecosystem processes and health in Bahamian and Mexican anchialine caves. International Conference for Subterranean Biology, Fayetteville, Arkansas. June 12-17, 2016. p. 73.

- http://www.speleobiology.com/icsb2016/wp-content/uploads/bsk-pdf-manager/ICSB_2016_Abstracts_2.pdf (oral)
- (176) **Engel, A.S.*** (2016) Prevalence of microbial taxonomic groups to specific subterranean habitats may shed light on ubiquity of microbial function in cave ecosystems. International Conference for Subterranean Biology, Fayetteville, Arkansas. June 12-17, 2016. p. 20. http://www.speleobiology.com/icsb2016/wp-content/uploads/bsk-pdf-manager/ICSB_2016_Abstracts_2.pdf (oral)
- (175) Hutchins, B.T., **Engel, A.S.**, Nowlin, W.H., Schwartz, B.F. (2016) Biodiversity, stability, and trophic complexity in the Edwards Aquifer, United States: The influence of chemolithoautotrophy on stygobiont community structure. International Conference for Subterranean Biology, Fayetteville, Arkansas. June 12-17, 2016. p. 44. http://www.speleobiology.com/icsb2016/wp-content/uploads/bsk-pdf-manager/ICSB_2016_Abstracts_2.pdf (oral)
- (174) Johnson H.^U, **Engel A.S.**, Paterson A.T. (2016) Diversity and abundance of alkane-degrading bacteria from Grand Isle, Louisiana, 2011-2014. 3rd annual Southeastern Biogeochemistry Symposium, p 22. (poster presentation)
- (173) Bagley B.^G, Paterson A.T., **Engel A.S.** (2016) Bacterial community responses to natural and anthropogenic stressors in Louisiana marsh soils, 2012-2014. 3rd annual Southeastern Biogeochemistry Symposium, p13. (poster presentation)
- (172) **Engel, A.S.***, Paterson, A.T., R.E. Turner, E. Overton (2016) Tracking changes in organic carbon sources for Louisiana marshes following the Deepwater Horizon oil spill. Gulf of Mexico Oil Spill and Ecosystem Science Conference, Tampa, Florida, February 1-4, 2016. (oral presentation)
- (171) Bagley, B.^G, Paterson, A.T., **Engel, A.S.** (2016) Homogeneity of microbial communities in marsh soils since the Deepwater Horizon oil spill. Gulf of Mexico Oil Spill and Ecosystem Science Conference, Tampa, Florida, February 1-4, 2016. (poster presentation)
- (170) Roberts, B.J., Chatelain, K., Fortin, S., Chelsky, A., Setta, S., Sullivan, H., Ceresnak, N., Baudoin, K., Scheuermann, R., Bernhard, A., Paterson, A.T., **Engel, A.S.**, Giblin, A. (2016) Highly variable biogeochemical process rates across salt marsh soil subhabitats: implications for scaling-up plot level measurements. Gulf of Mexico Oil Spill and Ecosystem Science Conference, Tampa, Florida, February 1-4, 2016. (oral presentation)

2015

- (169) Lim, S.J.^{CG}, Goemann, A.^G, **Engel, A.S.**, Anderson, L.C. & Campbell, B.J. (2015). Functional diversity of chemosymbiosis in lucinid bivalves from coastal biomes. First Gordon Research Conference on Animal-Microbe Symbioses. Waterville Valley Resort, New Hampshire (poster).
- (168) Keenan, S.W.^G, **Engel, A.S.** (2015) Thermodynamic predictions of bioapatite stability in environmental systems. Geological Society of America meeting, Baltimore, MD, Nov. 1 – 4, 2015.
- (167) Long, B.L.^{CG}, Anderson, L.C., **Engel, A.S.** (2015) Testing the association of *Stewartia floridana* shell morphology with environmental parameters in a coastal seagrass area. Geological Society of America meeting, Baltimore, MD, Nov. 1 – 4, 2015. (**received best student poster award, Geobiology and Geomicrobiology division**)
- (166) Brannen-Donnelly, K.^G, **Engel, A.S.** (2015) Evidence for functional niches and dominant carbon utilization pathways in an epigenic cave system prone to nutrient pulses. 22nd

- International Symposium on Environmental Biogeochemistry, Sept 28 – Oct 2 2015, Piran, Slovenia. (oral presentation; **received best student presentation award**, tied for 1st)
- (165) **Engel, A.S.***, Harmon, D.^U, Paterson, A.T., Keenan, S.W.^G (2015) Cave dripwater microbiology reveals epikarstic biogeochemical cycling that can affect speleothem records. 22nd International Symposium on Environmental Biogeochemistry, Sept 28 – Oct 2 2015, Piran, Slovenia. (oral presentation)
- (164) **Engel, A.S.*** (2015) Response of bacterial communities to changes in alkaline sources and distribution in marsh sediments over time. 22nd International Symposium on Environmental Biogeochemistry, Sept 28 – Oct 2 2015, Piran, Slovenia. (poster)
- (163) Niemiller, M.L.^{CPD}, Zigler, K.S., Stephen, C.D.R.^{CG}, Carter, E.T.^{CG}, Paterson, A.T., Taylor, S.J., Fenolio, D.B., Kendall, K.D.^{CPD}, **Engel, A.S.*** (2015) Updated invertebrate and vertebrate cave fauna records for eastern Tennessee Appalachian Valley and Ridge. National Speleological Society convention, Waynesville, Missouri, July 13-17, 2015.
- (162) Brannen-Donnelly, K.^G, **Engel, A.S.** (2015) Evidence for stable functional niches in an epigenic cave system prone to disturbance. National Speleological Society convention, Waynesville, Missouri, July 13-17, 2015.
- (161) **Engel, A.S.*** (2015) Cave microbiology research publication history and collaboration, 1997-2015. National Speleological Society convention, Waynesville, Missouri, July 13-17, 2015.
- (160) Kendall, K.D.^{CPD}, Niemiller, M.L.^{CPD}, **Engel, A.S.**, Zigler, K.S., Fenolio, D.B. (2015) Cave biodiversity and conservation teaching and learning module for K-5 students in the Tennessee-Alabama-Georgia region. National Speleological Society convention, Waynesville, Missouri, July 13-17, 2015.
- (159) Doty, T.W.^G, **Engel, A.S.** (2015) Microbial diversity fluctuations within mangrove-associated sediments that harbor the lucinid bivalve, *Phacoides pectinatus*, and their free-living bacterial endosymbionts. 2nd Annual Southeastern Biogeochemistry Symposium, Atlanta, GA, March 28-29, 2015. (poster presentation)
- (158) **Engel, A.S.**, Paterson, A.T. (2015) Ecosystem responses to changing microbial community compositions as a function of natural and anthropogenic stressors in Louisiana coastal marshes. Gulf of Mexico Oil Spill and Ecosystem Science Conference, Houston, Texas, February 16-19, 2015. (talk)
- (157) Beeler, S.^U, Paterson, A.T., **Engel, A.S.** (2015) Microbial community response to natural organic matter enrichments after being primed by Deepwater Horizon oiling. Gulf of Mexico Oil Spill and Ecosystem Science Conference, Houston, Texas, February 16-19, 2015.
- (156) Keenan, S.W.^G, Elsey, R.M., **Engel, A.** (2015) The good, the bad, and the unknown: microbial symbiosis of the American alligator (*Alligator mississippiensis*). Symposia of the Society for Integrative and Comparative Biology, West Palm Beach, Florida, January 3-7, 2015 (talk)

Invited or Keynote Speaker, at Scientific Conferences, Workshops, Symposia, Departmental Seminars, Banquets, etc.

- 2017 To occur, 15th Symposium on Aquatic Microbial Ecology, Zagreb, Croatia (**Keynote Speaker**) September 3-8.
To occur, International Society for Subsurface Microbiology, Rotorua, New Zealand (**Plenary Speaker**) November 6-11.

- 2016 University of Kentucky, Department of Geology (Invited Seminar Speaker)
Tennessee Cave Survey spring meeting, Univ. Tennessee, Knoxville, TN
(Invited Speaker)
- 2015 McClung Museum, University of Tennessee (Speaker during Earth Science Week)
Tennessee Department of Environment and Conservation, DOE Oversight Office,
Oak Ridge, TN (Invited Speaker)
Smoky Mountain Grotto, Knoxville, TN (Invited Speaker)
Ball State University, Department of Chemistry/Environmental Sciences, Muncie, IN
(Invited Seminar Speaker)
- 2014 Vanderbilt University, Department Earth & Environmental Sciences, Nashville, TN
(Invited Seminar Speaker)
Tennessee Cave and Karst Working Group, Tennessee Cave Survey, University of
the South, Sewanee, Tennessee (Invited Speaker)
Sigma Xi - University of Tennessee chapter (**Keynote Speaker**)
22nd International Karstological School, Postojna, Slovenia (**Plenary Speaker**)
Southwest University, Departments of Geology and Geography, Chongqing, China
UNESCO International Research Center on Karst, Guilin, China. International
Training Course specializing on Karst Microbiology (**Plenary Speaker, Invited
Lecturer**)
- 2013 “Carbon and Boundaries in Karst,” Karst Waters Institute, Carlsbad, New Mexico
(Invited Speaker)
East Tennessee Grotto, Oak Ridge, TN (Invited Speaker)
International Congress of Speleology, Brno, Czech Republic (**Plenary Speaker**)
- 2012 Tennessee Cave and Karst Working Group, “Identification, Study, and Preservation
of Cave and Karst Resources in Tennessee (and Beyond),” Knoxville, TN
(Invited Speaker)
Biosciences Division, Oak Ridge National Laboratory Microbial Ecology &
Physiology Group, TN (Invited Speaker)
2nd International Geobiology Conference: Critical Zone Observatories for
Sustainable Soil Development and Beyond. Wuhan, China (Invited Speaker)
University of Tennessee, Department of Microbiology (Invited Seminar Speaker)
University of Kentucky, Karst Critical Zone Observatory Workshop, Lexington, KY
LSU-CAMD User Meeting. LSU AgCenter and the Center for Advanced
Microstructure Devices, Baton Rouge (Invited Speaker)
- 2011 Marine Extremophiles. 1st World Congress of Marine Biotechnology, Dalian, China
(Invited Speaker)
8th International Symposium of Subsurface Microbiology. Garmisch-Partenkirchen,
Germany (Invited Speaker)
University of Hamburg, Department of Microbiology, Hamburg, Germany (Invited
Seminar Speaker)
University of Tennessee, Department of Ecology and Evolutionary Biology (Invited
Seminar Speaker)
- 2010 7th Okazaki Biology Conference: “The Evolution of Symbiotic Systems,”
Kakegawa, Japan (Invited Speaker)
Texas Speleological Association Convention, Cedar Park, Texas (Invited Speaker)

- Wittenberg University Speleological Society Grotto 30th Anniversary Banquet
(Invited **Keynote Speaker** for Banquet)
- 2009 Texas State University, Department of Biology, San Marcos, Texas (Invited Speaker)
American Society for Microbiology conference session "Geobiology: Microorganism-Rock Interactions from the Deep Subsurface Through the Rock Record." Philadelphia, PA (Invited Speaker)
University of Delaware, College of Marine and Earth Sciences, Lewes, Delaware (Invited Seminar Speaker)
- 2008 "National Ecological Observatory Network (NEON) Workshop to Promote Greater Integration of Microbial Biology." Baton Rouge, Louisiana (Invited Speaker)
"Karst from Recent to Reservoirs: International Conference on Paleokarst & Multi-permeability Flow Systems," Karst Waters Institute, Rapid City, South Dakota (Invited Speaker)
"China-US Collaborative Research on Geomicrobiological Processes in Extreme Environments", workshop sponsored by NSF and NSF-China (Invited Speaker)
- 2007 Edwards Aquifer Authority, San Antonio, Texas (Invited Speaker)
Science Club, Louisiana State University (Invited Speaker)
"Future Directions in Karst Research Workshop," Karst Waters Institute, San Antonio, Texas (Co-organizer and Invited Speaker)
Bexar Grotto, San Antonio, Texas (Invited Speaker)
- 2006 International Mineralogical Association conference, Session 24 (Bio-Geo interface in Minerals), Kobe, Japan (Invited Speaker)
Southeastern Louisiana University, Department of Biology, Hammond, LA (Invited Seminar Speaker)
"Slovenian-US Workshop on Long Term Ecological Studies in the Slovenian Karst". Postojna, Slovenia (Invited Speaker)
University of Alabama, Department of Geological Sciences, Tuscaloosa, AL (Invited Seminar Speaker)
- 2005 Universidad Católica, Santiago, Chile. Department of Engineering and Hydrology
Oregon State University, Subsurface Biosphere Program for IGERT seminar series
Edwards Aquifer Authority, San Antonio, Texas (Invited Speaker)
Center for Advanced Microstructures and Devices (CAMD), LSU (Invited Speaker)
- 2004 University of Kansas, Department of Geology, Lawrence, KS (Invited Speaker)
University of Windsor, Department of Geology, Windsor, Ontario, Canada
McMaster University, Department of Geology, Hamilton, Ontario, Canada
2nd Okazaki Biology Conference on "Terra Microbiology," Okazaki, Japan (Invited Speaker)
- 2002 Louisiana State University, Department of Oceanography, Baton Rouge, LA
Lehrstuhl für Mikrobiologie, Technische Universität, Freising, Germany

Media and Publicity

- Starred in "Rocky Top" UT's **30-second television half-time commercial**, featuring cave research, produced by UT Office of Communications and Marketing
<http://tntoday.utk.edu/2016/08/29/rocky-top-heard-tennessee-ut-commercial-2/>
<https://www.youtube.com/watch?v=7qGrqkhY2FE>
- Article about election to Fellow of Explores Club, "Professor Named to Same Society as

First Man on the Moon,” *Tennessee Today* <http://tntoday.utk.edu/2015/10/22/professor-named-society-man-moon/>

- **Podcast** interview about *Deepwater Horizon* research and high-performance computing, “NICS and XSEDE Advance an Investigation of the Gulf Coast Ecosystem” (reposted >12 other sites, including *Tennessee Today*) <https://www.nics.tennessee.edu/gulf-coast-research>
- *Deepwater Horizon* research and high-performance computing highlighted by the magazine *Inside HPC* (reposted >12 other websites, including Gulf of Mexico Research Initiative) <http://insidehpc.com/2015/02/podcast-supercomputing-the-impact-of-deepwater-horizon/>
- Research featured in the **National Science Foundation Press Release**, September 27, 2013, for the Dimensions of Biodiversity awards; include link to report with 2-page research details http://www.nsf.gov/news/news_summ.jsp?cntn_id=129242
- Lucinid bivalve chemosymbiosis research featured on **National Science Foundation** website and in *Tennessee Today*, Sept. 30, 2013. <http://www.utk.edu/tntoday/2013/09/30/annette-engel-receives-nsf-award/>; http://thetandd.com/sports/outdoors/scientist-studies-threats-to--million-year-old-marine-life/article_6f4323f8-4f0c-11e3-9aac-0019bb2963f4.html
- Interviewed after Plenary talk at the International Congress of Speleology, Brno, Czech Republic, about geomicrobiology in karst. July 24, 2013; aired on local news in CZ <http://www.ceskatelevize.cz/zpravodajstvi-brno/zpravy/235789-za-podobou-krasovych-oblasti-stoji-mikroorganismy/>
- Oil spill research featured in April 28, 2013, *Knoxville News Sentinel*, including photography <http://www.knoxnews.com/news/2013/apr/28/ut-experts-bp-oil-spill-gone-from-deep-ocean-but/>
<http://www.bayoubuzz.com/louisiana-news/bp-oil-spill/item/429677-ut-experts-bp-oil-spill-gone-from-deep-ocean-but-remains-in-marshes>
- Research featured by ScienceAlerts.com (Science Alerts Social Network), WorldWideScience.org, Science.gov, Geoscience.net, and other outlets (based on publication “Bacterial diversity of siliciclastic sediments in a *Thalassia testudinum* meadow and the implications for *Luciniscas nassula* chemosymbiosis”) http://sciencealerts.com/stories/1945468/Bacterial_diversity_of_siliciclastic_sediments_in_a_Thalassia_testudinum_meadow_and_the_implications_for_Luciniscas_nassula_chemosymbiosis.html
<http://worldwidescience.org/topicpages/t/testudinum+turtle+grass.html>
<http://www.science.gov/topicpages/t/thalassia+testudinum+beds.html>
- Oil spill research feature in September 2011, based on Gulf Research Initiative funding announcement - *Tennessee Today*, *Knoxville News Sentinel*, *Tennessee News Digest*, *EurekaAlert!* *First Science NEW*, *Oil World 2011*, *AOL News*, *SiloBreaker*, *e! Science News*, *BioTechMashup*, *Chem Info*, plus others
<http://m.knoxnews.com/news/2011/sep/12/university-of-tennessee-professor-part-of-12-m/>
http://www.eurekaalert.org/pub_releases/2011-09/uota-uri091211.php
http://www.firstscience.com/home/news/agriculture/ut-researcher-investigates-deepwater-horizon-oil-spill-impact-on-coast_113083.html; <http://www.oil-world-2011.com/about/tag/oil-spill-effects/page/6>
- Research feature by the **National Science Foundation, Press Release 10-142**, August, 16, 2010 “Gulf Oil Spill: NSF Awards Grant to Study Effects of Oil and Dispersants on Louisiana Salt Marsh Ecosystem”, including photographs http://www.nsf.gov/news/news_summ.jsp?cntn_id=117498&org=NSF&from=news
- Interviewed for **CNN**, **WKRK Mobile News**, “Oil hits Alabama, Mississippi barrier islands, Tarballs on Dauphin Island;” Posted June 1, 2010
<http://www.cnn.com/2010/US/06/01/oil.spill.alabama/index.html>;
http://www.wkrk.com/gulf_oil_spill/article/tarballs-on-dauphin-island/892429/Jun-01-2010_10-51-pm/
- Interviewed and featured on **National Public Radio**, Alaska, “Southeast Cave Life Chews through Rock” by Ed Schoenfeld. Posted December 21, 2008.
http://kfsk.org/modules/local_news/index.php?op=sideBlock&syndicated=true&ID=489

- “Ist die Erde ein Lebewesen”, 2007, by Holger Diedrich. *Wunder Natur*, p 36-42. [In German] Reference to ongoing investigations in Lower Kane Cave, Wyoming, being the “window into the subsurface” for geomicrobiology research interests.
- “Subterranean Life Thrives Deep in Water System”, 2006, by Michael R. Taylor. *Houston Chronicle*, June 19.
- “Bakterier bigger drypsteshuler”, *Illustreret Videnskab*, 2004 (10/3 - 30/3), pp. 18-19.
- “Slime Hunters”, 2004, *Science World*, vol. 81(4):18-20.
- Research citation in *Science*, *Nature* (Online 10 May, 2004, doi:10.1038/news040503-12), *Spiegel*, *Nederlandse Geologische Vereniging*, and other print and web sources.
- PBS-NOVA television show (2002) “Mysterious Life of Caves”. Companion website <<http://www.pbs.org/wgbh/nova/caves/>>.
- “Subterranean Surprises”, 2002, by E. Haddingham, *Smithsonian Magazine*, October.

CONTRIBUTIONS TO THE PROFESSION & SCHOLARLY SERVICE ACTIVITIES

Membership in professional organizations

Explorers Club (Fellow)	2015–present
Coastal and Estuarine Research Federation	2013–present
American Chemical Society	2013–present
International Society for Environmental Biogeochemistry	2013–present
International Society for Microbial Ecology	2010–present
International Symbiosis Society	2009–present
Karst Waters Institute (former Director & Officer, Emeritus)	2005–present
AAAS	2003–present
American Geophysical Union	2000–present
American Society of Microbiology	1998–present
Geological Society of America (Fellow)	1996–present
Sigma Xi (Full Member)	1994–present
National Speleological Society (#31319Life, JM, SA, Fellow)	1987–present

Committee work at Department, College, & University levels – past 5 years only

- Member, ICP-MS Committee, College of Arts & Sciences (2016 – present)
- Member, Selection committee for College of Arts & Sciences, Senior College Convocation Research Award, College Convocation Award for the Development of Interdepartmental Collaboration in Scholarship & Research (2016)
- Mentor, Matrix Mentoring Program, College of Arts & Sciences (2016)
- **Chair**, Discretionary Fund, Department of Earth and Planetary Sciences (2015 – present)
- Member, peer teaching review evaluation committee, Earth and Planetary Sciences (Fall 2015)
- Member, Planetary Mineralogy/Petrology/Geochemistry Search Committee (2015 – 2016)
- Member, Assistant Professor Mentoring Team (2015 – present)
- Member, Diversity ad hoc committee, Dept. Earth and Planetary Sciences (2014 – present)
- Member, Executive Committee, Dept. Earth and Planetary Sciences (Sept. 2014 – present); member because of being Director of Graduate Studies and Chair of the Discretionary Fund

- Member, Strong Hall ad hoc Space Committee, Dept. Earth and Planetary Sciences (June 2012 – present)
- **Director of Graduate Studies**, Graduate Program Committee, Department of Earth and Planetary Sciences (2012 – 2014)
- Faculty Mentor to assistant professor, Earth and Planetary Sciences (2012 – 2013)
- Member, peer teaching review evaluation committee, Earth and Planetary Sciences (Spring 2012)
- Member, Graduate Program Committee, Dept. Earth and Planetary Sciences (2011 – 2012)
- Member, Watershed Science Minor program faculty (2011 – present)

Leadership in public & private organizations (using professional expertise)

- International Board, International Society for Subsurface Microbiology (invited), November 2016 – present
- Secretary, International Society for Environmental Biogeochemistry (501(c)3 organization) (elected position), January 2016 – present
- Chair, Graduate Academic Fellowship program, Cave Conservancy Foundation (501(c)3 organization), November 2014 – present.
- Board Member, Cave Conservancy of the Virginias (501(c)3 organization) (elected to position 2013; reelected 2016), November 2013 – present
- Awards Committee, Cave Conservancy of the Virginias (501(c)3 organization), April 2012 – present
- Member, International Advisory Committee, International Society for Environmental Biogeochemistry (501(c)3 organization) (elected position), 2011 – present
- Vice-President of Communications, Karst Waters Institute. (elected position), March 2009 – March 2015.
- Assistant Webmaster, Karst Waters Institute. Appointed, August, 2007 – March 2008
- Board of Directors, Karst Waters Institute (501(c)3) (elected position), March 2005 – 2008; reelected to 2011. Director responsibilities include attending meetings twice a year and advancing the KWI mission.

Service to organizations (using professional expertise) (past 5 years)

- Scientific Committee, 24th International Conference on Subterranean Biology. Aveio, Portugal, to occur August 27-30, 2018.
- Session Chair. “Microbial Subterranean Systems.” International Conference on Subterranean Biology. Fayetteville, Arkansas, June 12-17, 2016.
- Session Co-chair. "New Perspectives in Karst Geomicrobiology and Redox Geochemistry: Advances from 20 Years of Interdisciplinary Research and Exploring Our Future Frontiers". Geological Society of America meeting, Baltimore, MD, October, 2015. With J. Spear, H. Barton, P. Bennett, S. Carmichael.
- Short Course Instructor, UNESCO International Research Center on Karst (IRCK), International Training Course specializing on Karst Microbiology, Guilin, China, October 15 – 25, 2014: Assisted students in field, and presented topics, “Analytical geochemical methods and their application to constrain microbial carbon cycling and geomicrobial interactions,” “Microbial carbon cycling across differing hydrological regimes in karst, from cave streams to deep aquifers,” and “Use of geochemical approaches to quantify microbial ecosystem dynamics.”

- Session Co-chair, “Extreme Environments” and “Climate Change,” International Symposium for Environmental Biochemistry meeting in Piran, Slovenia, September 27 - October 2, 2015.
- Program Committee, 22nd International Karstological School "Classical karst," theme (changes every year) “Karst and Microorganisms.” Postojna, Slovenia, June 16 – 20, 2014. http://iks.zrc-sazu.si/en/organizing_committee.html
- Session Co-chair, “Disturbance and Stressor Impacts on Microbial Communities and Biogeochemical Feedbacks” 22nd Biennial Conference of the Coastal and Estuarine Research Federation, Nov. 23, 2013. With B. Roberts, A. Bernhard, A. Giblin.
- Session Co-chair, “Feedback Processes and Impacts on Microbial Communities and Biogeochemical Cycling in Coastal Ecosystems Following Stress or Disturbance” Gulf of Mexico Research Initiative Meeting, New Orleans, LA, Jan. 21–23, 2013. With B Roberts.
- Session Chair, “Sources and Quality of Organic Carbon” Carbon and Boundaries in Karst meeting, Carlsbad, New Mexico. Karst Waters Institute, Jan. 7 – 11, 2013.
- Short Course Instructor, “Microbe-Mineral Interactions,” a Short Course by the International Society for Environmental Biogeochemistry, Cancun, Mexico. Instruction topic: “Linking microbial activity to the carbon cycle in the terrestrial subsurface,” November 4 – 8, 2012.

Service to governmental agencies at international, federal, state & local levels

- NASA Exobiology and Evolutionary Biology Panelist, NASA, proposal review panels.
- National Science Foundation Panelist, Critical Zone Observatories, proposal review panel.
- Committee of Visitors - Surface Earth Processes, National Science Foundation. *The COV (8 people nationally) reviews the research core-programs in the EAR Surface Earth Processes (SEP) Section: Geobiology and Low-Temperature Geochemistry, Geomorphology and Land Use Dynamics, Hydrologic Sciences, and Sedimentary Geology and Paleobiology; the review was from 2008-2010. The report can be downloaded at:*
- National Science Foundation Panelist, Dimensions of Biodiversity, Division of Environmental Biology, proposal review panel.
- National Science Foundation Panelist, Systematic Biology and Biodiversity Inventories, Division of Environmental Biology, proposal review panel.
- National Science Foundation Panelist, Geobiology and Low Temperature Geochemistry Panel, Earth Sciences Research, proposal review panel.

Editorship and associated activities

- Review Editor, Editorial Board *Frontiers in Evolutionary and Genomic Microbiology* (2010 – present)
- Editor: *The Conduit*; electronic publication of the Karst Waters Institute (2009 – 2015)
- Associate Editor: *Journal of Sedimentary Research* (2004 – present) 45 manuscripts reviewed.
- January 2007 – March 2010: Advisory Board, *Journal of Cave and Karst Studies*