Mineralogy of the Pahrump Hills region, Gale Crater, Mars

E. B. RAMPE[1], D. W. MING[2], D. T. VANIMAN[3], D. F. BLAKE[4], S. J. CHIPERA[5], R. V. MORRIS[2], D. L. BISH[6], P. D. CAVANAGH[6], C. N. ACHILLES[6], T. F. BRISTOW[4], S. M. MORRISON[7], A. H. TREIMAN[8], R. T. DOWNS[7], J. D. FARMER[9], J. A. CRISP[10], K. FENDRICH[7], J. M. MOROOKIAN[10] AND THE CHEMIN TEAM

[1]Aerodyne Industries, Jacobs JETS Contract at NASA JSC, Houston, TX USA elizabeth.b.rampe@nasa.gov
[2]NASA Johnson Space Center, Houston, TX USA
[3]Planetary Science Institute, Tucson, AZ USA
[4]NASA Ames Research Center, Moffett Field, CA USA
[5]Chesapeake Energy Corp, Oklahoma City, OK USA
[6]Indiana University, Bloomington, IN USA
[7]University of Arizona, Tucson, AZ USA
[8]Lunar and Planetary Institute, Houston, TX USA
[9]Arizona State University, Tempe, AZ USA
[10]Jet Propulsion Laboratory/Caltech, Pasadena, CA USA

The Pahrump Hills region of Gale crater is a ~12 m thick section of sedimentary rocks in the Murray formation, interpreted as the basal geological unit of Mount Sharp [1]. The Mars Science Laboratory, *Curiosity*, arrived at the Pahrump Hills in September, 2014, and performed a detailed six-month investigation of the sedimentary structures, geochemistry, and mineralogy of the area. During the campaign, *Curiosity* drilled and delivered three rock samples to its internal instruments, including the CheMin XRD/XRF.

The three targets, Confidence Hills, Mojave 2, and Telegraph Peak, contain variable amounts of plagioclase, pyroxene, iron oxides, jarosite, phyllosilicates, and X-ray amorphous material. Hematite was predicted at the base of Mount Sharp from orbital visible/near-IR spectroscopy [2], and CheMin confirmed this detection [3]. The presence of jarosite throughout Pahrump Hills suggests the sediments experienced acid-sulfate alteration, either *in-situ* or within the source region of the sediments. This acidic leaching environment is in stark contrast to the environment preserved within the Sheepbed mudstone on the plains of Gale crater. The minerals within Sheepbed, including Fe-saponite, indicate these sediments were deposited in a shallow lake with circumneutral pH that may have been habitable [4-6].

[1] Stack *et al* (2015) *LPS XLVI*, #1994. [2] Milliken *et al* (2010) *Geophys. Res. Lett.*, **37**. [3] Cavanagh *et al* (2015) *LPS XLVI*, #2735. [4] Grotzinger *et al* (2014) *Science*, **343**. [5] Vaniman *et al* (2014) *Science*, **343**. [6] Bristow *et al* (2015) *Am. Mineral.*, in press.