

## Michael D. Lee, PhD

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Full software and publication list: <https://astrobiomike.github.io/research/>

### Experience Summary

My formal educational background is in biology and microbial ecology, and my professional experience has been spent applying bioinformatics to questions about microbial ecology and evolution in various microbial systems ranging from deep-sea basalts up to the International Space Station. I have extensive first-hand experience in many common bioinformatics approaches/analyses (e.g., marker-gene analysis, genomics, metagenomics, metatranscriptomics, comparative genomics, phylogenomics, pangenomics). And I am an adept coder in the programming languages of bash, python, and R, enabling me to not only access and utilize available tools and data for processing and analysis, but to also adjust and/or build tools as needed for any given project.

### Appointments/Positions

2019–Current: NASA GeneLab Bioinformatician; Science Team, NASA Ames Research Center

2019–Current: Research Scientist contracted through Blue Marble Space Institute of Science; NASA Ames

2018–2020: NASA Space Biology Postdoctoral Fellow; Exobiology, NASA Ames Research Center

2018–2020: JCVI Research Fellow; J. Craig Venter Institute, La Jolla, CA

2015–2018: USC SeaGrant Fellow; Biological Oceanography, University of Southern California, Los Angeles, CA

2013–2015: USC Dornsife Fellow; Biological Oceanography, University of Southern California, Los Angeles, CA

9/2012–12/2012: NASA Undergraduate Student Research Program (USRP) Intern; NASA Ames Research Center

6/2011–8/2011: NASA USRP Intern; NASA Kennedy Space Center, Merritt Island, FL

### Education/Training

2018 – Ph.D. Biology, University of Southern California, Los Angeles, CA

2013 – B.S. Biology, minor in Chemistry, Kean University, Union, NJ

2010 – A.A. General Science, Ocean County College, Toms River, NJ

### Select publications

Lee, M.D., O'Rourke, A., Lorenzi, H., Bebout, B.M., Dupont, C.L., and Everroad, R.C. (2021). Reference-guided metagenomics reveals genome-level evidence of potential microbial transmission from the ISS environment to an astronaut's microbiome. *iScience*.

<https://doi.org/10.1016/j.isci.2021.102114>

Zajkowski, T., Lee, M.D., Mondal, S.S., Carbajal, A., Dec, R., Brennock, P.D., Piast, R.W., Snyder, J.E., Bense, N.B., Dzwolak, W., Jarosz, D.F., and Rothschild, L.J. (2021). The hunt for ancient prions: Archaeal prion-like domains form amyloid-based epigenetic elements. *Molecular Biology and Evolution*. <https://doi.org/10.1093/molbev/msab010>

McParland, E.L., Lee, M.D., Webb, E.A., Alexander, H., and Levine, N.M. (2021). DMSP synthesis genes distinguish two types of DMSP producer phenotypes. *Environmental Microbiology*. <https://doi.org/10.1111/1462-2920.15393>

O'Rourke, A. and Lee, M.D., Nierman, W.C., Everroad, R.C., and Dupont, C.L. (2020). Genomic and phenotypic characterization of *Burkholderia* isolates from the potable water system of the International Space Station. *PLoS ONE*. <https://doi.org/10.1371/journal.pone.0227152>

Lee, M.D. (2019). GToTree: a user-friendly workflow for phylogenomics. *Bioinformatics*. <https://doi.org/10.1093/bioinformatics/btz188>

Lee, M.D. (2019). Happy Belly Bioinformatics: an open-source resource dedicated to helping biologists utilize bioinformatics. *The Journal of Open-Source Education*. <https://doi.org/10.21105/jose.00053>

Lee, M.D., Ahlgren, N.A., Kling, J. D., Walworth, N.G., Rocap, G., Saito, M.A., Hutchins, D.A., and Webb, E.A. (2019). Marine *Synechococcus* isolates representing globally abundant genomic lineages demonstrate a unique evolutionary path of genome reduction without a decrease in GC content. *Environmental Microbiology*. <https://doi.org/10.1111/1462-2920.14552>

Ahlgren, N.A., Belisle, B.S., and Lee, M.D. (2019). Genomic mosaicism underlies the adaptation of marine *Synechococcus* ecotypes to distinct oceanic iron niches. *Environmental Microbiology*. <https://doi.org/10.1111/1462-2920.14893>

Lee, M.D., Walworth, N.G., McParland, E.L., Fu, F.-X., Mincer, T.J., Levine, N.M., Hutchins, D.A., and Webb, E.A. (2017). The *Trichodesmium* consortium: conserved heterotrophic co-occurrence and genomic signatures of potential interactions. *ISMEJ*. <https://doi.org/10.1038/ismej.2017.49>

Lee, M.D., Webb, E.A., Walworth, N.G., Fu, F.-X., Held, N.A., Saito, M.A., and Hutchins, D.A. (2017). Transcriptional activities of the microbial consortium living with the marine nitrogen-fixing cyanobacterium *Trichodesmium* reveal potential roles in community-level nitrogen cycling. *Applied and Environmental Microbiology*. <https://doi.org/10.1128/AEM.02026-17>