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**Water-rock reaction pathway modeling for Mars
– from alteration to habitability**

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Thermochemical modeling is a tool to assess the processes during aqueous alteration, especially the factors not accessible through observation. This includes, but is not limited to, assessing the fluid composition, its pH and Eh, as well as calculating the energy budget of reactions for potential microbes.

This talk will give an overview of over a decade of thermochemical reaction pathway modeling on Mars using CHIM-XPT [1], from hydrothermal systems [e.g., 2,3,4] to diagenesis [5,6,7]. The talk will detail on environmental factors that can be discerned from the models to understand Mars' habitable history, with special focus on Gale crater – and astrobiology.

[1] [chim-xpt_guide_V.2.50.pdf \(uoregon.edu\)](#) [2] Schwenzer and Kring (2009) *Geology* 37, 1091–1094. [3] Bridges and Schwenzer (2012) *Earth and Planetary Science Letters*, 359–360: 117–123. [4] Ramkissoon et al. (2021) *Meteoritics and Planetary Science*, 56: 1350–1368. [5] Bridges et al. (2015) *Journal of Geophysical Research*, **120**: DOI: 10.1002/2014JE004757. [6] Schwenzer et al. (2016) *Meteoritics and Planetary Science*, 51: 2175–2202. [7] Turner et al. (2021) *Meteoritics & Planetary Science*, 10.1111/maps.13748.

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