



**Exponent<sup>®</sup>**  
Engineering & Scientific Consulting

**Lily Momper, Ph.D.**

Managing Scientist | Environmental and Earth Sciences  
Pasadena  
+1-626-204-4068 | [lmomper@exponent.com](mailto:lmomper@exponent.com)

## Professional Profile

Dr. Momper specializes in aquatic geochemistry, microbiology, and water resources. She conducted her doctoral and postdoctoral research studying the chemistry and biology of groundwater systems using field- and laboratory-based analytical tools to detect and quantify chemicals and nutrients associated with minerals, fluids, natural waters, and gases.

Dr. Momper uses her expertise to aid clients in matters of regulatory compliance, state water quality regulations, and litigation involving Natural Resources Damages (NRD). She has also assisted clients in matters of sustainability, soil health, soil water and carbon holding capacity, and implemented innovative solutions to improve clients' drought resilience.

In various terrestrial and aquatic environments she has studied occurrence and fate of iron, manganese, lithium, copper, arsenic, carbon, nitrogen, phosphorus and sulfur and trace gases such as methane, carbon monoxide, carbon dioxide, and nitric and nitrous oxide. She has utilized these measurements to model and predict chemical transformations, energetic yield, and bioavailability of chemical species, thereby understanding complex microbiological controls on the fate and transport of nutrients, contaminants, and trace gases and elements. Dr. Momper also has expertise in bacterial genome DNA sequencing. By reconstructing environmental bacterial genomes and metabolic pathways she can predict microbially mediated consumption and transformation of nutrients such as ammonium, nitrate, nitrite, phosphate, carbon dioxide, halogenated compounds and various sulfur bearing species.

Dr. Momper has coordinated and participated in numerous open ocean and land-based field sampling expeditions in remote locations such as the central Pacific Ocean, the Western Coast of Australia, and in mining facilities as deep as 5,000 feet underground. In these studies, she examined marine cyanobacteria blooms, coastal microbial ecology, and changes in groundwater geochemistry and microbiology as a function of depth and host geology. Before joining Exponent Dr. Momper was the W. O. Crosby Postdoctoral Fellow at the Massachusetts Institute of Technology and a NASA Postdoctoral Scholar at Northwestern University. In these positions, she researched microbial ecology in marine and freshwater coastal systems such as the Indian and Pacific Oceans and Lake Michigan. Dr. Momper has collaborated with national and international agencies, such as NASA's Mars 2020 Mission and the Japan Agency for Marine-Earth Science and Technology (JAMSTEC). She has designed and taught both field-based and laboratory classes in environmental microbiology, ecology, and marine microbiology. Dr. Momper has authored or co-authored over thirty conference presentations, including invited talks, and published over a dozen papers in peer reviewed journals.

## Academic Credentials & Professional Honors

Ph.D., Biology, University of Southern California, 2016

B.A., Biology, Washington University in St. Louis, 2008

National Science Foundation, (NSF) East Asia and Pacific Summer Institutes Fellow, 2014

## Prior Experience

Postdoctoral Scholar, Northwestern University, 2018-2019

W.O. Crosby Postdoctoral Fellow, Massachusetts Institute of Technology, 2016-2018

## Professional Affiliations

American Geophysical Union (AGU)

American Association for the Advancement of Science (AAAS)

## Publications

Momper LM, Casar CP, Osburn MR. A metagenomic view of novel microbial and metabolic diversity found within the deep terrestrial biosphere at DeMMO: A microbial observatory in South Dakota, USA. *Environmental Microbiology*. 2023; DOI: 10.1111/1462-2920.16543.

Goldman A, Fulk E, Momper LM, Heider C, Mulligan J, Osburn MR, Masiello C, Silberg J. Microbial sensor variation across biogeochemical conditions in the terrestrial deep subsurface. *mSystems*. 2023.

Skoog EJ, Moore KR, Gong J, Ciccarese D, Momper LM, Cutts EM, Bosak T. Metagenomic, (bio) chemical, and microscopic analyses reveal the potential for the cycling of sulfated EPS in Shark Bay pustular mats. *ISME Communications*. 2022; 2, 1-11.

Schwartz SL, Momper LM, Rangel LT, Magnabosco C, Amend JP, Fournier GP. Novel nitrite reductase domain structure suggests a chimeric denitrification repertoire in the phylum Chloroflexi. *MicrobiologyOpen*. 2022; 11:e1258.

Momper LM, Semler A, Lu GS, Miyazaki M, Imachi H, Amend JP. *Rectinema subterraneum* sp. nov., a chemotrophic spirochaete isolated from the deep terrestrial subsurface *International Journal of Systematic and Evolutionary Biology*. 2020; 8, 4739-4747.

Momper LM, Hu E, Moore KR, Skoog EJ, Tyler M, Evans AJ, Bosak T. Metabolic versatility in a modern lineage of cyanobacteria from terrestrial hot springs *Free Radical Biology and Medicine* 2019; 140, 224-232.

Momper LM, Aronson HS, Amend JP. Genomic description of 'Candidatus Abyssobacterium,' a novel subsurface lineage within the candidate phylum Hydrogenedentes. *Frontiers in Microbiology* 2018; doi.org/10.3389/fmicb.2018.01993.

Momper LM, Jungbluth SP, Lee MD, Amend JP. Metagenome analysis of fluids 1.5 km below surface reveals expansion of the energy and carbon metabolisms in microbial dark matter and discovery of two candidate phyla not previously described. *The ISME Journal* 2018; 10, 2319-2333.

Momper LM, Reese BK, Zinke L, Wanger G, Osburn MR, Moser DP, Amend JP. Major phylum-level differences between porefluid and host rock bacterial communities in the terrestrial deep subsurface. *Environmental Microbiology Reports* 2017; 9, 501-511.

Momper LM, Reese BK, Carvalho G, Lee P, Webb EA. A novel cohabitation between two diazotrophic cyanobacteria in the oligotrophic ocean. *The ISME Journal* 2015; 9, 882-893.

Casar C, Kruger B, Flynn T, Masterson A, Momper LM, Osburn MR. Mineral-hosted biofilm communities in the continental deep subsurface, Deep Mine Microbial Observatory, SD, USA *Geobiology*. 2020; 18; 508-522.

Moore KR, Magnabosco C, Momper LM, Gold DA, Bosak T, Fournier GP. An Expanded Ribosomal Phylogeny of Cyanobacteria Supports a Deep Placement of Plastids. *Frontiers in Microbiology-Evolutionary and Genomic microbiology* 2019; <https://doi.org/10.3389/fmicb.2019.01612>.

Jangir Y, French S, Momper LM, Moser DP, Amend JP, El-Naggar MY. Electrochemical enrichment and isolation of electrochemically active subsurface Delftia and Azonexus species. *Frontiers in Microbiology-Extreme Microbiology*. 2016; DOI: 10.3389/fmicb.2016.00756.

Sylvan JB, Hoffman CL, Momper LM, Toner BM, Amend JP, Edwards KJ. *Bacillus rigiliprofundus* sp. nov., an endospore-forming, Mn-oxidizing, moderately halophilic bacterium isolated from deep seafloor basaltic crust. *International Journal of Systematic and Evolutionary Microbiology* 2015; 65, 1992–1998.

Osburn MR, LaRowe DE, Momper LM, Amend JP. Chemolithotrophy in the continental deep subsurface: Sanford Underground Research Facility (SURF), USA. *Frontiers in Microbiology* 2014; 5.

Van Mooy BAS, Hmelo LR, Sofen LE, Campagna SR, May AL, Dyhrman ST, Heithoff A, Webb EA, Momper LM, Mincer T. J. Quorum sensing control of phosphorus acquisition in *Trichodesmium* consortia. *The ISME Journal* 2012; 6, 422–429.

## **Select Presentations**

### **Invited Talks**

Momper LM. Geomicrobiology in Earth's deep terrestrial subsurface biosphere. Invited Speaker, Northwestern University Departmental Lecture Series, Chicago, IL, 2019.

Momper LM. Microbial ecology in the deep terrestrial biosphere. Invited speaker, MIT, Departmental Lecture Series, Cambridge, MA, 2016.

Momper LM. Cultivation of novel deep subsurface microbes. Invited speaker. NASA Executive Council Meeting. University of Southern California, November 18, 2014.

Momper LM, Amend JP. Annual Conference of the Board of Trustees of the University of Southern California, Science Panel: 'Life Underground.' Invited speaker. April 7, 2012.

### **Conference Talks**

Momper LM, Osburn MR. Combining geochemistry and metagenomics to understand processes in the deep terrestrial biosphere. Astrobiology Science Conference (AbSciCon). Seattle, WA, 2019.

Momper LM, Gold DA, Caron A, Summons R, Fournier GP. Complex sterol biosynthesis in bacteria conferred by horizontal gene transfer (HGT). Northeast Geobiology Conference, Woods Hole, MA, 2018.

Momper LM, Magnabosco C, Amend JP, Osburn MR, Fournier GP. Genomic evidence of chemotrophic metabolisms in deep-dwelling Chloroflexi conferred by ancient horizontal gene transfer events. American Geophysical Union, New Orleans, LA, 2017.

Momper LM, Osburn MR, Amend JP. Correlating geochemistry and microbial functions in the deep continental biosphere (SURF, USA). Astrobiology Science Conference (AbSciCon). Chicago, IL, 2015.

Momper LM, Osburn MR, Amend JP. Microbial taxonomic diversity of the continental deep biosphere.

International Symposium for Microbial Ecology (ISME), Seoul, South Korea, 2014.

Osburn MR, Momper LM, Schubotz F, Summons R, Amend JP. Lipid biomarkers of the deep terrestrial subsurface biosphere. American Geophysical Union, San Francisco, CA, 2014.

Osburn MR, Momper LM, Schubotz F, Summons R, Amend JP. Lipid Biomarkers of the continental deep subsurface: Homestake Mine, USA. Magdalena Osburn, Florence Schubotz, Lily Momper, Roger Summons, Jan Amend. Gordon Conference on Organic Geochemistry, Holderness, NH, 2014.

Osburn MR, Momper LM, LaRowe DE, Amend JP. Life underground: Energetics and microbial diversity in a gold mine. Goldschmidt, Sacramento, CA, 2014.

Skoog, EJ, Moore KR, Gong J, Ciccarese D, Momper LM, Cutts EM, Bosak T. Metagenomic,(bio) chemical, and microscopic analyses reveal the potential for the cycling of sulfated EPS in Shark Bay pustular mats. ISME Communications. 2022; 2, 1-11.

Schwartz SL, Momper LM, Rangel LT, Magnabosco C, Amend JP, Fournier GP. Novel nitrite reductase domain structure suggests a chimeric denitrification repertoire in the phylum Chloroflexi. MicrobiologyOpen. 2022; 11:e1258.

## Peer Reviews

International Society for Microbial Ecology

Geosciences

Energies

Frontiers in Microbiology Genes

Marine Drugs

FEMS Microbiology Ecology