

MICHELLE M. GIERACH

Jet Propulsion Laboratory, California Institute of Technology
M/S 233-300 • 4800 Oak Grove Drive • Pasadena, CA 91109
Phone: (818) 354-1933 • Fax: (818) 354-3223
michelle.gierach@jpl.nasa.gov

RELEVANT EXPERIENCE

I have extensive experience in the analysis and application of satellite and airborne observations, in-situ data, and model simulations to study synoptic to decadal changes in the marine environment, with specific focus on biophysical interactions, ecosystem dynamics, and carbon fluxes. My current research ranges from the open ocean, investigating the biophysical response associated with the El Niño Southern Oscillation, to coastal and inland waters, assessing variability in water quality and the current condition of coral reefs.

EDUCATION

Ph.D., Marine Science, University of South Carolina, 2009
M.S., Meteorology, Florida State University, 2006
B.S., Meteorology, Florida State University, 2004

PROFESSIONAL EXPERIENCE

Scientist in Carbon Cycle and Ecosystems Group, JPL, 2011 – present

- Project Manager, NASA EVS-2 Coral Reef Airborne Laboratory (CORAL) mission, 2018 – 2019
- Project Scientist, NASA EVS-2 Coral Reef Airborne Laboratory (CORAL) mission, 2015 – 2019
- Project Scientist, NASA Physical Oceanography Data Center (PO.DAAC), 2011 – present

Postdoctoral Associate, Applied Marine Physics, RSMAS, University of Miami, 2009 – 2011

AWARDS

NASA Exceptional Public Achievement Medal, 2018
Florida State University Reubin O'D. Askew Young Alumni Award, 2016
Florida State University Notable Noles, 2016
JPL Lew Allen Award for Excellence, 2015
NASA Early Career Achievement Medal, 2013
Dean's Award for Excellence in Graduate Study, 2009

REFEREED PUBLICATIONS

Hochberg, E.J., and **M.M. Gierach**, 2019: Unexpected trends between coral reef condition and environment at ecosystem the scale, *Nature*, submitted.

Stavros, N.E., C. Oaida, J. Hausman, M. Srinivasan, H. Hua, M. Gangl, and **M.M. Gierach**, 2019: A Quantitative Framework to Inform Cloud Data System Architecture and Services Requirements Based on User Needs and Expected Demand, *Requirements Engineering*, submitted.

Carroll, D., D. Menemenlis, **M. M. Gierach**, et al., 2019: The ECCO-Darwin data-assimilative global ocean biogeochemistry model: Estimates of seasonal to multi-decadal surface ocean pCO₂ and Air-sea CO₂ flux, *Journal of Advances in Modeling Earth Systems*, submitted.

Fichot, G.G., K. Matsumoto, B. Holt, **M.M. Gierach**, K.S. Tokos, 2019: Assessing change in the overturning behavior of the Laurentian Great Lakes using remotely sensed lake surface water temperatures, *Remote Sensing of Environment*, accepted.

Thompson, D., K. Cawse-Nicholson, Z. Erickson, C.G. Fichot, C. Frankenberg, B.-C. Gao, **M.M. Gierach**, R. Green, D. Jensen, V. Natraj, A. Thompson, 2019: A unified approach to estimate land and water reflectances with uncertainties for coastal imaging spectroscopy, *Remote Sensing of Environment*, 231, doi:10.1016/j.rse.2019.05.017.

- Erickson, Z., C. Frankenberg, D. Thompson, A. Thompson, **M.M. Gierach**, 2019: Remote sensing of chlorophyll fluorescence in the ocean using imaging spectrometry: Towards a vertical profile of fluorescence, *Geophysical Research Letters*, doi:10.1029/2018GL081273.
- Stephens, B., et al., 2018: The O₂/N₂ Ratio and CO₂ Airborne Southern Ocean (ORCAS) Study, *Bulletin of American Meteorological Society*, doi:10.1175/BAMS-D-16-0206.1.
- Fournier, S., J. Vialard, M. Lengaigne, T. Lee, **M.M. Gierach**, and A.V.S. Chaitanya, 2017: Modulation of the Ganges-Brahmaputra river plume by the Indian Ocean Dipole and eddies inferred from satellite observations, *Journal of Geophysical Research*, doi:10.1002/2017JC013333.
- Fournier, S., D. Vandemark, L. Gaultier, T. Lee, B. Jonsson, and **M.M. Gierach**, 2017: Interannual variation in offshore advection of Amazon-Orinoco plume waters: observations, forcing mechanisms, and impacts, *Journal of Geophysical Research*, 122, 8966-8982, doi:10.1002/2017JC013103.
- Chatterjee, A., **M. M. Gierach**, D. Crisp, A. Eldering, M. Gunson, C. O'Dell, B. Stephens, A. Sutton, and D. Schimel, 2017: Influence of El Niño on atmospheric CO₂ over the tropical Pacific Ocean: Findings from NASA's OCO-2 mission, *Science*, doi:10.1126/science.aam5776.
- Liu, J., K. Bowman, D. Schimel, N. Parazoo, Z. Jiang, M. Lee, A. Bloom, D. Wunch, K. Gurney, D. Menemenlis, **M. M. Gierach**, D. Crisp, and A. Eldering, 2017: Contrasting carbon cycle responses of tropical continents to the 2015-16 El Niño, *Science*, doi:10.1126/science.aam5690.
- Trinh, R. C., C. G. Fichot, **M. M. Gierach**, B. Holt, N. K. Malakar, G. Hulley, and J. Smith, 2017: Application of Landsat 8 for monitoring impacts of wastewater discharge on coastal water quality, *Frontiers in Marine Science*, doi:10.3389/fmars.2017.00329.
- Bowman, K., J. Liu, A. Bloom, N. Parazoo, M. Lee, Z. Jiang, D. Menemenlis, **M. M. Gierach**, G.J. Collatz, and K. Gurney, 2017: Global and Brazilian carbon response to El Niño Modoki 2011-2010, *Earth and Space Science*, 4, 637-660, doi:10.1002/2016EA000204.
- Thompson, D. M., E. Hochberg, G. P. Asner, R. O. Green, D. Knapp, B. C. Gao, R. Garcia, **M. M. Gierach**, Z. Lee, and S. Maritorena, 2017: Airborne Mapping of Benthic Reflectance Spectra with Bayesian Linear Mixtures, *Remote Sensing Environment*, 200, 18-30, doi:10.1016/j.rse.2017.07.030.
- Holt, B., R. C. Trinh, and **M. M. Gierach**, 2017: Stormwater Runoff Plumes in the Southern California Bight: A Comparison Study with SAR and MODIS Imagery, *Marine Pollution Bulletin*, 118, 141-154, doi:10.1016/j.marpolbul.2017.02.040.
- Gierach, M. M.**, B. Holt, R. Trinh, B. Pan, and C. Rains, 2017: Satellite detection of wastewater diversion plumes in southern California. *Estuarine, Coastal and Shelf Science*, 186, 171-182, doi:10.1016/j.ecss.2016.10.012.
- Basnayake, R., E. Bollt, N. Tuffiaro, J. Sun, and **M. M. Gierach**, 2017: Regularization destriping of remote sensing imagery. *Nonlinear Processes in Geophysics*, doi:10.5194/npg-2016-74.
- Fournier, S., J. T. Reager, T. Lee, J. Vazquez-Cuervo, C. H. David, and **M. M. Gierach**, 2016: SMAP observes flooding from land to sea: The Texas event of 2015, *Geophysical Research Letters*, doi:10.1002/2016GL070821.
- Fournier, S., T. Lee, and **M. M. Gierach**, 2016: Seasonal and interannual variations of sea surface salinity associated with the Mississippi River plume observed by SMOS and Aquarius, *Remote Sens. Environ.*, 180, 431-439, doi:10.1016/j.rse.2016.02.050.
- Fichot, C. G., B. Downing, B. Bergamaschi, L. Windham-Myers, M. Marvin-DiPasquale, D. R. Thompson, and **M. M. Gierach**, 2015: High-resolution remote sensing of water quality in the San Francisco Bay-Delta Estuary, *Environmental Science and Technology*, 50(2), 573-583, doi:10.1021/acs.est.5b03518.
- Thompson, D. R., F. C. Seidel, B. C. Gao, **M. M. Gierach**, R. O. Green, R. M. Kudela, and P. Mouroulis, 2015: Optimizing irradiance estimates for coastal and inland water imaging spectroscopy. *Geophys. Res. Lett.*, 42, doi:10.1002/2015GL063287.
- Lee, T., G. Lagerloef, H.-Y. Kao, M. J. McPhaden, J. Willis, **M. M. Gierach**, 2014: The influence of salinity on Tropical Atlantic instability waves and eddies. *J. Geophys. Res.*, 119(12), 8375-8394, doi:10.1002/2014JC010100.

- Gierach, M. M.,** M. Messié, T. Lee, K. B. Karnauskas, and M.-H. Radenac, 2013: Biophysical Responses near Equatorial Islands in the Western Equatorial Pacific Ocean during El Niño/La Niña Transitions. *Geophys. Res. Lett.*, 40(20), 5473-5479, doi:10.1002/2013GL057828.
- Gierach, M. M.,** J. Vazquez, T. Lee, V. Tsontos, 2013: Aquarius and SMOS detect effects on an extreme Mississippi River flooding event in the Gulf of Mexico, *Geophys. Res. Lett.*, 40(19), 5188-5193, doi:10.1002/grl.50995.
- Lee, T., D. E. Waliser, J. F. Li; F. W. Landerer, and **M. M. Gierach**, 2013: Evaluation of CMIP3 and CMIP5 Wind Stress Climatology Using Satellite Measurements and Atmospheric Reanalysis Products. *J. Clim.*, 26(16), 5810-5826, doi:http://dx.doi.org/10.1175/JCLI-D-12-00591.1.
- Lee, T., G. Lagerloef, **M. M. Gierach**, H.-Y. Kao, S. Yueh, and K. Dohan, 2012: Aquarius reveals salinity signature of tropical instability waves. *Geophys. Res. Lett.*, 39, L12610, doi:10.1029/2012GL052232.
- Gierach, M. M.,** T. Lee, D. Turk, and M.J. McPhaden, 2012: Biological response to the 1997-98 and 2009-10 El Niño events in the equatorial Pacific Ocean. *Geophys. Res. Lett.*, 39, L10602, doi:10.1029/2012GL051103.
- Gierach, M. M.,** H. C. Graber, and M. J. Caruso, 2012: SAR-derived gap jet characteristics in the lee of the Philippine Archipelago. *J. Remote Sens. Environ.*, 117, 289-300.
- Gierach, M. M.,** B. Subrahmanyam, and P. G. Thoppil, 2009: Physical and biological responses to Hurricane Katrina (2005) in a 1/25° nested Gulf of Mexico HYCOM. *J. Mar. Syst.*, 78, 168-179.
- Gierach, M. M.,** B. Subrahmanyam, A. Samuelsen, and K. Ueyoshi, 2009: Hurricane-driven alteration in plankton community size structure in the Gulf of Mexico: A modeling study. *Geophys. Res. Lett.*, 36, L07604, doi:10.1029/2009GL037414.
- Gierach, M. M.,** and B. Subrahmanyam, 2008: Biophysical responses of the upper ocean to major Gulf of Mexico hurricanes in 2005. *J. Geophys. Res. Oceans*, 113, C04029, doi:10.1029/2007JC004419.
- Gierach, M. M.,** and B. Subrahmanyam, 2007: “Global ocean color and phytoplankton”, State of the Climate in 2006. *Bull. Amer. Meteor. Soc.*, 88, S43-S45.
- Gierach, M. M.,** and B. Subrahmanyam, 2007: Satellite data analysis of the upper ocean response to Hurricanes Katrina and Rita (2005) in the Gulf of Mexico. *IEEE Geosci. Remote Sens. Lett.*, 4, 132-136.
- Gierach, M. M.,** M. A. Bourassa, P. Cunningham, J. J. O’Brien, and P. D. Reasor, 2007: Vorticity-based detection of tropical cyclogenesis. *J. Appl. Meteor. Climatol.*, 46, 1214-1229.

PROFESSIONAL ACTIVITIES

- | | |
|--------------|---|
| 2018 | Technical Advisory Committee (TAC) Alliance for Coastal Technologies for Hyperspectral Imaging |
| 2018 | US CLIVAR Phenomena, Observations, and Synthesis (POS) Panel member |
| 2015 | NASA representative at the U.N. Climate Change Conference (COP-21) |
| 2015 | NASA representative for the 2016 National Earth Observation Assessment |
| 2014-2016 | NASA Early Career Scientist/Engineer Working Group (ECSEWG) member |
| 2014 | NASA representative at the U.N. Climate Change Conference (COP-20) |
| 2013 | USGCRP Oceans and Coasts Indicator team member |
| 2013 | NASA ESD Decadal Survey System Trade Study: Data Latency Needs and Requirements steering committee member |
| 2012-2014 | NASA representative for the IOOS Data Management And Communications steering team |
| 2009-present | Journal Reviewer for Geophysical Research Letters, Journal of Geophysical Research, Journal of Applied Meteorology and Climatology, Remote Sensing of Environment, Estuaries and Coasts, Marine Environmental Research, Marine Ecology Progress Series, Subject Matter Editor for Ecological Applications Journal |

MENTORING

- | | |
|--------------|---|
| 2018-present | Senior mentor, Mentoring Physical Oceanography Women to Increase Retention (MPOWIR) |
| 2017-present | Advisor to Dustin Carroll, Caltech Postdoctoral Associate |
| 2017 | Co-Advisor, NASA DEVELOP San Francisco Bay-Delta Water Resources I & II project |

2016-present Thesis Advisory Committee for Zachary Erickson, Caltech
2016 Co-Advisor, NASA DEVELOP Los Angeles Oceans & Water Resources III project
2015-2018 Advisor to Severine Fournier, NPP Postdoctoral Associate (now JPL scientist)
2015 Co-Advisor, NASA DEVELOP Los Angeles Oceans & Water Resources II project
2015-2016 Advisor to Yang (Cathy) Feng, Caltech Postdoctoral Associate
2014-2016 Advisor to Cedric Fichot, Caltech Postdoctoral Associate (now Assistant Professor at Boston University)
2014 Co-Advisor, NASA DEVELOP Los Angeles Oceans & Water Resources I project
2014 Thesis Jury for Severine Fournier, IFREMER