Hannah E. Holland-Moritz, Ph.D

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EDUCATION

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

Academic Recognition and Awards:
University of California Regents Scholar (2010-2014)
Integrated Studies Honors Scholar (2011-2014)

RESEARCH

April 2021 - present **Trait-based Assembly of Microbial Communities in Permafrost**
Postdoctoral Researcher, University of New Hampshire
Advisor: Dr. Jessica Ernakovich

- Characterize abiotic and biotic drivers of seasonal and decadal microbial community assembly in thawing permafrost as member of the EMERGE Biological Integration Institute

2015 - 2021 **Structure and Function of Terrestrial Microbial Communities**
Graduate Research Assistant, University of Colorado, Boulder
Advisor: Dr. Noah Fierer

- **Microbial communities of Alaskan mosses:** Used 'omics tools to examine the diversity, structure, and function of microbial communities associated with boreal mosses and their relationship to N_2-fixation in high-latitude biomes.
- **Effects of climate on microbial primary succession:** Investigated the impact of climate on community traits during primary succession of microbial communities in sand microcosms
- **Non-homologous annotation of genes of unknown function in soils:** Ecological modeling and annotation of genes of unknown function in soil metagenomes.

Summer 2020 **Automating Community Land Model (CLM) at Long-Term Ecological Research (LTER) sites**
Graudate Research Assistant, National Center for Atmospheric Research (NCAR)
Advisor: Dr. Will Wieder

- Parameterized and validated point-simulations of CLM at Niwot Ridge LTER
- Wrote pipeline to download, clean, and gap-fill LTER and NEON data for use as CLM atmospheric forcings

2014 - 2015 **Host-microbe interactions of Seagrass microbiomes**
Junior Specialist Research Assistant, University of California, Davis
Supervisors: Drs. Jenna Morgan Lang and Jonathan Eisen

- Sequenced and analyzed 16S libraries to explore the microbial communities associated

with the seagrass *Zostera marina*.
- Coordinated and oversaw the collection and sequencing of *Zostera marina* microbiome samples collected from a global network of researchers (Zostera Experimental Network).

2011 - 2014 **Sequencing and Assembly of Bacterial Isolate Genomes**
Undergraduate Research Assistant, University of California, Davis
Advisors: Drs. David Coil and Jonathan Eisen
- Sequenced, assembled, and annotated reference genomes of the bacteria *Synergistes jonesii* and of a novel bacterial isolate (genus *Leucobacter*)

PUBLICATIONS

(Total = 10, First Author = 2)

Forthcoming (papers submitted, in review, and in revision)

1. Vincent, K., **Holland-Moritz, H.**, Solon, A.J., Gendron, E.M.S., Schmidt, S.K., *In Revision at Frontiers in Microbiology,* Crossing Treeline: Bacterioplankton communities of alpine and subalpine Rocky Mountain Lakes

2. Stuart, J., **Holland-Moritz, H.E.**, Jean, M., Miller, S.N., Ponciano, J.M., McDaniel, S.F., Mack, M.C., *In revision at Oecologia,* The relationship of C and N stable isotopes to high latitude moss-associated N_2-fixation.

3. Dragone, N. B., Henley, J. **Holland-Moritz, H.**, Diaz, M., Hogg, I., Lyons, W.B., Wall, D. Adams, B., Fierer, N., *In revision at ISMEJ,* Elevational constraints on the composition and genomic attributes of soil microbial communities in the Transantarctic Mountains.

Peer Reviewed

1. **Holland-Moritz, H.**, Stuart, J., Lewis, L. R., Miller, S., Mack, M., Ponciano, J.M., McDaniel, S., and Fierer, N. 2021. The bacterial communities of Alaskan mosses and their contributions to N_2-fixation. *Microbiome*

2. Stuart, J., **Holland-Moritz, H.,** Lewis, L., Jean, M., Miller, S., McDaniel, S., Fierer, N., Ponciano, J. M., and Mack, M., 2020. Host identity as a driver of moss-associated N_2-fixation rates in Alaska. *Ecosystems*

3. Jean, M., **Holland-Moritz, H.,** Melvin, A., Johnstone, J., and 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*

4. Carini, P., Delgado-Baquerizo, M., Hinckley, E. S., **Holland-Moritz, H.** Brewer, T. E., Rue, G., Vanderburgh, C., McKnight, D., and 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., and **Holland-Moritz, H.** 2019. Evolutionary Implications of Anoxygenic Phototrophy in the Bacterial Phylum Candidatus Eremiobacterota (WPS-2). *Front. Microbiol.*

6. **Holland-Moritz, H.**, J. Stuart, L. R. Lewis, S. Miller, M. C. Mack, S. F. McDaniel, and N. Fierer. 2018. Novel bacterial lineages associated with boreal moss species. *Environmental Microbiology*

7. Gunawardana, M., S. Chang, A. Jimenez, D. Holland-Moritz, **H. Holland-Moritz**, T. P. La Val, C. Lund, M. Mullen, J. Olsen, T. a Sztain, J. Yoo, J. a Moss, and M. M. Baum. 2014. Isolation of PCR quality microbial

community DNA from heavily contaminated environments. *Journal of microbiological methods*.

Non-Peer Reviewed

1. **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.*
2. **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.

PRESENTATIONS

Research Talks

2020 Departmental Colloquium, University of Colorado, Boulder (Contributed talk)

2020 Ecological Society of America General Meeting, Salt Lake City, UT, USA/Virtual Meeting (Contributed talk)

2019 Front Range Microbiome Symposium, Fort Collins, CO, USA. (Contributed Talk)

2017 Future Arctic Conference on Bryophytes and Lichens, Quebec, Canada (Contributed Talk)

2017 Guild of Rocky Mountain Ecologists and Evolutionary Biologists, Nederland, CO, USA (Contributed Talk)

2016 Lunch and Learn Seminar, University of Colorado, Boulder (Contributed talk)

Poster Presentations

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.

GRANTS & AWARDS

(totaling $15,751)

Dept. of Ecology and Evolutionary Biology Graduate Student Service Award	2019	$200

Dept. of Ecology and Evolutionary Biology (EBIO) Graduate Research Grant	2019	$2500
Beverly Sears Graduate Student Grant (2019)	2019	$1000
Dept. of Ecology and Evolutionary Biology (EBIO) Graduate Research Grant	2018	$2500
EBIO Travel Grant	2018	$300
CU Boulder Graduate School Domestic Travel Grant	2017	$500
Wood's Hole Oceanographic Institute Summer Scholarship	2016	$8751
NSF-GRFP Honorable Mention	2017 2016 2015	

TEACHING

Courses and Workshops

Co-instructor – Graduate Course: Sewage Metagenomics	2020
Lead – Using Make and Makefiles for automating analysis pipelines Workshop	2020
Lead – Collaboration and Version Control with git Workshop and Hackathon	2020
Lead – Science and the Creative Process Workshop	2019
Co-instructor – High-throughput sequence data workshop series	2018
Lab Instructor – Principles of Ecology	2017

Pedagogical Training

Graduate course in Mentorship and Leadership in STEM	2017

MENTORSHIP

Graduate Students	
Joy O'Brian	2021
Undergraduates	
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
High School Students	
Henna Hundal	Summer 2014

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 (2020)
    - Created microbial analysis pipeline tutorial and led workshops in its use for CU Boulder Center for Microbial Exploration. (2019-2020)
    - 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. *Leader and Colleague*

    - 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 ARPAC 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*

    - Served as a peer mentor for four graduate students in departmental mentoring program. (2016-2019)
    - Served as primary mentor for seven undergraduate and high school students. (shown above)

4. *Science Communicator*

    - 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 "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. *Invited Speaker*

    - Research Experience for Community College Students (RECCS) Program, Q&A panelist and invited talk "How to communicate your research." (speaker 2018, 2017; panelist 2020)
    - UC Davis, Bioinformatics Club, invited talk "rRNA Sequence Analysis in QIIME." (2014)

6. *Reviewer*

- For journals including: Applied and Environmental Biology, Global Change Biology, PeerJ, American Journal of Botany, and Trends in Microbiology.
- Invited judge for undergraduate research presentations at the annual EBIO departmental Spring Symposium (2018).

FURTHER RELEVANT RESEARCH & WORK EXPERIENCE

Participant, Anvi'o workshop, University of California, Irvine 2017
- a multi-day workshop focused on the use of Anvi'o in 'omics analyses

Participant, MBL Microbial Diversity Course, Woods Hole, MA 2016
- a 6.5 week course dedicated to training students in laboratory and theoretical aspects of microbial diversity

Research Internship, Drs. Manjula Gunawardana and Marc Baum, Oak Crest Institute of Science 2009 - 2010
- Researched extraction methods of PCR-quality DNA from heavily hydrocarbon-polluted environmental samples (e.g. asphalt pools).

RELEVANT SKILLS

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

Bioinformatics: 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)

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)

REFERENCES

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

Noah Fierer, Ph.D. (PhD Advisor) noah.fierer@colorado.edu
University of Colorado, Boulder
Dept. of Ecology and Evolutionary Biology

Will Wieder, Ph.D. (Internship Mentor) wwieder@ucar.edu
National Center for Atmospheric Research
Climate & Global Dynamics Lab