

## **Weiyi Tang**

Assistant Professor

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College of Marine Science

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University of South Florida, Florida, USA

<https://www.usf.edu/marine-science/research/biogeochemistry-lab/>

### **Education**

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2014.8 – 2019.5      PhD in Oceanography and Biogeochemistry, Duke University, USA

Thesis: Exploring the Spatial Distribution of Marine Nitrogen Fixation through Statistical Modeling, High-Resolution Observations and Molecular Level Characterization

(Advisor: Dr. Nicolas Cassar)

2010.9 – 2014.6      B.S. Chemical Oceanography, Xiamen University, China

Thesis: N<sub>2</sub> fixation products in both particulate and dissolved components

(Advisor: Dr. Shuh Ji Kao)

### **Research Interests**

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Biogeochemical cycling of nitrogen and carbon; nitrogen fixation; nitrification; denitrification and anammox; N<sub>2</sub>O production and consumption; nitrogen biogeochemical modeling; marine productivity; net community production; marine microbial ecology.

### **Awards, Fellowships and Honors**

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2019 – 2021      Harry H. Hess Postdoctoral Fellow in Department of Geosciences, Princeton University

2018 – 2019      Duke Interdisciplinary Studies: Graduate Student Training Enhancement Grants (GSTEG)

2018 – 2019      Duke Graduate School: The International Dissertation Research Travel Award

2016 – 2017      Minigrant of Sea Grant in North Carolina

2015 – 2016      Link Foundation Ocean Engineering & Instrumentation Ph.D. Fellowship

2014.5      Best Presentation, Marine Science Training Project for undergraduates supported by National Natural Science Foundation of China.

## Professional Experience

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2024.8 – present	Assistant Professor, University of South Florida
2019.9 – 2024.7	Postdoctoral Research Associate, Princeton University (Advisor: Dr. Bess Ward) Research areas: N cycling in the Chesapeake Bay, and nitrification in the global ocean
2019.6 – 2019.8	Postdoctoral Research Associate, Duke University
2019 Spring	Graduate Teaching Assistant in Weather and Climate (EOS365, undergraduate level course), Duke University
2018.3 – 2018.6	Visiting Research Student, National Oceanography Centre in Southampton, UK (Host: Dr. Julie Robidart) Research project: molecular characterization and quantification of diazotrophs in the North Atlantic Ocean
2014.8 – 2019.5	Graduate Research Assistant, Duke University

## Publications

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1. **Tang, W.**, Fortin, S. G., Intrator, N., Lee, J. A., Kunes, M. A., Jayakumar, A., ... & Ward, B. B. (2025). Similar Oxygen Sensitivities of Different Steps of Denitrification in Estuarine Waters. *Environmental Science & Technology*. 59(14), 7165–7175. <https://doi.org/10.1021/acs.est.5c02248>
2. Gu, S., Berthelot, H., Lin, Y., **Tang, W.**, Robidart, J., Eren, A. M., ... & Cassar, N. (2025). Evidence of limited N<sub>2</sub> fixation in the Southern Ocean. *Communications Earth & Environment*, 6(1), 264. <https://doi.org/10.1038/s43247-025-02225-0>
3. **Tang, W.**, Da, F., Tracey, J. C., Intrator, N., Kunes, M. A., Lee, J. A., ... & Ward, B. B. (2024). Nutrient management offsets the effect of deoxygenation and warming on nitrous oxide emissions in a large US estuary. *Science Advances*, 10(51), eadq5014. <https://doi.org/10.1126/sciadv.adq5014>
4. Gittings, J. A., Dall’Olmo, G., **Tang, W.**, Llorc, J., Jebri, F., Livanou, E., ... & Raitsos, D. E. (2024). An exceptional phytoplankton bloom in the southeast Madagascar Sea driven by African dust deposition. *PNAS nexus*, 3(10), pgae386. <https://doi.org/10.1093/pnasnexus/pgae386>
5. Frey, C., **Tang, W.**, Ward, B. B., & Lehmann, M. F. (2024). Sample preservation methods for nitrous oxide concentration and isotope ratio measurements in aquatic environments. *Limnology and Oceanography: Methods*. <https://doi.org/10.1002/lom3.10638>
6. **Tang, W.**, Talbott, J., Jones, T., & Ward, B. B. (2024). Variable contribution of wastewater treatment plant effluents to downstream nitrous oxide concentrations and emissions. *Biogeosciences*, 21(14), 3239-3250. <https://doi.org/10.5194/bg-21-3239-2024>
7. **Tang, W.**, Fortin, S. G., Intrator, N., Lee, J. A., Kunes, M. A., Jayakumar, A., & Ward, B. B. (2024). Determination of site-specific nitrogen cycle reaction kinetics allows accurate simulation of in situ nitrogen transformation rates in a large North American estuary. *Limnology and Oceanography*. <https://doi.org/10.1002/lno.12628>

8. **Tang, W.**, Ward, B. B., Beman, M., Bristow, L., Clark, D., Fawcett, S., Frey, C., Fripiat, F., Herndl, G. J., Mdutyana, M., Paulot, F., Peng, X., Santoro, A. E., Shiozaki, T., Sintes, E., Stock, C., Sun, X., Wan, X. S., Xu, M. N., and Zhang, Y. (2023): Database of nitrification and nitrifiers in the global ocean, *Earth Syst. Sci. Data*, 15, 5039–5077, <https://doi.org/10.5194/essd-15-5039-2023>.
9. Wan, X. S., Sheng, H. X., Liu, L., Shen, H., **Tang, W.**, Zou, W., ... & Kao, S. J. (2023). Particle-associated denitrification is the primary source of N<sub>2</sub>O in oxic coastal waters. *Nature Communications*, 14(1), 8280. <https://doi.org/10.1038/s41467-023-43997-3>
10. Shao, Z., Xu, Y., Wang, H., Luo, W., Wang, L., Huang, Y., ... **Tang, W.**, ... & Luo, Y.-W (2023). Global oceanic diazotroph database version 2 and elevated estimate of global oceanic N<sub>2</sub> fixation, *Earth Syst. Sci. Data*, 15, 3673–3709, <https://doi.org/10.5194/essd-15-3673-2023>.
11. Niebergall, A. K., Traylor, S., Huang, Y., Feen, M., Meyer, M. G., McNair, H. M., ... **Tang, W.**, ... & Cassar, N (2023). Evaluation of new and net community production estimates by multiple ship-based and autonomous observations in the Northeast Pacific Ocean. *Elementa: Science of the Anthropocene*. <https://doi.org/10.1525/elementa.2021.00107>
12. **Tang, W.**, Jayakumar, A., Sun, X., Tracey, J. C., Carroll, J., Wallace, E., et al. (2022). Nitrous oxide consumption in oxygenated and anoxic estuarine waters. *Geophysical Research Letters*, 49, e2022GL100657. <https://doi.org/10.1029/2022GL100657>
13. **Tang, W.**, Tracey, J. C., Carroll, J., Wallace, E., Lee, J. A., Nathan, L., ... & Ward, B. B. (2022). Nitrous oxide production in the Chesapeake Bay. *Limnology and Oceanography*, 67(9), 2101–2116. <https://doi.org/10.1002/lno.12191>
14. Zhang, F., Wen, Z., Wang, S., **Tang, W.**, Luo, Y., Kranz, S., Hong, H., Shi, D. (2022). Phosphate limitation intensifies negative effects of ocean acidification on globally important nitrogen fixing cyanobacterium. *Nature Communications*. 13. <https://doi.org/10.1038/s41467-022-34586-x>
15. **Tang, W.**, Llorc, J., Weis, J., Perron M., Basart, S., Li, Z., Sathyendranath, S., Jackson, T., Sanz Rodriguez, E., Proemse, B., Bowie, A., Schallenberg, C., Strutton, P., Matear, R., & Cassar, N. (2021). Widespread phytoplankton blooms triggered by 2019-2020 Australian wildfires. *Nature*, 597(7876), 370-375. <https://doi.org/10.1038/s41586-021-03805-8>
16. Siegel, D. A., Cetinić, I., Graff, J. R., Lee, C. M., Nelson, N., Perry, M. J., ... **Tang, W.**, ... & Zhang, X. (2021). An operational overview of the EXport Processes in the Ocean from RemoTe Sensing (EXPORTS) Northeast Pacific field deployment. *Elementa: Science of the Anthropocene*, 9(1). <https://doi.org/10.1525/elementa.2020.00107>
17. Wang, S., **Tang, W.**, Delage, E., Gifford, S., Whitby, H., González, A. G., ... & Cassar, N. (2021). Investigating the microbial ecology of coastal hotspots of marine nitrogen fixation in the western North Atlantic. *Scientific Reports*, 11(1), 1-14. <https://doi.org/10.1038/s41598-021-84969-1>
18. **Tang, W.**, Garcia, E. C., Berthelot, H., Polyviou, D., Wang, S., Baylay, A., Whitby, H., Planquette, H., Mowlem, M., Robidart, J. and Cassar, N (2020). New insights into the distribution of diazotrophs and nitrogen fixation revealed by high-resolution sampling and sensing methods. *The ISME Journal*. 14(10), 2514-2526. <https://doi.org/10.1038/s41396-020-0703-6>
19. **Tang, W.** and Cassar, N. (2019). Data-driven modeling of the distribution of diazotrophs in the global ocean. *Geophysical Research Letters*. 46(21), 12258-12269. <https://doi.org/10.1029/2019GL084376>
20. **Tang, W.**, Li, Z. and Cassar, N. (2019). Machine learning estimates of global marine nitrogen fixation. *JGR: Biogeosciences*. 124, 717– 730. <https://doi.org/10.1029/2018JG004828>
21. **Tang, W.**, Wang, S., Fonseca-Batista, D., Dehairs, F., Gifford, S., González, A. G., ...& Cassar, N. (2019). Revisiting the distribution of oceanic N<sub>2</sub> fixation and estimating diazotrophic contribution to marine production. *Nature Communications*. 10(1), 831. <https://doi.org/10.1038/s41467-019-08640-0>

22. Cassar, N., **Tang, W.**, Gabathuler, H., & Huang, K. (2018). Method for High Frequency Underway N<sub>2</sub> Fixation Measurements: Flow-Through Incubation Acetylene Reduction Assays by Cavity Ring Down Laser Absorption Spectroscopy (FARACAS). *Analytical Chemistry*, 90(4), 2839-2851. <https://doi.org/10.1021/acs.analchem.7b04977>
23. Simonin, M., Colman, B. P., **Tang, W.**, Judy, J. D., Anderson, S. M., Bergemann, C. M., ... & Bernhardt, E. S. (2018). Plant and microbial responses to repeated Cu(OH)<sub>2</sub> nanopesticide exposures under different fertilization levels in an agro-ecosystem. *Frontiers in Microbiology*, 9, 1769. <https://doi.org/10.3389/fmicb.2018.01769>

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## Manuscripts in Progress

1. **Tang, W.**, Fortin, S. G., Intrator, N., Kunes, M., Lee, J., Jayakumar, A., Ward, B. B. Oxygen sensitivity of ammonia oxidation in aquatic environments. In prep.
2. **Tang, W.**, Paulot, F., Stock, C., Dunne J., Ward, B. B. Observation-constrained estimates of nitrification distribution in the global ocean. In prep.

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## Funding

1. Validating, improving, and assessing marine nitrification under climate change in GFDL's Earth System Model 4 (ESM4). Cooperative Institute for Modeling the Earth System. PI: Bess B. Ward; Post Doc: Weiyi Tang; GFDL collaborators: Fabien Paulot, Charles Stock, John P. Dunne. 2020-2022

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## Presentations and Posters

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| 2025.3.31      | <b>Tang, W.</b> , Talbott, J., Jones, T., Ward, B. Nitrous oxide from wastewater treatment plants – eutrophication is more than nutrient loading. Oral presentation at 2025 ASLO Aquatic Sciences Meeting, Charlotte, NC, USA.   |
| 2024.8.20      | <b>Tang, W.</b> , Hexter, C., Dai, R., Fortin, S., Tracey, J. Intrator, N., Kunes, M., Jayakumar, A., Wan, X., Shi, D., Ward, B. Substrate regulation of the contribution of ammonium and urea to marine nitrification and nitrous oxide production. Faculty Seminar in the College of Marine Science at University of South Florida. St. Petersburg, FL, USA. |
| 2023.7.30– 8.3 | <b>Tang, W.</b> , Fortin, S., Intrator, N., Lee, J., Kunes, M., Jayakumar, A., Ward, B. Nitrogen recycling and removal in the seasonally hypoxic Chesapeake Bay. The Eighth International Conference on Nitrification and Related Processes (ICoN8). Princeton, NJ, USA.   |
| 2023.6.5       | <b>Tang, W.</b> , Tracey, J., Intrator, N., Kunes, M., Lee, J., Wan, X., Jayakumar, A., Ward, B. Deoxygenation and warming stimulate nitrous oxide production in the   |

- Chesapeake Bay. ASLO 2023 Aquatic Sciences Meeting. Palma de Mallorca. Spain. Presented by Bess Ward on behalf of Weiyi Tang
- 2022.7.7 – 7.10 **Tang, W.** Autonomous observations of phytoplankton bloom by biogeochemical Argo floats. Invited presentation at 19<sup>th</sup> Chinese-American Kavli Frontiers of Science Symposium. Irvine, CA, USA.
- 2022.6.27 **Tang, W.** The impact of Australian wildfires on phytoplankton productivity in the Southern Ocean. Invited virtual talk at Climate Geochemistry Seminar in Max Planck Institute for Chemistry (MPIC).
- 2022.3.4 **Tang, W.**, Paulot, F., Stock, C., Dunne, J., Ward, B. Observation-constrained estimate of nitrification distribution in the global ocean. Oral presentation at virtual 2022 Ocean Sciences Meeting.
- 2022.3.19 **Tang, W.** & Ward, B. Synthesis of Nitrification and Nitrifiers Observations in the Global Ocean. Town Hall session at virtual 2022 Ocean Sciences Meeting.
- 2021.11.24 **Tang, W.** The impact of Australian wildfires on phytoplankton productivity in the Southern Ocean. Invited virtual talk at Ecology Seminar in Scripps Institution of Oceanography. UC San Diego.
- 2021.6.25 **Tang, W.**, Tracey, J., Carroll, J., Wallace, E., Lee, J., Edling, S., Nathan, L., Sun, X., Jayakumar, A., Ward., B. Environmental controls on estuarine N<sub>2</sub>O cycling at the global and regional scales. Oral presentation at 2021 ASLO virtual meeting.
- 2021.4.19 **Tang, W.**, Paulot, F., Stock, C., Dunne, J., Ward, B. Marine nitrification under climate change. Invited talk in Atmospheric and Oceanic Sciences, Princeton University and Geophysical Fluid Dynamics Laboratory, Princeton, NJ, USA.
- 2020.2.19 **Tang, W.**, Mulholland, M., Granger, J., Moisander, P. A global database of diazotrophs and N<sub>2</sub> fixation in the world's ocean. Town Hall session at 2020 Ocean Sciences Meeting, San Diego, CA, USA.
- 2020.2.17 **Tang, W.** & Cassar, N. Data-driven modeling of the distribution of diazotrophs in the global ocean. Oral presentation at 2020 Ocean Sciences Meeting, San Diego, CA, USA.
- 2019.6.24 – 6.27 **Tang, W.** & Cassar, N. Data-driven modeling of the distribution of diazotrophs

- in the global ocean. Poster presentation at 2019 OCB summer workshop, Woods Hole, MA, USA.
- 2019.3.29 **Tang, W.** New insights into marine nitrogen fixation via high-resolution observations and statistical models. Invited talk in the Department of Geosciences, Princeton University, Princeton, NJ, USA.
- 2018.6.25 – 6.28 **Tang, W.**, Li, Z. and Cassar, N. Machine learning estimates of nitrogen fixation in the world's oceans. Poster presentation at 2018 OCB summer workshop, Woods Hole, MA, USA.
- 2018.6.25 – 6.28 Wang, S., **Tang, W.**, Whitby, H., González, A. G., Planquette, H., Gifford, S., Johnson, Z. and Cassar, N. Variability in North Atlantic marine microbial communities in relation to patterns of nutrient availability, nitrogen fixation, and net community production. Poster presentation at 2018 OCB summer workshop, Woods Hole, MA, USA.
- 2018.2.14 **Tang, W.**, Wang, S., Fonseca-Batista, D., Dehairs, F., Gifford, S., González, A. G., Planquette, H., Sarthou, G., Gallinari, M. and Cassar, N. Contrasting distribution of N<sub>2</sub> fixation in open and coastal oceans. Oral presentation in 2018 Ocean Science Meeting, Portland, Oregon, USA.
- 2014 9.29 – 10.2 Palmer-LTER meeting, Williamsburg, VA, USA.
- 2014.1 **Tang, W.**, and S.J. Kao. Measuring particulate and dissolved products of marine N<sub>2</sub> fixation in the northern South China Sea. Poster presentation in the 1<sup>st</sup> Xiamen Symposium on Marine Environmental Sciences (XMAS-I), Xiamen, China.

### **Scientific Cruises and Fieldwork**

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- 2023.11 - 2023.12 Measure nitrification and N<sub>2</sub>O cycling in the Eastern Tropical South Pacific Ocean, assess the interactions between nitrogen and sulfur cycling, measure carbon fixation rates, R/V Roger Revelle. Chief Scientist: Bess B. Ward (Princeton)
- 2022.8 Organize the cruise and lead a team of graduate students to prepare for the cruise and to explore the sensitivity of nitrogen cycling processes to oxygen including nitrification, denitrification and anammox and the response of microbial community to changes in oxygen in the Chesapeake Bay, R/V Hugh Sharp. Chief

	Scientist: Amal Jayakumar (Princeton)
2021.8	Organize the cruise and lead a team of graduate students to prepare for the cruise and to explore the changes of nitrification, denitrification, anammox, $N_2O$ production and consumption under projected climate change including deoxygenation and warming in the Chesapeake Bay, R/V Hugh Sharp. Chief Scientist: Amal Jayakumar (Princeton)
2020.8	Organize the cruise and lead a team of both undergraduate and graduate students to prepare for the cruise and to explore the distribution of nitrification, $N_2O$ production and consumption in the Chesapeake Bay, R/V Hugh Sharp. Chief Scientist: Amal Jayakumar (Princeton)
2019.10	Ammonia oxidation, $N_2O$ production and consumption in the Chesapeake Bay, R/V Hugh Sharp. Chief Scientist: Amal Jayakumar (Princeton)
2018.8	Continuous measurements of net community production via $O_2/Ar$ using Equilibrator Inlet Mass Spectrometer, molecular sampling for characterizing microbial community structure, and $O_2$ measurements by Winkler titrations to calibrate BioArgo floats and Seagliders in the northeastern Pacific during EXPORTS cruise, R/V Sally Ride. Chief Scientists: Norm Nelson (UCSB) and Mary Jane Perry (UMaine)
2017.7	Deployment of the updated underway method for continuous $N_2$ fixation measurements and high frequency collection of molecular samples in the western North Atlantic, R/V Atlantic Explorer. Chief Scientist: Nicolas Cassar (Duke)
2016.8	Underway $N_2$ fixation measurements and deployment of a towfish system (GeoFish) for trace metal sampling in the Sargasso Sea, R/V Atlantic Explorer, Chief Scientist: Nicolas Cassar (Duke)
2015.8	Test of underway $N_2$ fixation measurement system in Sargasso Sea, R/V Atlantic Explorer, Chief Scientist: Nicolas Cassar (Duke)
2014.4	Response of marine phytoplankton to atmospheric deposition; $N_2$ Fixation, primary production and nitrate uptake incubations, R/V Dong Fang Hong 2, Chief Scientist: Peiliang Li (Ocean University of China)
2012.7	Denitrification measurements of water column and sediments in Pearl River and

northern South China Sea continuum, R/V Tian Long, Chief Scientist:  
Biyan He (Jimei University and Xiamen University)

### **Teaching and Mentoring Experiences**

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#### **Teaching Assistant for**

2022 Spring Biological Oceanography, Princeton University  
2019 Spring Weather and Climate, Duke University

#### **Undergraduate students supervised**

2024.6 – 2024.8 Celia Murphy-Braunstein, Princeton University  
Marlan Zha, Princeton University  
Oleksandr Mykhantso, Princeton University

High Meadows Environmental Institute (HMEI) Internship Program: Analysis of nutrient samples (ammonium, nitrite, nitrate) collected in the eastern tropical South Pacific; DNA and RNA extraction, analysis of nitrate nitrogen isotopes using denitrifier method to determine nitrite oxidation rates.

2023.6 – 2023.8 Lindsay Pagaduan, Princeton University

High Meadows Environmental Institute (HMEI) Internship Program: Analysis of nutrient samples collected in the subpolar North Atlantic; Preparation for Eastern Tropical South Pacific cruise

2022.7 – 2022.12 Elizabeth Wallace, Princeton University alumnus

Research Internship: The distribution and transport of nitrous oxide (N<sub>2</sub>O) in the subpolar North Atlantic

2022.2 – 2022.6 Kyle Singh, University of Pennsylvania

Research Internship: The distribution and cycling of nitrogen nutrients in the Chesapeake Bay

2020.10 – 2021.5 William Ueberroth, Princeton University

Senior Thesis: Environmental Controls on N<sub>2</sub>O Concentration and Emissions in Global Estuaries

2019.11 – 2021.5 Levy Nathan, Princeton University

Junior Thesis: Investigating Spatial and Temporal Patterns of Water Parameters in the Chesapeake Bay

Senior Thesis: A Dive into the Chesapeake Bay: An Investigation of the Parameters Shaping Nitrous Oxide Distribution

2020.6 – 2020.8 Sean Edling, Princeton University

High Meadows Environmental Institute (HMEI) Internship Program: Synthesis and Meta-analysis of N<sub>2</sub>O Observations in the Global Estuaries

### **Outreach and Service**

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2023.7.30	Organizer of Early Career & Graduate Student Workshop in The Eighth International Conference on Nitrification and Related Processes (ICoN8). Princeton, NJ, USA.
2019.10 – 2024.7	Member of the Princeton Postdoctoral Council. Hosting professional and social events for postdoctoral community at Princeton University. e.g., organizing monthly welcome events for new postdocs.
2016-2017	Volunteering in STEM Days events for K-12 students at the Museum of Life and Science in Durham. e.g., Participating in the Wetlands Activity and introducing the concept of water pH or acidity and explaining the effects of changing environment like pH on organisms living in the wetlands to over 1000 students.

### **Professional Memberships**

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2024 – present	Association for the Sciences of Limnology and Oceanography
2016 – present	The Oceanography Society

### **Review for**

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National Science Foundation, The Royal Society, NOAA Sea Grant, Nature Climate Change, Nature Communications, The ISME Journal, Global Biogeochemical Cycles, Frontiers in Marine Sciences, Ocean Dynamics, Atmosphere-Ocean, Journal of Geophysical Research: Ocean, Limnology and Oceanography Letters, Biogeosciences, Remote Sensing of Environment, Geophysical Research Letters, Environmental Microbiology, Earth System Data Science, Marine Pollution Bulletin, Communication Biology, Marine Chemistry