

Dr. Joshua Steele

Microbiologist

Microbiology Department

Southern California Coastal Water Research Project

Education

Ph.D., marine environmental biology, University of Southern California, 2010

B.S., molecular biology, University of California, San Diego, 2000

Professional Experience

Scientist, Southern California Coastal Water Research Project, Costa Mesa, CA. 2014-present

Associate Research Scientist, Geobiology, California Institute of Technology, Pasadena, CA.
2013-2014

Postdoctoral Scholar in Geobiology, California Institute of Technology, Pasadena, CA. 2010-2013

Research Assistant, University of Southern California, Los Angeles, CA. 2001-2010

Knauss Marine Policy Fellow: Legislative Assistant for Rep. Sam Farr (CA-17), U.S. House of Representatives, Washington, DC. 2008-2009

Teaching Assistant, University of Southern California, Los Angeles, CA. 2001-2006

Doctoral Fellow, NSF Integrative Graduate Education, Research, and Training: Environmental Studies, Policy and Engineering- Sustainable Cities Program, University of Southern California, Los Angeles, CA 2003-2004

Participant USC Sustainable Cities Internship in Hong Kong SAR, China 2004

Sea Grant Trainee, Beach Water Quality Study, 2002

Laboratory Technician, CalBioMarine Technologies, Inc. Carlsbad, CA 2000-2001

Honors and Awards

Knauss Sea Grant Fellowship in Marine Policy 2008-2009

Rose Hills Graduate Internship 2005, 2006

National Science Foundation IGERT Doctoral Fellowship in Sustainable Cities 2003-2004

Student travel Award ASLO Ocean Sciences Conference, Honolulu, HI 2004

Traineeship, USC Sea Grant Program 2002

Professional Societies and Certifications

Association for the Sciences of Limnology and Oceanography

American Geophysical Union

American Society for Microbiology

Coastal and Estuarine Research Federation

International Society for Microbial Ecology

Society for Applied Microbiology

Selected Presentations and Conference Proceedings

Steele, J.A., R.E. Diner, A.G. Zimmer-Faust, M.L. Griffith, T. Harper, J. Chokry, D. Wanless, J.F. Griffith. Antimicrobial Resistance in Wastewater Effluent Streams and in Urban Coastal Waters Influenced by Effluent Discharge. Oceans and Human Health Session Co-Chair. ASLO/AGU/TOS Ocean Sciences Meeting February 16-21, 2020, San Diego CA.

Steele, J.A., D. Ebentier McCarger, A.G. Zimmer-Faust, J.F. Griffith, R.T. Noble, K.C. Schiff. Tracking human fecal sources in an urban, coastal watershed during wet weather. Coastal Estuarine Research Federation Biennial Meeting. 3-7 November, 2019 Mobile, AL, USA

Steele, J.A., A. G. Zimmer-Faust, M.L. Griffith, L.E. Darjany, P. Chen, D. Wanless, J. F. Griffith. Distinct Biofilm Communities in Separate Sewer and Storm Drain Infrastructure in Urbanized

Watersheds. ASM Microbe 2019. June 20-24, 2019. San Francisco, CA, USA

Steele, J.A. Scaling the issues across culture-based methods and whole environmental matrix based bioinformatics, an overview. Impacts of Bioinformatics on Water Quality Research and Management Side Event. Co-Conveners: J.A. Steele, J.F. Griffith, R.T. Noble UNC Water Microbiology Conference 2019. May 16, 2019. Chapel Hill, NC, USA

Steele, J.A., P. Chen, M.L. Griffith, A.G. Zimmer-Faust, D. Wanless, J.F. Griffith. An Antimicrobial Resistance Survey: Primary-Tertiary Treated Wastewater, UNC Water Microbiology Conference 2019. May 14-16, 2019. Chapel Hill, NC, USA

Steele, J.A., M.R. Raith, L.E. Darjany, J.F. Griffith. Application of a cultivable halophilic archaeon as an extraction and quantification control for the measurement of bacteria using qPCR and digital PCR in wastewater and environmental waters. UNC Water Microbiology Conference 2018. May 22-24, 2018. Chapel Hill, NC, USA.

Steele, J.A., P.A. Greenfield, L.R. Thompson, J. Martinson, D. Kacev, A. Bush, M. Hajibabaei, D. Baird, E.M. Pilgrim, E.D. Stein, A.A. Chariton. Inter-laboratory comparative study of bioinformatics pipelines: Initial Results. Second Annual Environmental DNA Technical Exchange Workshop (Virtual) January 9-10, 2018.

Steele, J.A., M.R. Raith, J.F. Griffith, K.C. Schiff. Molecular Fecal Source Investigation at an Urban Marine Beach with Chronic Microbial Water Quality Problems in support of a Quantitative Microbial Risk Assessment. UNC Water Microbiology Conference 2017: May 15-17, 2017 Chapel Hill, NC

Steele, J. A., A.A. Chariton, S. M. Theroux, E.D. Stein. Inter-laboratory comparative study of bioinformatics pipelines. 2017 International Workshop on Environmental Genomics. June 8-9, 2017 St. John's, NL, Canada.

Steele, J.A., Theroux, S.M, Kacev, D., Mazor, R. , Cao, Y., J.F. Griffith, E.D. Stein. Towards standards for sequence and bioinformatic analysis quality control when using eDNA for metabarcoding and taxonomic identification. First Annual Environmental DNA Training

& Technical Exchange Workshop, 2-3 August 2016. Denver, Colorado, USA

Journal Articles

Crain, C., K. Kezer, S. Steele, J. Owiti, S. Rao, M. Victorio, B. Austin, A. Volner, W. Draper, J.F. Griffith, J.A. Steele, M. Seifert. 2021. Application of ddPCR for detection of *Enterococcus* spp. in

coastal water quality monitoring. *Journal of Microbiological Methods*
DOI:10.1016/j.mimet.2021.106206.

Rothman, J.A., T.B. Loveless, M.L. Griffith, J.A. Steele, J.F. Griffith, K.L. Whiteson. 2020. Metagenomics of Wastewater Influent from Southern California Wastewater Treatment Facilities in the Era of COVID-19. *Microbiology Resource Announcements* 9:e00907-20.

Zimmer-Faust, A.G., J.A. Steele, J.F. Griffith, K.C. Schiff. 2020. The challenges of microbial source tracking at urban beaches for Quantitative Microbial Risk Assessment (QMRA). *Marine Pollution Bulletin* DOI:10.1016/j.marpolbul.2020.111546.

Steele, J.A., A.D. Blackwood, J.F. Griffith, R.T. Noble, K.C. Schiff. 2018. Quantification of pathogens and markers of fecal contamination during storm events along popular surfing beaches in San Diego, California. *Water Research* 136:137-149.

Arnold, B.F., K.C. Schiff, A. Ercumen, J. Benjamin-Chung, J.A. Steele, J.F. Griffith, S.J. Steinberg, P.D. Smith, C.D. McGee, R. Wilson, C. Nelsen, S.B. Weisberg, J.M. Colford Jr. 2017. Acute Illness Among Surfers After Exposure to Seawater in Dry- and Wet-Weather Conditions. *American Journal of Epidemiology* 186:866-875.

Soller, J.A., M. Schoen, J.A. Steele, J.F. Griffith, K.C. Schiff. 2017. Incidence of gastrointestinal illness following wet weather recreational exposures: Harmonization of quantitative microbial risk assessment with an epidemiologic investigation of surfers. *Water Research* 121:280-289.

Marlow JJ, Steele JA, Ziebis W, Scheller S, Case D, Reynard LM, Orphan VJ. 2017. Monodeuterated Methane, an Isotopic Tool To Assess Biological Methane Metabolism Rates. *mSphere* 2(4): e00309-17-19 doi:10.1128/mSphereDirect.00309-17.

Pasulka, A.L; Levin, L.A; Steele, J.A; Case, D.H; Landry, M. R; Orphan, V.J. 2016 Microbial eukaryotic distributions and diversity patterns in a deep-sea methane seep ecosystem. *Environ Microbiol*, 18: 3022-3043. doi:10.1111/1462-2920.13185

Cram, J. A., Chow, C.-E. T., Sachdeva, R., Needham, D. M., Parada, A. E., Steele, J. A., & Fuhrman, J. A. 2015. Seasonal and interannual variability of the marine bacterioplankton community throughout the water column over ten years. *ISME Journal* 9 (3), 563-580
doi:10.1038/ismej.2014.153

Marlow JJ, Steele JA, Case DH, Connon SA, Levin LA and Orphan VJ 2014 Microbial abundance and diversity patterns associated with sediments and carbonates from the methane seep environments of Hydrate Ridge, OR. *Front. Mar. Sci.* 1:44. doi: 10.3389/fmars.2014.00044

Marlow, J. J., Steele, J. A., Ziebis, W., Thurber, A. R., Levin, L. A., & Orphan, V. J. 2014 Carbonate-hosted methanotrophy represents an unrecognized methane sink in the deep sea. *Nature*

Communications, 5, 5094. doi:10.1038/ncomms6094

Glass, J.B., H. Yu, J.A. Steele, K.S. Dawson, S. Sun, K. Chourey, R.L. Hettich, V.J. Orphan. 2014 Geochemical, metagenomic and metaproteomic insights into trace metal utilization of methane-oxidizing microbial consortia in sulfidic marine sediments. *Environmental Microbiology* 16(6), 1592-1611. doi:10.1111/1462-2920.12314

Hatosy, S.M., J.B.H. Martiny, R. Sachdeva, J. Steele, J.A. Fuhrman, A.C. Martiny 2013 Beta-diversity of marine bacteria depends on temporal scale. *Ecology* 94 (9), 1898-1904

Chow, C.E.T., R. Sachdeva, J.A. Cram, J.A. Steele, D.M. Needham, A. Patel, A.E. Parada, J.A. Fuhrman. 2013. Temporal variability and coherence of euphotic zone bacterial communities over a decade in the Southern California Bight *ISME Journal* 7, 2259-2273; doi:10.1038/ismej.2013.122

Tavormina, P.L., W. Ussler III, J.A. Steele, S.A. Connon, M.G. Klotz, V. J. Orphan. 2013. Depth distribution of Cu-MMO variants through the oxygen minimum zone along the Costa Rica convergent margin. *Environmental Microbiology Reports* 5 (3), 414-423

Gilbert, J.A., J.A. Steele, J.G. Caporaso, L. Steinbrück, P. Somerfield, J. Reeder, B. Temperton, S. Huse, I. Joint, A.C. McHardy, R. Knight, J.A. Fuhrman, D. Field. 2012 Defining seasonal marine microbial community dynamics. *ISME Journal* 6:298-308.

Steele, J.A., P.D. Countway, L. Xia, P. D. Vigil, J.M. Beman, D.Y. Kim, C. T. Chow, R. Sachdeva, A.C. Jones, M.S. Schwalbach, J. M. Rose, I. Hewson, A. Patel, F. Sun, D.A. Caron, J.A. Fuhrman. 2011 Marine bacterial, archaeal, and protistan association networks reveal ecological linkages *ISME Journal* 5:1414-1425.

Xia, L. C., J.A. Steele, J. Cram, Z.G. Cardon, S.L. Simmons, J.J. Vallino, J.A. Fuhrman, F. Sun 2011. Extended local similarity analysis (eLSA) of microbial community and other time series data with replicates. *BMC Systems Biology* 5:S15.

Beman, J.M., J.A. Steele, and J.A. Fuhrman. 2011 Co-occurrence patterns for abundant marine archaeal and bacterial lineages in the deep chlorophyll maximum of coastal California. *ISME Journal* 5:1077-1085.

Fuhrman J.A., J.A. Steele. 2008 Community Structure of Marine Bacterioplankton: Patterns, Networks, and Relationships to Function. *Aquatic Microbial Ecology* 53:69-81.

Fuhrman, J.A., J.A. Steele, I. Hewson, M. S. Schwalbach, M.V. Brown, J. Green, Brown, J.H. 2008 A Latitude Diversity Gradient in Planktonic Marine Bacteria. *Proceedings of the National Academy of Sciences* 105:7774-7778.

Patel, A., R. Noble, J.A. Steele, M.S. Schwalbach, I. Hewson, J.A. Fuhrman 2007 Virus and

Prokaryote Enumeration from Planktonic Marine Environments by Epifluorescence Microscopy with SYBR Green I. *Nature Protocols* 2:269-276.

Ruan, Q., D. Dutta, M.S. Schwalbach, J.A. Steele, J.A. Fuhrman, F. Sun 2006 Local Similarity Analysis Reveals Unique Associations Among Marine Bacterioplankton Species and Environmental Factors. *Bioinformatics* 22: 2532-2538.

Fuhrman, J. A., Hewson, I., Schwalbach, M. S., Steele, J. A., Brown, M. V., & Naeem, S. 2006. Annually reoccurring bacterial communities are predictable from ocean conditions. *Proceedings of the National Academy of Sciences*, 103(35): 13104–13109.

Ruan, Q., Steele, J. A., Schwalbach, M. S., Fuhrman, J. A., & Sun, F. 2006. A dynamic programming algorithm for binning microbial community profiles. *Bioinformatics*, 22(12), 1508-1514.

Hewson, I., D.G. Capone, J. A. Steele, J.A. Fuhrman. 2006 Influence of Amazon and Orinoco Offshore Surface Water Plumes on Oligotrophic Bacterioplankton Diversity in the West Tropical Atlantic. *Aquatic Microbial Ecology* 43:11-22.

Hewson, I, J.A. Steele, D.G. Capone, J.A. Fuhrman. 2006 Remarkable Heterogeneity in Meso- and Bathypelagic Bacterioplankton Community Composition. *Limnol. Oceanography* 51:1274-1283.

Hewson, I, J.A. Steele, D.G. Capone, J.A. Fuhrman. 2006 Temporal and Spatial Scales of Oligotrophic Surface Water Bacterioplankton Assemblage Variation. *Marine Ecology Progress Series* 311:67-77.

Steele, J.A., F. Ozis, J.A. Fuhrman, J.S. Devinny. 2005. Structure of Microbial Communities in Ethanol Biofilters. *Chemical Engineering Journal* 113:135-143.

Technical Reports

Steele, J.A., D. Ebentier, A.G. Zimmer-Faust, J.F. Griffith, K.C. Schiff. 2019. Los Coches Creek Microbial Source Tracking Study. Technical Report 1087. Southern California Coastal Water Research Project. Costa Mesa, CA.

Schiff, K.C., J.F. Griffith, J.A. Steele, A.G. Zimmer-Faust, J.A. Soller. 2019. Inner Cabrillo Beach Microbial Source Tracking and Quantitative Microbial Risk Assessment (QMRA). Technical Report 1068. Southern California Coastal Water Research Project. Costa Mesa, CA.

Steele, J.A., J.F. Griffith, R. Noble, K.C. Schiff. 2017. Tracking Human Fecal Sources in an Urban Watershed During Wet Weather. Technical Report 1002. Southern California Coastal Water Research Project. Costa Mesa, CA.

Schiff, K.C., J.F. Griffith, J.A. Steele, B. Arnold, A. Ercumen, J. Benjamin-Chung, J.M. Colford Jr, J. Soller, R. Wilson, C. McGee. 2016. The Surfer Health Study: A Three-Year Study Examining Illness Rates Associated with Surfing During Wet Weather. Technical Report 943. Southern California Coastal Water Research Project Authority. Costa Mesa, CA.