Rachel L. Harris

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PROFESSIONAL SUMMARY

Third year Ph.D. student under Dr. Tullis C. Onstott, Department of Geosciences, Princeton University. Research interests in functional diversity of active but rare microbial players in biogeochemical cycling, with special emphasis on applications to early evolution and habitability on early Earth and Mars Special Regions. Doctoral research focuses on coupling a novel fluorescent *in situ* hybridization method with metatranscriptomics, metagenomics, and single-cell genomics to elucidate and characterize the contributions of rare biosphere methanogens and ANMEs inhabiting extreme temperature and pressure regimes. Extensive field and bench experience collecting, characterizing, and analyzing metabolites of extremophiles from a variety of reducing environments including hydrothermal features, oligotrophic marine sediments, and saline fracture fluids in the deep terrestrial subsurface.

EDUCATION

2014: **Wellesley College** – Wellesley, MA 02481 USA, B.A. Biological Sciences; Minor: Russian
2016*: **Princeton University** – Princeton, NJ 08544 USA, M.A. Geosciences
2019* **Princeton University** – Princeton, NJ 08544 USA, Ph.D. Geosciences

PROFESSIONAL EXPERIENCE

August 2014 – present: **Princeton University** – Princeton, NJ 08544 USA, Ph.D., Dept. of Geosciences
Advisor: Dr. Tullis C. Onstott (tullis@princeton.edu)

May 2014 – August 2014: **Centre National de la Recherche Scientifique (CNRS)** – Aix-Marseille Université - Campus St. Jérôme, Marseille, France, Project VAHIIA (Volatile Analyses from the Heating of Interstellar/cometary Ice Analogues), Équipe Spectrom´tries et Dynamique Moléculaire, Laboratoire de Physique des Interactions Ioniques et Moléculaires
Advisor: Dr. Grégoire Danger (gregoire.danger@univ-amu.fr)

May 2011 – August 2011, January 2014 – May 2014: **Massachusetts Institute of Technology** – Cambridge, MA 02139 USA, Undergraduate Research Opportunities Program (UROP)/Senior Thesis, Dept. of Earth, Atmospheric, and Planetary Sciences
Advisors: Dr. Tanja Bosak (tbosak@mit.edu), Dr. Vanja Klepac-Ceraj (vklepacc@wellesley.edu)

June 2012 – August 2012, June 2013 – August 2013: **NASA Ames Research Center** – Moffett Field, CA 94035 USA, SETI REU/Exobiology Branch (SSX) Intern, NASA Astrobiology Institute
Advisor: Dr. David J. Des Marais (David.J.Desmarais@nasa.gov)

September 2012 – May 2014: **Wellesley College** – Wellesley, MA 02481, Teaching Assistant, Astronomy Department
Supervisor: Dr. Stephen Slivan (sslivan@wellesley.edu)

PUBLICATIONS

Harris, R. L., Lau, M. C. Y., and Onstott, T. C. Elucidation of active metabolic players in biogeochemical cycling via Fluorescence *in situ* Hybridization of Transcript-Annealing Molecular Beacons (FISH TAMB). *In prep.*

Huang, J., Salvatore, M., Edwards, C., Christensen, P., Harris, R. L., Xiao, L., and Xu, Y. A complex fluviolacustrine environment on early Mars: insights into the timing of chloride precipitation and clay alteration. *In prep.*

Lau, M. C. Y., Harris, R. L., Oh, Y., Yi M., and Onstott, T. C. The quality of metatransctriptomic assemblies varies significantly depending on the choice of de novo assemblers. *In prep.*

Lau, C. Y. M., Kieft, T., Kuloyo, O., Linage-Alvarez, B., van Heerden, E., Lindsay, M., Magnabosco, C., Wang, W., Wiggins, J., Guol, L., Perlman, D., Kyin, S., Shwe, H., Harris, R., Oh, Y., Yi, M. J., Purtschert, R., Slater, G., Smart, S., Sigman, D., Ono, S., Wei, S., Li, L., Sherwood Lollar, B., Onstott, T. Dominant sulfur-driven autotrophic denitrifiers top the symbiotically-linked metabolic chain in the deep subsurface. *PNAS. In revision.*

SELECT COMMUNICATIONS

Harris, R. L., Lau, M. C. Y., Onstott, T. C. Elucidation of active players in biogeochemical cycling via fluorescent in situ hybridization of transcript-annealing molecular beacons (FISH-TAMB). ISME-16. Oral presentation. 2016.

Harris, R. L., Onstott, T. C., van Heerden, E., Cason, E., and Kieft, T. Technical considerations for deep-life drilling. International Continental Drilling Program DSeis Workshop. Oral presentation. 2015.

Jahnke, L., Parenteau, M. N., Harris, R. L., Bristow, T., Farmer, J., Des Marais D. J. Lipid biomarker production and preservation in acidic ecosystems: relevance to early Earth and Mars. AGU Fall Meeting. Poster. 2013.

PUBLIC OUTREACH

July 2016: **QUEST – Questioning Underlies Effective Scientific Teaching** – Princeton, NJ USA, Life in Extreme Environments

July 2013: **Lassen Dark Sky Festival** – Lassen Volcanic National Park, Mineral, CA 96063 USA, NASA Astrobiology Institute, Mars Analog Environments

HONORS AND AWARDS

ISME-16 Travel Grant	2016
National Science Foundation Graduate Research Fellow	2015-present
Three Generations Prize for Writing in the Sciences – Wellesley College	2014
Edward M. Armfield Scholar -- Northwestern North Carolina	2010 – 2014
Frances Meaker Colville Scholar – Wellesley College	2013 – 2014
Office of the Provost Student Research Grant – Wellesley College	2013
Dr. Gerald A. Soffen Memorial Travel Grant	2013

SKILLS

Laboratory

Microbial ecology and physiology
FISH
Flow Cytometry

Cavity Ring-Down Spectroscopy (CRDS)
Gas Chromatography Mass Spectrometry (GC MS)
Microscopy – confocal and SEM
DNA/RNA isolation, amplification, sequencing assembly and annotation

Computational
R
Unix
NCBI BLAST
Cytoscape
STRING

Linguistic
English: Native
Russian: Advanced
French: Intermediate

SOCIETY MEMBERSHIP

International Society of Microbial Ecology	2016 - present
American Geophysical Union	2016 - present
The Mars Society	2016 - present
Sigma Xi	2014 - present