
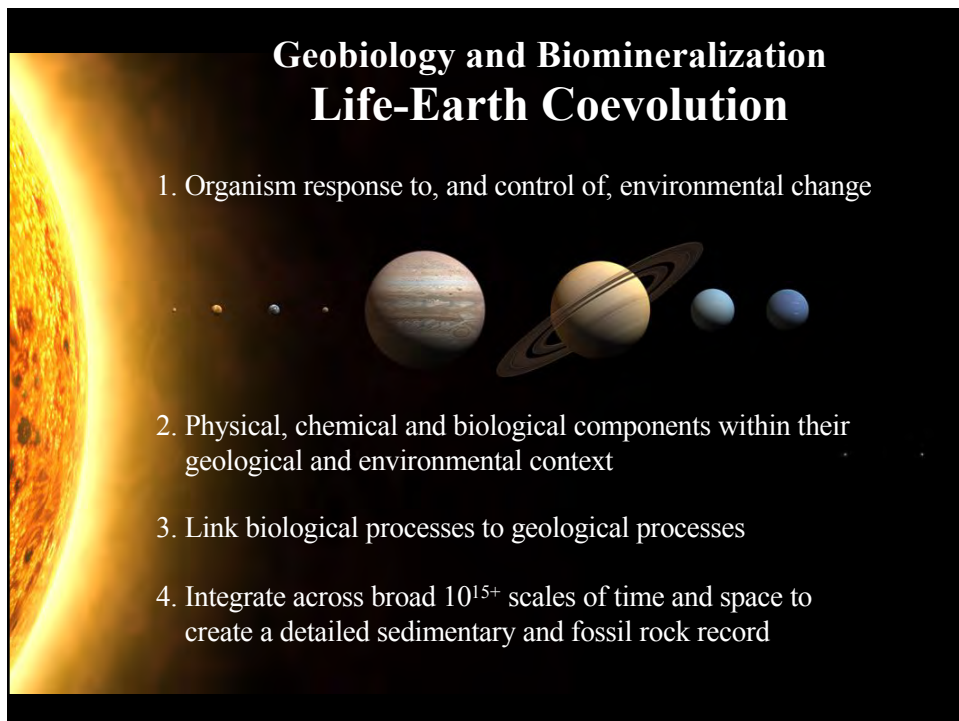


Life Make Rock: 4 Billion Years of Biomineralization

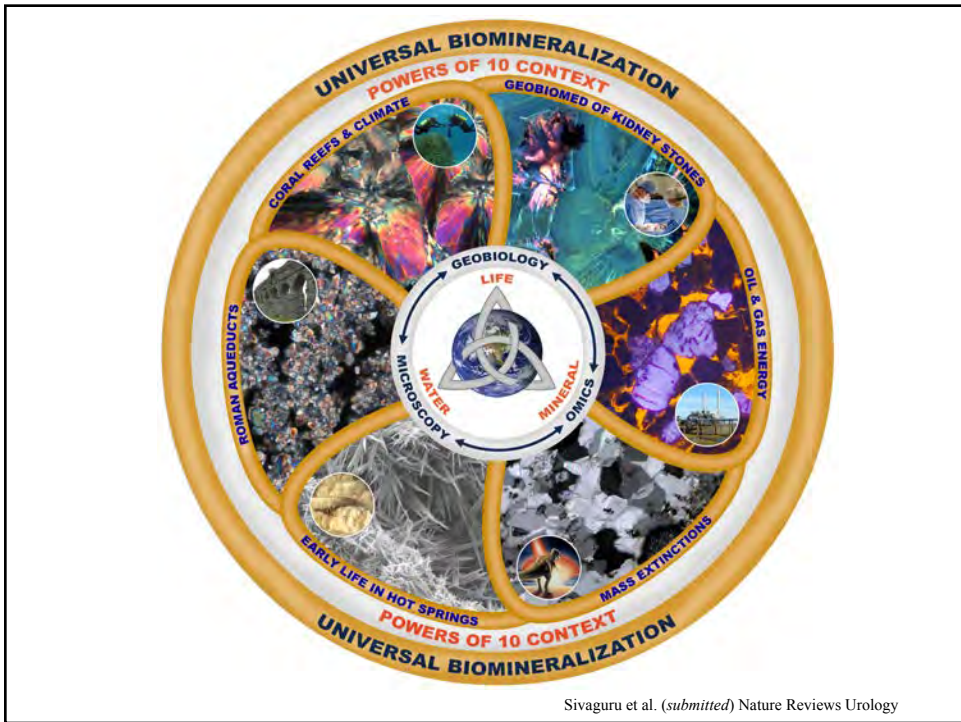
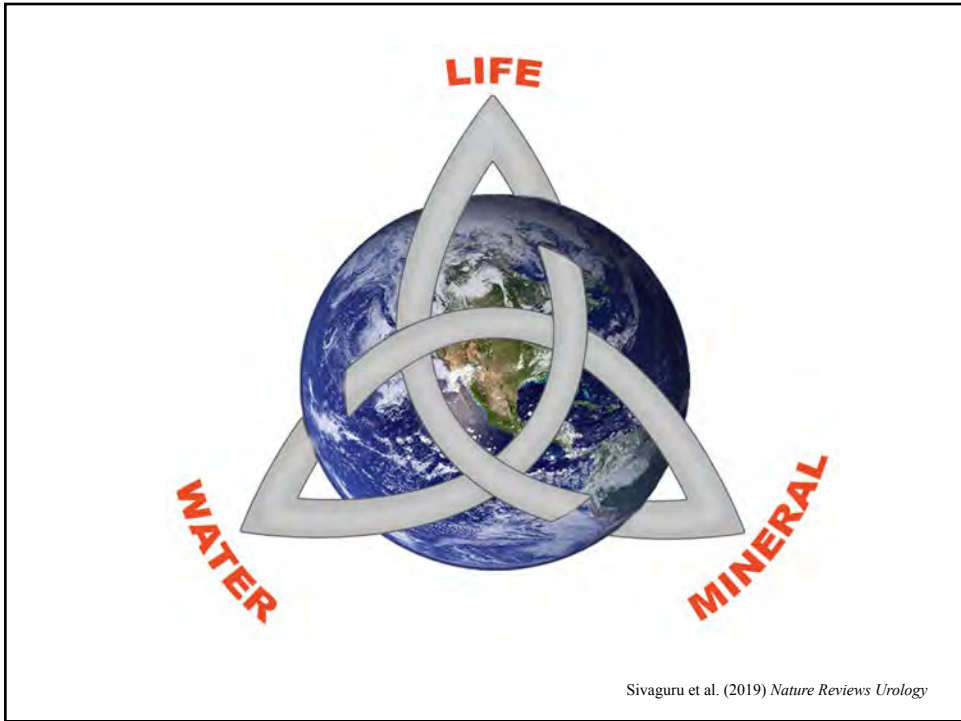
Bruce W. Fouke

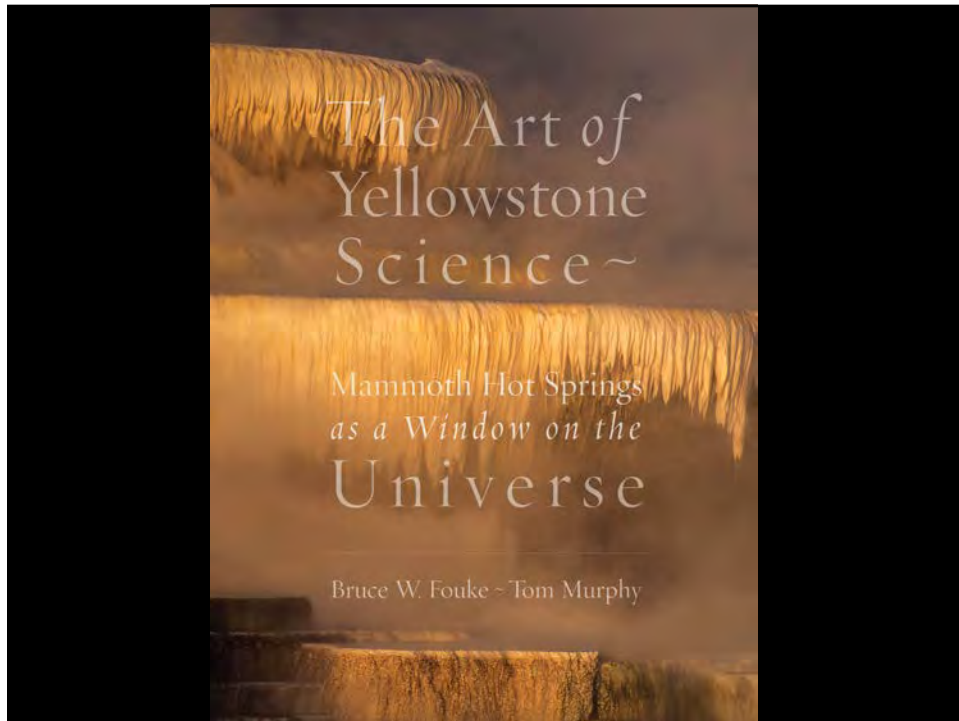
 Director Roy J. Carver Biotechnology Center
Professor of Geology and Microbiology
Carl R. Woese Institute for Genomic Biology



Geobiology and Biomineralization Life-Earth Coevolution

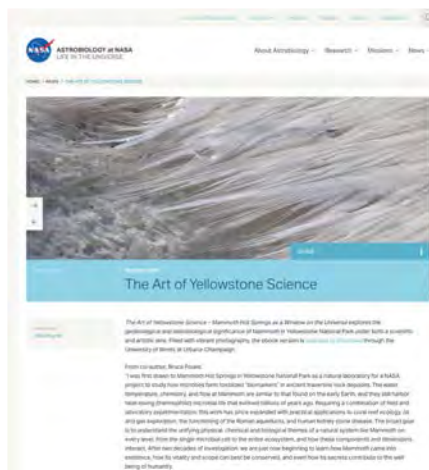
1. Organism response to, and control of, environmental change
2. Physical, chemical and biological components within their geological and environmental context
3. Link biological processes to geological processes
4. Integrate across broad 10^{15+} scales of time and space to create a detailed sedimentary and fossil rock record





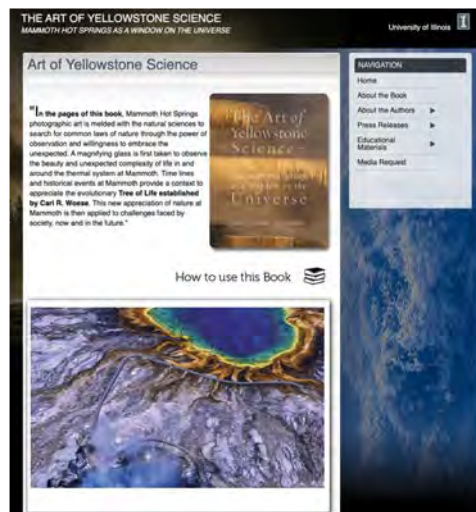
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Again he turned his head, and saw the warrior not twenty yards from him. Determined to avoid the expected blow, he suddenly stopped, turned round, and spread out his arms. The warrior, surprised by the suddenness of the action, and perhaps at the bloody appearance of Colter, also attempted to stop; but exhausted with running, he fell whilst throwing his spear, which stuck in the ground, and broke in his hand. Colter instantly snatched up the pointed part, with which he pinned him to the earth, and then continued his flight.

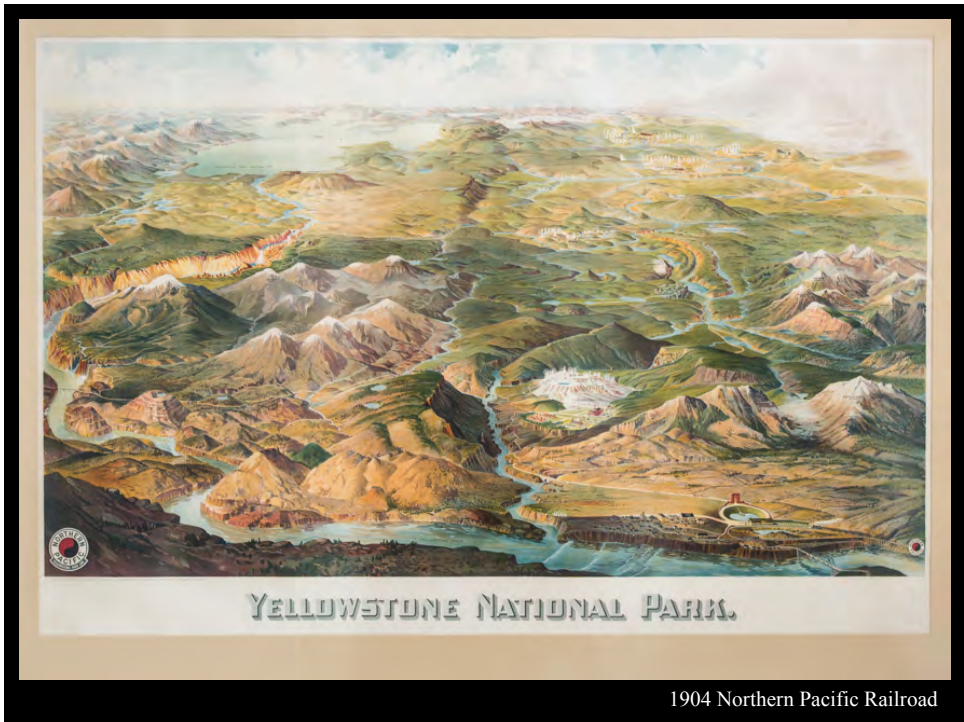
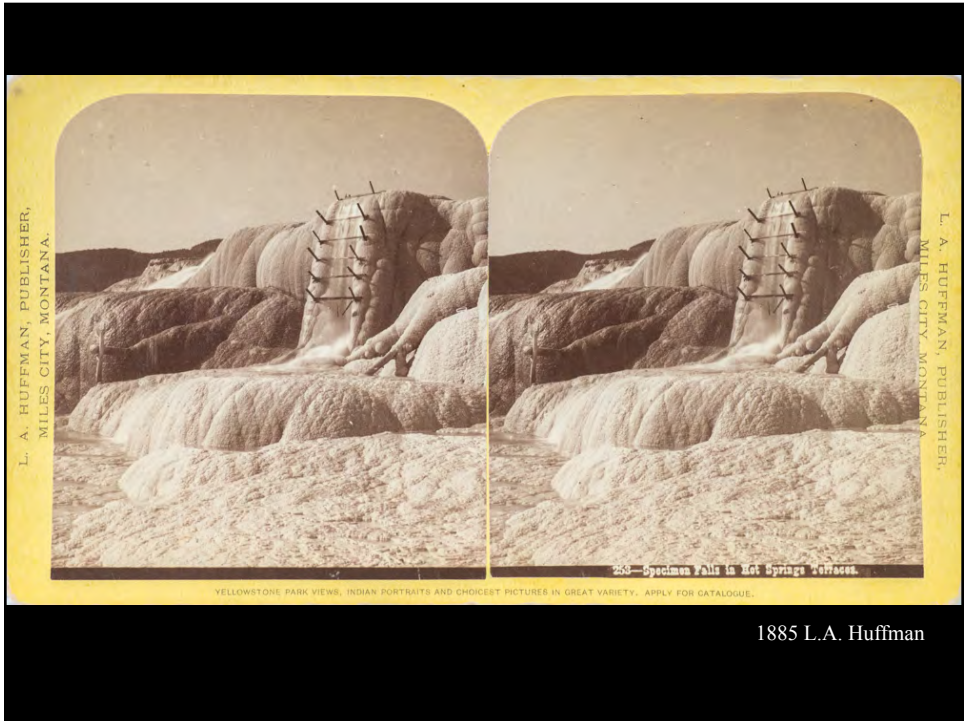
John Bradbury 1817



1878 by H.B. Calfee



1880 by H.B. Calfee

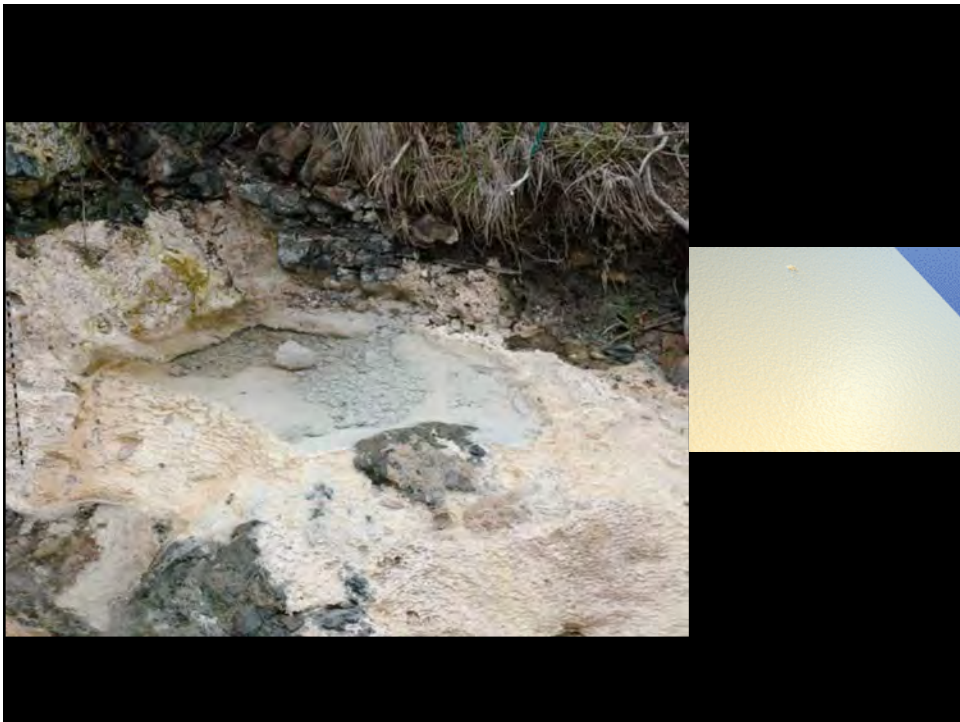






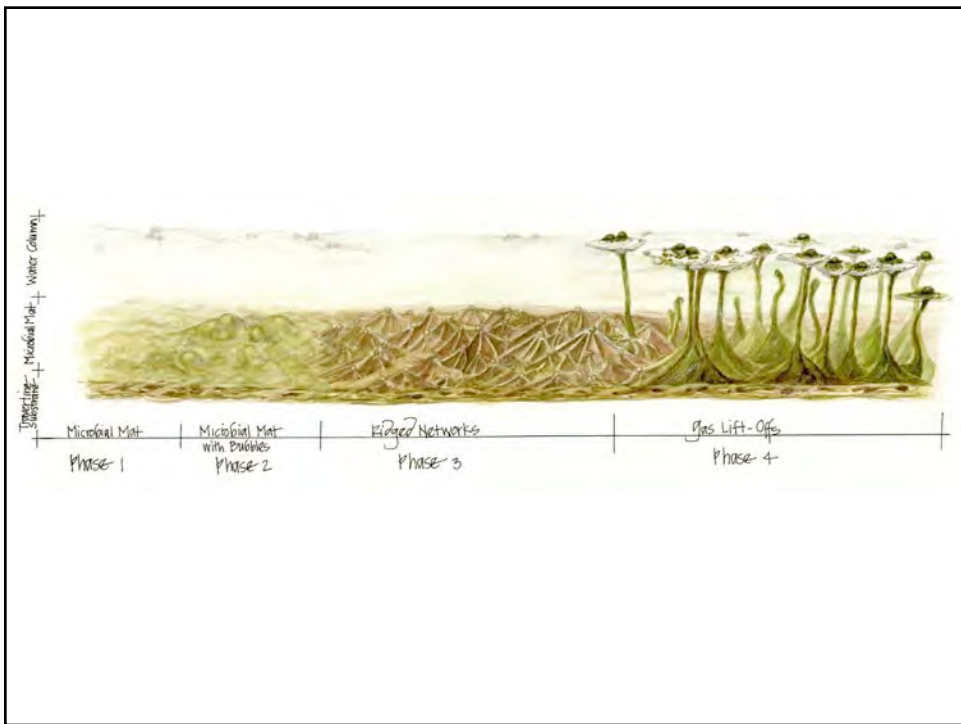


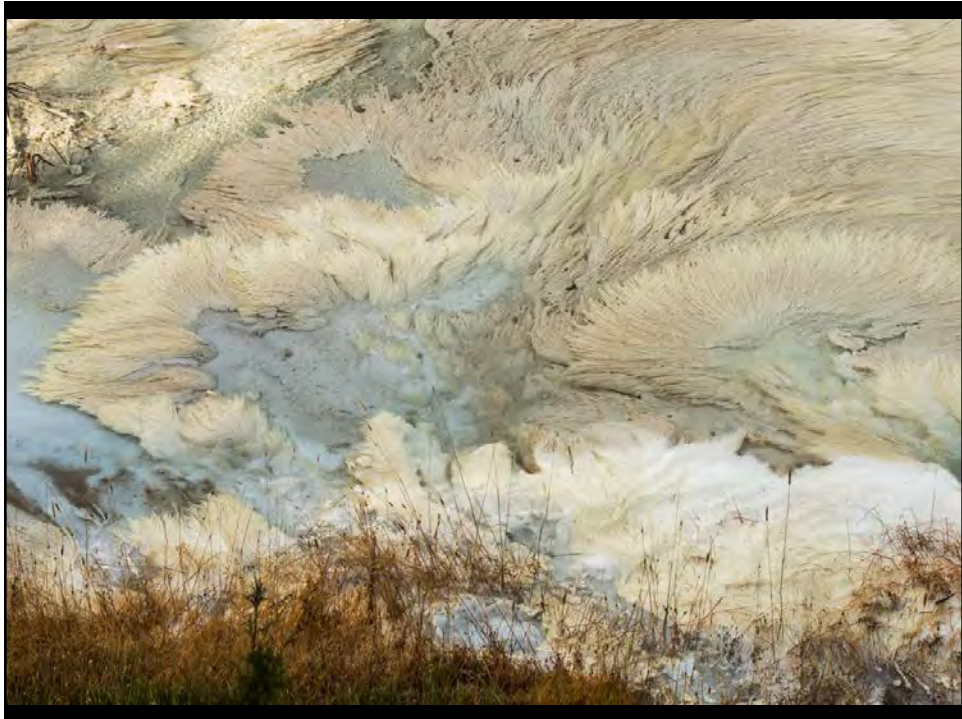


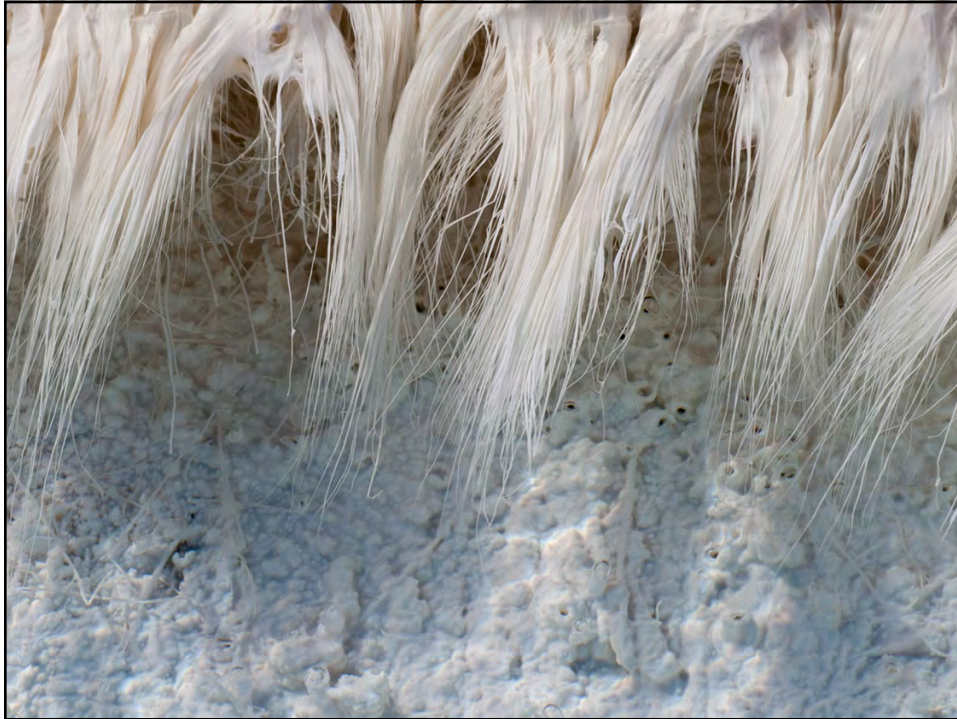






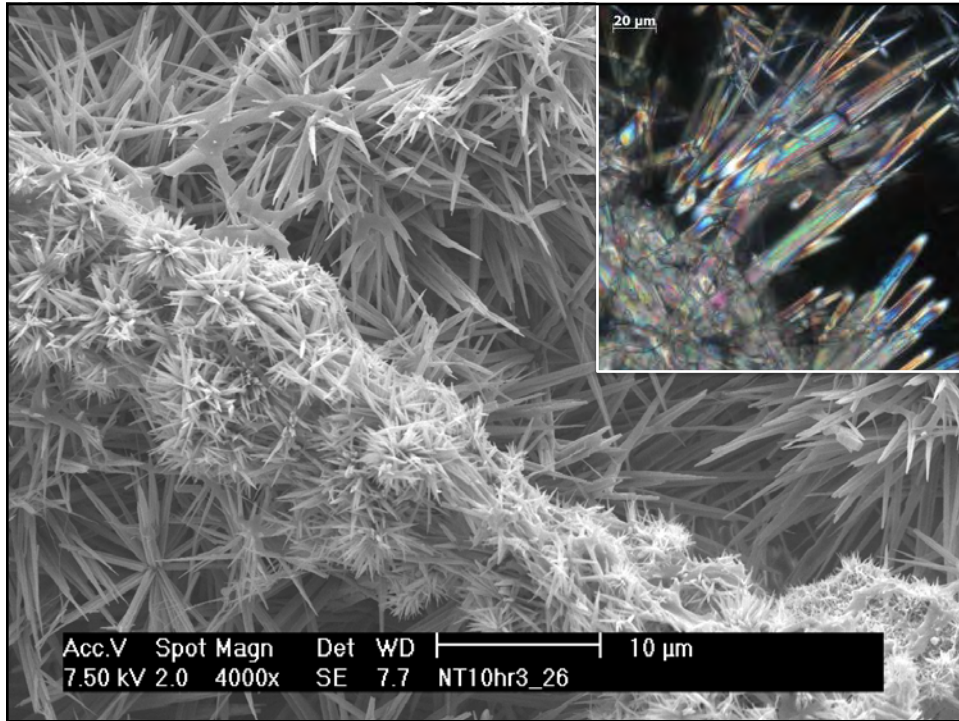


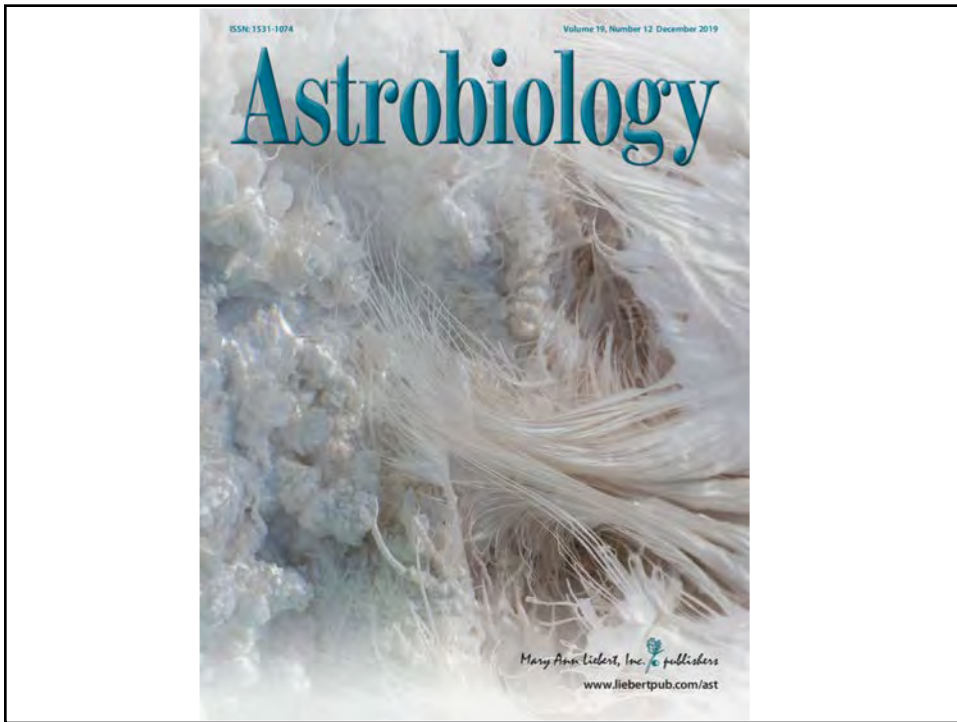
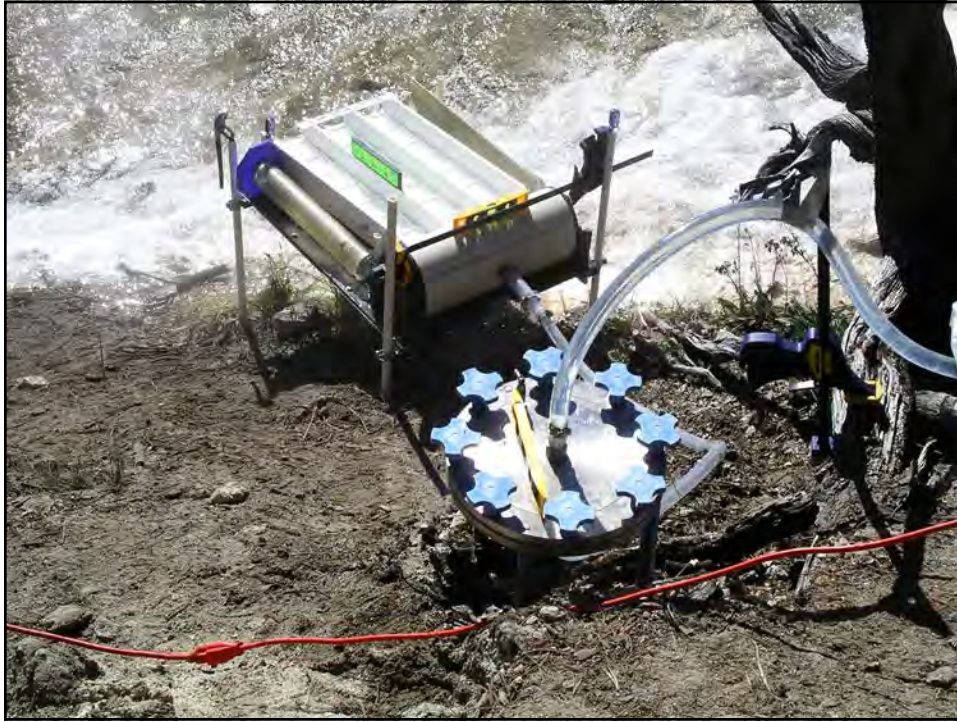




**Physiology, Metabolism and Fossilization
Of Filamentous Microbial Mats**

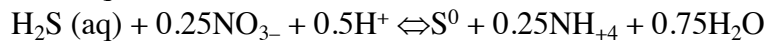
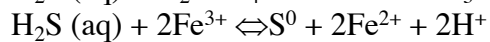
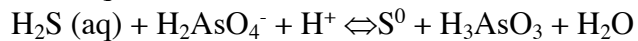
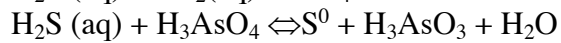
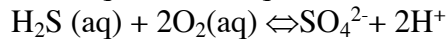
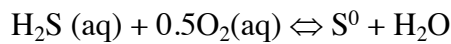




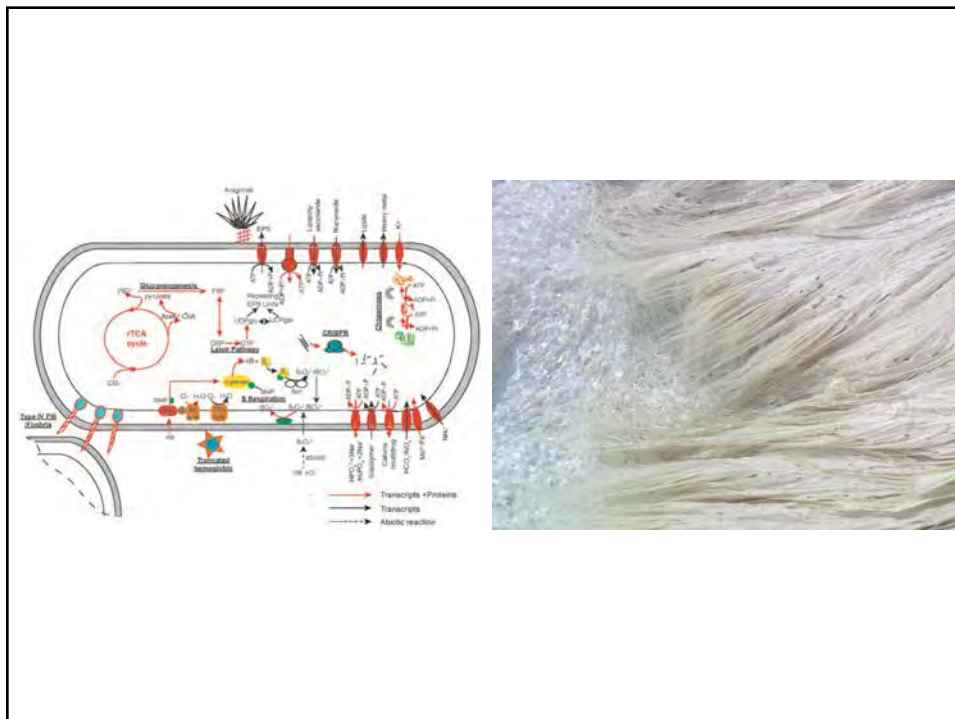


Metabolism of *Sulfurihydrogenibium*

- Chemolithoautotroph that fixes CO₂ using reductive reverse tricarboxylic acid (rTCA) cycle (ATP citrate lyase *acI*B gene)
- Oxidize reduced forms of S using O₂ as the electron acceptor (sulphide oxidation (*sox*) genes in the genome and a sulphide-quinone glutathione reductase family of flavoproteins (*sqr*))
- Capable of anoxygenic photosynthesis



Dong et al. (2019) *Astrobiology*





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Science

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Minerals detected around Jezero Crater would preserve even tiny fossils



An artist's rendition of NASA's Mars 2020 rover studying its surroundings. (NASA/JPL-Caltech)

By Sarah Kaplan
November 16 at 8:00 AM





