

Name: Christine Knudson

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Home institution: UMCP

Name of task: Sample Analysis at Mars (SAM)

What do you do for CRESST: I am a geologist with a background in geochemistry and volcanology working on site in the mineralogy and geochemical laboratories in the Planetary Environments Laboratory group at NASA Goddard Space Flight Center. I am a member of the Sample Analysis at Mars instrument team on the Mars Science Laboratory Curiosity Rover. My work in the laboratory includes X-ray diffraction, evolved gas analyses, thermogravimetry, differential scanning calorimetry, and X-ray fluorescence of a range of Mars relevant samples and Mars analogs for comparison to flight data from the SAM instrument suite and other instruments on board the Curiosity rover. I am also involved with SAM mission operations serving as a Payload Downlink Lead responsible for determining the health of the SAM instrument and processing of flight data used for tactical and strategic planning. While I spend the majority of my time in the laboratory, I am also involved in field work supported by the Remote In Situ and Synchrotron Studies for Science and Exploration (RISE II) NASA (SSERVI) project, the Scientific Hybrid Reality Environments (SHyRE) project funded by NASA ROSES, and the ISFM Goddard Instrument Field Team (GIFT). I use portable instruments for geochemical analyses in the field and collect samples for laboratory analyses which in part supports Mars related analog studies.



Publications:

Franz, H. B., P. R. Mahaffy, C. R. Webster, et al. 2020. "Indigenous and exogenous organics and surface-atmosphere cycling inferred from carbon and oxygen isotopes at Gale crater." *Nature Astronomy*, [Full Text (Link)] [10.1038/s41550-019-0990-x]

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Jacobson, N. S., B. Fegley, A. C. McAdam, and C. A. Knudson. 2020. "Solubility of CO₂ in Sodium Silicate Melts." *ACS Earth and Space Chemistry*, 4 (11): 2113-2120 [10.1021/acsearthspacechem.0c00223]

Johnson, S. S., M. Millan, H. Graham, et al. 2020. "Lipid Biomarkers in Ephemeral Acid Salt Lake Mudflat/Sandflat Sediments: Implications for Mars." *Astrobiology*, 20 (2): 167-178 [10.1089/ast.2017.1812]

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Richardson, J. A., N. L. Whelley, P. L. Whelley, et al. 2020. "Building Safer and More Inclusive Field Experiences in Support of Planetary Science." *2023–2032 NAS Planetary Science and Astrobiology Decadal Survey*

Wong, G., J. M. Lewis, C. A. Knudson, et al. 2020. "Detection of reduced sulfur on Vera Rubin ridge by quadratic discriminant analysis of volatiles observed during evolved gas analysis." *Journal of Geophysical Research: Planets*, 125 (8): e2019JE006304 [Full Text (Link)] [10.1029/2019JE006304]

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Williams, A. J., J. L. Eigenbrode, M. A. Floyd, et al. 2019. "Recovery of Fatty Acids from Mineralogic Mars Analogs by TMAH Thermochemolysis for the Sample Analysis at Mars Wet Chemistry Experiment on the Curiosity Rover." *Astrobiology*, 19 (4): [Full Text (Link)] [10.1089/ast.2018.1819]

Young, K. E., J. E. Bleacher, A. D. Rogers, et al. 2018. "The Incorporation of Field Portable Instrumentation Into Human Planetary Surface Exploration." *Earth and Space Science*, 5: 24 [10.1029/2018ea000378]

Stern, J. C., B. Sutter, P. D. Archer, et al. 2018. "Major Volatiles Evolved From Eolian Materials in Gale Crater." *Geophysical Research Letters*, [Full Text (Link)] [10.1029/2018gl079059]

Franz, H. B., A. C. McAdam, D. W. Ming, et al. 2017. "Large sulfur isotope fractionations in Martian sediments at Gale crater." *Nature Geoscience*, [10.1038/ngeo3002]

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