

XUEFENG “Nick” PENG

Address: 701 Sumter Street, EWS 617, School of Earth, Ocean and Environment, University of South Carolina, Columbia, SC, 29208, USA

Email: xpeng@seo.sc.edu Phone: 609.865.3075 Homepage: <http://www.marinemicrobe.com>

RESEARCH INTERESTS

Marine microbial ecology, biogeochemistry, nitrogen cycling, marine fungi, chemical oceanography

EMPLOYMENT

Assistant Professor, University of South Carolina Jan. 2021 - current

EDUCATION AND TRAINING

University of California, Santa Barbara Oct. 2015 – Dec. 2020

Postdoctoral Scholar

- 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 Sept. 2010 - Sept. 2015

Ph.D. in Geosciences

Thesis: Nitrogen cycling in strong redox gradients of marine environments

Marine Biological Laboratory, Woods Hole, MA

Microbial Diversity Course

Jul. 2014 - Aug. 2014

Semester in Environmental Science

Sept. 2008 - Dec. 2008

Connecticut College, New London, CT

Aug. 2006 - May 2010

B.A. in Economics, Environmental Studies (summa cum laude)

HONORS AND AWARDS

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

Simons Foundation Postdoctoral Fellowship in Marine Microbial Ecology 2018 - 2020

PUBLICATIONS

- (19) **Peng, X.**, Ji, Q., Angell, J., Kearns, P., Bowen, J.L., and Ward, B.B. Long-term fertilization alters nitrous oxide cycling dynamics in salt marsh sediments, Under review.
- (18) 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. Chapter 5. Marine Fungi in The Marine Microbiome, In revision.
- (17) Roux, S., Paul, B.G., Bagby, S.C., Allen, M.A., Attwood, G., Cavicchioli, R., Chistoserdova, L., Crowe, S., Hallam, S.J., Hernandez, M.E., Hess, M., Liu, W-T., O’Malley, M.A., **Peng, X.**, Rich, V.I., Saleska, S., and Elloe-Fadrosh, E.A. Ecology and molecular targets of hypermutation in the global microbiome, In revision.
- (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*.
- (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., Elloe-Fadrosh, E.A. (2020). A genomic catalog of Earth’s microbiomes. *Nature Biotechnology*.
- (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.

FIELD EXPERIENCE

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

Reviewer for: Limnology and Oceanography, Environmental Microbiology, Environmental Science and Technology, Geophysical Research Letters, 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

Session chair for 2020 Ocean Sciences Meeting (MM002: Fungi in the marine environment)

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

CONFERENCE PRESENTATIONS AND SEMINARS

** *Invited seminars*

* *Oral presentations*

- (28) Peng, X. and Valentine, D.L. Fungal contribution to marine nitrogen cycling. Ocean Sciences Meeting, San Diego, CA, 21 February, 2020.
- (27) Peng, X. and Valentine, D.L. Fungal contribution to marine nitrogen cycling. First Annual Meeting of the Early Career Investigators in Marine Microbial Ecology and Evolution and Fellows in Marine Microbial Ecology, New York, NY, 28 October 2019.
- (26) Peng, X. and Valentine, D.L. Fungal contribution to marine nitrogen cycling. Gordon Research Conference in Chemical Oceanography, Holderness, NH, 17 July 2019.
- (25) Peng, X. and Valentine, D.L. The ecology and diversity of fungi in the eastern tropical North Pacific oxygen minimum zone. 16th Southern California Geobiology Symposium, Pasadena, CA, 6 April 2019.
- (24)* Peng, X., Wilken, S., Lankiewicz, T.S., Gilmore, S.P. Brown, J.L., Henske, J.K., Swift, C.L., Barry, K., Theodorou, M.K., Grigoriev, I.V., Valentine, D.L., and O'Malley, M.A. Microbial consortia derived from goat feces reveal cross-domain partnerships that accelerate methane release from plant biomass. 30th Fungal Genetics Conference, Pacific Grove, CA, 15 March 2019.
- (23)* Peng, X., and Valentine, D.L. The ecology and size-fractionated diversity of fungi in the eastern tropical North Pacific oxygen minimum zone. 15th International Marine and Freshwater Mycology Symposium, Xiamen, China, 26 September 2018.
- (22)* Peng, X., Fawcett, S.E., van Oostende, N., Wolf, M.J., Marconi, D., Sigman, D.M., and Ward, B.B. Nitrogen assimilation and nitrification in the subarctic North Atlantic. Gordon Research Conference and Seminar in Chemical Oceanography, New London, NH, 22 July 2017.
- (21)* Peng, X., Gilmore, S.P., Henske, J.K., Swift, C.L., Theodorou, M.K., Valentine, D.L., and O'Malley, M.A. Evolution of biomass-degrading anaerobic consortia revealed by metagenomics. American Chemical Society National Meeting & Exposition, San Francisco, CA, 4 April 2017.
- (20) Peng, X., Gilmore, S.P., Henske, J.K., Swift, C.L., Theodorou, M.K., Valentine, D.L., and O'Malley, M.A. Understanding the genomic basis of syntrophic relationships between rumen anaerobes. Joint Genome Institute User Meeting, Walnut Creek, CA, 22 March 2017.
- (19)* Peng, X., Fawcett, S.E., Wolf, M.J., van Oostende, N., Marconi, D., Sigman, D.M., and Ward, B.B. Nitrification and nitrate assimilation in the subarctic North Atlantic. The third Xiamen Symposium on Marine Environmental Sciences, Xiamen, China, 11 January 2017.
- (18) Peng, X., Gilmore, S.P., Henske, J.K., Swift, C.L., Theodorou, M.K., Valentine, D.L., and O'Malley, M.A. Investigating the fungal-methanogen syntrophy using comparative transcriptomics. 16th International Symposium on Microbial Ecology, Montreal, Canada, 23 August 2016.
- (17) Peng, X., Gilmore, S.P., Henske, J.K., Theodorou, M.K., Valentine, D.L., and O'Malley, M.A. Understanding the genomic basis of syntrophic relationships between rumen anaerobes. Joint Genome Institute User Meeting, Walnut Creek, CA, 23 March 2016.
- (16)** Peng, X. Nitrogen cycling in strong redox gradients of marine environments. Department of

- Earth Science, University of California, Santa Barbara, CA, 7 January 2016.
- (15)** Peng, X. Nitrification in oceanic oxygen minimum zones. State Key Laboratory of Marine Environmental Science, Xiamen, China, 21 December 2015.
 - (14)** Peng, X. Nitrogen cycling in strong redox gradients of marine environments. Department of Earth and Planetary Sciences, University of California, Davis, CA, 6 November 2015.
 - (13) Peng, X., Fuchsman, C., Jayakumar, A., Devol, A.H., and Ward, B.B. Ammonium and nitrite oxidation in the eastern tropical North and South Pacific oxygen minimum zones. Chemical Oceanography Gordon Research Conference, Plymouth, NH, 26 July 2015.
 - (12)* Peng, X., Fuchsman, C., Jayakumar, A., Devol, A.H., and Ward, B.B. Nitrification in the eastern tropical North and South Pacific oxygen minimum zones. 4th International Conference on Nitrification, Edmonton, Alberta, Canada, 28 June 2015.
 - (11) Peng, X., Fuchsman, C., Jayakumar, A., Devol, A.H., and Ward, B.B. Nitrification rates in the eastern tropical South Pacific oxygen minimum zone. Association for the Sciences of Limnology and Oceanography Aquatic Sciences Meeting, Granada, Spain, 25 February 2015.
 - (10) Peng, X., Fuchsman, C., Jayakumar, A., Devol, A.H., and Ward, B.B. Nitrification rates in the eastern tropical South Pacific oxygen minimum zone. Northeastern Geobiology Symposium, Princeton, NJ, 7 February 2015.
 - (9) Peng, X., Ji, Q., Angell, J., Kearns, P., Bowen, J.L., and Ward, B.B. Accelerated rates of nitrogen cycling and N₂O production in salt marsh sediments due to long-term fertilization. American Geophysical Union Fall Meeting, San Francisco, CA, 18 December 2014.
 - (8)* Peng, X., Jayakumar, A., and Ward, B.B. Ammonia-oxidizing archaea community composition in oceanic oxygen minimum zones. Theobald Smith Society Meeting (North Jersey Branch of the American Society for Microbiology), New Brunswick, NJ, 3 April 2014.
 - (7) Peng, X., Fuchsman, C.A., Jayakumar, A., Martens-Habbena, W., Devol, A.H., and Ward, B.B. Nitrification in the eastern tropical North Pacific ocean. Association for the Sciences of Limnology and Oceanography Ocean Sciences Meeting, Honolulu, HI, 25 February 2014.
 - (6)* Peng, X., Fuchsman, C., Jayakumar, A., Martens-Habbena, W., and Ward, B.B. Nitrification in the eastern tropical North Pacific. 3rd International Conference on Nitrification, Tokyo, Japan, 4 September 2013.
 - (5)* Peng, X., Angell, J., Ji, Q., Kearns, P., Bowen, J.L., and Ward, B.B. Effect of long-term fertilization on nitrogen removal from a salt marsh ecosystem. Association for the Sciences of Limnology and Oceanography Aquatic Sciences Meeting, New Orleans, LA, 21 February 2013.
 - (4) Peng, X., Jayakumar, A., and Ward, B.B. Archaeal ammonia oxidizer community composition in oceanic oxygen minimum zones. American Society of Microbiology General Meeting, San Francisco, CA, 18 June 2012.
 - (3) Peng, X., Jayakumar, A., and Ward, B.B. Ammonia oxidizers in oceanic oxygen minimum zones. Northeastern Graduate Student Symposium, Princeton, NJ, 11 November, 2011.
 - (2) Peng, X., Yando, E., Hildebrand, E., Dwyer, C., Kearney, A., Valiela, I., and Bernhard, A.E. Impact of long-term fertilization on community structure of ammonia oxidizers in a New England salt marsh. 13th International Symposium on Microbial Ecology, Seattle, WA, 26 August 2010.
 - (1)* Peng, X., and Giblin, A.E. Nitrogen cycling in sediments in two stretches of the Coonamessett river. New England Estuarine Research Society Spring Meeting, Salem, MA, 3 April 2009.

TEACHING AND MENTORING

Lab Instructor (2013 - 2015) at Princeton University for GEO202: Ocean, Atmosphere, and Climate Teaching Transcript Certificate (2016) from the McGraw Center, Princeton University
 Teagle Teaching Seminar (2013 - 2014) at the McGraw Center, Princeton University

Master Class in Teaching (2013) at the McGraw Center, Princeton University

Taichi Instructor in Princeton, NJ (2011)

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