RACHEL Y. SHEPPARD

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EDUCATION

Brown University, Providence, RI
M.Sc., Earth, Environmental, and Planetary Sciences, 2017
Ph.D., Earth, Environmental, and Planetary Sciences, anticipated May 2020

Columbia College of Columbia University, New York, NY
B.A., Earth Science, 2013

PUBLICATIONS

Sheppard, R. Y., Milliken, R. E., Itoh, Y., & Parente, M. Updated mineral stratigraphy around Mt. Sharp. Submitted, *Journal of Geophysical Research: Planets*.

2019 Sheppard, R. Y., Milliken, R. E., Russell, J. M., Dyar, M. D., Sklute, E., Vogel, H., Melles, M., Bijaksana, S, Hasberg, A. K. M., & Morlock, M. A. Characterization of iron in Lake Towuti sediment. *Chemical Geology*. 512, pp. 11-30.

2017 Johnson, B. C., **Sheppard, R. Y.**, Pascuzzo, A. C., Fisher, E. A., & Wiggins, S. E. Porosity and salt content determine if subduction can occur in Europa's ice shell. *Journal of Geophysical Research: Planets*. 122.

2015 Sheppard, R. E., D'Haenens-Johansson, U., Moe, K. S., & Wang, W. HPHT synthetic diamond melee in high-quality mounted jewelry piece. *Gems & Gemology*. 51(1).

2015 Sheppard, R. E., Wang, W., & Moses, T. Analysis of melee diamonds using FTIR spectroscopy. *Gems & Gemology*. 51(1).

2015 Sheppard, R. E., Polissar, P. J., & Savage, H. M. Organic thermal maturity as a proxy for frictional fault heating: experimental constraints on methylphenanthrene kinetics at earthquake timescales. *Geochimica et Cosmochimica Acta*. 151, pp. 103-116.

2014 Wang, W., Altobelli, M., Dieck, C., & **Sheppard, R. E.** Screening of small yellow melee for treatment and synthetics. *Gems & Gemology*. 50(4).

2014 Savage, H. M., Polissar, P. J., **Sheppard, R.**, Rowe, C. D., & Brodsky, E. E. Biomarkers heat up during earthquakes: New evidence of seismic slip in the rock record. *Geology*. 42(2), pp. 99-102.

PUBLICATIONS IN PREPARATION

Sheppard, R. Y., Milliken, R. E., Russell, J. M., Dyar, M. D., Sklute, E., Vogel, H., Melles, M., Bijaksana, S., Hasberg, A. K. M., & Morlock, M. A. Shifts visible in a 100 m long sediment core, with implications for Fe-rich systems including Mars.

Russell, J. M., Vogel, H., Melles, M., Bijaksana, S., Hasberg, A., Morlock, M., **Sheppard, R. Y.**, et al. The Late Quaternary Tectonic, Biogeochemical, and Environmental Evolution of Ferruginous Lake Towuti, Indonesia

RELEVANT EXPERIENCE

Mars Science Laboratory Team May 2016 - present
Science Team member

Gemological Institute of America October 2013 - June 2015
Research Laboratory Technician, diamond color origin research team *New York, NY*

Lamont-Doherty Earth Observatory May 2011 - August 2013
Research Assistant *Palisades, NY*

AWARDS & FELLOWSHIPS

2019 Dissertation fellowship, Brown University Graduate School.

2019 Sigma Xi, Full Member, Brown University Chapter.

2018 Sigma Xi, Associate Member, Brown University Chapter.

2017 NASA Group Achievement Award, MSL Extended Mission-1 Science and Operations Team.

2015 NASA Group Achievement Award, MSL Prime Mission Science and Operations Team.

2015-2018 Presidential Fellowship, Brown University Graduate School, three years full stipend support.

2013 Walter C. Pitman III Award for excellence in thesis research and presentation, Columbia University Department of Earth and Environmental Sciences.

PRESENTATIONS: FIRST AUTHOR (* DENOTES ORAL PRESENTATION)

2020 Sheppard, R. Y.* Lamont-Doherty Earth Observatory geochemistry colloquium, invited. (Scheduled).

2019 Sheppard, R. Y.*, Milliken, R., & Robertson, K. M. Cycling of hydrous minerals and implications for the martian hydrological cycle. American Geophysical Union Fall Meeting, San Francisco, CA. (Scheduled)

2019 Sheppard, R. Y., Milliken, R., Itoh, Y., & Parente, M. Mineral stratigraphy around Mt. Sharp suggests aqueous processes affected the entire mound: directions for upcoming rover observations from orbital data. Ninth International Conference on Mars, Pasadena, CA.

2019 Sheppard, R. Y.*, Milliken, R., Itoh, Y., & Parente, M. Updated orbital view of mineral stratigraphy of Mount Sharp and implications for Curiosity's traverse. Mars Science Laboratory team meeting, NASA Goddard, Greenbelt, MD.

2019 Sheppard, R. Y., Milliken, R., Itoh, Y., & Parente, M. Lateral continuity of mineralogical and morphological contacts in Mt. Sharp: linking upcoming rover observations and orbital data. Lunar and Planetary Science Conference, The Woodlands, TX.

2018 Sheppard, R. Y.*, Milliken, R., Itoh, Y., & Parente, M. Assessing Lateral Variations in the Mineralogical Stratigraphy of Mt. Sharp: Linking Rover and Orbital Observations. American Geophysical Union Fall Meeting, Washington, D.C.

2018 Sheppard, R. Y.*, Milliken, R., Russell, J., Vogel, H., Melles, M., & Bijaksana, S. Signatures of iron cycling in a terrestrial redox-stratified lake and implications for Gale Crater, Mars. Lunar and Planetary Science Conference, The Woodlands, TX.

2018 Sheppard, R. Y.*, Milliken, R., & Russell, J. Sedimentation in Lake Towuti & martian planetary processes. Towuti Drilling Project (TDP) team meeting, Makassar, Indonesia.

2017 Sheppard, R. Y., Milliken, R., & Russell, J. Tracking changes in iron mineralogy through time in a terrestrial analogue for Gale Crater. American Geophysical Union Fall Meeting, New Orleans, LA.

2017 Sheppard, R. Y., Milliken, R., & Russell, J. Iron oxidation state and cycling in sediments of Lake Towuti, Indonesia and implications for chemistry and mineralogy of Martian mudstones. Lunar and Planetary Science Conference, The Woodlands, TX.

2017 Sheppard, R. Y.*, Milliken, R., & Russell, J. Lake Towuti as an analogue for trends seen in Gale Crater, Mars. Towuti Drilling Project (TDP) team meeting, Bandung, Indonesia.

2016 Sheppard, R. Y.*, Milliken, R., & Russell, J. Terrestrial analogs for chemical trends in Gale Crater: Ultramafic lakes in Indonesia and Iceland. NASA Astrobiology Institute (NAI) team meeting, Williamstown, MA.

2013 Sheppard, R. E., Polissar, P. J., & Savage, H. M. Organic thermal maturity as a proxy for frictional fault heating: experimental constraints on biomarker kinetics at earthquake timescales. American Geophysical Union Fall Meeting, San Francisco, CA.

2012 Sheppard, R. E., Polissar, P. J., & Savage, H. M. Rapid heating experiments demonstrate the usefulness of organic molecules as an earthquake thermometer. American Geophysical Union Fall Meeting, San Francisco, CA.

PRESENTATIONS: CONTRIBUTING AUTHOR

2019 Milliken, R. E., Grotzinger J. P., Wiens R., Gellert R., Thompson L. M., **Sheppard R.**, Vasavada A., Bristow T., & Mangold N. The chemistry and mineralogy of an ancient lacustrine sequence on Mars: lessons learned from integrating rover and orbiter datasets. Ninth International Conference on Mars, Pasadena, CA.

2018 Morriss, D., Sanders, C. B., Grotzinger, J. P., Busch, J., Cury, L. F., Daoust, P., Fischer, W. W., Howes, B., Jones, D. S., **Sheppard, R.**, Nelson, L. L., Pu, J. P., Quinn, D. P., Wilcots, J., & Swart, R. Cap Sequence Post-dating Marinoan Glacial Deposits, Naukluft Mountains, Namibia. American Geophysical Union Fall Meeting, Washington, D.C.

2017 Pascuzzo, A. C., Brandon, B. C., **Sheppard, R. Y.**, Fisher, E. A., & Wiggins, S. E. Porosity and salt content determine if subduction can occur in Europa's ice shell. Europa Deep Dive 1: Ice-Shell Exchange Processes, Houston, TX.

2015 Savage, H., Polissar, P. J., Rabinowitz, H., & **Sheppard, R.** Some like it hot: the spectrum of temperature rise during earthquakes. American Geophysical Union Fall Meeting, San Francisco, CA.

2012 Savage, H., Polissar, P. J., **Sheppard, R.**, Rowe, C., & Kirkpatrick, J. Organic geochemical evidence for frictional heating of the NE Japan dcollement in drillcores from Expedition 343: JFAST. American Geophysical Union Fall Meeting, San Francisco, CA.

2011 Savage, H., Polissar, P. J., **Sheppard, R.**, Brodsky, E., & Rowe, C. Do faults stay cool under stress? American Geophysical Union Fall Meeting, San Francisco, CA.

2011 Polissar, P. J., Savage, H., **Sheppard, R.**, Rowe, C., & Brodsky, E. What's Cooking? Evaluating frictional stress using extractable organic material in fault zones. American Geophysical Union Fall Meeting, San Francisco, CA.

TEACHING EXPERIENCE

2018 Instructor, summer course, Brown University's STEM II program.

2018 Teaching Assistant, *Planetary Geology* (GEOL0810), Brown University.

2017 Teaching Assistant, summer course, Brown University's STEM II program.

MENTORING EXPERIENCE

2018-2019 Mentor, Sarah Martinez, Brown undergraduate.

2018 Leadership Alliance Program Mentor, Brown University.

2017 Mentor, Grant Rutherford, Brown undergraduate.

2017 Mentor, Ana Colon, Dartmouth undergraduate, Leadership Alliance program. *(Now a PhD student at University of Oregon.)*

2017 Mentor, Catherine Miranda, Brown undergraduate, Undergraduate Teaching and Research Awards program.

2016-2017 Mentor, Christopher Yen, Brown undergraduate, Undergraduate Teaching and Research Awards program. *(Now a PhD student at WashU.)*

OTHER SERVICE & OUTREACH

2019 Session convener, American Geophysical Union Fall Meeting, *"Evidence of water-rock interaction throughout the Solar System,"* oral and poster session. (Scheduled)

2019 Executive secretary, NASA review panel.

2019 Workshop leader, Girl Scout Senior Leadership Conference, Salve Regina University. *"Craters, spacecraft, and the surfaces of our Solar System."*

2019-present Participant, semiannual Skype a Scientist program.

2018-present GeoW+ Co-Founder, Graduate Student Leader, Brown University. Intersectional mentoring and social group for the department's underrepresented race and gender undergraduates.

2018-present Graduate Student DIAP Representative, Brown University. Faculty-selected member of the department's Diversity and Inclusion Action Plan Committee.

2018-present Graduate Student Faculty Representative, Brown University. Student-elected liaison between faculty and graduate students, attends faculty meetings.

2018-2019 Graduate Student Climate Task Force Representative, Brown University. Student-elected member of the Department's Planetary Climate Task Force.

FIELD WORK

2018 Agouron Institute Advanced Geobiology Field School, Caltech, **Naukluft Mountains, Namibia** (12 days in the field).

2016 Field component of Sedimentary Cycle of Earth and Mars course, Brown University, **Guadalupe Mountains, TX** (5 days in the field).

2013 Research sample collection from the Punchbowl Fault, **San Gabriel Mountains, CA** (3 days in the field).

2012 Geologic Mapping course, Columbia University, **Catskill Mountains, NY** (12 days in the field).

2011 Research sample collection from the Champlain Thrust Fault, **Adirondack Mountains, VT** (2 days in the field).

OTHER PROFESSIONAL DEVELOPMENT

2019 Effective Performance workshop series, Brown University & Trinity Repertory Theater (5 weeks).

2016 Certificate: Reflective Teaching, Harriet W. Sheridan Center, Brown University (12 weeks).