

## Hannah E. Holland-Moritz, Ph.D

Dept. of Biology  
Syracuse University, Syracuse, NY 13244  
[hhollandmoritz@gmail.com](mailto:hhollandmoritz@gmail.com) | (626) 390-6275 | <https://hhollandmoritz.github.io/>

Integrating genome-resolved microbiology, biogeochemistry, and predictive ecosystem modeling to link microbial function to global climate feedbacks.

### EDUCATION

|                                 |                                                                                              |       |      |
|---------------------------------|----------------------------------------------------------------------------------------------|-------|------|
| University of Colorado, Boulder | Ecology & Evolutionary Biology Advisor: Noah Fierer                                          | Ph.D. | 2021 |
| University of California, Davis | Biochemistry & Molecular Biology with Honors<br>Minor: Quantitative Biology & Bioinformatics | B.S.  | 2014 |

### ACADEMIC POSITIONS

|                |                                                                                                                                           |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 2026 – present | <b>Research Assistant Professor</b> , Department of Biology<br>Syracuse University, Syracuse NY, USA                                      |
| 2023 – 2026    | <b>Microbiome Research Scientist</b> , Department of Natural Resources and the Environment<br>University of New Hampshire, Durham NH, USA |
| 2021 – 2022    | <b>Postdoctoral Researcher</b> , Department of Natural Resources and the Environment<br>University of New Hampshire, Durham NH, USA       |

### GRANTS, AWARDS, FELLOWSHIPS, AND FUNDING

(research grants totaling \$210,753)

Funded (\* indicates PI, \*\* indicates co-PI)

|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |           |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|
| Grant | *Ernakovich, JE, **Hicks Pries, C, <b>Holland-Moritz, H.</b> Monano Lopez, Wieder, W. Grandy, A.S. “FICUS: A high-resolution view of the plant–microbe–mineral interactions affecting C-cycling in thawed permafrost soils”, <i>Integrating Collaborations for User Science (FICUS) Award, DOE</i> <ul style="list-style-type: none"><li>Contributed to study design, outline, and core writing of research background (institutional constraints prohibited service as PI)</li></ul> | 2023 | \$204,753 |
| Award | BRiDGE Scholar (UMass Amherst), graduate student-led initiative recognizing external early career scientists for their scientific achievements                                                                                                                                                                                                                                                                                                                                        | 2023 |           |
| Grant | * <b>Holland-Moritz, H.</b> , “Sandbox Succession: Functional succession of microbial communities in a climate context” <i>Graduate Research Grant, CU Boulder</i>                                                                                                                                                                                                                                                                                                                    | 2019 | \$2,500   |
| Grant | * <b>Holland-Moritz, H.</b> “Sandbox Succession: Functional Succession of Microbial Pioneers in a Climate Context” <i>Beverly Sears Graduate Grant, CU Boulder</i>                                                                                                                                                                                                                                                                                                                    | 2019 | \$1,000   |
| Award | Dept. of Ecology and Evolutionary Biology Graduate Student Service Award                                                                                                                                                                                                                                                                                                                                                                                                              | 2019 | \$200     |

|             |                                                                                                             |      |         |
|-------------|-------------------------------------------------------------------------------------------------------------|------|---------|
| Grant       | <b>*Holland-Moritz, H.</b> , Graduate Research Grant, <b>CU Boulder</b>                                     | 2018 | \$2,500 |
| Travel      | Departmental Graduate Travel Grant, <b>CU Boulder</b>                                                       | 2018 | \$300   |
| Travel      | Graduate School Domestic Travel Grant, <b>CU Boulder</b>                                                    | 2017 | \$500   |
| Fellowship  | Wood's Hole Marine Biological Laboratory Summer Fellowship, <i>Wood's Hole Marine Biological Laboratory</i> | 2016 | \$8,751 |
| Award       | Integrated Studies Honors Scholar                                                                           | 2014 |         |
| Scholarship | University of California Regents Scholar                                                                    | 2014 |         |

*Pending, Planned Resubmission, and Unfunded (where topic relevant) (\* indicates PI, \*\* indicates co-PI)*

|       |                                                                                                                                                                                                                                                                                                                                                                     |                    |             |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------|
| Grant | *Ernakovich, JE, <b>**Holland-Moritz, H.</b> , Collab. Research: Systems phenology: How the seasonality of interactions among plants, microbes, and minerals shapes carbon and nitrogen dynamics in Arctic tundra, <b>NSF</b>                                                                                                                                       | Pending            | \$2,794,334 |
| Grant | Rich, V., Varner, R., ... <b>Holland-Moritz, H.</b> , ... BII: EMERGE2: Integrating from Molecules to Landscapes to Decode the Rules of Emergent Ecosystem Response to Change, <b>NSF</b><br><ul style="list-style-type: none"> <li>Conceptualization, development, &amp; writing of model-experiment integration. Program discontinued after submission</li> </ul> | 2025, unfunded     | \$8,592,544 |
| Grant | <b>*Holland-Moritz, H.</b> , **Ernakovich, JE, "Resolving How Soil Organic Matter Degrading-Functional Groups Contribute to Priming in the Arctic Rhizosphere", <i>Environmental Systems Science Program</i> , <b>DOE</b>                                                                                                                                           | 2026, re-submitted | \$999,876   |

## PUBLICATIONS

(Total = 36, First Author = 8;

\* co-first author, † graduate mentee ‡ undergraduate mentee)

*Forthcoming (papers in prep, submitted, in review, and in revision after reviews)*

36. †Senewiratne, N., Gilbert, N.E., **Holland-Moritz, H.**, Murray, C., Rappaport, H.B., Wolfe, B., Oliverio, A.M., 2026, A genome atlas of sourdough starter microbiomes, *In prep.*
35. †Schaefer, Sean R. **Holland-Moritz, H.**, Hicks Pries, C., Grandy, A.S., †Montaño-López, F., Wieder, W., Rozinski, M., †Alexander, N., Bernhardt, L., †Schlerman, E., Gilman Ernakovich, J., 2026, Plant and Permafrost Types Differentially Influence Carbon Cycling and Soil Priming, *In prep.*
34. †Schlerman, E., **Holland-Moritz, H.**, Davis, M., †Montaño-López, F., †Schaefer, S., Sheldrake, M., Gilman Ernakovich, J., Hicks Pries, C., Wieder, W., Daly, J. Grandy, A.S. 2026, Seeing Soil at Scale, Cartography for the Underground, *In prep*
33. **Holland-Moritz, H.**, Davis, M., ‡Naidu, D., Rich, V.R., Varner, R., Crill, P., Hodgkins, H., Palace, M., Gilman Ernakovich, J. 2026, Half a decade of enzyme activity reveals phenotype-genotype mismatch belowground in northern wetland, *In prep*
32. Zhong, Z.-P, Li, Y.-F., **Holland-Moritz, H.**, Davis, M., Wainaina, J.M., Gowda, K., Yao, T., Sullivan, M.B.,

- Mosley-Thompson, E., Thompson, L.G., Rich, V.I., 2026, Microbiome Climate Linkages over >150,000 years., *Nature* *In review, after revision*
31. †Hernandez, A. I., **Holland-Moritz, H.**, McDonald, M.D., Hung, J. McDowell, W.H., Natlali, S.M., Ernakovich, J.G., 2026, Post-Fire Microbial Nitrogen Recovery in Arctic Tundra Soils, *submitted Soil Biology and Biogeochemistry*
  30. \***Holland-Moritz H.**, \*Cronin D., \*Smith D., \*Aroney S., Hodgkins S., Borton M., Li Y., Healy K., IsoGenie Field & Analytic Teams 2010–2017, EMERGE Institute Coordinators, Tfaily M., Crill P., McCalley C., Wrighton K., Varner R., Tyson G., Woodcroft B., Bagby S., Ernakovich J., Rich V. 2025. Stable states in an unstable landscape: microbial resistance at the front line of climate change. *In review after revision, Nature*. doi:10.1101/2025.02.07.636677.
  29. **Holland-Moritz H.**, Montañó-López F., †Schaefer S., †Schlerman E., †Bakke P., Wieder W., Grandy S., Hicks Pries C., Gilman Ernakovich J. 2025. Microbial systems approach to understanding priming effects on carbon in permafrost soils. *Invited review, in revision, Nature Microbiology*.
  28. Stuart, J., †Key, R., McDaniel, S., Hoffert, M., Fierer, N., **Holland-Moritz, H.**, Mack, M., 2024, Tundra moss transplants show host species-specific bacterial communities and independent responses of associated N<sub>2</sub> fixation rates to environmental change. *In revision*
  27. †Kimmell L., **Holland-Moritz H.**, Fagan J.M., Munson S.M., Gehring C.A., Havrilla C.A. 2026. Differences in microbiomes between intact and degraded sites suggest opportunities for dryland soil restoration. *In review, Ecological Applications*.
  26. **Holland-Moritz H.**, Vanni C., Fernández-Guerra A., Bissett A., Fierer N. 2021. An ecological perspective on microbial genes of unknown function in soil. *BioRxiv*, *In revision*. doi:10.1101/2021.12.02.470747
- Published*
25. Weissman, J.L., †O'Brien, J.M., †Blais, N.D., **Holland-Moritz, H.**, Shek, K., Barbato, R.A., Douglas, T.A., Ernakovich, J.G., 2025. Growth Optimization Predicts Microbial Success in a Permafrost Thaw Experiment, *Soil Biology and Biochemistry*, <https://doi.org/10.1101/2025.09.01.673550>
  24. †Schaefer, S.R., Blazewicz, S.J., **Holland-Moritz, H.**, Hicks Pries, C. Allen, M., Pett-Ridge, J., Montañó-López F., Grandy, A.S., Wieder, W., Ernakovich, J.E., 2026, Shrub and Sedge Rhizosphere Communities Display Distinct Affinities Toward Exudates and Soil Organic Matter Degradation: A quantitative Stable Isotope Probing Analysis, *Soil Biology and Biochemistry*
  23. †O'Brien J.M., †Blais N.D., **Holland-Moritz H.**, Shek K.L., Douglas T.A., Barbato R.A., Ernakovich J.G. 2025. Consistent microorganisms respond during aerobic thaw of Alaskan permafrost soils. *Frontiers in Microbiology*.
  22. †Schaefer S., Montañó-López F., **Holland-Moritz H.**, Hicks Pries C., Ernakovich J.E. 2025. Rhizosphere bacteria and fungi are differentially structured by host plants, soil mineralogy and ectomycorrhizal communities in the Alaskan tundra. 2025, *Arctic Science*.
  21. †Blais N.D., †O'Brien J.M., **Holland-Moritz H.**, Farnsworth L., Barbato R.A., Douglas T.A., Contosta A., ‡Bobycock J., Rooney E., Sullivan T., Ernakovich J.G. 2025. Permafrost pore structure and its influence

- on microbial diversity: insights from X-ray computed tomography. *Geoderma*.
20. †Bradbury E., **Holland-Moritz H.**, Gill A., Havrilla C. 2024. Plant and soil microbial composition legacies following indaziflam (Rejuvra™) herbicide treatment. *Frontiers in Microbiology*.
  19. †Freire Zapata V., **Holland-Moritz H.**, Cronin D., Aroney S., Smith D., Wilson R.M., Ernakovich J.E., Woodcroft B.J., EMERGE 2012 Field Team, EMERGE Coordinators, Rich V., Sullivan M., Stegen J.C., Tfaily M.M. 2024. Microbiome–metabolite linkages drive greenhouse gas dynamics over a permafrost thaw gradient. *Nature Microbiology*.
  18. Slate M., Antoninka A., Bailey L., Berdugo Moreno M.B., Callaghan D., Cárdenas M., Chmielewski M., Fenton N., **Holland-Moritz H.**, Hopkins S., Jean M., Kraichak B.E., Lindo Z., Merced A., Oke T., Stanton D., Stuart J., Tucker D., Coe K.K. 2024. Impact of changing climate on bryophyte contributions to terrestrial water, carbon, and nitrogen cycles. *New Phytologist*.
  17. Rocci K.S., Cleveland C.C., Eastman B.A., Georgiou K., Grandy A.S., Hartman M.D., Hauser E., **Holland-Moritz H.**, Kyker-Snowman E., Pierson D., Reich P.B. 2024. Aligning theoretical and empirical representations of soil carbon-to-nitrogen stoichiometry with process-based terrestrial biogeochemistry models. *Soil Biology and Biochemistry*.
  16. †Teixeira C.D.S., **Holland-Moritz H.**, Bayer C., Eichelberger Granada C., Sausen T.S., Tonial F., Petry C., Frey S.D. 2024. Land management of formerly subtropical Atlantic Forest reduces soil carbon stocks and alters microbial community structure and function. *Applied Soil Ecology*.
  15. Jay K.R., Wieder W.R., Swenson S.C., Knowles J.F., Elmendorf S.C., **Holland-Moritz H.**, Suding K.N. 2023. Topographic heterogeneity and aspect moderate exposure to climate change across an alpine tundra hillslope. *Journal of Geophysical Research: Biogeosciences*.
  14. Fierer N., **Holland-Moritz H.**, Alexiev A., Batther H., Dragone N.B., Friar L., Gebert M.J., Gering S., Henley J.B., Jech S., Kibby E.M., Melie T., Patterson W.B., Peterson E., Schutz K., Stallard-Olivera E., Sterrett J., Walsh C., Mansfeldt C. 2022. A metagenomic investigation of spatial and temporal changes in sewage microbiomes across a university campus. *Msystems*.
  13. †Fan K., **Holland-Moritz H.**, Walsh C., Guo X., Wang D., Bai Y., Zhu Y., Fierer N., Chu H. 2022. Identification of rhizosphere microbes that actively consume plant-derived carbon. *Soil Biology and Biochemistry*.
  12. Vincent K., **Holland-Moritz H.**, Solon A.J., Gendron E.M.S., Schmidt S.K. 2022. Crossing treeline: bacterioplankton communities of alpine and subalpine Rocky Mountain lakes. *Frontiers in Microbiology*.
  11. Dragone N.B., Henley J., **Holland-Moritz H.**, Diaz M., Hogg I., Lyons W.B., Wall D., Adams B., Fierer N. 2021. Elevational constraints on the composition and genomic attributes of soil microbial communities in the Transantarctic Mountains. *Msystems*.
  10. Stuart J., **Holland-Moritz H.E.**, Jean M., Miller S.N., Ponciano J.M., McDaniel S.F., Mack M.C. 2021. The relationship of C and N stable isotopes to high-latitude moss-associated N<sub>2</sub> fixation. *Oecologia*.
  9. **Holland-Moritz H.**, Stuart J., Lewis L.R., Miller S., Mack M., Ponciano J.M., McDaniel S., Fierer N. 2021. The bacterial communities of Alaskan mosses and their contributions to N<sub>2</sub> fixation. *Microbiome*.

8. Stuart J., **Holland-Moritz H.**, Lewis L., Jean M., Miller S., McDaniel S., Fierer N., Ponciano J.M., Mack M. 2020. Host identity as a driver of moss-associated N<sub>2</sub> fixation rates in Alaska. *Ecosystems*.
  7. Jean M., **Holland-Moritz H.**, Melvin A., Johnstone J., Mack M. 2020. Experimental assessment of tree canopy and leaf litter controls on the microbiome and nitrogen fixation rates of two boreal mosses. *New Phytologist*.
  6. Carini P., Delgado-Baquerizo M., Hinckley E.S., **Holland-Moritz H.**, Brewer T.E., Rue G., Vanderburgh C., McKnight D., Fierer N. 2020. Effects of spatial variability and relic DNA removal on the detection of temporal dynamics in soil microbial communities. *Mbio*.
  5. Ward L.M., Cardona T., **Holland-Moritz H.** 2019. Evolutionary implications of anoxygenic phototrophy in the bacterial phylum Candidatus Eremiobacterota (WPS-2). *Frontiers in Microbiology*.
  4. **Holland-Moritz H.**, Stuart J., Lewis L.R., Miller S., Mack M.C., McDaniel S.F., Fierer N. 2018. Novel bacterial lineages associated with boreal moss species. *Environmental Microbiology*.
  3. Gunawardana M., Chang S., Jimenez A., D. Holland-Moritz, **Holland-Moritz H.**, La Val T.P., Lund C., Mullen M., Olsen J., Sztain T.A., Yoo J., Moss J.A., Baum M.M. 2014. Isolation of PCR-quality microbial community DNA from heavily contaminated environments. *Journal of Microbiological Methods*.
- Published, Non-Peer Reviewed*
2. **Holland-Moritz, H. E.**, D. R. Bevans, J. M. Lang, A. E. Darling, J. A. Eisen, and D. A. Coil. 2013. Draft genome sequence of *Leucobacter* sp. strain UCD-THU (phylum *Actinobacteria*). *Genome announcements* 1:e00325--13.
  1. **Holland-Moritz, H. E.**, D. A. Coil, J. H. Badger, G. I. Dmitrov, H. Khouri, N. L. Ward, F. T. Robb, and J. A. Eisen. 2014. Draft genome sequence of the pyridinediol-fermenting bacterium *Synergistes jonesii* 78-1. *Genome announcements* 2:e00833--14.

## TEACHING

### Courses

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <p>Co-instructor – Graduate Course: Sewage Metagenomics</p> <ul style="list-style-type: none"> <li>• Pandemic-era hands-on research course focused on metagenomic analysis</li> <li>• Co-developed readings to familiarize students with latest research and techniques in microbial ‘omics analyses, and sewage microbial source tracking</li> <li>• Prepared lessons in collaborative coding, informatics analysis, and data organization for students</li> <li>• Helped students develop, write, and publish scientific article on course findings</li> </ul>                                                                                                                      | 2020 |
| <p>Lab Instructor – Undergraduate Course: Principles of Ecology</p> <ul style="list-style-type: none"> <li>• Instructed two sections of ecology laboratory science (30 students total)</li> <li>• Designed laboratory lecture material, assessments, and activities to train students in ecological research methods, reading and writing scientific literature, and basic ecological statistics</li> <li>• Implemented group learning, and hands-on activities to teach students to analyze ecological data, write a research paper, and design and carry out research projects</li> <li>• Assessed effectiveness of course material through use of pre- and post-surveys</li> </ul> | 2017 |

### *Workshops, Guest-lectures, and Teaching Modules*

(\* indicates workshop materials are freely available from my website)

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Lead instructor – <b>“10-Minute Data Science”</b> – UNH SoilBioME group                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2025        |
| <ul style="list-style-type: none"> <li>Weekly 10-minute micro-lessons in data sciences best practices targeted towards advanced undergraduates and first year graduate students to set them up for success in scientific coding and project management.</li> <li>Conceived of, designed syllabus, and created material</li> </ul>                                                                                                                                                                                                                                                                                                                  |             |
| Guest Instructor – <b>“Uses and abuses of ‘omics tools in Soil Microbial Ecology”</b> – UNH Soil Ecology guest lecture and paper discussion activity:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2024, 2026  |
| <ul style="list-style-type: none"> <li>Cross-listed graduate/undergraduate course for students from broad interdisciplinary backgrounds (20 students)</li> <li>Designed and led paper discussion on topic of utility of ‘omics tools in Soil Microbial Ecology</li> </ul>                                                                                                                                                                                                                                                                                                                                                                          |             |
| Lead Instructor – <b>Introduction to Metagenomics Workshop</b> Series, UNH-CRREL Bioinformatics Group                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2021, 2022  |
| Instructor – <b>EMERGE Biology Integration Institute Summer Program</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2021 – 2024 |
| <ul style="list-style-type: none"> <li>Two-week intensive early career-focused short course on interdisciplinary ecosystem science</li> <li>120 participants over 4 years, ranging from undergraduate REU students to assistant professors</li> <li>Designed, developed, and taught three modules for the workshop: <ul style="list-style-type: none"> <li><b>*Introduction to Community Assembly,</b></li> <li><b>Tools of Environmental Microbiology,</b></li> <li><b>*An ecosystem of models: Using Predictive Models Across Spatial and Temporal Scales</b></li> </ul> </li> </ul>                                                             |             |
| Lead instructor – <b>*Using Make and Makefiles for automating analysis pipelines</b> workshop                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2020        |
| <ul style="list-style-type: none"> <li>Designed and tailored workshop for the needs and tools of research ecologists</li> <li>Advertised, led and adapted workshop for virtual presentation during the COVID-19 pandemic</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                |             |
| Lead instructor – <b>*Collaboration and Version Control with git Workshop and Hackathon</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2020, 2025  |
| <ul style="list-style-type: none"> <li>Two-day workshop to teach graduate students how to use version control software and apply that knowledge to real-world collaborations</li> <li>Designed adaptable lesson plan, customizable to student learning goals</li> </ul>                                                                                                                                                                                                                                                                                                                                                                            |             |
| Lead instructor – <b>Science and the Creative Process: Training Creative Thinking (Workshop)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2019, 2021  |
| Co-instructor – <b>*High-throughput sequence data workshop series</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2018        |
| <ul style="list-style-type: none"> <li>Co-Designed a pipeline and tutorial in use of high performance computing environments to analyze microbial amplicon sequence data with the dada2 pipeline</li> <li>Held series of workshops to train students and users through CU Boulder’s Center for Microbial Exploration</li> <li>Manage pull-requests and train students to contribute to pipeline</li> <li>Published and maintained tutorial on github, integrated updates for handling sequencing data from the NovaSeq platform</li> <li>&gt;1200 unique visitors, 531 unique clones, 11 stargazers, and 2 forks on github in last year</li> </ul> |             |

### *Pedagogical Training Training and Professional Development*

|                          |      |
|--------------------------|------|
| Mentorship Academy – UNH | 2022 |
|--------------------------|------|

## MENTORSHIP AND RESEARCH ADVISING

*\* indicates service on student's thesis committee or primary undergraduate research mentor*

Graduate Students (Committee member: 3, total: 18)

### *Committee Member (3)*

Nate Blais (PhD), Adeena Ahsan (MS), Louisa Kimmell (MS)

### *Masters (9)*

Natalie Danek (Marine Biology, UNH, 2026-present), Chelsea Oti (Earth Sciences, 2025-2026), Nate Alexander (Nat. Resources, UNH, 2023-2026), Adeena Ahsan (Nat. Resources, 2022-2026) \*, Alma Hernandez (Nat. Resources, 2021-2024), Pax Bakke (Natural Resources, 2021-2022), Nate Blais (Nat. Resources, 2021-2022), Louisa Kimmell (Rangeland stewardship, Colorado State University, 2021-2023) \*, Joy O'Brien (Natural Resources, 2021-2022)

### *PhD (10)*

Nimshika Senewiratne (Biology, SU, 2026-present); Torin Scalora-Riley (Earth Sciences, UNH, 2025-2026); Nora Fried (Earth science, 2025-2026); Rebecca Key (Botany, University of Florida, 2023-2026); Sam Bratsman (Earth Science, UNH, 2022-2026), Sean Schaefer (2021-2025), Nate Blais (2022-2026), Viviana Freire Zapata (Env. Science, 2021-2025), Ember Bradbury (Ecology, Colorado State University 2022-2024), Cristhian Teixeira (Agronomy, Universidade de Passo Fundo, Brazil, 2022)

Undergraduates (Primary mentor 7, total: 13)

Jessica Carter\* (2026 – present), Ross Sammons\* (2026-present), Dhiraj S. Naidu (2024-2026), Alice Larson\* (2024-2025), Torin Scalora-Riley\* (2024-2025), Tallulah Biletzkov (Summer REU 2022), Parker Stoddard (Summer REU 2022), Mikayla Lopez\* (Summer 2021), Savanna Pierce\* (Summer 2019), Lady Grant (2018-2019), Maya Montoya-Pimolwatana (2017-2018), Alexander Kaaua\* (2015-2016), Ruth Lee (2014-2015), Briana Pompa-Hogan (2014-2015), Henna Hundal (high school, 2014)

## INVITED TALKS AND PRESENTATIONS

*Invited Talks (\* indicates equal first or senior author contribution)*

2025 **Holland-Moritz, H.\*** Li\*, Z., Younge\*, R. Collaboration between climate scientists, microbiologists and biogeochemists on the front line of methane predictions, *Uniting modelers, microbiologists, and biogeochemists" workshop*, Columbus, OH

2024 **Holland-Moritz, H.** Using microbial traits to connect to ecosystem processes through models, *BRIDGE2Science, Stockbridge School of Agriculture*, University of Massachusetts, Amherst, Amherst MA.

2024 **Holland-Moritz, H.,** Practicing Finding and Using Your Power: A manual for early career scientists, *BRIDGE2Impacts, Stockbridge School of Agriculture*, University of Massachusetts, Amherst, Amherst

MA.

- 2023 **Holland-Moritz, H\***, Dylan Cronin\*, Derek Smith\*, Samuel Aroney\*, et al. Functional Ecology and Community Assembly Buffer Climate Feedbacks Across a Permafrost Thaw Gradient: A Genome-Resolved, Seven Year Study, *American Geophysical Union Annual Meeting*, San Francisco, CA.
- 2023 **Holland-Moritz, H.**, et al. How systems thinking can help narrow uncertainty in priming outcomes in permafrost soils. *ASA, CSSA, SSSA International Annual Meeting*, St. Louis, MO
- 2022 **Holland-Moritz, H.**, et al., An ecological perspective on microbial genes of unknown function in soils, *Brodie group*, Lawrence Berkeley National Lab
- 2022 **Holland-Moritz, H.** Phylogenetic and environmental controls on the structure of boreal moss microbiomes, in “From desert to the Arctic: ecological significance of bryophytes across systems”, *ESA*, Montreal, Canada (Lightning talk and invited panelist)
- 2022 **Holland-Moritz, H.** Dylan Cronin\*, Derek Smith\*, Samuel Aroney\*, et al. Assembly of microbes in thawing permafrost, *Extreme Microbiome seminar series*, virtual
- 2021 **Holland-Moritz, H.**, Microbes, mosses, and metagenomes, *Ecology and Evolutionary Biology Seminar*, Case Western University, virtual
- 2021 **Holland-Moritz, H.** Dylan Cronin\*, Derek Smith\*, Samuel Aroney\*, et al. Microbial Assembly in Thawing Permafrost, *Regional Conference on Permafrost*, Boulder, CO USA/Virtual (invited talk)
- 2020 **Holland-Moritz, H.**, Microbes, mosses, and metagenomes, *Departmental Colloquium*, University of Colorado, Boulder, Boulder CO
- 2020, **Holland-Moritz, H.** Research Experience for Community College Students (RECCS) Program, Q&A  
2018, panelist and invited talk “How to communicate your research.”  
2017
- 2014 “rRNA Sequence Analysis in QIIME.” UC Davis Bioinformatics Club, invited talk

*Contributed Talks (\* indicates equal first or senior author contribution, † indicates graduate student mentee, § indicates undergraduate mentee)*

- 2026 Ernakovich, J.G., Bratsman, S., **Holland-Moritz, H.**, McDonald, M., O’Brien, J., Doherty, S., Alexander, N., Davis, M., (2026) Microbial dynamics following permafrost thaw: how do disturbance intensity and time affect microbiome structure and biogeochemical function?, *Global Soil Biodiversity Conference*, Victoria B.C.
- 2026 Scalora, T., Fried, N., Krein, M., Bratsman, S., Alexander, N., Davis, M., **Holland-Moritz, H.**, Ernakovich, J.G., (2026) Are Emergent, Opportunistic Microbes Driving the Post-Permafrost Thaw Community?, *Soil Ecology Society, Tabernacle, NJ*
- 2026 Ernakovich, J.G., Bratsman, S., **Holland-Moritz, H.**, McDonald, M., O’Brien, J., Doherty, S., Alexander, N., Davis, M., (2026) Microbial dynamics following permafrost thaw: how do disturbance intensity and time affect microbiome structure and biogeochemical function?, *Soil Ecology Society, Tabernacle, NJ*.

- 2024 **Holland-Moritz, H.** Do Microbes Matter? When and how we can use Microbial Traits in Models of Ecosystem Processes, NEMPET – NorthEastern Microbiologists – Physiology, Ecology, Taxonomy, *Minnowbrook Conference Center*, Indian Lake, NY
- 2023 Ernakovich, J.G., Bobyock, J., Doherty, S.J., **Holland-Moritz, H.**, O'Brien, J.M., Schaefer, S., Schlerman, E. Microbial dynamics following permafrost thaw: how does disturbance intensity and time affect microbiome structure and biogeochemical function? *American Geophysical Union Annual Meeting*, San Francisco, CA.
- 2023 Rich, V.I., Li, Z., **Holland-Moritz, H.**, Varner, R.K., Saleska, S.R., Riley, W.J., Wehr, R., Tang, J., Brodie, E., Chanton, J., Wrighton, K., Sullivan, M.B., Ferrière, R., Tfaily, M.M., Bagby, S., Tyson, G.W., Woodcroft, B.J., Ernakovich, J.G., Frolking, S.E., Zayed, A.A., Palace, M.W., Wu, Q. and The EMERGE Biology Integration Institute. An ecosystem of models to model an ecosystem. *American Geophysical Union Annual Meeting*, San Francisco, CA.
- 2023 †Bratsman, S., Ernakovich, J.G., Fahnestock, M.F., Varner, R.K., McCalley, C.K., **Holland-Moritz, H.**, DeFelice, H., Rodriguez, Y.G., Ortega, M., Rodríguez, A.L., Wilcox, M., Atley, E.T. Microbial and Carbon Feedbacks During Thaw-Induced Transitions in Arctic Peatlands. *American Geophysical Union Annual Meeting*, San Francisco, CA.
- 2023 †Blais, N., Warren, N., Teixeira, C. dS., **Holland-Moritz, H.**, Smith, R., Castillo, B., §Krein, M., Ernakovich, J.G. The Effects of Grass Legume Bi-culture Defoliation on Soil Microbial Communities and Physico-chemistry. *ASA, CSSA, SSSA International Annual Meeting*, St. Louis, MO
- 2022 \*Aroney, S., \*Smith, D., \*Cronin, D., **Holland-Moritz, H.**, Hodgkins, S., \*Ernakovich, J., \*Rich, V., \*Bagby, S., \*Woodcroft, B., \*Tyson, G.. A fork in the metabolic road: mapping methane and carbon dioxide emissions from a microbial community in a thawing permafrost ecosystem. *Australian Microbial Ecology*, Melbourne, Australia.
- 2022 **Holland-Moritz, H.**, \*Cronin, D., \*Aroney, S., \*Smith, D., et al.. Biological and environmental drivers of microbial community assembly in a thawing permafrost ecosystem, *Ecological Society of America*, Montreal, Canada
- 2021 **Holland-Moritz, H.**, \*Cronin, D. et al. Microbial Assembly in Thawing Permafrost, *American Geophysical Union*, New Orleans, LA USA/Virtual
- 2021 **Holland-Moritz, H.**, \*Cronin, D., et al. Assembly of microbial communities in thawing permafrost. *Regional Conference on Permafrost*, Boulder, CO (virtual).
- 2021 †O'Brien, J., †Blais, N., §Bobyock, J., Bernhardt, L., **Holland-Moritz, H.**, Douglas, T., Sullivan, T., Bailey, V., Barbato, R., Ernakovich, J.G.. Investigating microbial dormancy within the permafrost microbiome. *Regional Conference on Permafrost*, Boulder, CO (virtual).
- 2020 **Holland-Moritz, H.**, et al., Primary succession of microbial communities in terrestrial environments: an experimental cross-site investigation, *Ecological Society of America General Meeting*, Salt Lake City, UT, USA/Virtual Meeting
- 2019 **Holland-Moritz, H.**, et al., Phylogenetic and Environmental Controls on N<sub>2</sub>-fixation in the boreal moss microbiome, *Front Range Microbiome Symposium*, Fort Collins, CO, USA. (Contributed Talk & poster)
- 2017 **Holland-Moritz, H.**, et al. Taxonomic and Functional Attributes of the Boreal Moss Microbiome, *Future Arctic Conference on Bryophytes and Lichens*, Quebec, Canada
- 2017 **Holland-Moritz, H.**, et al., Taxonomic and Functional Attributes of the Boreal Moss Microbiome, *Guild of Rocky Mountain Ecologists and Evolutionary Biologists*, Nederland, CO, USA

Poster Presentations († indicates graduate student mentee, § indicates undergraduate mentee)

- 2026 †Daneke, N., **Holland-Moritz, H.**, Harvey, E. L., Spatiotemporal Analysis of Antibiotic-Resistant Genes in Great Bay Watershed, New Hampshire, RARGON, Durham NH
- 2024 McDonald, M., Bagby, S., Baker, C., Barbato, R., Barta, J., Bradley, J.A., Doherty, S.J., Heffernan, L., Hewitt, R.E., **Holland-Moritz, H.** It's not about what it is, it's about what it can become: a meta-analysis of bacterial community changes following permafrost thaw across the globe. *American Geophysical Union Annual Meeting*, Washington, DC
- 2024 §Scalora-Riley, T., **Holland-Moritz, H.**, Mayrberger, T., Alexander, N., Davis, M., Ernakovich, J.G. Permafrost microbial characterization along an upland to subsea gradient from the Arctic Coastal Plain of Alaska. *American Geophysical Union Annual Meeting*, Washington, DC.
- 2024 †Hernández, A. I., **Holland-Moritz, H.**, Natali, S., Ernakovich, JE. Evaluating post-fire changes in soil microbial communities involved in nitrogen-cycling in the arctic tundra, NEMPET – NorthEastern Microbiologists – Physiology, Ecology, Taxonomy, *Minnowbrook Conference Center*, Indian Lake, NY
- 2023 Rodríguez, A.L., Rodriguez, Y.G., Ortega, M., Wilcox, M., Atley, E.T., †Bratsman, S., **Holland-Moritz, H.**, Fahnestock, M.F., Varner, R.K., Ernakovich, J.G. The Wettening of Arctic Peatlands: A Microbial Perspective on Evolving Arctic Landscapes. *American Geophysical Union Annual Meeting*, San Francisco, CA. [EMERGE REU]
- 2023 **Holland-Moritz, H.**, Hicks Pries, C., Wieder, W., Grandy, A. S., Ernakovich, J. “Strategies for translating microbial ‘omics into function in models of Arctic priming” EMERGE Institute Workshop, Tuscon AZ, USA
- 2022 §Biletzkov, T., §Scalora-Riley, T., §Stoddard, P., Cory, A., Bosman, S., **Holland-Moritz, H.**, Varner, R., Fahnestock, F., Chanton, J. “Presence of Phenolic Compounds in Porewater at Stordalen Mire”, *American Geophysical Union Annual Meeting*, San Francisco, CA. [EMERGE REU]
- 2022 §Stoddard, P., **Holland-Moritz, H.**, Ellenbogen, J., §Scalora-Riley, T., §Biletzkov, T., Fahnestock, F., Varner, R., Wrighton, K., “Redox profiles across thawing permafrost in Stordalen Mire” *American Geophysical Union Annual Meeting*, San Francisco, CA. [EMERGE REU]
- 2022 §Scalora-Riley, T., §Stoddard, P., §Biletzkov, T., Kuhn, MA., Bernhardt, L, Alexander, N., **Holland-Moritz, H.**, Fahnestock, M.F., Varner, R.K, Ernakovich, JE. “Dispersing microbial communities increases variability in methane fluxes in arctic Sweden” *American Geophysical Union Annual Meeting*, San Francisco, CA. [EMERGE REU]
- 2018 **Holland-Moritz, HE**, Stuart, J, Lewis, LR, Ponciano, JM, McDaniel, S, Mack, M, Fierer, N “Phylogenetic and Environmental Controls on the Boreal Moss Microbiome” Poster Presentation, 2018, *International Society for Microbial Ecology Meeting*, Leipzig, Germany.
- 2014 **Holland-Moritz, HE**, Lang, JM, Stachowicz, J, Eisen, JA "Exploring the biogeography of microbial communities on the surface of seagrasses." Poster Presentation: *20th Annual International Conference on Microbial Genomics* 2014 Lake Arrowhead, CA, USA.
- 2014 **Holland-Moritz, HE**, Lang, JM, Stachowicz, J, Eisen, JA "The Seagrass Microbiome" Poster Presentation at: University of California, Davis *Undergraduate Research Symposium* 2014. Davis, CA, USA.

## RELEVANT SKILLS

**Computational:** Terminal/Bash (proficient), Git version control (proficient), R (proficient), Linux (proficient), use of high power computing systems (proficient), Python (familiar with), Perl (familiar with), C (familiar with), LaTeX (familiar with)

**Bioinformatics and Statistics:** Genome assembly, metagenomics (read-based and assembly), environmental amplicon-sequencing analysis, phylogenetic tree-building, gene annotation, plotting and visualization of biological data, hierarchical bayesian modeling, terrestrial climate modeling with Community Land Model (CLM), machine learning

**Laboratory:** cell culture, defined culture media design, PCR, amplicon library sequencing, DNA/RNA extraction, metagenomics, metatranscriptomics, genomic library preparation

**Language (ILR Scale):** English (native), French (full professional proficiency), German (limited working proficiency), Japanese (limited working proficiency), Arabic (elementary proficiency)

**Other:** Social Media (Twitter: @hhollandmoritz)

## SELECTED SYNERGISTIC ACTIVITIES

### 1. *Educator*

- Lead instructor in numerous data science skills workshops including workshops focused on version control, make, reproducible science, and best practices in scientific coding (2018–present)
- Created microbial analysis pipeline tutorial and led workshops in its use for CU Boulder Center for Microbial Exploration, and UNH’s SoilBioME group. (2019–2022)
- Contributed multiple workshops on quantitative topics including R, multivariate analysis, and Bayesian statistics to EBIO Department’s weekly Quantitative Discussion working group (2016–2019).

### 2. *Community Service*

- Created, organized and co-run SoilBioME writing cooperative – a collaborative peer-writing group of soil scientists and students (2022–2026)
- EMERGE-BII (Biology Integration Institute) DEI committee. Led efforts to improve cross-institutional reporting structure, community agreement, and field safety (2022)
- Co-organized the departmental graduate student orientation. (2020, 2017)
- Served as the Graduate Student Representative to the Faculty. Led efforts to improve mentorship, financial stability, and accessibility for graduate students. (2017–2019)
- Colloquium committee member and travel coordinator for weekly colloquium series for CU Boulder’s EBIO Department. (2015 – 2019)
- Graduate student representative on Departmental Climate and Graduate Degree Program Committees for departmental 7-year Academic Review and Planning Advisory Committee review. (2018)
- Graduate student representative to two faculty search committees. (2018)
- Organized and ran departmental graduate student writing cooperative. (Summer 2017)
- Drafted departmental Inclusion, Diversity, and Excellence in Academics (IDEA) plan, led initiative to increase diversity of graduate student applicant pool, and foster an inclusive graduate student environment as member of EBIO Diversity and Inclusion Working Group (2017–2021)

### 3. *Mentor*

- Research mentor to 7 graduate students (2 as a committee member), 10 undergraduates, and 1 high school student
- Served as a peer mentor for four graduate students in departmental mentoring program. (2016–2019)

### 4. *Science Communicator*

- Scientist guest speaker, Skype a Scientist, at 5 K-12 classrooms

- Designed, coordinated, and carried out community science research project focused on microbial succession with middle and high school educators across the USA. (2018 – 2019)
- Co-chair and participant of CU Boulder Evolution Outreach Committee. Annually organized continuing education “Teaching Controversial Science Topics” workshop for local middle and high school teachers, and Museum Family Day on evolution. (2015 – 2019)
- “Mysterious Microbes of Soil” Workshops and Webinar series. Helped organize, plan, and run workshops for K-12 teachers and gave public webinar presentations focused on microbial ecology. (2016)

#### 5. Reviewer

- For domestic and international funding agencies including: NSF (ad hoc, panel), DOE (ad hoc), NSERC (ad hoc), European Research Council (ad hoc)
- For journals including: Applied and Environmental Biology, Global Change Biology, PeerJ, American Journal of Botany, Ecosystems, Functional Ecology, Trends in Microbiology, Oecologia, Microbiome, ISMEJ, Journal of Ecology, New Phytologist, and Science of the Total Environment.
- Invited judge for undergraduate research presentations at the annual EBIO departmental Spring Symposium (2018).

### FURTHER RELEVANT RESEARCH & WORK EXPERIENCE

|                                                                                                                                                                                       |                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <b>Adjunct Research Staff: Bioinformatics &amp; Computational Specialist</b> , Department of Biological Sciences<br><i>University of New Hampshire, Durham NH, USA</i>                | 2026 – present         |
| <b>Affiliate Faculty</b> , Department of Forest and Rangeland Stewardship,<br><i>Colorado State University, Fort Collins, CO, USA</i>                                                 | 2022 – 2023            |
| <b>Graduate Research Assistant</b> , Cooperative Institute for Environmental Sciences<br><i>University of Colorado, Boulder CO, USA</i>                                               | 2015 – 2021            |
| <b>Graduate Research Assistant</b> , Land Model Working Group<br><i>National Center for Atmospheric Research (NCAR), Boulder CO, USA</i>                                              | Spring/<br>Summer 2020 |
| <i>Participant, Anvi'o workshop, University of California, Irvine</i><br>- a multi-day workshop focused on the use of Anvi'o in 'omics analyses                                       | 2017                   |
| <i>Participant, MBL Microbial Diversity Course, Woods Hole, MA</i><br>- a 6.5 week course dedicated to training students in laboratory and theoretical aspects of microbial diversity | 2016                   |
| <b>Junior Specialist Researcher</b> , UC Davis Genome Center<br><i>University of California, Davis, Davis CA, USA</i>                                                                 | 2014 – 2015            |
| <b>Undergraduate Research Assistant</b> , UC Davis Genome Center<br><i>University of California, Davis, Davis CA, USA</i>                                                             | 2011 – 2014            |
| <b>Research Intern</b> , Drs. Manjula Gunawardana and Marc Baum, Oak Crest Institute of Science,<br><i>Pasadena, CA, USA</i>                                                          | 2009 – 2010            |

### REFERENCES

Jessica Ernakovich, Ph.D. (Postdoctoral Advisor)  
University of New Hampshire  
Dept. of Natural Resources and the Environment

[jessica.ernakovich@unh.edu](mailto:jessica.ernakovich@unh.edu)

Noah Fierer, Ph.D. (PhD Advisor)  
University of Colorado, Boulder  
Dept. of Ecology and Evolutionary Biology

[noah.fierer@colorado.edu](mailto:noah.fierer@colorado.edu)

Will Wieder, Ph.D. (Summer Research Mentor, current collaborator)  
National Center for Atmospheric Research  
Climate & Global Dynamics Lab

[wwieder@ucar.edu](mailto:wwieder@ucar.edu)