

## Dr. Scott M. Gifford

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 Department of Marine Sciences  
 University of North Carolina at Chapel Hill  
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### Education

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2011 Ph.D. Marine Sciences, University of Georgia  
 2006 M.Sc., Marine Biology, San Francisco State University  
 2003 B.S., Evolution, Ecology, and Organismal Biology, The Ohio State University

### Professional Experience

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2015-present Assistant Professor, University of North Carolina at Chapel Hill  
 2012-15 Postdoctoral Associate, Massachusetts Institute of Technology

### Honors and Awards

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2015 Romberg Tiburon Center Distinguished Alumnus Award  
 2010 UGA Marine Sciences Outstanding Research Award  
 2010 International Society of Microbial Ecology (ISME) Early Researcher poster award  
 2004 San Francisco Bay Scholarship  
 2002 REU Fellow, Baylor University

### Publications

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*Submitted* Wang S, Tang W, Delange E, **Gifford S**, Whitby H, Gonzalaz A, Eveillard D, Planquette H, Cassar N. Patterns of North Atlantic microbial community structure in relation to net community production, nitrogen fixation, and nutrient availability. ISME

*In press* Lin Y, **Gifford S**, Ducklow H, Schofield O, Cassar N. Towards quantitative marine microbiome community profiling using internal standards. Applied and Environmental Microbiology.

*In press* Tang W, Cassar N, Wang S, Batista DB, Dehairs F, **Gifford S**, Gonzalez, Planquette H. Coastal oceans broaden biogeography of marine N<sub>2</sub> fixation. Nature Communications.

2018 Wang S, Cassar, N, **Gifford S**, Lin Y, Eveleth R. Linking patterns of net community production and marine microbial community structure in the western North Atlantic. ISME-J (12) 2582–2595

2018 Gómez-Consarnau L, Sachdeva R, **Gifford S**, Cutter L, Fuhrman J, Sañudo-Wilhelmy S, Moran MA. B-vitamin synthesis and utilization by a natural marine microbial community. Environmental Microbiology.

- 2017 Medeiros P, Seidel M, **Gifford S**, Ballantyne F, Dittmar T, Whitman W, Moran MA. Microbially-mediated Transformations of Estuarine Dissolved Organic Matter. *Frontiers in Marine Science*. doi.org/10.3389/fmars.2017.00069
- 2016 **Gifford SM**, Becker J, Sosa O, Repeta D, and DeLong EF. Quantitative transcriptomics reveals the growth- and nutrient-dependent response of a streamlined marine methylotroph to methanol and naturally occurring dissolved organic matter. *mBio* 7(6): e01279-16. doi:10.1128/mBio.01279-16.
- 2015 Sosa O.\*, **Gifford SM\***, Repeta D., and DeLong EF. Methylotrophs Dominate Dilution-to-Extinction Cultures Enriched with Marine Dissolved Organic Matter. *\*Authors contributed equally to this work.* . *ISME-J* (9) 2725–2739
- 2015 Varaljay VA, Robidart J, Preston CM, **Gifford SM**, Ryan JP, Marin R, , *et al.* Single-taxon field measurements of bacterial gene regulation controlling DMSP fate. *ISME-J* (9) 1677–1686
- 2014 Ottesen E, Curtis R, **Gifford SM**, Eppley JM, Marin R, Schuster SC, Scholin CA, DeLong EF. Multispecies diel transcriptional oscillations in open ocean heterotrophic bacterial assemblages. *Science* 345 (6193) 207-211.
- 2014 **Gifford SM**, Sharma S, and Moran MA. Linking Activity, Function, and Ecosystem Dynamics in Complex Bacterioplankton Communities. *Frontiers in Microbiology* (5) 185 doi: 10.3389/fmicb.2014.00185
- 2014 **Gifford SM**, Satinsky BM, and Moran MA. Quantitative Microbial Metatranscriptomics. In *Environmental Microbiology: Methods and Protocols, Second Edition*. Springer Science Publ. p213-229.
- 2013 Hollibaugh JT, **Gifford SM**, Moran MA, Ross M, Sharma S, Tolar B. Seasonal Variation in the Metatranscriptomes of a Thaumarchaeota Population from SE USA Coastal Waters. *The ISME Journal* doi: 10.1038/ismej.2013.171
- 2013 Satinsky BM, **Gifford SM**, Crump BC, and Moran MA. Use of Internal Standards for Quantitative Metatranscriptome and Metagenome Analysis. *Methods in Enzymology: Microbial Metagenomics, Metatranscriptomics, and Metaproteomics*. Elsevier publishers.
- 2013 Reisch CR, Crabb W, **Gifford SM**, Teng Q, Stoudemyer MJ, Moran MA, and Whitman WB. Metabolism of dimethylsulfoniopropionate by *Ruegeria pomeroyi* DSS-3. *Molecular Microbiology*. 89(4) 774-91
- 2012 **Gifford SM**, Sharma S, Booth M, and Moran MA. Expression Patterns Reveal Niche Diversification in a Marine Microbial Assemblage. *The ISME Journal*. 7(2)281-298
- 2012 Moran MA, Satinsky B, **Gifford SM**, Luo H, Rivers A, Chan LK, et al. Sizing up metatranscriptomics. *The ISME Journal*. 7(2) 237-43
- 2012 Varaljay VA, **Gifford SM**, Wilson ST, Sharma S, Karl DM, and Moran MA. Bacterial Dimethylsulfoniopropionate-degrading Genes in the Oligotrophic North Pacific Subtropical Gyre. *Applied and Environmental Microbiology*. 78(8): 2775-2782

- 2011 Rinto-Kanto JM, Bürgmann H, **Gifford SM**, Sun S, Sharma S, Kiene RP, and Moran MA. Analysis of sulfur-related gene expression by roseobacter communities using a taxon-specific functional gene microarray. *Environmental Microbiology* 13(2):453-467
- 2011 Rollwagen-Bollens G, **Gifford SM**, and Bollens SM. The role of protistan microzooplankton in the upper San Francisco Estuary planktonic food web: source or sink? *Estuaries and Coasts* 34:1026–1038
- 2011 Hollibaugh JT\*, **Gifford SM\***, Sharma S., Bano N, and Moran MA. Metatranscriptomic analysis of ammonia-oxidizing organisms in an estuarine bacterioplankton assemblage. *The ISME Journal* 5(5): 866–878 \*Authors contributed equally to this work.
- 2011 **Gifford SM**, Shalabh S, Rinta-Kanto JM, and Moran MA. Quantitative analysis of a deeply-sequenced marine microbial metatranscriptome. *The ISME Journal* 5(3): 461–472
- 2010 Newton RJ, Griffin LE, Bowles K, Meile C, **Gifford SM**, Givens CE, *et al.* Genome characteristics of a generalist marine bacterial lineage. *The ISME Journal* 4: 784-798
- 2009 Poretsky RS, **Gifford SM**, Rinta-Kanto JM, Vila-Costa M, and Moran MA. Analyzing gene expression from marine microbial communities using environmental transcriptomics. *Journal of Visualized Experiments*. doi: 10.3791/1086
- 2009 Eloë E, Celussi M, Croal L, **Gifford SM**, Gomez-Consarnau L, Liu L, Paerl R, and Bottjer D. C-MORE/Agouron Institute young investigators perspective on the future of microbial oceanography. *Environmental Microbiology Reports* 1:3-26
- 2007 **Gifford SM**, Rollwagen-Bollens G, and Bollens SM. Microzooplankton omnivory in the upper San Francisco Estuary. *Marine Ecology Progress Series* 348: 33-46

## Presentations

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- 2018 *In Darwin's wake: A Microbial Expedition across the Galapagos Islands.* **Gifford SM.** Department of Marine Sciences, The University of Georgia, Athens, Georgia.
- 2018 *Calibration of marine bacterial transcriptome signals to carbon inputs: Quantitative links between substrates, transcriptomics, and metabolism.* Gifford SM. Ocean Sciences Meeting. Portland Oregon.
- 2016 *Marine Transcriptomics: Eavesdropping on the Ocean Microbiome.* **Gifford SM.** American Society of Microbiology: ASM Micro Day Regional Meeting. UNC Chapel Hill. Invited Seminar.
- 2016 *Quantitative transcriptomics reveals an expanding carbon repertoire for marine methylotrophs.* **Gifford SM.** Marine Microbes Gordon Research Conference. Girona, Spain. Oral pres.
- 2016 *The expanding role of methylotrophs in the marine carbon cycle.* **Gifford SM.** Department of Marine Sciences, The University of Georgia, Athens, Georgia. Invited Seminar

- 2016 *The expanding role of methylotrophs in the marine carbon cycle.* **Gifford SM**. Department of Marine Sciences, Duke University Marine Laboratory, Beaufort, North Carolina. Invited Seminar
- 2014 *Metabolism and Genomics of Methylotrophic Bacteria Grown on Marine Dissolved Organic Matter.* **Gifford SM**, Sosa O, Repeta D, DeLong EF. *American Society for Microbiology*, Boston, Massachusetts. Invited as a Young Investigator Presentation.
- 2013 *Bioinformatic analysis of marine bacterial isolate collections in CLC genomics.* **Gifford SM**, Sosa O, DeLong EF. *CLC-bio users workshop*. Cambridge, Massachusetts. Oral pres.
- 2013 *Methylotrophs Dominate Dilution-to-Extinction Cultures Enriched with Marine Dissolved Organic Matter.* **Gifford SM**, Sosa O, Repeta D, DeLong EF. *American Society for Microbiology*, Denver, Colorado. **Invited as a Young Investigator Presentation.**
- 2012 *Resolving the niches of coastal bacterioplankton: Growth and function signals in metatranscriptomes.* **Gifford SM**, Sharma S, Booth M, and Moran MA. *Marine Microbes Gordon Conference*, Lucca, Italy. Poster pres.
- 2010 *Metatranscriptomic analysis of a summer bacterioplankton community in southeastern U.S. coastal waters.* **Gifford SM**, Sharma S, Hollibaugh JT, and Moran MA. *ISME*, Seattle, Washington. Poster pres. **Received ISME early researcher award.**
- 2010 Deep sequencing of a coastal metatranscriptome. **Gifford SM**, Sharma S, Hollibaugh JT, Moran MA. *Marine Microbes Gordon Conference*, Tilton, New Hampshire. Poster pres.
- 2009 Deep sequencing of a coastal metatranscriptome: How does sequence coverage affect biogeochemical interpretation? **Gifford SM**, Sharma S, and Moran MA. *NSF FIBR Workshop: Do species matter in microbial communities?* Bozeman, Montana. Poster pres.
- 2009 Regulation of DMSP flux through the demethylation and cleavage pathways of *Silicibacter pomeroyi*. **Gifford SM**, Reisch C, Griffin L, and Moran MA. *ASLO Aquatic Sciences Meeting*, Nice, France. Oral pres.
- 2008 Environmental transcriptomics in a coastal ecosystem. **Gifford SM**, Poretsky R, and Moran MA. *454 Pyrosequencing Symposium*, Columbia, South Carolina. Oral pres.
- 2008 Investigation of mesoscale biological interactions within a cyclonic eddy in the North Pacific subtropical gyre. Grant SR, Bernardino AF, Bottjer D, Celussi M, Croal L, Eloe E, **Gifford SM**, Gomez-Consarnau L, Hartz AJ, Hmelo L. *Ocean Sciences Meeting*, Orlando, Florida. Poster pres.
- 2008 Microarray-based analysis of *Silicibacter pomeroyi*'s transcriptional response to metabolites of the DMSP degradation pathways. **Gifford SM** and Moran MA. *Ocean Sciences Meeting*, Orlando, Florida. Poster pres.
- 2005 Mesozooplankton predation on protists in Suisun Bay (Northern San Francisco Estuary). **Gifford SM**, Rollwagen-Bollens G, Slaughter AM, and Bollens SM. *Estuarine Research Federation*, Norfolk, Virginia. Oral pres.

2003 The effects of light climate on the trophic state of lakes and reservoirs. **Gifford SM** and Lind O. *ASLO Aquatic Sciences Meeting*, Salt Lake City, Utah. Poster pres.

## Teaching and Service Activities

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### Courses taught at UNC Chapel Hill:

MASC 101 / GEOL 103: Introduction to the Marine Environment

Spring 2018: 1 section of 75 students

Spring 2017: 1 section of 74 students

Spring 2016: 1 section of 65 students

MASC 395: Undergraduate Research

Spr 2018: Acacia Zhao

Fall 2017: Martina Savage

MASC 447: Microbial Ecological Genomics

Fall 2017: 1 section of 15 students

MASC 443: Marine Microbiology

Fall 2016: 1 section of 11 students

MASC 490: Ecological Genomics Seminar

Fall 2015: 1 section of 10 students

### C-MORE Microbial Oceanography course instructor, University of Hawaii.

Summer 2015, 2014, and 2013

## Advisor Activities

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**Ph.D. candidates:** Garrett Sharpe  
(Co-advised by Dr. Septer, Department of Marine Sciences)  
2017 - present; expected completion August, 2022  
Title: Novel social interactions of the coastally abundant *Roseobacter* clade and their ecological implications

Laura Fisch  
2016 - present; expected completion August, 2021  
Title: Bacterial Transcriptomics as Bioassays of Dissolved Organic Matter Degradation.

Jess Boulton  
2018 - present; expected completion August, 2023  
Title: Calibration of Bacterial Transcript-DOC substrate relationships.

**PostDoctoral:** Dr. Adam Spaulding (2015)

**Technicians:** Jessica Bolton (2017 – 2018)  
Kimberly DeLong (2017, Currently Ph.D. candidate at UC Santa Cruz)  
Broke Stemple (2016, Currently Ph.D. candidate at Notre Dame)

**Undergraduate Researchers** Sierra Parker (2019 – pres.)  
 Acacia Zhao (2017 – pres.)  
 Martina Savage (2016 – 2018)  
 Lauren Clance (2015 – 2016)

**Grants**

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UNC Provost’s Office Junior Faculty Development Awards. 2018. *Development of biosensors to identify carbon and energy flow in marine ecosystems*. Principle Investigator. \$10,000 total direct funding. Support for field work. 0% effort.

National Aeronautics and Space Administration. 2017-2020. *Quantifying the carbon export potential of the marine microbial community: coupling of biogenic rates and fluxes with genomics at the ocean surface*. Co-Principle Investigator (with A. Marchetti, N. Cassar). \$1,024,125 total funding. 8.3% percent effort.

**Professional Service**

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To discipline

Journal reviews, panels, Funding reviews

NSF, SeaGrant

International Journal of Microbial Ecology, environmental microbiology, Frontiers in Microbiology, Nature GeoSciences, Scientific Reports

Professional Memberships

2008-present International Society for Microbial Ecology

2007-present American Society for Microbiology

2003-present American Society for Limnology and Oceanography

Within UNC Chapel Hill: Seminar committee, Graduate performance committee

Student committees

*UNC*: Stephanie Smith, Weida Gong, Erika Neave, Sarah Brown, Lauren Speare.

*Duke*: Seaver Wang, Weiyi Tang

**Research Cruise Experience**

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R/V *Revelle* 2018, 31 days Line P to Station Papa in the North Pacific

R/V *Savannah* 2017, 3 days from Coastal Georgia, U.S.A, to South Atlantic Bight shelf

R/V *Atlantic Explorer* 2017, 10 days from Bermuda to Nova Scotia and Northeastern U.S.A.

R/V *Sierra Negra*, 2016 - 15 days off the Galapagos Islands, Ecuador

R/V *Atlantic Explorer* 2016, 10 days from Bermuda to the Caribbean and South Atlantic Bight

R/V *Sierra Negra*, 2015 - 15 days off the Galapagos Islands, Ecuador

R/V *Endeavor* 2015, 7 days in the eastern North Atlantic

R/V *Kai Kai* 2012, 5 days off the coast of Chile

R/V *Melville* 2011, 14 days in the Amazon River Plume and Western Atlantic

R/V *Kilo Moana* 2007, 10 days in the Subtropical North Pacific

R/V *Questuary* 2005, 12 day cruises in Northern San Francisco Bay

R/V *Polaris* 2004, 1 day from South to North San Francisco Bay

R/V *Point Sur* 2003, 1 day off the coast of Monterey Bay, U.S.A.