
XUEFENG “Nick” PENG

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Homepage: <https://marinemicrobe.github.io/>

EMPLOYMENT

<i>Associate Professor, The Ohio State University, Columbus, OH</i>	2026 - current
<i>Assistant Professor, University of South Carolina, Columbia, SC</i>	2021 - 2026

EDUCATION AND TRAINING

University of Hawaii, Manoa, HI	2024
<i>NSF-UNOLS Chief Scientist Training Cruise</i>	
University of California, Santa Barbara	2015 - 2020
<i>Postdoctoral Scholar</i>	
• Impact of marine fungi on global biogeochemical cycling of carbon and nitrogen • Accelerated methane release from plant biomass features cross-domain microbial partnership	
Princeton University, Princeton, NJ	2010 - 2015
<i>Ph.D. in Geosciences</i>	
Marine Biological Laboratory, Woods Hole, MA	
<i>Microbial Diversity Course</i>	2014
<i>Semester in Environmental Science</i>	2008
Connecticut College, New London, CT	2006 - 2010
<i>B.A. in Economics, Environmental Studies (summa cum laude)</i>	

HONORS AND AWARDS

National Science Foundation CAREER Award	2026
Simons Early Career Investigator in Aquatic Microbial Ecology and Evolution Award	2024
Simons Foundation Postdoctoral Fellowship in Marine Microbial Ecology	2018 - 2020
Arnold Guyot Teaching Award from Princeton University	2014
Centennial Fellowship from Princeton University	2010 - 2014
American Society for Microbiology Student Travel Award	2012
Anthony Francis Nelson Memorial Prize for Environmental Studies from Connecticut College	2010
Rankin Award for Best Undergraduate Student Research Presentation from the New England Estuarine Research Society	2009
Marine Biological Laboratory Associates Award	2008

FUNDING AND SUPPORT

NSF OCE award 2544141, \$952,731, 07/15/2026 – 06/30/2031:

CAREER: Marine Fungi and Carbon Processing in the Ocean

NSF OCE award 2342606, \$550,590, 02/15/2024 – 01/31/2027 (**\$77,157 to co-PI Peng**):

Collaborative Research: Multi-isotope and microbial ecology approaches to investigate sedimentary nitrous oxide production and consumption in the northern Benguela upwelling system

NSF DEB award 2348767, \$599,999, 08/01/2024 – 07/31/2029 (**\$133,689 to co-PI Peng**):

LTREB: Long Term Studies of Salt Marsh Primary Production

NSF DEB award 2303089, \$990,239, 06/15/2023 – 05/31/2026 (**\$793,550 to PI Peng**):

Nitrous oxide production by salt marsh sediment fungi: its significance and mechanisms

Simons Foundation early career award SFI-LS-ECIAMEE-00006491, \$810,000, 2024 – 2027:

Fungal contribution to benthic nitrogen and carbon cycling in a productive ocean basin

The DOE JGI Community Science Project Functional Genomics: Multi-omics characterization of fungal GH7 cellulases for sustainable bioconversion processes 2026

The DOE JGI Community Science Project New Investigator: Transcriptional studies of anaerobic metabolisms of fungi isolated from salt marsh sediments 2022

Small Equipment Purchase Support, USC: Acquisition of accessory equipment for an ultra-centrifuge to enable DNA stable isotope probing 2022

ASPIRE (Advanced Support for Innovative Research Excellence), USC: Unravel the microbial engine driving biogeochemical cycles in coastal ecosystems 2021

PUBLICATIONS

*denotes publications by students in Peng Lab

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- (36) Yousavich, D.J., Diamond, C.W., Hung, C., Vetushko, G., **Peng, X.**, Lyons, T.W., and Treude, T. (2026). Biogeochemical processes in a rapidly drying inland lake, the Salton Sea. *Journal of Great Lakes Research*, In press.
- (35) Amend, A.S., Gunde-Cimerman, N., Coelho, M.A., Durkin, C.A., Ettinger, C., Gifford, H., Gladfelter, A.S., Gostinčar, C., Granit, L., Grigoriev, I., Gutiérrez, M.H., Hickman, K.J.E., James, T.Y., Jones, A., Levi, R., David-Palma, M., **Peng, X.**, Quandt, C.A., Rămă, T., Vargas-Gastélum, L., Whitner, S., Williams, A., Yarden, O., Yenewodage, A., and Zahn, G. (2025). Ten pressing questions (and answers) about marine fungi and opportunities for collaborations in the ocean sciences. *Oceanography*, 38(4): e402.
- (34) *Thompson, M.A. and **Peng, X.** (2025). Interactions and Community Structure of Fungi and Prokaryotes in Salt and Brackish Marsh Ecosystems. *Environmental DNA*, 7: e70199.
- (33) *Thompson, M.A., Lazo-Murphy, B.M., Pfirrmann, B.W., Strosnider, W.H.J., Pinckney, J.L., and **Peng, X.** (2025). Beyond Dikarya: 28S Metabarcoding Uncovers Cryptic Fungal Lineages across a Tidal Estuary. *Environmental Microbiome*, 20: 129.
- (32) **Peng, X.** and Valentine, D.L. (2025). Expanded genetic and functional diversity of oceanic fungi. *Microbiome*, 13: 179.
- (31) *Lazo-Murphy, B.M., and **Peng, X.** (2025). Unexpected Abundance and Gene Expression of Polarella from a Tropical Oxygen Deficient Zone. *Ocean-Land-Atmosphere Research*, 4: 0094.
- (30) Blair, E.M., Navaratna, T.A., Ahern, C.B., Ragunathan, R., Brown, J.L., Mondo, S.J., Lipzen, A., Hanafy, R.A., LaButti, K., Talag, J., Barry, K., Chovatia, M., Wang, M., Gonzalez, J., **Peng, X.**, Grigoriev, I V., and O'Malley, M.A. (2025). Genomic and Transcriptomic Characterization of Carbohydrate-Active Enzymes in the Anaerobic Fungus Neocallimastix cameroonii var. constans. *G3 Genes|Genomes|Genetics*, 15: jkaf137.

- (29) *Thompson, M.A., Valentine, D.L., and **Peng, X.** (2024). Large volume size-fractionated filtration yields novel insights on prokaryotic community composition and interactions in the eastern tropical North Pacific Ocean. *FEMS Microbes*, 5: xtae028.
- (28) **Peng, X.**, Yousavich, D.J., Bourbonnais, A., Wenzhoefer, F., Janssen, F., Treude, T., and Valentine, D.L. (2024). The fate of fixed nitrogen in Santa Barbara Basin sediments during seasonal anoxia. *Biogeosciences*, 21: 3041-3052.
- (27) **Peng, X.**, Amend, A.S., Baltar, F., Blanco-Bercial, L., Breyer, E., Burgaud, G., Cunliffe, M., Edgcomb, V.P., Grossart, H., Mara, P., Masigol, H., Pang, K., Retter, A., Roberts, C., van Bleijswijk, J., Walker, A.K., and Whitner, S. (2024). Planktonic marine fungi: A review. *JGR Biogeosciences*, 129: e2023JG007887.
- (26) Yousavich, D.J., Robinson, D., **Peng, X.**, Krause, S.J.E., Wenzhoefer, F., Janßen, F., Liu, N., Tarn, J., Kinnaman, F., Valentine, D.L., and Treude, T. (2024) Marine anoxia initiates giant sulfur-bacteria mat proliferation and associated changes in benthic nitrogen, sulfur, and iron cycling in the Santa Barbara Basin, California Borderland. *Biogeosciences* 21: 789-809.
- (25) Liu, N., Kivenson, V., **Peng, X.**, Cui, Z., Lankiewicz, T., Gosselin, K., English, C., Blair, E., O'Malley, M.A., and Valentine, D.L. (2024) *Pontiella agarivorans* sp. nov., a novel marine anaerobic bacterium capable of degrading macroalgal polysaccharides and fixing nitrogen. *Applied and Environmental Microbiology* 90: e00914-23.
- (24) *Lane, D.M., Valentine, D.L., and **Peng, X.** (2023). Genomic analysis of the marine yeast *Rhodotorula sphaerocarpa* ETNP2018 reveals adaptation to the open ocean. *BCM Genomics*, 24: 695.
- (23) 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 System Science Data*, 15: 5039–5077.
- (22) Xenopoulos, M.A., Bond-Lamberty, B., Huntzinger, D., Desai, A.R., Feng, X., Hammond, W.M., Moore, D.J.P., **Peng, X.**, Sahagian, D., Santin, C., Vargas, R., Wells, N.S., and Wooden, P. (2023). Update on Our Action Plan for Equity, Inclusion, and Diversity in Publishing at JGR: Biogeosciences. *JGR Biogeosciences*, 128: e2023JG007712.
- (21) *Lazo-Murphy, B.M., Larson, S., Staines, S., Bruck, H., McHenry, J., Bourbonnais, A., and **Peng, X.** (2022). Nitrous oxide production and isotopomer composition by fungi isolated from salt marsh sediments. *Frontiers in Marine Science*, 9:1098508.
- (20) Burgaud, G., Edgcomb, V., Hassett, B.T., Kumar, A., Li, W., Mara, P., **Peng, X.**, Philippe, A., Phule, P., Prado, S., Quémener, M., and Roullier, C. (2022). Chapter 5: Marine Fungi. In: Stahl, L.J., Cretoiu, M.S. (eds) *The Marine Microbiome. The Microbiomes of Humans, Animals, Plants, and the Environment*, vol 3. Springer, Cham.
- (19) **Peng, X.**, Ji, Q., Angell, J., Kearns, P., Bowen, J.L., and Ward, B.B. (2021). Long-term fertilization alters nitrous oxide cycling dynamics in salt marsh sediments. *Environmental Science and Technology*, 55(15): 10832-10842.
- (18) **Peng, X.**, Gat, D., Paytan, A., and Rudich, Y. (2021). The response of airborne mycobiome to dust storms in the Eastern Mediterranean. *Journal of Fungi*, 7(10): 802.
- (17) Roux, S., Paul, B.G., Bagby, S.C., Nayfach, S., Allen, M.A., Attwood, G., Cavicchioli, R.,

- Chistoserdova, L., Gruninger, R.J., Hallam, S.J., Hernandez, M.E., Hess, M., Liu, W-T., McAllister, T.A., O'Malley, M.A., **Peng, X.**, Rich, V.I., Saleska, S., and Elie-Fadrosh, E.A. (2021). Ecology and molecular targets of hypermutation in the global microbiome. *Nature Communications*, 12: 3076.
- (16) **Peng, X.** and Valentine, D.L. (2021). Diversity and N₂O production potential of fungi in an oceanic oxygen minimum zone. *Journal of Fungi*, 7(3): 218.
- (15) **Peng, X.**, Wilken, S.E., Lankiewicz, T.S., Gilmore, S.P., Brown, J.L., Henske, J.K., Swift, C.L., Salamov, A., Barry, K., Grigoriev, I.V., Theodorou, M.K., Valentine, D.L., O'Malley, M.A. (2021). Genomic and functional analyses of fungal and bacterial consortia that enable lignocellulose breakdown in goat gut microbiomes. *Nature Microbiology*, 6: 499-511.
- (14) Nayfach, S., Roux, S., Seshadri, R., Udvary, D., Varghese, N., Schulz, F., Wu, D., Paez-Espino, D., Chen, I.-M., Huntemann, M., Palaniappan, K., Ladau, J., Mukherjee, S., Reddy, T.B.K., Nielsen, T., Kirton, E., Faria, J.P., Edirisinghe, J.N., Henry, C.S., Jungbluth, S.P., Chivian, D., Dehal, P., Wood-Charlson, E.M., Arkin, A.P., Tringe, S.G., Visel, **IMG/M Data Consortium** (including **Peng, X.**), Woyke, T., Mouncey, N.J., Ivanova, N.N., Kyrpides, N.C., Elie-Fadrosh, E.A. (2020). A genomic catalog of Earth's microbiomes. *Nature Biotechnology*, 39: 499-509.
- (13) Hassett, B.T., Vonnahme, T.R., **Peng, X.**, Jones, E.B.G., and Heuzé, C. (2020). Global diversity and geography of the planktonic marine fungi. *Botanica Marina*, 63(2): 121-139.
- (12) **Peng, X.**, Fawcett, S.E., van Oostende, N., Wolf, M.J., Marconi, D., Sigman, D.M., and Ward, B.B. (2018). Nitrogen uptake and nitrification in the subarctic North Atlantic Ocean. *Limnology and Oceanography*, 63(4): 1462-1487.
- (11) Angell, J.H., **Peng, X.**, Ji, Q., Craick, I., Jayakumar, A., Kearns, P.J., Ward, B.B., and Bowen, J.L. (2018). Community composition of nitrous oxide-related genes in salt marsh sediments exposed to nitrogen enrichment. *Frontiers in Microbiology*, 9: 170.
- (10) **Peng, X.**, Swift, C.L., Theodorou, M.K., O'Malley, M.A. (2018). Methods for genomic characterization and maintenance of anaerobic fungi. In: de Vries R., Tsang A., Grigoriev I. (eds) Fungal Genomics. Methods in Molecular Biology, vol 1775. Humana Press, New York, NY.
- (9) Gilmore, S.P., Henske, J.K., Sexton, J.A., Solomon, K.V., Seppala, S., Yoo, J.I., Huyett, L.M., Pressman, A., Cogan, J.Z., Kivenson, V., **Peng, X.**, Tan, Y., Valentine, D.L., and O'Malley, M.A. (2017). Genomic analysis of methanogenic archaea reveals a shift towards energy conservation. *BMC Genomics* 18: 639.
- (8) **Peng, X.**, Ji, Q., Angell, J., Kearns, P., Yang, H.J., Bowen, J.L., and Ward, B.B. (2016). Long-term fertilization alters the relative importance of nitrate reduction pathways in salt marsh sediments. *Journal of Geophysical Research: Biogeosciences*, 121(8), 2082-2095.
- (7) **Peng, X.**, Gilmore, S.P., O'Malley, M.A. (2016). Microbial communities for bioprocessing: Lessons learned from nature. *Current Opinion in Chemical Engineering*, 14, 103-109.
- (6) **Peng, X.**, Fuchsman, C.A., Jayakumar, A., Warner, M.J., Devol, A.H., and Ward, B.B. (2016). Revisiting Nitrification in the Eastern Tropical South Pacific: A focus on controls. *Journal of Geophysical Research: Oceans*, 121, 1667-1684.
- (5) **Peng, X.**, Fuchsman, C.A., Jayakumar, A., Oleynik, S., Martens-Habbena, W., Devol, A.H., and Ward, B.B. (2015). Ammonia and nitrite oxidation in the Eastern Tropical North Pacific. *Global Biogeochemical Cycles*, 29, 2034-2049.

- (4) Ji, Q., Babbin, A.R., **Peng, X.**, Bowen, J.L., and Ward, B.B. (2015). Nitrogen substrate-dependent nitrous oxide cycling in salt marsh sediments. *Journal of Marine Research* 73: 71-92.
- (3) Jayakumar, A., **Peng X.**, and Ward, B.B. (2013). Community composition of bacteria involved in fixed nitrogen loss in the water column of two major oxygen minimum zones in the ocean. *Aquatic Microbial Ecology* 70: 245-259.
- (2) **Peng, X.**, Jayakumar, A., and Ward, B.B. (2013). Community composition of ammonia-oxidizing archaea from surface and anoxic depths of oceanic oxygen minimum zones. *Frontiers in Microbiology* 4: 177.
- (1) **Peng, X.**, Yando, E., Hildebrand, E., Dwyer, C., Kearney, A., Waciega, A., Valiela, I., and Bernhard, A.E. (2013). Differential responses of ammonia-oxidizing archaea and bacteria to long-term fertilization in a New England salt marsh. *Frontiers in Microbiology* 3: 445.

TEACHING AND MENTORING

Courses taught: Chemical Oceanography (MSCI/GEOL 782), Marine Biogeochemistry (MSCI/BIOL 752), The Living Ocean (MSCI 102), The Marine Microbiome: A 21st century perspective (MSCI 790), Environmental Microbiology (MSCI 503/BIOL 502)

Graduate Students (as main advisor): Madeleine Thompson (Ph.D. awarded in 2026), Birch Lazo-Murphy (Ph.D. awarded in 2026), Margaret Bernish (M.S. received in 2023), Qingtian Nong (M.S. received in 2026), Jordan Lehman (Ph.D. expected in 2030), Julia Nuss (Ph.D. expected in 2030), Casey Burton (M.S. expected in 2027).

Graduate Students (as committee member): Madelyn Petersen, Rachel Schomaker, Archana Venkatachari, Margaret Gaspar, Sarah Bauman, Lauryn Carrington (College of Charleston), George Vetushko (UCLA)

Undergraduate Student Research Mentor (USC, 2021 - 2026): Samantha Larson, Sydney Staines, Dylan Lane, Heather Bruck, Julianne McHenry, Lily Bosch, Liam Kellogg, Hannah Lewis, Tressa Redmann, Juliana Doering, Tia Han, Margaret Pender

Undergraduate Student Research Mentor (2014 - 2019): Martin Wolf, Hannah Yang, KC Farrell, Zach Cogan, Winston Hsu, Corey Kerdman-Andrade

Lab Instructor (2013 - 2015) at Princeton University for GEO202: Ocean, Atmosphere, and Climate

FIELD EXPERIENCE

R/V Atlantic Explorer, Ocean Flux Program at Bermuda, 6 days	2025
R/V Kilo Moana, North Pacific Subtropical Gyre, 5 days	2024
R/V Roger Revelle, Eastern Tropical South Pacific, 32 days	2023
Water and sediment sampling in North Inlet and Winyah Bay, SC	2020-2023
R/V Atlantis, Santa Barbara Basin, 14 days	2019
R/V Sally Ride, Eastern Tropical North Pacific, 35 days	2018
R/V Nathaniel B. Palmer, Eastern Tropical South Pacific, 33 days	2013
R/V Thomas G. Thompson, Eastern Tropical North Pacific, 28 days	2012
Sediment sampling in the Great Sippewissett Marsh, Falmouth, MA	2011-2013
Water nutrient sampling in the Yukon River Watershed, 2 months	2009
Sediment survey and sampling in the Coonamesset River, 3 weeks	2008

SERVICE AND OUTREACH

Education partnership with the Columbus Zoo and Aquarium 2026 - current

Education partnership with the ZooTeens program at Riverbanks Zoo, Columbia, SC 2022-2026

Associate Editor for: Journal of Geophysical Research: Biogeosciences; Estuaries and Coasts

Reviewer for: Limnology and Oceanography, Environmental Microbiology, Environmental Science and Technology, Geophysical Research Letters, Journal of Geophysical Research: Biogeosciences, Deep-Sea Research, Scientific Reports, Estuarine, Coastal and Shelf Science, Estuaries and Coasts, Marine Ecology Progress Series, Frontiers in Marine Science, Marine Environmental Research, Journal of Soils and Sediments, Journal of Sea Research, Journal of Marine Systems, Antonie van Leeuwenhoek Journal of Microbiology, Canadian Journal of Microbiology, PeerJ, PLOS ONE, Environmental Pollution, Water, Journal of Fungi, mLife, Science of the Total Environment, Global Biogeochemical Cycles, Water Research, National Science Foundation Graduate Research Fellowship Program (GRFP)

Session chair for 2020 Ocean Sciences Meeting (MM002: Fungi in the marine environment), 2022 Ocean Sciences Meeting (OB02: Marine fungi and fungi-like organisms), 2027 Aquatic Sciences Meeting

Volunteer Speaker for the NanoDay at the Santa Barbara Museum of Natural History (2016)

Volunteer Speaker for elderlies at the Jenni Lynn Senior Living Center, West Columbia, SC (2022)

Graduate Committee, Marine Science, School of Earth, Ocean and Environment, USC (2022)

Search Committee for the Director of the Belle W. Baruch Institute for Marine and Coastal Sciences and Professor in the School of Earth, Ocean & Environment, USC (2022)

Search Committee for an Assistant Professor position in Microbial Ecology in the Department of Biological Sciences, USC (2025)

Search Committee for an Assistant Professor position in Physical Oceanography in the School of Earth, Ocean, and Environment, USC (2025)

Library liaison for the School of Earth, Ocean & Environment, USC (2021 - 2026)

SELECTED INVITED SEMINARS AND CONFERENCE PRESENTATIONS

Invited speeches:

Ecosystems Center 50th Anniversary Celebration, Woods Hole, MA, 2025.

ICEMHH Microbiome COBRE Seminar, University of Hawaii, Manoa, HI, 2024.

Marine Science Department Seminar, University of Georgia, Athens, GA, 2024.

Sixth Xiamen Symposium on Marine Environmental Sciences, virtual meeting, 2023.

Department Seminar, University of Maryland Center for Marine Environmental Science, Horn Point, MD, 2021.

Geocheminar, Earth, Planetary, and Space Sciences Department, University of California, Los Angeles, 2021.

Department of Microbiology and Plant Biology, University of Oklahoma, virtual seminar, 2021.

International Forum on Advanced Environmental Sciences and Technology (iFAST) Marine Environment and Ecosystem Symposium, virtual meeting hosted by the International Center for Deep Life Investigation, 2021.

Department of Earth and Planetary Sciences, University of California, Davis, CA, 2015.

Oral presentations:

Mycological Society of America Annual Meeting, Madison, WI, 2025.
Southeastern Biogeochemistry Symposium, Raleigh, NC, 2025.
8th International Conference on Nitrification, Princeton, NJ, 2023.
Aquatic Sciences Meeting, Palma de Mallorca, Spain, 2023.
30th Fungal Genetics Conference, Pacific Grove, CA, 2019.
15th International Marine and Freshwater Mycology Symposium, Xiamen, China, 2018.
Gordon Research Conference and Seminar in Chemical Oceanography, New London, NH, 2017.
American Chemical Society National Meeting & Exposition, San Francisco, CA, 2017.
The third Xiamen Symposium on Marine Environmental Sciences, Xiamen, China, 2017.
4th International Conference on Nitrification, Edmonton, Alberta, Canada, 2015.
Theobald Smith Society Meeting (North Jersey Branch of the American Society for Microbiology),
New Brunswick, NJ, 2014.
Association for the Sciences of Limnology and Oceanography Aquatic Sciences Meeting, New
Orleans, LA, 2013.
New England Estuarine Research Society Spring Meeting, Salem, MA, 2009.