Dr. Scott M. Gifford

Assistant Professor, Sewell Family Foundation Fellow
Department of Marine Sciences
University of North Carolina at Chapel Hill
4202G Murray Hall
Chapel Hill, NC 27516
Email: sgifford@email.unc.edu
Phone: (919) 962 9062

Education and Training

2012-15	Postdoctoral Associate, Massachusetts Institute of Technology
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

Research Awards

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

Research Experience

2012-present **Post Doctoral Research: DeLong Laboratory, MIT**
High-throughput dilution to extinction culturing to obtain novel isolates and consortia that degrade semi-labile DOC from the subtropical North Pacific gyre. Characterization of isolates growth on natural DOC to identify the genes providing the enzymatic mechanisms of DOC degradation.

2006-2011 **PhD dissertation research: Moran Laboratory, University of Georgia**
Sapelo Island Microbial Observatory (SIMO): Conducted a three year time series examining seasonal shifts in bacterioplankton taxonomic, functional gene, and transcript composition, and their influence on the fate of terrestrial and marine-derived organic matter in a Southeastern U.S. coastal ecosystem.

Metatranscriptomics of natural bacterioplankton communities: Employed massively parallel sequencing to examine diel and seasonal shifts in community expression, particularly as it relates to dissolved organic matter cycling.

Transcriptional response of *Silicibacter pomeroyi* to DMSP and related compounds: Performed whole-genome microarray analysis of a model marine organism's response to DMSP.

2007 **Microbial oceanography summer course: C-MORE, University of Hawaii**
Selected participant in a six week course exploring how marine microbes shape global biogeochemistry; consisted of lectures by leaders in the field, laboratory training, and a

10 day research cruise studying a cyclonic gyre in the subtropical North Pacific. In 2013, I returned to help teach the genomics portion of the course.

2006 **Research Associate: Culver laboratory, The Ohio State University**
Conducted hydrographic monitoring, chemical analysis, and zooplankton composition studies of Ohio's fish hatcheries, as well as zebra mussel monitoring throughout Ohio.

2003-2005 **Masters thesis research: Bollens laboratory, San Francisco State University**
The role of nano- and microzooplankton in the lower food web of Suisun Bay: An examination of the protistan community composition and its potential as a source of prey for higher trophic levels in the northern reach of San Francisco Bay.

2002 **Research experience for undergraduates: Lind laboratory, Baylor University**
Examined the effects of light climate on phytoplankton respiration in Lake Waco.

2001-2002 **Undergraduate research assistant: Snow laboratory, The Ohio State University**
Assisted in studies of ecological impacts of gene transfer from transgenic to wild crops

2001 **Field technician: Hawaii Volcanoes National Park**
Monitored the reproductive and nesting behavior of endangered Hawksbill sea turtles.

Publications

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 Metratranscriptomes 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 Oligotropic 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 Eloe 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

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

2013,14,15 **C-MORE microbial oceanography course instructor, University of Hawaii.** Gave lectures on how microbes structure marine ecosystems and biogeochemistry, as well as the molecular and bioinformatics tools used to identify those roles. Led bioinformatics labs in which the students annotated and analyzed a bacterial genome and metagenomes sequenced as part of the course.

2010 **Research mentor:** Provided instruction and guidance to three high school students who spent nine weeks characterizing *Silicibacter pomeroyi's* response to DMSP and reactive oxygen species.

2008 **Lab instructor**: *Biology and Ecology of the Marine Environment* MARS1020L, UGA Instructed three sections with 20 students each

2007-2011 **Treasurer**, Marine Science Graduate Student Association

Research Cruise Experience

R/V *Sierra Negra*, 15 days off the Galapagos Islands, Ecuador
R/V *Endeavor*, 7 days in the eastern North Atlantic
R/V *Kai Kai*, 5 days off the coast of Chile
R/V *Melville,* 14 days in the Amazon River Plume and Western Atlantic
R/V *Kilo Moana*, 10 days in the Subtropical North Pacific
R/V *Questuary*, 12 day cruises in Northern San Francisco Bay
R/V *Polaris*, 1 day from South to North San Francisco Bay
R/V *Point Sur*, 1 day off the coast of Monterey Bay

Professional Memberships

2008-present International Society for Microbial Ecology
2007-present American Society for Microbiology
2003-present American Society for Limnology and Oceanography