

# ALEXIS S. TEMPLETON

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## EDUCATION

2002 Ph.D. in Aqueous and Environmental Geochemistry, Stanford University  
1996 M.S. in Geochemistry, Dartmouth College  
1993 A.B. with high honors in Earth Sciences, Dartmouth College

## POSITIONS HELD

2024-present **Associate Chair, Undergraduate Program**  
Department of Geological Sciences, University of Colorado at Boulder  
2023-present **Head of Geochemistry**  
Eden GeoPower, Somerville MA  
2019-present **Professor**  
Department of Geological Sciences, University of Colorado at Boulder  
2017-2019 **Associate Chair, Graduate Program**  
Department of Geological Sciences, University of Colorado at Boulder  
2012-2019 **Associate Professor**  
Department of Geological Sciences, University of Colorado at Boulder  
2013 **Visiting Professor**  
Institut de Minéralogie et de Physique des Milieux Condensés, France  
Institut de Physique du Globe à Paris, France  
2005-2012 **Assistant Professor**  
Department of Geological Sciences, University of Colorado at Boulder  
2002-2005 **NSF Postdoctoral Fellow, Microbial Biology**  
Scripps Institution of Oceanography, Marine Biology Research Division  
1995-1997 **Senior Research Associate, Center for Isotope Geochemistry,**  
Earth Sciences Division, Lawrence Berkeley National Laboratory

## AWARDS AND HONORS

2019 University of Colorado "College Scholar" award  
2017 Mineralogical Society of America Fellow  
2012 Geobiology & Geomicrobiology Division Award, Geological Society of America  
2011 Department of Energy Early Career Research Award  
2006 David and Lucille Packard Foundation Fellowship in Science and Engineering  
2006 F.W. Clarke Medal, Geochemical Society  
2004 Rosalind Franklin Young Investigator Award, Advanced Photon Source  
2002-2004 National Science Foundation Microbial Biology Postdoctoral Fellowship  
1999 Wolf Vishniac Award, International Symposium Environmental Biogeochemistry  
1997-2000 Eugene Holman Stanford Graduate Fellowship, Stanford University  
1993 John Ebers & Upham Prizes for excellence in Earth Sciences, Dartmouth College

## INVITED PRESENTATIONS (2019-2023)

2023 CSIRO Cutting Edge Hydrogen Workshop, Perth, Australia  
2023 Natural Hydrogen World Summit (HNAT'23), Perth, Australia  
2023 Goldschmidt International Geochemistry Conference, France  
2023 Princeton University Geosciences Department, NJ  
2023 Dartmouth College Earth Sciences Department, NH  
2022 Astrobiology Science Conference 2022, Atlanta, GA  
2021 University of Nevada, Reno, NV  
2020 Geobiology Gordon Research Conference, Galveston, TX  
2019 California Institute of Technology, Division of Geological and Planetary Sciences  
2019 Keynote, Deep Carbon 2019, Washington DC  
2019 University of Michigan, Earth and Environmental Sciences  
2019 Goldschmidt International Geochemistry Conference, Spain  
2019 Anaerobic Biospheres, Astrobiology Science Conference 2019  
2019 Simons Foundation Collaboration on the Origins of Life  
2019 Dartmouth College 250<sup>th</sup> Anniversary Science Series  
2019 Deep Carbon Observatory Deep Energy Workshop, France

**PUBLICATIONS** (“underline” denotes an early career scientist advised by Templeton at CU-Boulder).

Rempfert, K.R., Kraus, E.A., Nothaft, D.B., Spear, J.R., Dildar, N., Sepúlveda, J., and **Templeton, A.S.** Intact polar lipidome and membrane adaptations of microbial communities Inhabiting serpentinite-hosted fluids. *Frontiers in Extreme Microbiology* <https://doi.org/10.3389/fmicb.2023.1198786>

**Templeton, A.S.** and Caro, T.C., 2023, The Rock Hosted Biosphere. *Annual Reviews in Earth and Planetary Sciences*, <https://doi.org/10.1146/annurev-earth-031920-081957>

Thieringer, P.H., Boyd, E.S., **Templeton, A.S.**, and Spear, J.R., 2023, Metapangenomic investigation provides insight into niche differentiation of methanogenic populations from the subsurface serpentinizing environment, Samail Ophiolite, Oman. *Frontiers in Extreme Microbiology*. <https://doi.org/10.3389/fmicb.2023.1205558>

Rempfert, K. R., Nothaft, D.B., Evans, D., Kraus, E.A., Asamoto, C., Spear, J.R., Matter, J.M., Kopf, S.H., and **Templeton, A.S.**, 2023, Subsurface Cycling of Nitrogen in the Actively Serpentinizing Samail Ophiolite, Oman. *Frontiers in Extreme Microbiology* <https://doi.org/10.3389/fmicb.2023.1139633>

Munro-Ehrlich, M., Nothaft, D.B., Fones, E., Matter, J.M., **Templeton, A.S.**, and Boyd, E.S., 2023, Parapatric speciation of *Meiothermus* in serpentinite-hosted aquifers in Oman. *Frontiers in Extreme Microbiology* <https://doi.org/10.3389/fmicb.2023.1138656>.

Seyler, L.M., Kraus, E.J., McClean, C., Spear, J., Schrenk, M.O., and **Templeton, A.S.**, 2023, A untargeted metabolomics approach to characterize dissolved organic matter in the Samail Ophiolite. *Frontiers in Extreme Microbiology* <https://doi.org/10.3389/fmicb.2023.1093372>

Colman, D., Kraus, E., Thieringer, P., Rempfert, K., **Templeton, A.S.**, Spear, J.R., and Boyd, E., 2022, Deep-branching acetogens in serpentinized subsurface fluids of Oman. *Proceedings of the National Academy of Sciences*, <https://doi.org/10.1073/pnas.2206845119>

Lima-Zaloumis, J., Neubeck, A., Ivarsson, M., Bose, M., Greenberger, R., **Templeton, A.S.**, Czaja, A., Kelemen, P.B., Edvinsson, T. and the Oman Drilling Project Science Party, 2022. Microbial biosignature preservation from serpentinizing systems: evidence from the Oman ophiolite. *Nature Communications*. <https://doi.org/10.1038/s43247-022-00551-1>

Fones, E.S., Mogk, D., **Templeton, A.S.**, Boyd, E., 2022, Transformation of low molecular weight organic acids by microbial endoliths in subsurface mafic and ultramafic igneous rock. *Environmental Microbiology* <https://doi.org/10.1111/1462-2920.16041>

Lau, G., Trivedi, C.B., Grasby, S.G., Spear, J.R., Cosmidis, J., and **Templeton, A.S.**, 2022. Sulfur and iron rich mineralogical features preserved in permafrost in the Canadian High Arctic: analogs for the astrobiological exploration of Mars. *Frontiers in Earth and Space Science* <https://doi.org/10.3389/fspas.2022.825019>

Hand, K.P., Phillips, C., Maize, E., Reeves, G., Hurst, K., Krajewski, J., Craft, K. et al., 2022. Science goals and mission architecture of the Europa Lander Mission Concept. *Planetary Science Journal* <https://doi.org/10.3847/PSJ/ac4493>

Kelemen, P.B., Leong, J.A., de Obeso, J.C., Matter, J.M., **Templeton, A.S.**, Nothaft, D.B., Elsami, A., Evans, K., Goddard, M., Coggon, J.A., Warsi, N.H., Pezard, P., Choe, S., Teagle, D.A., Michibayashi, K., Takazawa, E., Al Sulaimani, Z. and the Oman Drilling Project Science Team, 2021. Initial results from the Oman Drilling Project Multiborehole Observatory: Petrogenesis and Ongoing alteration of mantle peridotite. *Journal of Geophysical Research, Solid Earth* <https://doi.org/10.1029/2021JB022729>.

**Templeton, A.S.**, Ellison E.T., Glombitza, C., Morono, Y., Rempfert, K.R., Hoehler, T.M., Zeigler, S.D., Spear, J.R., Kraus, E., Nothaft, D.B., Fones, E.S., Munro-Ehrlich, M., Boyd, E.B., Mayhew, L.E., Cardace, D., Matter, J., Kelemen, P.K., and the Oman Drilling Project Science Party, 2021. Accessing the subsurface biosphere within rocks undergoing active low-temperature

serpentinization in the Samail Ophiolite (Oman Drilling Project) *Journal of Geophysical Research, Biogeosciences*. <https://doi.org/10.1029/2021JG006315>

Nothaft, D.B., **Templeton, A.S.**, Rhim, J.H., Wang, D.T., Labidi, J., Miller, H.M., Boyd, E.S., Matter, J.M., Ono, S., Young, E.D., Kopf, S.H., Kelemen, P., Conrad, M.E., Fierer, N., The Oman Drilling Project Science Team, 2021a. Geochemical, biological and clumped isotopologue evidence for substantial methane production under carbon limitation in serpentinites of the Samail Ophiolite, Oman. *Journal of Geophysical Research, Biogeosciences*, <https://doi.org/10.1029/2020JG006025>

Nothaft, D.B., **Templeton, A.S.**, Boyd, E.S., Matter, J.M., Stute, M., Van Keuren, A.N.P., and the Oman Drilling Project Science Team, 2021b. Aqueous geochemical and microbial variation across discrete depth intervals in a peridotite aquifer assessed using a packer system in the Samail Ophiolite, Oman. *Journal of Geophysical Research, Biogeosciences*, <https://doi.org/10.1029/2021JG006319>

Ellison, E.T., **Templeton, A.S.**, Mayhew, L.E., Ziegler, S.D., Kelemen, P.B., Matter, J.M., and the Oman Drilling Project Phase II Science Party, 2021. Low-temperature hydrogen formation during aqueous alteration of serpentinized peridotite in the Samail ophiolite. *Journal of Geophysical Research, Solid Earth*, <https://doi.org/10.1029/2021JB021981>

Hinz, I.L., Nims, C., Theuer, S., **Templeton, A.S.**, Johnson, J.E., 2021. Ferric iron triggers greenalite formation in simulated Archean seawater. *Geology*, DOI: [10.1130/G48495.1](https://doi.org/10.1130/G48495.1)

Glombitza, C., Putnam, L.I., Rempfert, K.R., Kubo, M.D., Schrenk, M.O., **Templeton, A.S.**, Hoehler, T.M., 2021, Active microbial sulfate reduction in serpentinizing fluids of the continental subsurface. *Communications Earth and Environment*, <https://doi.org/10.1038/s43247-021-00157-z>

Nims, C., Lafond, J., Alleon, J., **Templeton, A.S.**, Cosmidis, J., 2021, Preservation of organic biomorphs through silicification: questioning the early microfossil record. *Geology*, <https://doi.org/10.1130/G48152.1>

Kraus, E.A., Stamps, B.W., Nothaft, D.B., Rempfert, K.R., Ellison, E., Matter, J.M., **Templeton, A.S.**, Boyd, E.S., Spear, J.R., 2021, Molecular evidence for an active microbial methane cycle in subsurface serpentinite-hosted groundwaters in the Samail Ophiolite. *Applied and Environmental Microbiology*, doi: [10.1128/AEM.02068-20](https://doi.org/10.1128/AEM.02068-20)

Trivedi, C.B., Stamps, B.W., Lau, G.E., Grasby, S.E., **Templeton, A.S.**, Spear, J.R., 2020, Metagenomic insights into microbial metabolisms of a sulfur-influenced glacial ecosystem. *mSystems* doi: [10.1128/mSystems.00504-20](https://doi.org/10.1128/mSystems.00504-20)

Ellison, E.T., Mayhew, L.E., Miller, H.M., **Templeton, A.S.**, 2020, Quantitative microscale Fe redox imaging by multiple energy X-ray fluorescence mapping at the Fe K pre-edge. *American Mineralogist*, <https://doi.org/10.2138/am-2020-7359>.

Fones, E.M., Colman, D.R., Kraus, E.A., Stepanauskas, S., **Templeton, A.S.**, Spear, J.R., Boyd, E.S., 2020, Diversification of methanogens into hyperalkaline serpentinizing environments through adaptations to minimize oxidant limitation. *ISME journal*, <https://doi.org/10.1038/s41396-020-00838-1>.

Scicchitano, M.R., Spicuzza, M.J., Ellison, E.T., Tuschel, D., **Templeton, A.S.**, Valley, J.W., 2020, In situ oxygen isotope determination of serpentine minerals by ion microprobe: matrix effects and new insights on serpentinization in hole BA1B (Samail Ophiolite, Oman). *Geostandards and Geoanalytical Research*, <https://doi.org/10.1111/ggr.12359>.

McCullom, T.M., Klein, F., Moskowitz, B., Berquo, T., Bach, W. and **Templeton, A.S.**, 2020, Hydrogen generation and iron partitioning during experimental serpentinization of olivine-pyroxene mixtures (*Geochimica et Cosmochimica Acta*, v. 282, p. 55-76. <https://doi.org/10.1016/j.gca.2020.05.016>

- Templeton, A.S.**, and **Ellison, E.T.**, 2020, Formation and loss of metastable brucite: does Fe(II)-brucite support microbial activity in serpentinizing ecosystems? *Phil Trans R. Soc A v. 378*: 20180423. <http://dx.doi.org/10.1098/rsta.2018.0423>
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- Cosmidis, J.**, **Nims, C.**, **Diercks, D.**, and **Templeton, A.S.**, 2019, Sulfur organomineralization: a new S(0) formation mechanism. *Geochimica Cosmochimica Acta*, v. 247, 59-82. <https://doi.org/10.1016/j.gca.2018.12.025>
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- Miller, H.M.**, **Chaudhry, N.**, **Conrad, M.E.**, **Bill, M.**, **Kopf, S.** and **Templeton, A.S.**, 2018, Large carbon isotope variability during alkaline methanogenesis. *Geochimica et Cosmochimica Acta*, v. 237, p. 18-31. <http://dx.doi.org/10.1016/j.gca.2018.06.007>
- Trivedi, C.B., **Lau, G.**, **Grasby, S.E.**, **Templeton, A.S.**, and **Spear, J.R.**, 2018, Low-temperature sulfidic ice microbial communities, Borup Fiord Pass, Canadian High Arctic. *Frontiers in Extreme Microbiology*. [doi: 10.3389/fmicb.2018.01622](https://doi.org/10.3389/fmicb.2018.01622)
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- Mayhew, L.E.**, **Ellison, E.T.**, **Miller, H.M.**, **Kelemen, P.K.**, and **Templeton, A.S.**, 2018, Iron transformations during low-temperature alteration of serpentinized rocks from the Samail Ophiolite, Oman. *Geochimica et Cosmochimica Acta*, v. 222, p. 704-728. <https://doi.org/10.1016/j.gca.2017.11.023>
- Miller, H.M.**, **Mayhew, L.E.**, **Kelemen, P.K.**, **Ellison, E.**, **Kubo, M.** and **Templeton, A.S.**, 2017, Low temperature hydrogen production during hydration of partially-serpentinized peridotite. *Geochimica et Cosmochimica Acta*. <http://dx.doi.org/10.1016/j.gca.2017.04.022>
- Sudek, L.A.**, **Wanger, G.**, **Templeton, A.S.**, **Staudigel, H.**, and **Tebo, B.M.**, 2017, Basaltic glass colonization by the heterotrophic Fe(II)-oxidizing and Siderophore-producing deep sea bacteria *Pseudomonas stutzeri* VS-10: the potential role of basalt in enhancing growth. *Frontiers in Extreme Microbiology* <https://doi.org/10.3389/fmicb.2017.00363>
- Rempfert, K.**, **Miller, H.M.**, **Matter, J.M.**, **Kelemen, P.**, **Fierer, N.**, **Templeton, A.S.**, 2017, Geochemical and Hydrologic Controls on Subsurface Microbial Life in the Samail Ophiolite, Oman. *Frontiers in Extreme Microbiology* <https://doi.org/10.3389/fmicb.2017.00056>
- Lau, G.E.**, **Cosmidis, J.**, **Grasby, S.E.**, **Trivedi, C.B.**, **Spear, J.R.**, and **Templeton, A.S.**, 2017, Low-temperature formation and stabilization of rare allotropes of cyclooctasulfur ( $\beta$ -S<sub>8</sub> and  $\gamma$ -S<sub>8</sub>) in the

- presence of organic carbon at a sulfur-rich glacial site in the Canadian High Arctic. *Geochimica et Cosmochimica Acta* v. 200, p. 217-231. <http://dx.doi.org/10.1016/j.gca.2016.11.036>
- Miller, H.M., Matter, J.M., Kelemen, P.K., Ellison, E., Conrad, M., Tominaga, M. and **Templeton, A.S.**, 2017. Methane origin in the Samail ophiolite: Reply to comment on "Modern water/rock reactions in Oman hyperalkaline peridotite aquifers and implications for microbial habitability". *Geochimica et Cosmochimica Acta*, v. 197, p.471-473. <http://dx.doi.org/10.1016/j.gca.2016.11.011>
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- Swanner, E.D., and **Templeton, A.S.**, 2011, Potential for nitrogen fixation and nitrification in the granite-hosted subsurface at Henderson Mine, CO. *Frontiers in Extreme Microbiology* 2:254.
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## **Papers in Review**

Cosmidis, J., O'Reilly, S., Crispin, K.L., Ellison, E.T., Diercks, D., and **Templeton, A.S.**, Carbonate polymorphism controlled by microbial iron redox dynamics at a CO<sub>2</sub> leakage site (Crystal Geyser, Utah). *Sedimentology* (in revision).

Zhou, A., **Templeton, A.S.**, Johnson, J.E., Dissolved silica influences the bulk iron redox state and transformation products of photoferrotothrophy. *Geobiology journal* (in revision).

Boyd, E.S., Colman, D. and **Templeton, A.S.**, Microbial hydrogen metabolism in rock-hosted ecosystems. *Frontiers in Energy Research: Hydrogen Production and Storage* (in revision).

**Templeton, A.S.**, Ellison, E.T., Kelemen, P.K., Leong, J., Boyd, E.S., Colman, D., and Matter, J.M., Low-temperature hydrogen production and consumption in partially-hydrated peridotites in Oman: implications for stimulated hydrogen production. *Frontiers in Geochemistry* (submitted).

Caro, T.A., Kashyap, S., Brown, G., Chen, C., Kopf, S.K., and **Templeton, A.S.**, Quantitative measure of microbial growth rate with Raman microspectroscopy. *FEMS Microbiology* (submitted).

## **Technical Reports & White Papers**

Hand, K., Murray, A., Garvin, J., Brinckerhoff, W., Christner, B., Edgett, K., Ehlmann, B., German, C., Hayes, A., Hoehler, T., Horst, S., Lunine, J., Neelson, K., Parnicas, C., Schmidt, B., Smith, D., Rhoden, A., Russell, M., **Templeton, A.S.**, Willis, P., Yingst, R., Philips, C., Cable, M., Hoffman, A., Nordheim, T., Pappalardo, R., and the Project Engineering Team (2017). Europa Lander Study Report: Europa Lander Mission Science Definition Team. NASA, Washington D.C., <https://europa.nasa.gov/resources/58/europa-lander-study-2016-report/>

Willis, P., Mora, M.F., Noell, A., Creamer, J., Kehl, F., Zamuruyev, K., Jaramillo, E., Kok, M., Cieslarova, Z., Santos, M.S.F., Oborny, N., Drevinskas, T., Badescu, M., Simcic, J., Waller, S., Madzunkov, S., Lindensmith, C., Brinkerhoff, W., Hoehler, T., Quinn, R., Ricco A., Lunte, S. and Templeton, A.S. (2021) How to earch for chemical biosignatures on Ocean Worlds. <https://doi.org/10.3847/25c2cf8a770808>

## **INTELLECTUAL PROPERTY**

### **Patents**

"Sulfur-carbon tubes and sphere, and Methods of Making Same", 2019. US Patent 20190363346.

### **FUNDING HISTORY (2006-present)**

Jet Propulsion Laboratory: Strategic University Research Partnerships (SURP). Life detection in serpentinizing systems relevant to current and future astrobiology missions. Mora, F. (PI), **Templeton, A.S.** (co-PI). \$180K: 1/1/2024 to 12/31/2027.

Grantham Foundation for the Protection of the Environment: "Rock-Hydrogen: Stimulated Hydrogen Production from Ultramafic Rocks". **Templeton, A.S.** (PI), Matter, J.M., Boyd, E.S., Kelemen, P.K. (co-Is). \$1.35M 7/1/23 to 6/30/25.

NASA ICAR Program: "Engine of Innovation". Rosenzweig, R.F. (PI), Copley, S (co-I), Wing, B. (co-I), **Templeton, A.S.** (co-I), Cameron, J. (co-I), Orphan, V. (co-I), McCutcheon, J., Goldford, J., \$5.99M 10/1/2023-9/30/2028.

NASA Exobiology Program: "Methanogenic activity and isotope biosignatures under carbon limitation". Hoehler, T. (PI), **Templeton, A.S.** (co-I), Kopf, S.R (co-I), Howells, A. (co-I). \$1.2M: 10/1/2022-9/30/2025.

NASA Exobiology Program: "Targeted Life Detection in Subsurface Serpentinities". **Templeton, A.S. (PI)**, Boyd, E.B. (co-I). \$789K: 1/1/2021-12/31/2024.



NASA Solar System Workings Program: "Tracing serpentinization across the solar system". Ehlmann, B. (PI), **Templeton, A.S.**, (co-I). \$596K: 1/1/2021-12/31/2024.

Jet Propulsion Laboratory: Geomicrobiology Investigations to support the development of the Ocean Worlds Life Surveyor (OWLS) capabilities. **Templeton, A.S.** (PI), \$245K: 1/1/20 to 10/1/2022

Simons Foundation: Life Sciences - Simons Collaboration on the Origin of Life Investigator Award, **Templeton, A.S. (PI)**. \$738K: 1/1/2020 to 12/31/2024.

NASA Exobiology Program: "Ancient Iron Silicates: deciphering mineral clues of early life". Johnson, J.E. (PI), **Templeton, A.S. (co-I)** \$493K: 9/1/18 to 8/31/21.

NASA Astrobiology Institute Cooperative Agreement: "Rock-Powered Life: Revealing mechanisms of Energy Flow from the Lithosphere to the Biosphere". **Templeton, A.S. (PI)**, Mayhew, L. (co-PI), McCollom, T. (co-PI), Spear, J., (co-PI), Boyd, E., (co-PI), Shock, E., (co-PI), Cardace, D. (co-PI), Tominaga, M. (co-PI), Ono, S. (co-PI), Brazelton, W. (co-PI), Schrenk, M. (co-PI), Hoehler, T. (co-PI). \$7M: 1/1/2015-12/31/2019

Advanced Industries Accelerator: "Multidimensional sulfur-carbon networks for optimized cathodes in next-generation Li-S batteries". **Templeton, A.S. (PI)**, Cosmidis, J. (co-I). \$79K: 4/1/2016-9/1/2018.

NASA Director's Discretionary Fund: "Probing the isotope systematics of low-temperature serpentinites", **Templeton, A.S. (PI)** \$50K, 1/1/2016 to 12/31/2016.

DOE Basic Energy Sciences: "Defining Fe and H speciation during olivine carbonation under highly reducing conditions". **Templeton, A.S. (PI)** \$759K: 7/1/2011-6/30/2017.

NASA Exobiology Program: "Elemental sulfur deposits as an astrobiological target: formation and preservation of elemental sulfur in low-temperature springs relevant to Mars and Europa". **Templeton, A.S. (PI)**, Spear, J. (co-I) \$609K: 6/1/13 to 5/31/16.

NSF Ocean Sciences: "Experimental study of hydrogen generation during serpentinization of ultramafic rocks". McCollom, T.M. (PI), **Templeton, A.S. (co-PI)**. \$446K: 1/2010 -12/2012.

NASA Director's Discretionary Fund: "Geomicrobiology of a Unique Ice-Sulfur Spring Ecosystem in the High Canadian Arctic: A Testbed for Europa Exploration". **Templeton A.S. (PI)**, Pappalardo, R. (co-PI), Spear, J. (co-PI), Grasby, S. (co-PI). \$135K; 6/2007-10/2008.

David and Lucile Packard Fellowship in Science and Engineering. **Templeton, A.S. (PI)** \$775K: 10/2006 to 10/2011.

CU VCR Innovative Seed Grant Program, "Development of novel technologies for real-time studies of microbial biofilms". Palmer, A.E. (PI), **Templeton, A.S. (co-PI)**. \$49K, 6/2007-6/2008.

NSF Biology: "Isolation of novel metal-oxidizing bacteria at a deep subsurface oxic/anoxic interface". **Templeton, A.S. (PI)** \$50K: 8/2006 to 8/2007.

NSF "The role of Fe and Mn oxidizing bacteria in the submarine bioalteration of the oceanic crust". Staudigel, H. (PI), Tebo, B.M. (co-PI), **Templeton, A.S. (co-PI)**. \$458K: 6/2006-10/2008.

## TEACHING ACTIVITIES

### **GEOL 1150: Water, Energy and Environment**

Introductory-level course with a mix of lecture and recitation format for non-STEM majors. Developed with Prof David Budd and the WEE teaching cohort. Fall 2018, 2021.

### **GEOL 2100: Environmental Geology**

Introductory-level course for non-STEM majors. Developed in close-collaboration with the Science Education Initiative to design and implement interactive teaching strategies. Taught Fall 2007, 2008, 2009, 2010, 2011, 2015.

### **GEOL 3320: Introduction to Geochemistry**

Course for GEOL Majors that applies concepts of equilibrium thermodynamics to chemical differentiation of the Earth, chemical weathering and redox biogeochemistry. Spring 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2019, 2021, 2022, 2023.

### **GEOL 4716: Environmental Field Geochemistry**

Upper division field course focusing on laboratory and field-based measurements and data interpretation for problems in aquatic chemistry, acid-mine drainage and subsurface bioremediation. Taught Spring 2012, Fall 2014, 2017, 2020. 2022.

### **GEOL 5280: Aqueous and Environmental Geochemistry**

Graduate-level interdisciplinary course on aquatic chemistry, redox processes, mineral weathering and metal cycling with students from GEOL, CEAE, GEOG, EBIO, MCDB and CHEM. Taught Fall 2006, Spring 2009, Fall 2013, Fall 2016.

### **GEOL 5700: Geomicrobiology**

Graduate-level interdisciplinary course integrating aqueous geochemistry, microbial physiology and biomineralization processes with students from GEOL, CEAE, MCDB and CHEM. Spring 2008.

### **GEOL 5700: Geobiology**

Graduate-level interdisciplinary course on early-Earth geochemistry and evolution of biogeochemical processes with students from GEOL, EBIO and ESE at Colorado School of Mines. Taught Spring 2009 with Prof. Steven Mojzsis.

### **GEOL 5700: Geochemical Principles**

Graduate-level seminar to apply equilibrium thermodynamics to chemical differentiation of the Earth, chemical weathering and redox biogeochemistry. Spring 2016, 2017, 2019, 2021, 2022, 2023.

### **GEOL 5845: Undergraduate Independent Study**

Nabil Chaudhry (2016), Toby Halamka (2018), Rudy Peterson (2022).

### **Graduate PhD thesis committee membership**

Corey Lawrence (GEOL), Nicole Cates (GEOL), Jason Sahl (Colorado School of Mines), Chase Gerbig (CEAE), Lindsey Link (GEOL), Timothy Dittrich (CEAE), Audrey Norvell (CEAE), Miori Yoshino (GEOL), Janice Brahney (GEOL), Katherine Eilers (EBIO), Sanjay Mohanty (CEAE), Emma Marcucci (GEOL/APS), Stephen Glaser (GEOL), Joseph Mills (GEOG), Sarah Black (GEOL), Sarah Hirner (GEOL), Rachel Gabor (CEAE), Valerio Pasini (IPGP, France), Paul Le Campion (IPGP, France), Brad Bailey (Scripps Institution of Oceanography), Lisa Sudek (Scripps Institution of Oceanography), Chris Trivedi (Colorado School of Mines), Emily Kraus (Colorado School of Mines), Alexandra Mlosweska (University of Alberta), Elizabeth Fones (Montana State University), David Wren (CHEM), Audrey Norvell (CEAE), Brett Poulin (CEAE), Brigitta Rongstad (GEOL), Rebecca Simon (GEOL), Laura Beckerman (GEOL), Anne Fetrow (GEOL), Ciara Asamoto (GEOL), Patrick Thieringer (Colorado School of Mines), Tyler Lincoln (GEOL), Harry Allbrook (GEOL), Ruth Quispe Pilco (EBIO), Denise Mondragon (GEOG), Briana Prado (GEOG).

## **MENTORING**

### **Postdoctoral Researchers**

Dr. Julie Cosmidis	Sulfur “biomineralization” and the self-assembly of C/S microstructures
Dr. Jena Johnson	Fe-silicate mineralization under Archean ocean conditions
Dr. Elle Chimiak	Mineral-driven amino acid synthesis
Dr. Srishti Kashyap	Subsurface microbial life detection

### **Professional Research Associates**

Dr. Lisa Mayhew	Mars2020 Return Sample Scientist
Eric Ellison	Hydrogen scientist
Jessica Hankins	Raman microspectroscopy lab manager

### **Principal Dissertation Advisor**

Damhnait Gleeson	PhD December 2009 (co-advised with Dr. Bob Pappalardo). “ <i>Microbial life in cold sulfur-rich environments.</i> ” Postdoctoral Scientist Jet Propulsion Laboratory; Scientist with the European Space Agency; now Program Manager Science Foundation Ireland.
Elizabeth Swanner	PhD June 2011. “ <i>Microbially-mediated geochemical cycling of iron and nitrogen within the granite-hosted subsurface of Henderson Mine, CO.</i> ” NSF Postdoctoral Fellow, University of Tubingen, Germany; now Assistant Professor, Iowa State.
Lisa Mayhew	PhD May 2012. “ <i>Geological hydrogen production and microbial consumption during low-temperature water-rock reactions.</i> ” Postdoctoral Scientist University of Alaska, Fairbanks. Now Research Scientist at CU-Boulder.
Katherine Wright	PhD (in MCDB) August 2012. “ <i>Sulfur energetics and metagenomics at a terrestrial analogue for Europa.</i> ” Postdoctoral Scientist at University of Bristol, UK; now Head Space Science, UK Space Agency.
Emily Knowles	PhD December 2012. “ <i>Interpreting physical and chemical biosignatures in basalt.</i> ” Postdoctoral Scientist at the Jet Propulsion Laboratory; now Instructor at Johnson & Wales University.
Hannah Miller	PhD May 2017. “ <i>Low temperature hydrogen production and habitability of a hyperalkaline serpentinite aquifer in the Samail ophiolite.</i> ” Now postdoctoral Scientist at Colorado State University.
Graham Lau	PhD August 2017. “ <i>Modern and ancient cold spring sulfur deposits in the High Arctic.</i> ” Now Communications Director, Blue Marble Space Institute.
Tyler Kane	M.S. December 2018. “ <i>Mechanisms of uranium immobilization during in-situ phosphate injections.</i> ” Now Research Scientist U.S. Geological Survey.
Daniel Nothhaft	PhD December 2020. “ <i>Subsurface Microbial Ecosystems and the Origin of Methane in Serpentinites of the Samail Ophiolite, Oman.</i> ” Now a postdoctoral scientist at University of Pennsylvania.
Kaitlin Rempfert	PhD May 2021. “ <i>Influence of Geology and Geochemistry on Microbial Dynamics and Associated Lipid Biosignatures in a Subsurface, Serpentinite-Hosted Ecosystem.</i> ” Now a postdoctoral scientist at EMSL.
Ellie Hara	PhD December 2023. “ <i>Cyanide dynamics in serpentinizing systems: implications for prebiotic chemistry.</i> ”
Tristan Caro	PhD candidate (current)
Harpreet Batther	PhD candidate (current)
Harry Brodsky	PhD candidate (current)

### **Undergraduate Advisor (\*and co-author for peer-reviewed papers)**

Daniel Eldridge	GEOL honors thesis advisee. Graduated Summa Cum Laude, May 2009.
Ryan Nell*	GEOL mentor program and research assistant.
Rachael Hoover	GEOL UROP advisee and research assistant.
Graham Lau*	GEOL UROP advisee and research assistant.
Eric Ellison*	GEOL mentor program and research assistant.
Michael Leitshuh	GEOL geochemistry research assistant.
Julia Dziennik	GEOL/ENVS UROP advisee and research assistant.
Katherine Ebeling	GEOL honors thesis advisee. Graduated Magna Cum Laude May 2014.
Nabil Chaudhry*	GEOL UROP advisee and research assistant
Christine Nims*	GEOL geochemistry research assistant

Isaac Hinz*	GEOL honors thesis advisee. Graduated Magna Cum Laude May 2018.
Spencer Zeigler*	GEOL petrology and geochemistry research assistant
Josie Marquez	GEOL honors thesis advisee. Graduated Magna Cum Laude May 2021.
Rudy Peterson	GEOL undergraduate research assistant
Dani Buchheister	GEOL undergraduate research assistant
Grant Peterson	GEOL undergrad research assistant
Carson Cucarola	BIOCHEM undergrad research assistant
Luciana Baright	GEOL undergrad research assistant

### ***Undergraduate Learning or Peer Assistant Mentor***

Katherine Anarde (2009)	Amanda Yoshino (2011)
Andrew Parker (2009)	Lauren Terry (2011)
Trevor Mills (2009)	Gordon Bowman (2015)
Rachael Hoover (2010)	Helle Sketjine (2015)
Laura Schafenacker (2010)	

## **SERVICE ACTIVITIES**

### ***Service to National or International Organizations***

<b>2023</b>	U.S. Bureau of Educational and Cultural Affairs Speakers Program
<b>2022-present</b>	Geochemical Society, Board of Directors
<b>2022</b>	Panelist, NASA PSTAR Program
<b>2021-present</b>	NASA Network for Life Detection (NFoLD) Steering Committee
<b>2021-present</b>	Stanford Synchrotron Radiation Lightsource Review Committee
<b>2021</b>	Panelist, NASA Exobiology Program
<b>2019-2021</b>	Geochemical Society, Endowed Biogeochemistry Lecture Selection Committee
<b>2018-2021</b>	Guest Editor, Journal of Geophysical Research - Biogeosciences
<b>2016-2017</b>	Europa Lander Science Definition Team
<b>2015-2020</b>	ICDP Oman Drilling Project Steering Committee & Lead for Biogeosciences
<b>2015-2020</b>	NASA Astrobiology Institute Executive Council
<b>2015-2020</b>	NASA Serpentinizing Systems Science Working Group Lead
<b>2013-2016</b>	Stanford Synchrotron Radiation Lightsource Proposal Review Committee
<b>2013-2016</b>	Geochemical Society, Patterson Award Committee (Chair & Member)
<b>2013</b>	Participant, NSF Workshop to evaluate the field of "Microbial Geochemistry"
<b>2012-2020</b>	ICDP Oman Drilling Project participant and proponent
<b>2012-2013</b>	Goldschmidt 2013 International Conference Theme co-organizer
<b>2011-2018</b>	Review Editor, <i>Frontiers in Microbiology: Microbial Chemistry</i> .
<b>2011</b>	Program Committee "Geochemistry of the Earth's Surface 9" Intl. Conference
<b>2011</b>	Panelist, NASA Exobiology and Evolutionary Biology Program
<b>2010</b>	Co-convenor "Sulfur Biogeochemistry Past and Present", Goldschmidt 2010
<b>2009</b>	Department of Energy: Environmental Remediation Sciences Program Strategic Planning workshop in "Subsurface Complex System Science"
<b>2009-2014</b>	Editorial Board & ad-hoc Subject Editor: <i>Geobiology Journal</i>
<b>2006</b>	Panelist, NSF-EAR Low-Temperature Geochemistry and Geobiology
<b>2006</b>	IODP strategic workshop participant "Exploring Subseafloor Life"
<b>2005-2009</b>	Member: NSF Seamount Biogeosciences Research Coordination Network
<b>2005-present</b>	Funding proposal reviews: <i>DOE Basic Energy Sciences; NASA Exobiology and Evolutionary Biology; NSF Low-Temperature Geochemistry and Geobiology, NSF Instrumentation and Facilities; American Chemical Society Petroleum Research Fund, Louisiana Board of Regents.</i>
<b>2005-present</b>	Stanford Synchrotron Radiation Lightsource proposal reviews.
<b>2005-present</b>	Manuscript reviews: <i>Geochimica et Cosmochimica Acta, Science, Frontiers In, Applied &amp; Environmental Microbiology, Geobiology Journal, Environmental Science &amp; Technology, American Mineralogist, Geomicrobiology Journal, Chemical Geology, Water Resources, Reviews in Environmental Science &amp; Biotechnology, Journal of Geophysical Research – Biogeosciences, Elements Magazine. Nature Geoscience, Geology.</i>
<b>Affiliations</b>	<i>Geochemical Society, Mineralogical Society of America</i>

## ***Service to the University of Colorado***

<b>2023</b>	Lucas. J. Kimes Postdoctoral Fellowship Committee, Geological Sciences
<b>2023</b>	Graduate admissions Committee, Geological Sciences
<b>2022-present</b>	Salary Equity and Grievance Committee, Geological Sciences
<b>2022-present</b>	Undergraduate Curriculum Committee, Geological Sciences
<b>2020-present</b>	Chair, Space and Analytical Facilities Committee, Geological Sciences
<b>2017-2019</b>	Associate Chair for Graduate Studies, Department of Geological Sciences
<b>2017-2019</b>	University of Colorado Academic Futures Visioning Committee
<b>2017-2019</b>	Executive Committee, Department of Geological Sciences
<b>2016-2017</b>	CU Nanomaterials Electron Microscopy Faculty advisory board
<b>2016-2017</b>	Center for Water, Environment, and Science Center Executive Council.
<b>2015-2017</b>	Chair, Analytical Facilities and Space Committee, Geological Sciences
<b>2015-6</b>	Chair, Geobiology Faculty Search Committee, Geological Sciences
<b>2014-2021</b>	Member, BioFrontiers Task Force
<b>2014</b>	Environmental Sciences Curriculum Committee, School of the Environment
<b>2014</b>	Core Curriculum Committee, Dean of Arts and Sciences
<b>2013-4</b>	Member, Organic Geochemistry Search Committee
<b>2008-present</b>	Packard Fellowship Selection Committee, Vice Chancellor for Research
<b>2009-2018</b>	Space & Analytical Facilities Committee, Geological Sciences (Chair & Member)
<b>2010-2013</b>	Undergraduate Peer Learning Assistant Coordinator, Geological Sciences
<b>2010</b>	Science Education Initiative Postdoctoral Review Committee
<b>2005-6; 2007-8</b>	Departmental Admissions Committee, Geological Sciences
<b>2006-7</b>	Undergraduate Curriculum Committee, Geological Sciences
<b>2006</b>	SEI Postdoctoral Interview Committee
<b>2006</b>	Biology Committee, Henderson Underground Science and Engineering Project
<b>2006-present</b>	Faculty Member, Center for Astrobiology