

Curriculum Vitae (December 2018)  
Frank James Stewart, Ph.D.

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**Frank James Stewart**  
Associate Professor  
School of Biological Sciences

**I. EARNED DEGREES**

Ph.D. in Biology (advisor: <b>C.M. Cavanaugh</b> )	Harvard University	2008
M.S. in Environmental Science	University of Nevada-Reno	2002
B.A. in Biology	Middlebury College	2000

**II. EMPLOYMENT HISTORY**

Associate Professor in School of Biological Sciences	Georgia Tech	2017-present
Assistant Professor in School of Biological Sciences	Georgia Tech	2011-2017
Postdoc (advisor: <b>E.F. DeLong</b> )	MIT	2008-2010

**III. HONORS AND AWARDS**

Education Partnership Award, Georgia Tech, 2018  
Kavli Frontiers of Science Fellow, 2018  
Cullen-Peck Fellowship, Georgia Tech, 2016  
Georgia Tech "Thank a Teacher" recipient, 2016  
Simons Foundation Early Career Investigator, 2015  
Teasley Fellowship, Georgia Tech, 2014  
Sloan Fellowship, Ocean Sciences, 2012  
NSF CAREER Award, 2012  
Class of 1969 Teaching Fellow, Georgia Tech, 2011  
Harvard NSF IGERT Fellowship, Biomechanics, 2007  
NIH Genetics Training Grant, 2003-2005  
Phi Kappa Phi induction, 2002  
NASA Spacegrant Fellowship, 2001-2002  
Governor Kenny Guinn Environmental Research Fellowship, 2001-2002  
Outstanding Student Poster Award, ASLO Aquatic Sciences Meeting, 2001  
Sierra Pacific Fellowship, 2000-2001  
Phi Beta Kappa induction, 2000  
Barry Goldwater Scholarship, 1999-2000  
HHMI Undergraduate Research Fellowship, 1998  
Paul W. Ward Memorial Writing Award, Honorable Mention, Middlebury College, 1997

**IV. RESEARCH, SCHOLARSHIP, AND CREATIVE ACTIVITIES**

**boldface** = Stewart lab students, postdocs, or visiting scholars

Google Scholar profile: <https://scholar.google.com/citations?user=-234SKAAAAAJ&hl=en>

**A. PUBLISHED BOOKS, BOOK CHAPTERS, AND EDITED VOLUMES**

**A1. Books**

*No data*

**A2. Refereed Book Chapters**

1. **Sarode N, Parris DJ, Ganesh S, Seston SL, Stewart FJ.** 2015. Generation and analysis of

microbial metatranscriptomes. p 2.4.5-1-2.4.5-19. In Yates M, Nakatsu C, Miller R, Pillai S (ed), *Manual of Environmental Microbiology, 4th Edition*. ASM Press, Washington, DC.

### A3. Edited Volumes

1. Stewart FJ, Ulloa O. 2014. Microbial metagenomics of oxygen minimum zones. Marco D (ed.) *Metagenomics of the Microbial Nitrogen Cycle: Current innovations and future trends*. Horizon Scientific Press.
2. Cavanaugh CM, McKiness ZP, Newton ILG, Stewart FJ. 2013. Marine chemosynthetic symbioses” in E. Rosenberg et al., Eds., *The Prokaryotes 1*: 579-607. Springer-Verlag, New York.
3. Stewart FJ. 2013. Preparation of microbial community cDNA for metatranscriptomic analysis in marine plankton. *Methods in Enzymology*. 531: 187-218.
4. Stewart FJ. 2011. Dissimilatory sulfur cycling in oxygen minimum zones: an emerging metagenomics perspective. *Biochemical Society Transactions*. 39: 1859-63.
5. Stewart FJ, Cavanaugh CM. Pyrosequencing analysis of endosymbiont diversity. 2011. In: de Bruijn FJ (ed.). *Handbook of Molecular Microbial Ecology II: Metagenomics in Different Habitats*. Wiley-Blackwell.
6. Mix LJ, Armstrong JC, Mandell AM, Mosier AC, Raymond J, Raymond SN, Stewart FJ, von Braun K, Zhaxybayeva O (eds.). 2006. The Astrobiology Primer: An outline of general knowledge. *Astrobiology*. 6(5):735-813.
7. Cavanaugh CM, McKiness ZP, Newton ILG, Stewart FJ. 2006. Marine chemosynthetic symbioses. In: Dworkin M, Falkow S, Rosenberg E, Schleifer KH, Stackebrandt E (eds.). *The Prokaryotes. Third Edition. A Handbook on the Biology of Bacteria: Symbiotic Associations, Biotechnology, Applied Microbiology*. Springer, New York.
8. Stewart FJ, Cavanaugh CM. 2005. Symbiosis of thioautotrophic bacteria with *Riftia pachyptila*. In: Overmann, J. (ed.). *Molecular Basis of Symbiosis*. Springer-Verlag, Berlin. p.197-225.

### B. REFEREED PUBLICATIONS AND SUBMITTED ARTICLES

**B1. Published and Accepted Journal Articles** (major papers, as well as middle authorship papers and papers with prior advisors (post 2011), are annotated to describe contributions)

1. **Parris DJ, Morgan MM<sup>^</sup>, Stewart FJ**. Feeding rapidly alters microbiome composition and gene transcription in the clownfish gut. In press, *Applied and Environmental Microbiology*. 10.1128/AEM.02479-18 <sup>^</sup>= **Georgia Tech undergraduate**
2. Kitzinger K, **Padilla CC**, Marchant HK, Hach PF, Herbold CW, Kidane AT, Könneke M, Littmann S, Mooshammer M, Niggemann J, Petrov S, Richter A, Stewart FJ, Wagner M, Kuypers MMM, Bristow LA. 2018. Cyanate and urea are substrates for nitrification by Thaumarchaeota in the marine environment. In press, *Nature Microbiology*.
3. **Pratte ZA, Patin NV, McWhirt ME, Caughman AM<sup>^</sup>, Parris DJ, Stewart FJ**. 2018. Association with a sea anemone alters the skin microbiome of clownfish. *Coral Reefs*. 37:1119-1125. <sup>^</sup>= **Georgia Tech undergraduate**
4. **Bertagnolli AD, Stewart FJ**. 2018. Microbial niches in marine oxygen minimum zones. *Nature Reviews Microbiology*. 16: 723-729.
5. **Burns AS, Padilla CC, Pratte ZA**, Gilde K, Regensburger M, Hall E, Dove ADM, Stewart FJ. 2018. Broad phylogenetic diversity associated with nitrogen loss through sulfur oxidation in a large public marine aquarium. *Applied and Environmental Microbiology*. 84: e01250-18.
6. **Ganesh S, Bertagnolli AD**, Bristow LA, Padilla CC, Blackwood N, Aldunate M, Bourbonnais A, Altabet MA, Woyke T, Ulloa O, Konstantinidis KK, Thamdrup B, Stewart FJ. 2018. Genomic evidence for the use of alternative nitrogen substrates by anammox bacteria. *The ISME Journal*. 12:2706-2722.
7. **Patin NV, Pratte ZA**, Regensburger M, Hall E, Gilde K, Dove ADM, Stewart FJ. Microbiome dynamics in a large artificial seawater aquarium. *Applied and Environmental Microbiology*. 84: e00179-18.

8. Fareed S, **Sarode N**, Stewart F, Malik A, Khizer S, Laghaie E, **Pratte ZA**, Yan F, Lewis J, Immergluck LC. Applying fecal microbiota transplantation (FMT) to treat recurrent *Clostridium difficile* infections (rCDI) in children. *PeerJ*. 6:e4663.
9. **Pratte ZA**, Besson M, **Hollman RD**<sup>^</sup>, Stewart FJ. The gills of reef fish support a distinct microbiome shaped by host-specific factors. *Applied and Environmental Microbiology*. 84:e00063-18. <sup>^</sup>=*Georgia Tech undergraduate*
10. Beatty DS, Clements CS, Stewart FJ, Hay ME. 2018. Inter-generational effects of macroalgal reef dominance on coral: major declines in survival of coral larvae but subtle changes in microbiomes. *Marine Ecology Progress Series*. 589:97-114.
11. **Bertagnolli AD**, **Padilla CC**, Glass JB, Thamdrup B, Stewart FJ. 2017. Metabolic potential and in situ activity of marine Marinimicrobia bacteria in an anoxic water column. *Environmental Microbiology*. 19:4392-4416.
12. **Pratte ZA** Longo GO, **Burns AS**, Hay ME, Stewart FJ. 2017. Contact with turf algae alters the coral microbiome: contact versus systemic impacts. *Coral Reefs*. 37:1-13.
13. Sharp KH, **Pratte ZA**, Kerwin AH, Rotjan RD, Stewart FJ. 2017. Season, but not symbiont state, drives microbiome structure in the temperate coral *Astrangia poculata*. *Microbiome*. 5:120.
14. Hay ME, Beatty DS, Stewart FJ. 2017. Chemical ecology: the language of microbiomes. In: Exploring the Chemistry of Microbiomes. National Academies Proceedings Series.
15. Garcia-Robledo E, **Padilla CC**, Aldunate M, Paulmier A, Gregori G, Stewart FJ, Ulloa O, Revsbech NP. 2017. Cryptic oxygen cycling in anoxic oxygen minimum zones. *Proceedings of the National Academy of Sciences of the USA*. 114: 8319-8324 (wrote grant that enabled sample collection, contributed molecular data generation and analysis, helped write paper)
16. Vik DR, Roux S, Brum JR, Bolduc B, Emerson JB, **Padilla CC**, Stewart FJ, Sullivan MB. 2017. Putative Archaeal viruses from the mesopelagic ocean. *PeerJ*. 5:e3428
17. Bray MS, **Wu J**, Reed BC, Kretz CB, Stewart FJ, DiChristina TJ, Brandes JA, Fowle DA, Crowe SA, Glass JB. 2017. Shifting microbial communities sustain multiyear iron reduction and methanogenesis in ferruginous sediment incubations. *Geobiology*. 15:678-689. (Stewart lab was responsible for molecular data generation, help with analysis and writing)
18. **Padilla CC**, **Bertagnolli AD**, Bristow LA, **Sarode N**, Glass JB, Thamdrup B, Stewart FJ. 2017. Metagenomic binning identifies a transcriptionally active Gammaproteobacterium linking methanotrophy to partial denitrification in an anoxic oxygen minimum zone. *Frontiers in Marine Science*. 4:23
19. **Parris DJ**, Brooker RM, **Morgan MA**<sup>^</sup>, Dixon DL, Stewart FJ. 2016. Whole gut microbiome composition of damselfish and cardinalfish before and after reef settlement. *PeerJ*. 4:e2412. <sup>^</sup>=*Georgia Tech undergraduate*
20. Tsementzi D, **Wu J**, Deutsch S, Nath S, Rodriguez-R LM, **Burns AS**, **Ranjan P**, **Sarode N**, Malmstrom RR, **Padilla CC**, **Stone BK**<sup>^</sup>, Bristow LA, Glass JB, Thamdrup B, Woyke T, Konstantinidis KT, Stewart FJ. 2016. SAR11 bacteria linked to ocean anoxia and nitrogen loss. *Nature*. 536:179-183. (sole corresponding author; wrote the two grants that enabled sample collection, sequencing, and analysis; Chief Scientist on cruises for sample collection and experiments; oversaw all aspects of data generation, analysis, and synthesis; wrote paper with first author Tsementzi) <sup>^</sup>=*Stewart lab ACE REU student*
21. **Seston SL**, Beinart RA, **Sarode N**, **Shockey AC**<sup>^</sup>, **Ranjan P**, **Ganesh S**, Girguis PR, Stewart FJ. 2016. Metatranscriptional response of chemoautotrophic *Ifremeria nautilei* endosymbionts to differing sulfur regimes. *Frontiers in Microbiology*. 7:1074. <sup>^</sup>=*Georgia Tech undergraduate*
22. Larsen M, Lehner P, Borisov SM, Klimant I, Fischer J, Stewart FJ, Canfield DE, Glud RN. In situ quantification of ultra-low O<sub>2</sub> concentrations in oxygen minimum zones: application of novel optodes. *Limnology & Oceanography Methods*. doi:10.1002/lom3.10126 (wrote grant that sponsored/enabled sample collection, helped write manuscript)
23. **Padilla CC**, Bristow LA, **Sarode N**, Garcia-Robledo E, Gómez Ramírez E, **Benson CR**, Bourbonnais A, Altabet MA, Girguis PR, Thamdrup B, Stewart FJ. 2016. NC10 bacteria in marine oxygen minimum zones. *The ISME Journal*. 10:2067-2071. <sup>^</sup>=*Stewart lab ACE REU student*

24. Beckler JS, Kiiazis N, Rabouille C, Stewart FJ, Taillefert M. 2016. Importance of microbial iron reduction in deep sediments of river-dominated continental margins. *Marine Chemistry*. 178:22-34. (wrote grant that sponsored/enabled sample collection, helped write manuscript)
25. **Ganesh S**, Bristow LA, Larsen M, **Sarode N**, Thamdrup B, Stewart FJ. 2015. Size-fraction partitioning of community gene transcription and nitrogen metabolism in a marine oxygen minimum zone. *The ISME Journal*. 9: 2682-2696.
26. Glass JB, Kretz CB, **Ganesh S**, **Ranjan P**, **Seston SL**, Buck KN, Landing WM, Morton PL, Moffett JW, Giovannoni SJ, Vergin KL, Beszteri B, Stewart FJ. 2015. Meta-omic signatures of microbial metal and nitrogen cycling in marine oxygen minimum zones. *Frontiers in Microbiology*. 6:998.
27. Bristow LA<sup>^</sup>, **Sarode N<sup>^</sup>**, **Cartee J<sup>^^</sup>** Thamdrup B, Stewart FJ. 2015. Metagenomics and biogeochemical analysis of nitrite accumulation in the Gulf of Mexico hypoxic zone. *Limnology and Oceanography*. 60:1733-1750. <sup>^</sup>=Co-first authors; <sup>^^</sup>= Georgia Tech undergraduate
28. **Padilla C**, **Ganesh S**, **Gantt S<sup>^</sup>**, **Huhman A<sup>^</sup>**, **Parris DJ**, **Sarode N**, Stewart FJ. 2015. Standard filtration practices may significantly distort planktonic microbial diversity estimates. *Frontiers in Microbiology*. 6:547. <sup>^</sup>= Georgia Tech undergraduate
29. Duret MT, Pachiadaki MG, Stewart FJ, **Sarode N**, Christaki U, Monchy S, Edgcomb VP. 2015. Size-fractionated diversity of eukaryotic microbial communities in the Eastern Tropical North Pacific oxygen minimum zone. *FEMS Microbiology Ecology*. 91: fiv037. (Stewart lab contributed samples and helped generate and analyze molecular data, worked with all authors on manuscript writing)
30. Dalsgaard T, Stewart FJ, Thamdrup B, De Brabandere L, Revsbech NP, Ulloa O, Canfield DE, DeLong EF. Oxygen at nanomolar levels reversibly suppresses process rates and gene expression of anammox and denitrification in the oxygen minimum zone off northern Chile. *mBio*. 5(6):e01966-14. (Responsible for all molecular analyses; worked jointly with first-author Dalsgaard in writing; sequencing data generated during postdoc; analysis while at GT)
31. Dmytrenko O, Russel SL, Loo WT, Fontanez KM, Liao L, Roeselers G, **Sharma R**, Stewart FJ, Newton ILG, Woyke T, Wu D, Lang JM, Eisen JA, Cavanaugh CM. 2014. The genome of the intracellular bacterium of the coastal bivalve *Solemya velum*: A blueprint for thriving in and out of symbiosis. *BMC Genomics*. 15: 924. (Collected samples and prepared DNA for sequencing, analyzed data via internal pipelines, worked directly with co-authors on writing)
32. Lee FJ, Rusch D, Stewart FJ, Mattila HR, Newton ILG. 2014. Saccharide breakdown and fermentation by the honey bee gut microbiome. *Environmental Microbiology*. 17:796-815. (advised on computational analysis, worked jointly with Lee and Newton writing)
33. Lin Y, Cradick TJ, Brown MT, Deshmukh H, **Ranjan P**, **Sarode N**, Wile BM, Vertino PM, Stewart FJ, Bao G. 2014. CRISPR/Cas9 systems have off-target activity with insertions or deletions between target DNA and guide RNA sequences. *Nucleic Acids Research*. 42: 7473–7485. (oversaw Stewart lab grad student Ranjan who contributed novel informatics pipeline for SNP analysis, worked with authors on writing)
34. **Ganesh S**, **Parris DJ**, DeLong EF, Stewart FJ. 2014. Metagenomic analysis of size-fractionated picoplankton in a marine oxygen minimum zone. *The ISME Journal*. 8:187-211. (Ganesh and Parris are Stewart lab grad students; project idea, analysis, synthesis done at GT; DeLong provided samples)
35. **Parris DJ**, **Ganesh S**, Edgcomb VP, DeLong EF, Stewart FJ. 2014. Microbial eukaryote diversity in the marine oxygen minimum zone off northern Chile. *Frontiers in Microbiology*. 5:543. (Ganesh and Parris are Stewart lab grad students; project idea, analysis, synthesis done at GT; DeLong provided samples)
36. Sanders JG, Beinart RA, Stewart FJ, DeLong EF, Girguis PR. 2013. Metatranscriptomics reveal differences in in situ energy and nitrogen metabolism among hydrothermal vent snail symbionts. *The ISME Journal*. 7: 1556-1567. (Trained first-author Sanders on metatranscriptomic methods (2010); facilitated/advised data analysis, worked jointly with all authors on writing in 2012)
37. Dimond JL, Kerwin AH, Rotjan R, Sharp K, Stewart FJ, Thornhill DJ. 2013. A simple temperature-based model predicts the upper latitudinal limit of the temperate coral *Astrangia poculata*. *Coral Reefs*. 32:401-409. (minor contribution to data synthesis and writing)

38. Ulloa O, Canfield DE, DeLong EF, Letelier RM, Stewart FJ. 2012. Microbial oceanography of anoxic oxygen minimum zones. *Proceedings of the National Academy of Sciences of the USA*. 109: 15996-16003. (~equal contributions from all co-authors, done while at GT)
39. Stewart FJ, Dalsgaard T, Thamdrup B, Revsbech NP, Ulloa O, Canfield DE, and DeLong EF. 2012. Experimental perturbation and oxygen addition elicit profound changes in community transcription in OMZ bacterioplankton. *PLoS ONE*. 7: e37118 (Samples collected while post-doc; sample processing, analysis, and synthesis done while at GT)
40. Bryant JA, Stewart FJ, Eppley JM, and DeLong EF. 2012. Microbial community phylogenetic and trait diversity decline steeply with depth in a marine oxygen minimum zone. *Ecology*. 93: 1659-1673. (Directly advised first-author Bryant; worked jointly on project idea, data acquisition, analysis, and writing; >70% contribution done while at GT)
41. Stewart FJ, Ulloa O, DeLong EF. 2012. Microbial metatranscriptomics in a permanent marine oxygen minimum zone. *Environmental Microbiology*. 14: 23-40. (data generation, analysis, and writing done while a postdoc)
42. Stewart FJ, Dmytrenko O, DeLong EF, Cavanaugh CM. 2011. Metatranscriptomic analysis of sulfur oxidation genes in the endosymbiont of *Solemya velum*. *Frontiers in Microbiology*. 2:134. (sequence data generated during post-doc; analysis, synthesis, and writing done at GT)
43. Stewart FJ, Sharma AK, Bryant JA, Eppley JM, DeLong EF. 2011. Community transcriptomics reveals universal patterns of protein sequence conservation in microbial communities. *Genome Biology*. 12:R26. (data generation, analysis, and writing done during post- doc)
44. Canfield DE, Stewart FJ, Thamdrup B, De Brabandere L, Dalsgaard T, DeLong EF, Revsbech NP, Ulloa O. 2010. A cryptic sulfur cycle in oxygen-minimum zone waters off the Chilean Coast. *Science*. 330: 1375-1378.
45. Stewart FJ, Ottesen EA, DeLong EF. 2010. Development and quantitative analyses of a universal rRNA-subtraction protocol for microbial metatranscriptomics. *The ISME Journal*. 4: 896-907.
46. Roeselers G, Newton ILG, Woyke T, Auchtung TA, Dilly GF, Dutton RJ, Fisher MC, Fontanez KM, Lau E, Stewart FJ, Richardson P, Barry K, Saunders E, Detter JC, Wu D, Eisen JA, Cavanaugh CM. Complete genome sequence of *Candidatus Ruthia magnifica*. *Standards in Genomic Sciences*. 3:163-173.
47. Stewart FJ, Baik AHY, Cavanaugh CM. 2009. Genetic subdivision of chemosynthetic endosymbionts of *Solemya velum* along the southern New England coast. *Applied and Environmental Microbiology*. 75:6005-6007.
48. Stewart FJ, Cavanaugh CM. 2009. Pyrosequencing analysis of endosymbiont population structure: co-occurrence of divergent symbiont lineages in a single vesicomyid host clam. *Environmental Microbiology*. 11:2136-2147.
49. Stewart FJ, Young CR, Cavanaugh CM. 2009. Evidence for homologous recombination in intracellular chemosynthetic clam symbionts. *Molecular Biology and Evolution*. 26:1391-1404.
50. Fritsen CH, Memmott JC, Stewart FJ. 2008. Inter-annual sea ice dynamics and micro-algal biomass in winter pack ice: Marguerite Bay, Antarctica. *Deep-Sea Res. Pt II*. 55:2059-2067.
51. Stewart FJ, Young CR, Cavanaugh CM. 2008. Lateral symbiont acquisition in a maternally transmitted chemosynthetic clam endosymbiosis. *Molecular Biology and Evolution*. 25:673-687.
52. Newton ILG, Woyke T, Auchtung TA, Dilly GF, Dutton RJ, Fisher MC, Fontanez KM, Lau E, Stewart FJ, Richardson PM, Barry KW, Detter JC, Wu D, Eisen JA, Cavanaugh CM. 2007. The *Calyptogena magnifica* chemoautotrophic symbiont genome. *Science*. 315:998-1000.
53. Stewart FJ, Cavanaugh CM. 2007. Intragenomic variation and evolution of the internal transcribed spacer of the rRNA operon in Bacteria. *Journal of Molecular Evolution*. 65:44-67.
54. Stewart FJ, Cavanaugh CM. 2006. Bacterial endosymbioses in *Solemya* (Mollusca, Bivalvia): model systems for studies of symbiont-host adaptation. *Antonie van Leeuwenhoek*. 90:343-360.
55. Stewart FJ, Newton ILG, Cavanaugh CM. 2005. Chemosynthetic endosymbioses: adaptations to oxic-anoxic interfaces. *Trends in Microbiology*. 13: 439-448.

56. Stewart FJ, Fritsen CH, Garrison DL. 2005. Bacteria-algae associations in the sea ice and upper water column of the Ross Sea in late austral summer. *Antarctic Journal of the United States*. 33: 38-41.
57. Stewart FJ, Fritsen CH. 2004. Bacteria-algae relationships in Antarctic sea ice. *Antarctic Science*. 16(2): 143-156.

## **B2. Conference Presentation with Proceedings (Refereed)**

*No data*

## **B3. Other Refereed Material**

*No data*

## **B4. Submitted Journal Articles**

1. Canfield DE, Kraft B, Löscher C, Boyle RA, Thamdrup B, Stewart FJ. The regulation of oxygen to low concentrations in marine oxygen-minimum zones. In review.
2. **Patin NV**, Locklear S<sup>^</sup>, Stewart FJ, Lopanik NB. Symbiont frequency predicts microbiome composition in a model bryozoan-bacterial symbiosis. In review, *Aquatic Microbial Ecology*. <sup>^</sup>=*Georgia Tech undergraduate*
3. Beatty DS, Valayil JM, Clements CS, Ritchie KB, Stewart FJ, Hay ME. Local management can enhance coral chemical defense against a thermally-regulated bleaching pathogen. In review, *Science Advances*.
4. Thamdrup B, Steinsdóttir HGR, **Bertagnolli AD**, **Patin NV**, **Padilla CC**, García-Robledo E, Bristow LA, Stewart FJ. Anaerobic methane oxidation is an important sink for methane in the ocean's largest oxygen minimum zone. In review, *Limnology & Oceanography*.

## **B5. PUBLICATIONS IN PREP (full draft stage)**

1. **Bertagnolli AD**, Owings S, Eitel E, **Price A<sup>^</sup>**, **Clavere-Graciette A**, Taillefert M, Stewart FJ. Molecular and geochemical evidence for spatial de-coupling of sediment microbial communities in the Northern Gulf of Mexico. <sup>^</sup>=*Georgia Tech undergraduate*
2. Bray MS, **Wu J**, **Padilla CC**, Stewart FJ, Fowle DA, Henry C, Simister RL, Thompson KJ, Crowe SA, Glass JB. Structural diversity of electroactive type IV pili in the environment.
3. Szeinbaum N, Nunn BL, Cavazos AR, Crowe SA, Stewart FJ, DiChristina TJ, Reinhard CT, Glass JB. Genome-resolved metaproteomics implicates a novel Betaproteobacterium in Mn(III) reduction.
4. Bertagnolli AD, Boeuf D, Ulloa O, DeLong EF, Stewart FJ. Single-cell genomics links SAR324 bacteria to diverse chemoorganotrophic and chemolithotrophic metabolisms in anoxic marine zones.
5. Bristow LA, Bertagnoll AD, **Stewart FJ**, Thamdrup B. Anaerobic methane oxidation is an important sink for methane in the ocean's largest oxygen minimum zone.
6. Bristow LA, **Padilla CC**, **Sarode N**, Stewart FJ, Thamdrup B. Slow growth and high substrate affinity of anammox bacteria in a marine oxygen minimum zone.
7. Rogener MK, Hunter KS, Rabalais NN, Roberts BJ, Bracco A, Stewart FJ, Joye SB. Pelagic denitrification and methane oxidation in oxygen-depleted waters along the Louisiana-Texas Shelf.
8. Glass JB, Kretz CB, **Ranjan P**, **Wu J**, Nunn B, Reese BK, Tsementzi D, **Sarode ND**, McManus J, Girguis PR Konstantinidis KT, Stewart FJ. *Atribacteria* adaptations for life in methane ice.
9. **Burns AS**, Eitel E, Zwolinski A, **Ganesh S**, Seston SL, Taillefert M, Stewart FJ, DiChristina TJ. Novel microbial communities driving Fe(III)-reduction through a cryptic organosulfur intermediary.

## **C. OTHER PUBLICATIONS AND CREATIVE PRODUCTS**

1. Mandric I, Knyazev S, **Padilla C**, Stewart F, Mandoiu II, Zelikovsky A. 2017. Metabolic

- analysis of metatranscriptomic data from planktonic communities. International Symposium on Bioinformatics Research and Applications. 396-402. Springer.
2. Stewart FJ. 2013. Where the genes flow. *Nature Geoscience*. 6: 688-690. (invited, refereed by editorial board only, not external review)
  3. Weitz DA, Huidan Z, Nai Wen C, Yamei C, Girguis PR, Stewart FJ, Sarode N, Beate K. 2016. US Provisional patent application 62/405,775 ("Sequencing of bacteria or other species"). EFS ID 27160575

## D. PRESENTATIONS

### D1. Presentations - Invited seminars

Emory University, PBEE, April 2018  
 Scripps Institution of Oceanography, April 2018  
 Kavli Frontiers of Science Symposium, UC-Irvine, Feb. 2018  
 University of Southern California, Marine and Environmental Biology, Feb. 2018  
 Johns Hopkins University, Biology, Jan. 2018  
 University of Tennessee, Knoxville, Microbiology, Nov. 2017  
 Woods Hole Oceanographic Institution, Biological Oceanography, April 2017  
 Harvard University, Microbial Science Initiative, March 2016  
 University of Georgia, Microbiology, Sept. 2015  
 Harvard University, Radcliffe Symposium, March 2015  
 Georgia Tech, Integrative BioSystems Institute (IBSI), Feb. 2015  
 LSU, Systematics, Ecology and Evolution, Oct. 2014  
 Marine Microbes, Gordon Research Conference, Bentley University, June 2014  
 U. of British Columbia, Centre for Microbial Diversity and Evolution, March 2014  
 NSF Microbial Community 'Omics Cyberinfrastructure Meeting, Aug. 2013  
 ASLO Aquatic Sciences Meeting, New Orleans, Feb. 2013  
 U. of Florida, Microbiology and Cell Science, Feb. 2013  
 OMZ Symposium, Working group leader, Santa Cruz, Chile, March 2013  
 Emory University, PBEE, March 2012  
 University of Georgia, Marine Science, March, 2012  
 New Mexico State University, HHMI Speaker, Nov. 2011  
 University of Indiana, Microbiology, Sept. 2011  
 European N-Cycle meeting, Plenary address, July 2011  
 Georgia Tech, REU Aquatic Chemical Ecology, June 2011-20157  
 Symposium: Paleobiology During the Genomics Era, J. Craig Venter Institute, May 2011  
 Georgia Tech, Integrative BioSystems Institute (IBSI), May 2011  
 MACEPID Symposium, School of Public Health, University of Michigan, April 2011  
 US-EC Workshop on Marine Genomics, Oct. 2010  
 Georgia Tech, School of Biology, Feb. 2010  
 Northwestern University, CEE, Feb. 2010

### D2. Presentations – Contributed Conference Posters or Seminars

1. Sharp K.H, Pratte ZA, Kerwin AH, Rotjan RD, Stewart FJ. 2018. Using temporal and environmental patterns in the diversity and composition of the *Astrangia poculata* microbiome to identify drivers of coral microbiome assembly. International Symbiosis Society meeting.
2. Szeinbaum N, Crowe SA, Stewart FJ, DiChristina TJ, Reinhard CT, Nunn BL, Glass JB. 2018. Novel microbial metal and nitrogen cycling pathway revealed by metaproteomics. ASM General Meeting.
3. Glass JB, Ranjan P, Johnson AM, Stewart FJ. 2018. Atribacteria adaptations for life in methane ice. ASM General Meeting.
4. Bray MS, Costa B, **Wu J, Padilla CC**, Stewart FJ, Fowle DA, Henny C, Crowe SA, Glass JB.



2018. Characterization of a novel geopilin from Ferruginous Lake Sediments. ASM General Meeting.
5. Dmytrenko O, Stewart FJ, Utter D, DeLong EF, Cavanaugh CM. 2018. Enigmatic calvin cycle of chemosynthetic symbionts. ASM General Meeting.
  6. Kitzinger K, **Padilla CC**, Marchant HK, Mooshammer Herbold CW, Stewart FJ, Wagner M, Kuypers MM, Bristow LA. 2017. Cyanate and urea as substrates for marine Thaumarchaeota. Sandbebjerg, Marine Geomicrobiology Workshop.
  7. Bristow LA, **Padilla CC**, **Sarode N**, Kuypers MMM, Stewart FJ, Thamdrup B. 2017. Anammox: how to thrive in an oxygen minimum zone. ICoN5.
  8. Bristow LA, **Padilla CC**, Stewart FJ, Thamdrup B. 2017. Non-canonical N<sub>2</sub>O production pathways under low oxygen. Goldschmidt2017.
  9. Glass JB, Cavazos AR, Stanton CL, Tang Y, Taillefert M, Stewart FJ, Ostrom NE. 2017. Tales from the crypt(ic): The phantoms of the nitrogen cycle. Goldschmidt2017.
  10. Kitzinger K, **Padilla CC**, Marchant HK, Mooshammer M, Herbold C, Stewart FJ, Wagner M, Kuypers MMM, Bristow LA. 2017. Cyanate and urea as substrates for marine nitrification. ICoN5.
  11. Owings S, **Bertagnolli A**, Eitel E, Craig J, Stewart F, Taillefert. 2017. Evidence for manganese(IV)-coupled anaerobic nitrification in marine sediments. Southeastern Biogeochemistry Symposium
  12. Bray MS, **Wu J**, Reed BC, Kretz CB, Simister RL, Henny C, Stewart FJ, DiChristina DJ, Brandes JA, Fowle DA, Crowe SA, Glass JB. 2017. Shifting microbial communities sustain multi-year iron reduction and methanogenesis in ferruginous sediment incubations. AbSciCon2017.
  13. Szeinbaum N, Zhao S, Tang Y, Henny C, Crow S, Nunn B, Stewart F, Glass JB. 2017. Manganese biosignatures: Mn(III) mineral formation during Mn(IV) oxide reduction. AbSciCon2017.
  14. Tan G, Holtzen S, **Parris D**, Stewart F, Stockton A. 2017. High-throughput sequencing reveals diverse microbial communities in Icelandic Mars Analog Environments. ICISE conference – “Search for Life: From Early Earth to Exoplanets”
  15. Beatty DS, Clements CS, Stewart FJ, Hay ME. 2016. Coral microbiomes and coral survivorship on seaweed versus coral dominated reefs. Western Society of Naturalists Meeting.
  16. Beatty DS, Clements CS, Stewart FJ, Hay ME. 2016. No-take marine protected areas alter benthic communities with cascading positive effects on coral settlement and larval and recruit survivorship. International Coral Reef Symposium.
  17. Glass JB, Bray MS, Wu J, Reed BC, Kretz CB, Stewart FJ, DiChristina TJ, Brandes JA, Fowle DA, Crowe SA. 2016. How did ferruginous Archean oceans make methane? Goldschmidt2016.
  18. Fareed S, Malik A, Lewis J, Stewart F, Laghaie, **Sarode N**, Khizer S, Ali F, Churchill V, **Pratte Z**, Immergluck L. 2016. Applying fecal microbial transplantation (FMT) to treat recurrent *Clostridium difficile* infections (rCDI) in children. Curtis L. Parker Research Symposium.
  19. Sharp KH, **Pratte ZA**, Kerwin AH, Rotjan RD, Stewart FJ. 2016. Investigating the influence of *Symbiodinium psugmophilum* density of prokaryotic communities in the coral *Astrangia poculata*. ICRS 2016.
  20. Dmytrenko O, Stewart FJ, Utter DR, Cavanaugh CM. 2016. Calvin Cycle 2.0. ASM General Meeting.
  21. Glass JB, Stanton CL, Ochoa H, Haslun JA, Gandhi H, Taillefert M, DiChristina TJ, Stewart FJ, Klotz MG, Ostrom NE. 2016. An alternative pathway for marine nitrous oxide production at oxic-anoxic interfaces from coupled biotic-abiotic reactions. ASLO Ocean Sciences.
  22. **Padilla CC**, Bristow LA, **Sarode N**, Garcia-Robledo E, Girguis PR, Thamdrup B, Stewart FJ. 2016. Activity and diversity of aerobic methanotrophs in a coastal marine oxygen minimum zone. ASLO Ocean Sciences.

23. Rogener MK, Roberts BJ, Rabalais NN, Stewart FJ, Joye SB. 2016. Microbial nitrogen sinks in the water column of a large coastal hypoxic area, the Gulf of Mexico "Dead Zone". ASLO Ocean Sciences.
24. Bray MS, Reed BC, Wu J, Kretz CB, Stewart FJ, DiChristina TJ, Fowle DA, Crowe SA, Glass JB. 2015. Linking Iron reduction to anaerobic methane oxidation in an ancient ocean analog. AbSciCon2015.
25. Garcia-Robledo E, Tiano L, Paulmier A, Ward B, Stewart F, Klimant I, Ulloa O, Borisov S, Revsbech NP. 2015. Oxygen in the OMZ: In situ measurement and biological transformations. Goldschmidt2015.
26. Garcia-Robledo E, Revsbech NP, Tiano L, Paulmier A, Stewart F, Lehner P, Klimant I. 2015. Secondary chlorophyll maximum in oxygen minimum zones: Photosynthesis and aerobic respiration at nanomolar oxygen levels. ASLO Aquatic Sciences.
27. Kretz CB, Reese BK, **Sarode N**, Stewart FJ, Glass JB. 2014. Microbial diversity and distribution in deep subsurface Hydrate Ridge sediments. C-DEBI Annual Meeting.
28. **Padilla CC**, Bristow LA, **Benson CR**<sup>^</sup>, **Sarode N**, Girguis PR, Glass JB, DiChristina TJ, Thamdrup B, Stewart FJ. 2014. NC10 bacteria in a marine oxygen minimum zone. AGU Annual Meeting. <sup>^</sup>=**Stewart lab ACE REU student**
29. Glass JB, Reed BC, Bray M, **Sarode N**, Kretz CB, DiChristina TJ, Stewart FJ, Fowle DA, Crowe SA. 2014. Isolation and characterization of microbes mediating thermodynamically favorable coupling of anaerobic oxidation of methane and metal reduction. AGU Annual Meeting.
30. Glass JB, Kretz CB, **Ganesh S**, **Ranjan P**, **Seston SL**, Stewart FJ. 2014. Abundance and taxonomy of microbial genes encoding iron and copper-binding proteins in oxygen minimum zones: Integrating marine metagenomics and geochemistry. GRC Marine Microbes.
31. **Seston SL**, **Shockey AC**<sup>^</sup>, Beinart RA, **Sarode N**, **Ganesh S**, Girguis PR, Stewart FJ. 2014. Comparative metatranscriptomic analysis of *Ifremeria nautilei* endosymbionts in multiple individuals under different electron donating conditions. Poster. ASM General Meeting. <sup>^</sup>=**Georgia Tech undergraduate**
32. Bristow LA, **Ganesh S**, Larsen M, **Parris DJ**, Stewart FJ, Thamdrup B. 2014. Size fractionated process rates and omics of key nitrogen cycling processes in a marine oxygen minimum zone. ASLO Ocean Sciences.
33. **Caro-Quintero A**, **Sarode N**, **Parris DJ**, **Ganesh S**, Stewart FJ. 2014. Metagenomics of microbial communities in the Louisiana Shelf hypoxic zone. ASLO Ocean Sciences.
34. **Ganesh S**, Bristow LA, Thamdrup B, Stewart FJ. 2014. Metatranscriptomics identifies metabolic partitioning among microbial size fractions in a marine oxygen minimum zone. ASLO Ocean Sciences.
35. Glass J, Buck K, Bristow L, Thamdrup B, Stewart FJ. 2014. Bioessential trace metal and nitrogen cycling in the Eastern Tropical North Pacific oxygen minimum zone. ASLO Ocean Sciences.
36. **Parris DJ**, **Ganesh S**, DeLong EF, Edgcomb V, Stewart FJ. 2014. Microbial eukaryote diversity in the marine oxygen minimum zone off northern Chile. ASLO Ocean Sciences.
37. Schwenck SM, Brum JR, Stewart FJ, Sullivan MB. 2014. When the oxygen minimum zone and euphotic zone collide, viral communities are altered. ASLO Ocean Sciences.
38. Beckler J, Rabouille C, Stewart F, Taillefert M. 2013. Formation of soluble organic-Fe(III) complexes in sedimentary environments. ACS National Meeting.
39. Bristow L, Stewart FJ, **Parris DJ**, **Ganesh S**, Thamdrup B. 2013. How do we explain nitrite accumulation in the hypoxic bottom waters of the Gulf of Mexico. ASLO Aquatic Sciences.
40. Dalsgaard T, Stewart FJ, De Brabandere L, Thamdrup B, Revsbech NP, Canfield DE, Bristow L, Ulloa O, Young CR, DeLong EF. 2013. Effect of oxygen on process rates and gene expression of anammox and denitrification in the Eastern South Pacific oxygen minimum zone. ASLO Aquatic Sciences.
41. **Ganesh S**, **Parris DJ**, DeLong EF, Stewart FJ. 2013. Metagenomic analysis of size-fractionated picoplankton in a marine oxygen minimum zone. ASLO Aquatic Sciences.

42. Moisander PH, Valery C, **Parris DJ, Stewart FJ**, Montoya JM, Subramaniam A. 2013. Diversity and distribution of diazotrophs on the Mississippi River Plume. ASLO Aquatic Sciences.
43. Sanders JG, Beinart RA, Stewart FJ, DeLong EF, Girguis PR. 2012. Differences in energy metabolism among symbionts of hydrothermal vent gastropods relates to geochemical niche. ASM Beneficial Microbes.
44. Stewart FJ, Dalsgaard T, Thamdrup B, Revsbech NP, Ulloa O, Canfield DE, and DeLong EF. 2012. Experimental perturbation and oxygen addition elicit profound changes in community transcription in OMZ bacterioplankton. ASLO Ocean Sciences.
45. **Ganesh S, Parris DJ**, DeLong EF, Stewart FJ. 2012. Metagenomic analysis of size-fractionated picoplankton in a marine oxygen minimum zone. Georgia Tech Research and Innovation Conference.
46. Biddle J, Guigo R, Peplies J, Stewart F. 2011. Training Marine Microbiologists Today: Culturing Versus Unix. In: US-EU Task Force on Biotechnology Research, EC-US Workshop on Marine Genomics.
47. Kerwin A, Rotjan R, Dimond J, Thornhill D, Stewart F, Distel D, Sharp K. 2011. Variation in bacterial assemblages associated with different symbiotic states of the facultatively symbiotic coral, *Astrangia poculata*. Boston Bacterial Meeting.
48. Mondav R, Tyson G, Stewart F, Schmidt S. 2010. Metatranscriptomic comparison of an agricultural and a forest soil. Soil Metagenomics 2010.
49. Bristow LA, Altabet MA, Stewart FJ, DeLong EF, Ulloa O. 2010. Enriched nitrate and depleted nitrite isotopic signatures in the OMZ off Northern Chile. AGU Fall Meeting.
50. Stewart FJ, Young CR, Cavanaugh CM. 2008. Pyrosequencing analysis of endosymbiont population structure: co-occurrence of divergent bacterial symbiont lineages in a single host clam. ASM General Meeting, and Boston Bacterial Meeting.
51. Newton ILG, Stewart FJ, Woyke T, Richardson PM, Barry KW, Detter JC, Bruce DC, Eisen JA, Cavanaugh CM. 2006. The *Calyptogena magnifica* symbiont draft genome: an obligate, maternally transmitted endosymbiont with extensive metabolic capabilities. ASM General Meeting.
52. Fritsen CH, Stewart FJ, Stammerjohn S, Smith R. 2004. Winter sea ice biota and environmental change along the Western Antarctic Peninsula. 2004 Ocean Sciences.
53. Stewart FJ, Fritsen CH, Murray AE, Carter BJ. 2003. Prokaryotes in Antarctic sea ice: richness and assemblage composition. Presentation. Life in Ice session. ASLO Aquatic Sciences.
54. Fritsen CH, Stewart FJ, Marschall SM, Memmot JC, Hartsough PC, Cunningham LM, Boc J, Bles MK, Adkins P. 2003. Interannual variation in winter sea ice biota: response to interannual variability in sea ice formation along the Western Antarctic Peninsula. ASLO Aquatic Sciences.
55. Stewart FJ, Fritsen CH, Marschall SM, Memmott JM. 2002. Sea ice and water column microbial biomass and activity during the fall-winter transition west of the Antarctic Peninsula. 2002 Ocean Sciences.
56. Stewart FJ, Fritsen CH, Garrison DL, Gibson AH. 2001. Bacteria-algae associations in the sea ice and upper water column of the Ross Sea in the late austral summer. ASLO Aquatic Sciences.

## E. GRANTS AND CONTRACTS

### E1. As Principal Investigator

1. *Toward a predictive understanding of microbiomes in shark health and ecology*. Georgia Aquarium. Role: PI. Total dollar amount: \$178,400 for the period 05/01/2018-12/31/2019. Share: 100%
2. *Integration of Omics into a New Comprehensive Rate Law for Competitive Terminal Electron-Accepting Processes in Reactive Transport Models: Application to N, Fe, S, and*

- Contaminant Transformations in Stream and Wetland Sediments*. DOE EMSL General Cycle user proposal. Role: PI. Collaborators: Martial Taillefert (PI), Tom DiChristina (Co-PI). Exact budget undisclosed – funding for 500 hrs of mass spec usage. For the period 10/21/18-10/21/19 (or until completion). Share: 100%.
3. *Severe food selectivity and the gut metabolome in autism spectrum disorder*. Childrens Healthcare of Atlanta. Role: PI. Total dollar amount: \$90,000 for the period 07/01/2018-06/30/2019. Share: 50%.
  4. *Fostering immersive training in microbial bioinformatics for undergraduate women* (ROA supplement to 1558916). NSF Biological Oceanography. Role: PI. Collaborators: Sherry Seston (Co-PI). Total dollar amount: \$33,975 for the period 06/01/2017-05/31/2018. Share: 100%.
  5. *ABI Innovation: Collaborative Research: Computational framework for inference of metabolic pathway activity from RNA-seq data*. NSF DBI – Advances in Bioinformatics. Role: PI. Collaborators: Nicole Lopanik (Co-PI, Georgia Tech), Alex Zelikovsky (PI, Georgia State, \$300,000), Ion Mandiou (PI, U-Conn, \$300,000). Total dollar amount: \$299,828 for the period 05/01/2016 - 04/30/19 (\$899,828 across the 3 institutions). Share: 70% (of \$299,828)
  6. *REU Site: Aquatic Chemical Ecology at Georgia Tech*. NSF OCE, Education Human Resources. Role: PI. Collaborators: Linda Green (Co-PI). Total dollar amount: \$375,160 for the period 03/01/2016 - 02/28/19. Share: 5% (of funds, for summer salary; ~33-50% of the work, depending on year).
  7. *Microbial processes of pelagic anaerobic methane cycling in oxygen minimum zones*. NSF Biological Oceanography. Role: PI. Collaborators: Jen Glass (Co-PI). Total dollar amount: \$571,548 for the period 04/01/2016-03/31/2019. Share: 90%.
  8. *Reef fish microbiomes: models for bacteria-host interaction in the ocean*. Simons Foundation. Role: PI. \$540,000 for the period 07/01/2015 - 06/30/2018. Share: 100%.
  9. *The Summer Workshop in Marine Science (SWiMS) at Georgia Tech: A marine initiative for enhancing education standards in life and earth sciences*. Georgia Improving Teacher Quality (ITQ) program. Role: PI. Collaborators: Gustavia Evans, Marion Usselman (Co-PI, CEISMC). \$135,305 for the period 05/1/15 - 05/30/18. Share: 80%.
  10. *Microbial and viral regulation of community carbon cycling across diverse low-oxygen zones*. DOE JGI Community Science program. Role: PI. Exact budget undisclosed - estimated at \$180,000 based on current pricing (for sequencing) for the period 11/01/13-11/01/16 (or until completion). Share: 100%.
  11. *CAREER: A phylogenetic and functional understanding of microbial sulfur cycling in oxygen minimum zones*. NSF Biological Oceanography. Role: PI. \$1,210,901 for the period 02/01/2012-01/31/2017. Share: 100%.
  12. *Sulfur cycling in marine oxygen minimum zones*. Alfred P. Sloan Foundation. Role: PI. \$50,000 for the period 9/15/12 -9/15/16. Share: 100%.
  13. *Microbiome mediators of coral-algal interactions*. Teasley Foundation (Georgia Tech). Role: PI. \$30,000 (one time allotment; still active). Share: 100%.
  14. *Establishing Georgia Tech as a world leader in environmental microbiome research*. Georgia Tech EVPR Blue Sky Retreat program. Role: PI. Collaborators: Joshua Weitz (Co-PI, Georgia Tech). Total dollar amount: \$3000 for the period Oct 2016. Share: 100%.
  15. *Cullen-Peck Fellowship*. Georgia Tech College of Sciences Cullen-Peck Fellows Program. Role: PI. Total dollar amount: \$10,000 for the period 09/2016-12/2018. Share: 100%
  16. *The Chemical Ecology of Microbiome Interactions*. Proposal for the 2018 Suddath Symposium at Georgia Tech. Total dollar amount: \$15,000 for the period 04/2017-01/2018. Share: 100%.

## **E2. As Co-Principal Investigator**

1. *Integration of omics into a new comprehensive rate law for competitive terminal electron-accepting processes in reactive transport models*. DOE Subsurface Biogeochemical Research. Collaborators: Martial Taillefert (PI), Tom DiChristina (Co-PI). \$200,000 for the

- period 2018-2019. Share: 33%.
2. *Building capacity to quantify the ecosystem services and economic value of Georgia's living shorelines*. Georgia Tech Climate Fellows seed grant program. Collaborators: Joel Kostka, (PI), Laura Taylor (Co-PI). \$30,000 for the period 11/02/2018-06/19/2019. Share: 33%
  3. *Development of innovative techniques for exploring novel submarine springs on the Gulf of Mexico Outer Continental Shelf*. NOAA OER. Collaborators: Jordon Beckler (PI), Martial Taillefert (Co-PI), Emily Hall (Co-PI), Jim Culter (Co-PI), Chris Smith (Co-PI). \$257,441 for the period 2018-2019. Share: 16%.
  4. *Oceans Across Space and Time*. NASA Astrobiology Institute – Center for Life Detection Science. Collaborators: Britney Schmidt (PI), plus 20 Co-PIs. Share: <5%.
  5. *Collaborative Research: Dimensions: Biodiversity of iron-respiring microorganisms fueled by a cryptic organic sulfur cycle*. NSF Dimensions of Biodiversity. Role: Co-PI. Collaborators: Tom DiChristina (PI), Martial Taillefert (Co-PI). \$262,419 (pilot, sub-award) for the period 11/01/2015-10/31/2016. Share: 33%.
  6. *Characterization of microbes mediating anaerobic oxidation of methane coupled to iron reduction from an ancient ocean analogue*. NASA-Exobiology. Role: Co-PI. Collaborators: Jen Glass (PI), Tom DiChristina (Co-PI). \$799,858 for the period 01/01/2014-12/31/2016. Share: 33%.

### E3. As Senior Personnel or Contributor

1. *NOVel niches for Anaerobic Methane OXidation (NOVAMOX) and their biochemical significance*. Horizon 2020, ERC Advanced Grant. Role: unfunded collaborator. Collaborators: Bo Thamdrup (PI, U. Southern Denmark). Grant period: 10/01/2016-09/30/2021.

### E4. Proposals in Review in the Past Twelve Months

1. OPUS: MCS - Integrated perspectives of ocean deoxygenation: Uniting multi-omics and ecosystem models to understand ocean tipping points. NSF DEB OPUS. Role: PI. \$253,181. Share: 100% *(submitted 11/18, pending)*
2. *Dynamics of Microbial Chemistry and Community Organization During an Ecosystem Perturbation*. NSF BIO OCE. Role: PI. Collaborators: Julia Kubanek (Co-PI). \$833,015. Share: 50%. *(submitted 08/18, pending)*
3. *Positive effects of coral biodiversity on coral performance: patterns, processes, and dynamics*. NSF BIO OCE. Role: Co-PI. Collaborator: Mark Hay (PI). \$1,996,794. Share: 33%. *(submitted 08/18, pending)*
4. *RENEWAL – REU Site: Aquatic Chemical Ecology at Georgia Tech*. GEO OCE REU. Role: PI. Collaborator: Brian Hammer (Co-PI). \$388,034. Share: 50%. *(submitted 08/18, pending)*
5. *Microbiodiversity drives ecosystem function: SAR11 bacteria as models for oceanic nitrogen loss*. NSF BIO OCE. Role: PI. Collaborators: Kostas Konstantinidis (Co-PI). \$825,705. Share: 50%
6. *Microbial interactions through Augmented Reality: Immersive tools for cross-disciplinary microbiology education*. Georgia Tech SPAG. Role: PI. Collaborators: Marion Usselman (Co-PI). \$50,000. Share: 67%
7. *A quantitative training platform for the next generation of life scientists: Templates and models for scalable transformation*. Burroughs Wellcome Fund. Role: Co-PI. Collaborators: Joshua Weitz (PI). \$150,000. Share: 17%.
8. *Effects of reef degradation on dynamics, chemistry, and function of coral microbiomes*. NSF BIO OCE. Role: Co-PI. Collaborators: Mark Hay (PI) and Julia Kubanek (Co-PI). \$1,599,445. Share: 33%
9. *Collaborative Research: Sulfide-enhanced N<sub>2</sub>O production: an emerging threat of ocean deoxygenation*. NSF CHEM OCE. Role: PI. Collaborators: Damian Grundle (Co-PI). \$556,015. Share: 50%.
10. *Chemical drivers of microbe-phytoplankton interactions over a shifting environment*. NSF

- BIO OCE. Role: PI. Collaborators: Julia Kubanek (Co-PI). \$716,168. Share: 50%.
11. The Microbiome of the Living Building. Sloan Foundation. Role: PI. \$120,000. Share: 100%.
12. *Race, Place & Gut Microbiomes in Obese vs. Lean Youth*. Georgia Clinical and Translational Science Alliance. Role: PI. Collaborators: Lilly Immergluck (Co-PI). \$40,000. Share: 50%.

## F. OTHER SCHOLARLY AND CREATIVE ACCOMPLISHMENTS

*No data.*

## G. SOCIETAL AND POLICY IMPACTS

*No data.*

## H. OTHER PROFESSIONAL ACTIVITIES

*No data.*

## V. TEACHING

### A. COURSES TAUGHT

Fall, 2017	BIOL 3381	Microbiology Lab	14 students
Spring, 2018	BIOL 4744/8744	Microbial Symbiosis	22 students
Fall, 2017	BIOL 3381	Microbiology Lab	20 students
Fall, 2017	BIOL 8803	BIOL Frontiers	8 students
Spring, 2017	BIOL 4083/8803	Microbial Symbiosis	14 students
Fall, 2016	BIOL 3380	Intro. Microbiology	64 students
Fall, 2016	BIOL 3381	Microbiology Lab	16 students
Spring, 2016	BIOL 4083/8803	Microbial Symbiosis	15 students
Fall, 2015	BIOL 3380	Intro. Microbiology	62 students
Fall, 2015	BIOL 3381	Microbiology Lab	24 students
Spring, 2015	BIOL 4083/8803	Microbial Symbiosis	17 students
Fall, 2014	BIOL 3380	Intro. Microbiology	69 students
Spring, 2014	BIOL 4083/8803	Microbial Symbiosis	12 students
Fall, 2013	BIOL 3380	Intro. Microbiology	90 students
Spring, 2013	BIOL 4083/8803	Microbial Symbiosis	22 students
Fall, 2012	BIOL 3380	Intro. Microbiology	98 students
Fall, 2012	BIOL 3381	Microbiology Lab	28 students
Spring, 2012	BIOL 4083/8803	Microbial Symbiosis	19 students
Fall, 2011	BIOL 3380	Intro. Microbiology	83 students
Spring, 2007 (TA)	OEB 123 (Harvard)	Biology of Symbiosis	12 students
Fall, 2006 (TA)	OEB 399 (Harvard)	Topics Org. Evol. Biol.	15 students

### B. INDIVIDUAL STUDENT GUIDANCE

underline = current lab members or committee advisees

#### B1. Ph.D. Students

Cameron Perry (yr1, thesis: shark microbiome ecology)

Ana Clavere Graciette (yr5, thesis: TBD)

Mary Beth McWhirt (yr3, thesis: TBD)

Darren Joshua Parris (graduated fall 2018, thesis: “*Microbiome community change in the guts of marine fish: Feeding and life stage transition as significant organizing factors*”; postdoc as USDA, Athens GA)

Cory Cruz Padilla (graduated fall 2017, thesis: “*Unrecognized diversity of microbes linking methanotrophy to nitrogen loss in marine oxygen minimum zones*”; scientist at Dovetail Genomics)

Sangita Ganesh (graduated fall 2016, thesis: “*Environmental niche partitioning of microbial community genomic diversity, gene expression, and metabolism in a marine oxygen minimum zone*”; scientist at Radiant Genomics)

## **B2. M.S. Students**

Jack Cartee (M.S. Bioinformatics, project: “*Gut microbiome community structure in response to bacterial antagonism*”)

Piyush Ranjan (M.S. Biology: “*Applied bioinformatics for exploring diversity patterns in meta-omic data*”)

## **B3. Undergraduate Students** (all Georgia Tech-affiliated, unless noted; \* = co-author on Stewart lab publications)

Niko Alexandre (ACE REU student, Vassar College), Amelia Barber (ACE REU student, UNC-Chapel Hill), Max Beecroft, Catherine Benson\* (ACE REU student, Middlebury College), Nigel Blackwood (U. Penn), Jack Cartee\*, Allie Caughman (GT Fast-Track student), Gabi Chebli (ACE REU student, Agnes Scott College), Micayla Cochran (Vanderbilt), Natalie Chilcutt, Simon Chow, Sophie Dumas, Nolan Fenzl, Shelby Gantt\*, Claire Garfield (ACE REU student, SUNY-Stony Brook), Michael Gribble (ACE REU student, Pepperdine), Rebecca Hollman\*, Alex Huhman\*, Gwendolyn McManus (Grady high school intern), Michael Morgan\*, Rachel Morochnik (GT Fast-Track student), James Parker, Alex Price, Chloe Pryor (GT Fast-Track student), Abigail Shockey\* (current: grad student at Wisconsin), Casey Smith, Nicole Smith (GT CoS Scholar), Ben Stone\* (ACE REU student, Bowdoin College), Doug Terry, Arpita Yadav, Sarah York (ACE REU student, U. Miami), Kevin Zhou (Wheeler Magnet high school intern)

## **B4. Service on Thesis or Dissertation Committees**

Deanna Beatty (2015-present), Erin Bernardy (2013-2016), Marcus Bray (2014-present), Juan Camilo Castro (2017), Rebecca Cooper (2012-2015), Eryn Eitel (2013-2018), Kizee Etienne (2014-2016), Justine Garcia (2013-2015), Jordan Gulli (2015-present), Siulung Ng (2018-present), Angela Pena-Gonzalez (2015-present), Shengyun Peng (2017-present), Mary Kate Rogener (UGA, 2015-present), Sarah Weber (2014-2015), Samit Watve (2014-2016), Juliana Soto (2015-present), Jillian Walker (2015-2018), Charles Wigington (2016-2017), Diana Williams (2015-2018)

## **B5. Mentorship of Postdoctoral Fellows or Visiting Scholars**

**Postdocs:** Anthony Bertagnolli, Andrew Burns (current: postdoc with Mark Hay, Georgia Tech), Alejandro Caro-Quintero (current: Scientist, Corpoica, Columbia), Nastassia Patin, Zoe Pratte, Neha Sarode (current: postdoc at Harvard), Jieying Wu

**Visiting scholar/teachers:** Kenneth Gregg (retired professor, Winthrop University), Sherry Seston (visiting scholar, biology professor, Alverno College), LaTrice Swain (high school science teacher, Arabia Mountain High School, GT GIFT Internship, summers 2012-2015), Willa Mcgriff (high school science teacher, Miller Grove High School, summer 2016)

## **C. OTHER TEACHING ACTIVITIES**

- Developed a course, *Microbial Symbiosis & Microbiomes* (BIOL 4744/8744), taught annually each spring from 2012-2018 (scheduled again for spring 2019); enrollment: 12-22 students

- For BIOL 3801 (Intro Microbiology lab), developed and initiated a new multi-week lab exercise using next-gen sequencing to characterize the oral microbiome of students

## VI. SERVICE

### A. PROFESSIONAL CONTRIBUTIONS

- President, Southeastern Branch of the American Society of Microbiology (2018-present)
- Senior Editor, *Microbiology Resource Announcements* (2018-present)
- Editor, *Environmental Microbiology* (2016-present)
- Editorial Board member, *Microbiome* (2012-present)
- Editorial Board member, *Frontiers in Microbiology* (2012-present)
- Co-chair, 2018 Suddath Symposium on *The Chemical Ecology of Microbiome Interactions*
- Session chair/organizer, OceanVisions2019 – Climate Summit, Georgia Tech, April 2019
- Organizing Committee member, International Society of Chemical Ecology Annual Meeting, Georgia Tech, June 2019
- Conference Chair/Organizer, *Microbial Dynamics and Infection*, Annual Meeting - Southeastern Branch of the American Society for Microbiology, Georgia Tech, Nov 2018
- Instructor, Winter Institute in Statistical Genetics (topic: microbiomes), Abu Dhabi, Jan 2017
- Chief Scientist for oceanographic research cruises CH-02-12 (July-August 2012), NH1315 (June 2013), NH1410 (May-June 2014), PE1601 (July 2015), PE1702 (July-August 2016), OC1705A (May 2017)
- Session chair, 11<sup>th</sup> International Conference on Bioinformatics, Microbiomes and Metagenomes, Georgia Tech, 2017
- Ad hoc manuscript reviewer for *Antarctic Science*, *Applied and Environmental Microbiology*, *BMC Evolutionary Biology*, *Deep Sea Research*, *Environmental Microbiology*, *Environmental Science & Technology*, *FEMS Microbiology Letters*, *Frontiers in Microbiology*, *The ISME Journal*, *Limnology & Oceanography*, *Marine Drugs*, *mBio*, *Microbial Ecology*, *Molecular Ecology*, *Molecular Systems Biology*, *Nature Communications*, *Nature Geoscience*, *Nature Microbiology*, *PeerJ*, *PLoS Genetics*, *PLoS ONE*, *PNAS*, *Science Advances*
- Ad hoc grant proposal reviewer for NSF, NASA, DOE, the National Sea Grant College Program, the European Research Council, the Austrian Science Fund, the Leibniz Competition, and the University of Vienna
- Panel reviewer for NSF, NASA
- Faculty instructor, Symbiomics Workshop, HYDRA Institute of Marine Science, May 2012

### B. PUBLIC AND COMMUNITY SERVICE

- Director, *Summer Workshop in Marine Science* (SWiMS), 2015-present (SWiMS is a teacher development workshop focused on using marine science to improve high school life and earth science education in high needs districts in the Atlanta area; this program has involved over 70 Atlanta area educators (2015-2018); <https://swimsgatech.wordpress.com/>, <https://sites.google.com/site/ms2summer2018/>)
- Guest Instructor, JJ's Playhouse Children Museum, 2018
- Guest instructor, Northwestern Middle School, Fulton County, GA, 2017
- Siemens Competition, Regional Judge, 2014

### C. INSTITUTE CONTRIBUTIONS

- Associate Director, Center for Microbial Dynamics and Infection (2018-present)
- Member, Georgia Tech Climate Change Fellows Program, 2018
- Elizabeth Smithgall Watts Endowed Chair search committee, 2018
- NSF Aquatic Chemical Ecology REU program site director (w/ Brian Hammer), 2014-present
- Coordinator, School of Biological Sciences alumni newsletter, 2017-present
- Director, Microbiome Discussion Group, School of Biological Sciences, Fall 2015-present



- Coordinating committee, Ph.D. Program in Ocean Sciences & Engineering, 2014-present
- Undergraduate curriculum committee, School of Biological Sciences, 2013-present
- Ecology Faculty search committee, 2015
- Biology Faculty search committee, 2015
- Steering committee, Southeastern Biogeochemistry Symposium, 2013-2014
- Organizing committee, School of Biology graduation celebration, 2012-2016
- Organizing committee, School of Biology Holiday Party, 2012
- Coordinator, School of Biology Seminar Series, 2011-2012