

## Curriculum Vitae

### ANDREW D. CZAJA

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### Professional Appointments

- 2018–present **Associate Professor**, Paleobiology, Biogeochemistry, and Astrobiology.  
University of Cincinnati, Dept. of Geology
- 2012–2018 **Assistant Professor**, Paleobiology, Biogeochemistry, and Astrobiology.  
University of Cincinnati, Dept. of Geology
- 2008–2012 **Postdoctoral Research Associate**, Geochemistry, Isotope Geochemistry,  
Astrobiology. University of Wisconsin, Madison, Dept. of Geoscience.
- 2007 **Lecturer**, University of California, Los Angeles, Dept. of Earth & Space Sciences
- 2006–2007 **Lecturer**, California State University, Fullerton, Dept. of Geological Sciences

### Education

- Ph.D., University of California, Los Angeles, 2006, Geology (concentration: Paleobiology)  
Thesis title: *Characterization of the geochemical alteration of permineralized fossil plants based on macromolecular structure and composition*
- B.S., University of Connecticut, 1998, Environmental Sciences and Biological Sciences  
Summa cum laude, Honors Scholar  
Honors thesis title: *Effects of debris-avalanches on surrounding Betula cordifolia in Franconia Notch State Park, New Hampshire*

### RESEARCH

#### Research Interests

I want to know how life originated on Earth, how it evolved, and whether or not life exists elsewhere in the universe. I study Precambrian microfossils with emphasis on those of the Archean and terrestrial/lacustrine and deep marine paleoenvironments. I study the possibility of extraterrestrial life through the search for geochemical and morphological signatures of past terrestrial life and apply this knowledge to search for past extraterrestrial life on Mars with the Mars 2020 mission. I am also interested in the evolution of Earth's surface conditions, particularly the transition from anoxic to oxic conditions at the Neoproterozoic–Proterozoic boundary. Finally, I am interested in understanding the processes of fossilization. I approach this topic through studies of geochemical alteration of organic matter and inorganic aspects of such fossilization (e.g., permineralization), as well as geochemical, isotopic, and taphonomic studies of ancient sediments and stromatolites to understand their genesis and evidence of past life preserved within.

#### Current Projects

- Searching for oxidizing oases in the Paleoproterozoic Moodies Group, Barberton Greenstone Belt, South Africa through elemental, organic, and isotope geochemistry (Brianna Orrill's NASA-funded Ph.D. project with Mike Tice of Texas A&M University)
- Searching for evidence of ancient life in Jezero crater on Mars with the Mars 2020 mission (Mars 2020 Returned Sample Science Participating Scientist)

- Study of the microbial composition and diversity in microbialites from a 2.5-billion-year-old carbonate platform from the Kaapvaal craton of South Africa (Andrea Corpolongo's NSF-funded Ph.D. project with collaborator Nicolas Beukes, U. of Johannesburg)
- Thermal alteration of ancient sedimentary rocks as measured by Raman spectroscopy in various lithologies (Sam Hall's Ph.D. project with collaborators from Canada, South Africa, Australia, and UW-Madison)
- Thermal alteration of ancient sedimentary rocks as measured by Raman spectroscopy in various lithologies (Part of Sam Hall's Ph.D. project with several colleagues from UW, Madison)
- Carbon and sulfur isotope compositions and ecological interpretations of 2.5-billion-year-old coccoidal microfossils from the Kaapvaal Craton, South Africa (with Jeff Osterhout of UCLA; Dr. Ken Williford of JPL; and Prof. John Valley of UW, Madison)

## Publications

### *Peer-reviewed articles (\* indicates a student led paper)*

Bosak T, Shuster DL, Scheller E, Siljeström S, Zawaski M, Mandon L, Simon JI, Weiss BP, Stack KM, Mansbach EN, Treiman A, Benison K, Brown A, **Czaja AD**, Farley K, Hausrath EM, Herd CDK, Johnson J, Mayhew LE, Minitti ME, Williford K, Wogslund BV, Zorzano MP, Hurowitz J, Hand K, Allwood A, Amundsen HEF, Bell J, Benzerara K, Beyssac O, Cable M, Calef F, Caravaca G, Calef FJ III, Catling D, Clavé E, Cloutis E, Cohen BA, Cousin A, Flannery D, Forni O, Fouchet T, Gibbons E, Gómez F, Gupta S, Hickman-Lewis K, Kalucha H, Lopes-Reyes G, Maki J, Maurice S, Randazzo N, Rice J, Sephton M, Sharma S, Steele A, Tate C, Uckert K, Udry A, and Wiens R. (*accepted*) Astrobiological potential of rocks acquired by the Perseverance rover at a sedimentary fan front in Jezero crater, Mars. *AGU Advances*

Phua YY, Ehlmann BL, Siljeström S, **Czaja AD**, Beck P, Connell S, Wiens RC, Jakubek RS, Williams RME, Zorzano M-P, Minitti ME, Pascuzzo AC, Hand KP, Bhartia R, Kah LC, Mandon L, Razzell Hollis J, Scheller EL, Sharma S, Steele A, Uckert K, Williford KH, and Yanchilina AG (*accepted*) Characterizing hydration carrier phases in altered rocks of Jezero Crater fan and floor geologic units with SHERLOC on Mars 2020 *Journal of Geophysical Research: Planets*

Zorzano M-P, Martínez G, Polkko J, Tamppari LK, Newman C, Savijärvi H, Goreva Y, Viúdez-Moreiras D, Bertrand T, Smith M, Hausrath EM, Siljeström S, Benison K, Bosak T, **Czaja AD**, Debaille V, Herd CDK, Mayhew L, Sephton MA, Shuster D, Simon JI, Weiss B, Randazzo N, Mandon L, Brown A, Hecht MH, and Martínez-Frías J. (2024) Present-day thermal and water activity environment of the Mars Sample Return collection. *Scientific Reports* 14, 7175. <https://doi.org/10.1038/s41598-024-57458-4>

Benison, K. C., Gill, K. K., Sharma, S., Siljeström, S., Zawaski, M., Bosak, T., Broz A, Clark BC, Cloutis E, **Czaja AD**, Flannery D, Fornaro T, Gómez F, Hand K, Herd CDK, Johnson JR, Madariaga JM, Madsen MB, Martinez-Frías J, Nachon M, Núñez JI, Pedersen DAK, Randazzo N, Shuster DL, Simon J, Steele A, Tate C, Treiman A, Uckert K, Williams AJ, and Yanchilina A. (2024) Depositional and diagenetic sulfates of Hogwallow Flats and Yori Pass, Jezero crater: Evaluating preservation potential of environmental indicators and possible biosignatures from past Martian surface waters and groundwaters. *Journal of Geophysical Research: Planets*, 129 (2), e2023JE008155. <https://doi.org/10.1029/2023JE008155>

- Jakubek RS, Bhartia R, Uckert K, Asher SA, **Czaja AD**, Fries MD, Hand K, Haney NC, Razzell Hollis J, Minitti M, Sharma SK, Sharma S, and Siljeström S. (2023) Calibration of Raman Bandwidths on the SHERLOC Deep UV Raman and Fluorescence Instrument aboard the Perseverance Rover. *Applied Spectroscopy*. <https://doi.org/10.1177/00037028231210885>
- #Siljeström S, #**Czaja AD**, \*Corpolongo A, Berger EL, Li AY, Cardarelli E, Abbey W, Asher SA, Beegle LW, Benison KC, Bhartia R, Bleefeld BL, Burton AS, Bykov SV, Clark B, DeFlores L, Ehlmann BL, Fornaro T, Fox A, Gómez F, Hand K, Haney NC, Hickman-Lewis K, Hug WF, Imbeah S, Jakubek RS, Kah LC, Kivrak L, Lee C, Martínez-Frías J, McCubbin FM, Minitti M, Moore K, Morris RV, Núñez JI, Osterhout JT, Phua YY, Randazzo N, Razzell Hollis J, Rodriguez C, Roppel R, Scheller EL, Sephton ME, Sharma SK, Sharma S, Steadman K, Steele A, Tice M, Uckert K, VanBommel S, Williams AJ, Williford KH, Winchell K, Wu M, Yanchilina A, and Zorzano M-P. (2024) Evidence of Sulfate-Rich Fluid Alteration in Jezero Crater Floor, Mars. *Journal of Geophysical Research: Planets* 129 (1), e2023JE007989. <https://doi.org/10.1029/2023JE007989> (#Contributed equally as co-lead authors)
- \*Corpolongo A, Jakubek RS, Abbey W, Asher SA, Baker D, Beegle LW, Berger EL, Bhartia R, Brown AJ, Burton AS, Bykov SV, Cardarelli E, Cloutis EA, Conrad P, **Czaja AD**, DeFlores L, Flannery D, Fornaro T, Fries M, Haney NC, Hickman-Lewis K, Kah L, Lee C, McCubbin FM, Minitti M, Morris RV, Hollis JR, Roppel R, Scheller EL, Sharma S, Shkolyar S, Siljeström S, Steadman K, Steele A, Uckert K, Wogsland BV, and Yanchilina A. (2023) SHERLOC Raman mineral detections of the Mars 2020 Crater Floor Campaign, *Journal of Geophysical Research: Planets* 128 (3), e2022JE007455. <https://doi.org/10.1029/2022JE007455>
- Sharma S, Roppel RD, Murphy AE, Beegle LW, Bhartia R, Steele A, Razzell Hollis J, Siljeström S, McCubbin FM, Asher SA, Abbey WJ, Allwood AC, Berger EL, Bleefeld BL, Burton AS, Bykov SV, Cardarelli EL, Conrad PG, Corpolongo A, **Czaja AD**, DeFlores LP, Edgett K, Farley KA, Fornaro T, Fox AC, Fries MD, Harker D, Hickman-Lewis K, Huggett J, Imbeah S, Jakubek RS, Kah LC, Lee C, Liu Y, Magee A, Minitti M, Moore KR, Pascuzzo A, Sanchez-Vahamonde CR, Scheller EL, Shkolyar S, Stack KM, Steadman K, Tuite M, Uckert K, Werynski A, Wiens RC, Williams AJ, Winchell K, Kennedy MR, and Yanchilina A (2023) Diverse organic-mineral associations in Jezero crater, Mars. *Nature*, 619: 724–732. <https://doi.org/10.1038/s41586-023-06143-z>
- Simon JI, Hickman-Lewis K, Cohen BA, Mayhew LE, Shuster DL, Debaille V, Hausrath EM, Weiss BP, Bosak T, Zorzano M-P, Amundsen HEF, Beegle LW, Bell JF III, Benison KC, Berger EL, Beyssac O, Brown AJ, Calef F, Casademont TM, Clark B, Clavé E, Crumpler L, **Czaja AD**, Fairén AG, Farley KA, Flannery DT, Fornaro T, Forni O, Gómez F, Goreva Y, Gorin A, Hand KP, Hamran S-E, Henneke J, Herd CDK, Horgan BNH, Johnson JR, Joseph J, Kronyak RE, Madariaga JM, Maki JN, Mandon L, McCubbin FM, McLennan SM, Moeller RC, Newman CE, Núñez JI, Pascuzzo AC, Pedersen DA, Poggiali G, Pinet P, Quantin-Nataf C, Rice M, Rice JW Jr., Royer C, Schmidt M, Sephton M, Sharma S, Siljeström S, Stack KM, Steele A, Sun VM, Udry A, VanBommel S, Wadhwa M, Wiens RC, Williams AJ, and Williford KH. (2023) Samples Collected from the Floor of Jezero Crater with the Mars 2020 Perseverance Rover, *Journal of Geophysical Research: Planets* 128, e2022JE007474. <https://doi.org/10.1029/2022JE007474>

- Sun VZ, Hand KP, Stack KM, Farley KA, Simon JI, Newman C, Sharma S, Liu Y, Wiens RC, Williams AJ, Tosca N, Alwmark S, Beyssac O, Brown A, Calef F, Cardarelli EL, Clavé E, Cohen B, Corpolongo A, **Czaja AD**, Del Sesto T, Fairen A, Fornaro T, Fouchet T, Garczynski B, Gupta S, Herd CDK, Hickman-Lewis K, Horgan B, Johnson J, Kinch K, Kizovski T, Kronyak R, Lange R, Mandon L, Milkovich S, Moeller RC, Núñez J, Paar G, Pyrzak G, Quantin-Nataf C, Shuster DL, Siljeström S, Steele A, Tice M, Toupet O, Udry A, Vaughan A, and Wogsland B. (2023) Overview and Results from the Mars 2020 Perseverance Rover's First Science Campaign on the Jezero Crater Floor. *Journal of Geophysical Research: Planets* 128, e2022JE007613. <https://doi.org/10.1029/2022JE007613>
- Tingle KE, Porter SM, Raven MR, **Czaja AD**, Webb SM, and Bloeser B (2023) Organic preservation of vase-shaped microfossils from the late Tonian Chuar Group, Grand Canyon, Arizona, USA. *Geobiology*, 00, 1–20. <https://doi.org/10.1111/gbi.12544>
- Lima-Zaloumis J, Neubeck A, Ivarsson M, Bose M, Greenberger R, Templeton AS, **Czaja AD**, Kelemen P, and Edvinsson T (2022) Microbial biosignature preservation in carbonated serpentinite from the Samail Ophiolite, Oman. *Nature Communications Earth and Environment*, 3(231). <https://doi.org/10.1038/s43247-022-00551-1>
- \*Osterhout JT, Schopf JW, Kudryavtsev AB, **Czaja AD**, and Williford KH (2022) Deep-UV Raman spectroscopy of carbonaceous Precambrian microfossils: Insights into the search for past life on Mars. *Astrobiology*, 22(10): 1239-1254. <http://doi.org/10.1089/ast.2021.0135>
- Farley KA, Stack KM, Shuster DL, Horgan BHN, Hurowitz JA, and 110 coauthors (2022) Aqueously altered igneous rocks sampled on the floor of Jezero crater, Mars. *Science*, 377(6614): <http://doi.org/10.1126/science.abo2196>
- Johnson CM, Zheng XY, Djokic T, Van Kranendonk MJ, **Czaja AD**, Roden EE, and Beard BL (2022) Early Archean biogeochemical iron cycling and nutrient availability: New insights from a 3.5 Ga land-sea transition, *Earth-Science Reviews*, 228: 103992. <https://doi.org/10.1016/j.earscirev.2022.103992>.
- Hackley PC, Kus J, Mendonça Filho JG, **Czaja AD**, Borrego AG, Životić D, Valentine BJ, and Hatcherian JJ (2022) Characterization of bituminite in Kimmeridge Clay by confocal laser scanning and atomic force microscopy. *International Journal of Coal Geology*, 251: 103927. <https://doi.org/10.1016/j.coal.2022.103927>.
- Riedman LA, Porter SM, and **Czaja AD** (2021) Phosphatic scales in vase shaped microfossil assemblages from Death Valley, Grand Canyon, Tasmania and Svalbard. *Geobiology*. <https://doi.org/10.1111/gbi.12439>
- \*Gangidine A, Walter MR, Havig JR, Jones C, Sturmer DM, and **Czaja AD**. (2021) Trace elements in ancient microfossils as a biosignature for Earth and Mars. *Life*, 11(2): 142. <https://doi.org/10.3390/life11020142>
- Gan T, Luo T, Pang K, Zhou C, Zhou G, Wan B, Li G, Yi Q, **Czaja AD**, and Xiao S. (2021) Cryptic terrestrial fungus-like fossils of the early Ediacaran Period. *Nature Communications*, 12: Article number 641. <https://doi.org/10.1038/s41467-021-20975-1>
- Hegna TA, **Czaja AD**, and Rogers DC (2020) Raman spectroscopic analysis of the composition of the clam-shrimp carapace (Branchiopoda: Laevicaudata, Spinicaudata, Cyclestherida): a

- dual calcium phosphate–calcium carbonate composition. *Journal of Crustacean Biology* 1–5. <http://doi.org/10.1093/jcbiol/ruaa078>
- Peng X, Guo Z, Du M, **Czaja AD**, Papineau D, Chen S, Xu H, Li J, Ta K, Bai S, and Dasgupta S (2020) Past endolithic life in metamorphic ocean crust. *Geochemical Perspective Letters* 14, 14–19 <http://doi.org/10.7185/geochemlet.2017>
- Smith AJB, Beukes NJ, Gutzmer J, Johnson CM, **Czaja AD**, Nhleko N, de Beer F, Hoffman JW, and Awramik SM (2020) Life on a Mesoarchean marine shelf – insights from the world’s oldest known granular iron formation. *Scientific Reports*, 10, 10519. <https://doi.org/10.1038/s41598-020-66805-0>
- \*Gangidine A, Havig JR, Hannon JS, and **Czaja AD** (2020) Silica precipitation in a wet-dry cycling hot spring simulation chamber. *Life*, 10(3), <http://doi.org/10.3390/life10010003>
- \*Gangidine A, Havig JR, Fike DA, Jones C, Hamilton TL, and **Czaja AD** (2020) Trace element concentrations in hydrothermal silica deposits as a potential biosignature. *Astrobiology*, 20(3): 1–12. <http://doi.org/10.1089/ast.2018.1994>
- \*Osterhout JT, **Czaja AD**, Fralick PW, and Bartley JK (2019) Preservation of carbon isotopes in kerogen from thermally altered Mesoproterozoic lacustrine microbialites. *Canadian Journal of Earth Sciences*, 56: 1017–1026, <https://doi.org/10.1139/cjes-2018-0309>
- Manning-Berg AR, Wood RS, Williford KH, **Czaja AD**, and Kah LC (2019) The taphonomy of Proterozoic microbial mats and implications for early diagenetic silicification, *Geosciences*, 9, 40, <https://doi.org/10.3390/geosciences9010040>
- Beatty DW, et al. (70 co-authors) (2019), The potential science and engineering value of samples delivered to Earth by Mars sample return, *Meteoritics & Planetary Science*, 54(S1): S3–S152, <https://doi.org/10.1111/maps.13242>
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- Muscante AD, **Czaja AD**, Tuggle J, Winkler C, and Xiao S (2018) Manganese oxides resembling microbial fabrics and their implications for recognizing inorganically preserved microfossils. *Astrobiology*, 18(3): 249–258. <https://doi.org/10.1089/ast.2017.1699>
- Guo Z, Peng X., **Czaja AD**, Chen S, and Ta K (2018) Cellular taphonomy of well-preserved Gaoyuzhuang microfossils: a window into the preservation of ancient cyanobacteria. *Precambrian Research*, 304: 88–98. <https://doi.org/10.1016/j.precamres.2017.11.007>
- \*Vrazo MB, Diefendorf AF, Crowley BE, and **Czaja AD** (2018) Late Cretaceous marine arthropods relied on terrestrial organic matter as a food source: geochemical evidence from the Coon Creek lagerstätte in the Mississippian embayment. *Geobiology*, 16: 160–178. <https://doi.org/10.1111/gbi.12270>
- Kang J, **Czaja AD**, and Gulians VV (2017) Carbon dioxide as feedstock in selective oxidation of propane. *European Journal of Inorganic Chemistry*, 2017(40): 4757–4762. <https://doi.org/10.1002/ejic.201701049>
- Smith AJB, Beukes NJ, Gutzmer J, **Czaja AD**, Johnson CM, and Nhleko N (2017) Oncoidal granular iron formation in the Mesoarchean Pongola Supergroup, southern Africa: Textural



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- d'Abzac F-X, **Czaja AD**, Beard, BL, Schauer JJ, and Johnson CM (2014) Iron distribution in size-resolved aerosols generated by UV-femtosecond laser ablation: Influence of cell geometry and implications for *in situ* isotopic determination by LA-MC-ICP-MS. *Geostandards and Geoanalytical Research*, 38(3): 293–309.
- Wilmeth DT, Dornbos SQ, Isbell JL, and **Czaja AD** (2014) Putative domal microbial structures in fluvial siliciclastic facies of the Mesoproterozoic (1.09 Ga) Copper Harbor Conglomerate, Upper Peninsula of Michigan, USA. *Geobiology*, 12: 99–108. <https://doi.org/10.1111/gbi.12071>
- d'Abzac F-X, Beard BL, **Czaja AD**, Konishi H, Schauer J, and Johnson CM (2013) Iron isotope composition of particles produced by UV-femtosecond laser ablation of natural oxides, sulfides, and carbonates. *Analytical Chemistry*, 85: 11885–11892.
- Li W, **Czaja AD**, Van Kranendonk MJ, Beard BL, Roden EE, and Johnson CM (2013) An anoxic, Fe(II)-rich, U-poor ocean 3.46 billion years ago. *Geochimica et Cosmochimica Acta*, 120: 65–79.
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- Jones CS, Cardon ZG, and **Czaja AD** (2003) A phylogenetic view of low level CAM in *Pelargonium* (Geraniaceae). *American Journal of Botany*, 90: 135–142.
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Manuscripts in revision

Hausrath EM, Sullivan R, Goreva Y, Zorzano M-P, Vaughan A, Cousin A, Siljeström S, Sharma S, Shumway A, Kizovski T, VanBommel S, Tice M, Knight A, Martinez G, Vicente-Retortillo A, Mandon L, Adcock CT, Madariaga JM, Población I, Johnson JR, Lasue J, Gasnault O, Randazzo N, Cardarelli EL, Kronyak R, Bechtold A, Paar G, Udry A, Forni O, Bedford CC, Carman NA, Bell JF III, Benison K, Bosak T, Brown A, Broz A, Calef F, Clark BC, Cloutis E, **Czaja AD**, Fornaro T, Fouchet T, Golombek M, Gómez F, Herd CDK, Herkenhoff K, Jakubek RS, Jandura L, Martinez-Frias J, Mayhew LE, Meslin P-Y, Newman CE, Núñez JI, Poulet F, Royer C, Russell P, Sephton MA, Sharma SK, Shuster D, Simon JI, Tirona I, Wiens RC, Weiss BP, Williams AJ, Williford K, Wolf ZU, and the Regolith Working Group (*in revision*) Collection and in situ analyses of regolith samples by the Mars 2020 rover: Implications for their formation and alteration history. *Journal of Geophysical Research: Planets*.

Manuscripts in preparation (\* indicates a student led paper)

- \*Corpolongo A, **Czaja AD**, †George A, and †Kohl J (in prep) Morphological reconstruction and Raman analysis of fenestrate microbialites provide insight into a Neoproterozoic microbial ecosystem. For submission to *Geobiology*.
- \*Corpolongo A, **Czaja AD**, and Jakubek R (in prep) Morphological and geochemical analyses of Neoproterozoic carbonate microbialites inform the search for evidence of ancient life on Mars. For submission to *Icarus*.

\*Corpolongo A and **Czaja AD** (in prep) Neoproterozoic microfossils provide evidence for pre-GOE microbial sulfur-cycling and a deep marine microoxic/euxinic interface. For submission to *Geobiology*.

Czaja AD, Corpolongo AD, Hall SF, and Golland C (in prep) Coccolith microfossils from Neoproterozoic Gamohaan Formation, Transvaal Supergroup, South Africa: Their morphology and significance. For publication in *Precambrian Research*.

Osterhout JT, Czaja AD, Williford KH, Kitajima K, and Valley J (in prep) Carbon and sulfur isotopes of microfossils and pyrites from Neoproterozoic cherts: Microbial diversity in a deep marine environment preceding the Great Oxidation Event. For publication in *Geochimica et Cosmochimica Acta*

#### Peer-reviewed book chapters/encyclopedia entries

Muscante AD, **Czaja AD**, Riedman LA, and Colleary C (2017) Organic Matter in Fossils. In *Encyclopedia of Geochemistry*, White WM, Ed. Springer International Publishing.

Schopf JW, Kudryavtsev AB, Tripathi AB, and **Czaja AD** (2011) Three-dimensional morphological (CLSM) and chemical (Raman) imagery of permineralized fossils, in *Taphonomy: Process and Bias Through Time*, 2<sup>nd</sup> edition, PA Allison and DJ Bottjer, Eds., Springer, New York.

#### Invited papers

**Czaja AD** (2010) Microbes and the rise of oxygen. *Nature Geoscience*, 3: 522–523.

#### Book reviews

**Czaja AD** (2010) Astrobiology of Earth: The Emergence, Evolution, and Future of Life on a Planet in Turmoil, by Joseph Gale. *Quarterly Review of Biology*, 85(1): 88.

#### Professional reports

**Czaja AD**, Zorzano M-P, Kminek G, Meyer MA, Beaty DW, Sefton-Nash E, Carrier BL, Thiessen F, Haltigin T, Bouvier A, Dauphas N, French KL, Hallis LJ, Harris RL, Hauber E, Rodriguez LE, Schwenzer SP, Steele A, Tait KT, Thorpe MT, Usui T, Vanhomwegen J, Velbel MA, Edwin S, Farley KA, Glavin DP, Harrington AD, Hays LE, Hutzler A, and Wadhwa M: Members of the Mars Sample Return Campaign Science Group (MCSG) Team (2023) Report of the Science Community Workshop on the Proposed First Sample Depot for the Mars Sample Return Campaign. *Meteoritics and Planetary Science*. <https://doi.org/10.1111/maps.13981>.

Farley KA and Stack KM. (2023) Mars 2020 Initial Reports – Volume 2, Delta Front Campaign. [https://pds-geosciences.wustl.edu/missions/mars2020/Mars 2020 Initial Reports Volume 2 Release 2.pdf](https://pds-geosciences.wustl.edu/missions/mars2020/Mars%2020%20Initial%20Reports%20Volume%202%20Release%202.pdf) [I contributed data analyses and produced figures and text for 11 reports in 2023, which are the primary data products for the samples collected by the Mars 2020 mission.]

Farley KA and Stack KM. (2022) Mars 2020 Initial Reports - Crater Floor Campaign. [https://pds-geosciences.wustl.edu/missions/mars2020/Mars 2020 Initial Reports 1-10 October 2022.pdf](https://pds-geosciences.wustl.edu/missions/mars2020/Mars%2020%20Initial%20Reports%201-10%20October%202022.pdf) [I contributed data analyses and produced figures and text for 10 reports in 2022, which are the primary data products for the samples collected by the Mars 2020 mission.]



## Professional Presentations

### Invited Talks

- 2024 “Earth’s ancient biosphere: An analogue for life in the universe,” University of Texas, Austin, Jackson School of Geosciences, Center for Planetary Systems Habitability colloquium series
- 2023 “Perseverance’s first two years on Mars, and the search for ancient martian life,” University of California, Santa Cruz, Department of Earth & Planetary Sciences colloquium series
- 2022 “Perseverance’s first year on Mars, and the search for ancient martian life,” Miami University, Department of Geology & Environmental Earth Science speaker series
- 2022 “Perseverance’s first year on Mars,” University of Cincinnati, Department of Geology colloquium series
- 2021 “Earth’s Ancient Biosphere: An Analogue For Life In the Universe,” Purdue University, Department of Earth and Planetary Sciences colloquium series
- 2019 “Earth’s ancient biosphere: A paleontological and biogeochemical perspective,” Southern Illinois University, Department of Geology colloquium series
- 2019 “Searching for ancient life on Earth and other planets,” Institute of Deep Sea Science and Engineering, Chinese Academy of Sciences, Sanya, China
- 2019 “Searching for ancient life on Earth and other planets,” Nanjing University, School of Earth Sciences and Engineering, Nanjing, China
- 2018 “Discovering the Mars 2020 Rover”, University of Cincinnati, Alumni Weekend, *Explore UC* program
- 2017 “Geological fieldwork on another world: plans for Mars sample return and the search for extraterrestrial life”, University of Cincinnati, Undergraduate Astronomy Club meeting
- 2017 “Selecting a field work site from 50 million kilometers away: the landing site selection process for the Mars 2020 mission”, University of Cincinnati, Department of Geography Colloquium Series
- 2017 “Mission to Mars: the landing site selection process for the Mars 2020 mission”, University of Cincinnati, College of Arts & Sciences, Dean’s Advisory Board Meeting
- 2017 “Micron-scale organic geochemical and fluorescence imaging of Earth's most ancient life”, University of Cincinnati School of Design, Art, Architecture, and Planning, Architecture colloquium
- 2017 “Sulfur oxidation, biodiversity, and oxygenation in the Archean”, Harvard University, Department of Earth and Planetary Sciences, Geobiology Seminar
- 2016 “Life in the Archean: Increasing the diversity”, Ohio University, Department of Geological Sciences colloquium
- 2016 “Life in the Archean: Increasing the diversity”, Kent State University, Department of Geology, Palmer Lecture Series
- 2015 “Life in the Archean: Increasing the diversity”, University of South Florida, School of Geosciences colloquium
- 2014 “Possible large planktonic fossil microbes preserved in Neoproterozoic deep water sediments”, Virginia Tech, Department of Geosciences colloquium

- 2013 “Geochemical and paleontological evidence for photosynthesis on the early Earth”, Marine Biological Laboratory (MBL) Microbial Diversity Summer Course
- 2013 “Micron-scale organic geochemical and morphological analyses of Earth's ancient biosphere”, Univ. of Cincinnati, School of Energy, Environment, Biological and Medical Engineering
- 2011 “Evidence for significant free oxygen in the ocean prior to the Paleoproterozoic Great Oxidation Event”, University of Illinois, Chicago, Department of Earth and Environmental Sciences colloquium
- 2011 “Evidence for significant free oxygen in the ocean prior to the ~2.4 Ga Great Oxidation Event”, University of Wisconsin, Madison, Department of Geoscience Weeks Lecture
- 2009 “Iron and carbon isotope evidence for ecosystem and environmental diversity in the ~2.7 to 2.5 Ga Hamersley Province, Western Australia”, University of Wisconsin, Milwaukee, Department of Geosciences colloquium
- 2006 “Understanding the paleobiological afterlife: a modern approach to an ancient problem”, California Institute of Technology, Division of Geological and Planetary Sciences Geology Club colloquium
- 2006 “Understanding the paleobiological afterlife: a spectroscopic comparison of modern and permineralized plant axes”, Carnegie Institute of Washington, Washington, DC, Geophysical Laboratory
- 2004 “Illuminating the black box that is fossil kerogen”, NASA Astrobiology Institute, Forum for Astrobiological Research seminar series

*First-author oral presentations at conferences*

- 2023 **Czaja AD**, Herd CDK, Bosak T, Farley KA, Stack KM, Benison KC, Brown AJ, Cohen BA, Debaille V, Goreva Y, Hausrath EM, Hickman-Lewis K, Mansbach EN, Mayhew LE, Núñez JI, Osterhout JT, Randazzo N, Sephton MA, Shuster DL, Siljeström S, Simon JI, Wadhwa M, Weiss BP, and Zorzano M-P. Sampling Mars with NASA’s Perseverance Rover to Search for Ancient Life. Origins 2023, Quito, Ecuador
- 2022 **Czaja AD**, Sharma S, Allwood A, Benison KC, Corpolongo A, Gómez F, Mahew LE, Sephton M, Siljeström S, Williams A. Sampling potential biosignatures with the Mars 2020 Perseverance rover. *Geological Society of America Abstracts with Programs*. Vol. 54, No. 4 <http://doi.org/10.1130/abs/2022NC-375223>
- 2021 **Czaja AD**, Benison KC, Bosak T, Cohen BA, Hausrath EM, Hickman-Lewis K, Mahew LE, Shuster DL, Siljeström S, Simon JI, Weiss BP. Samples and notional caches from Jezero crater and beyond for Mars Sample Return. *Geological Society of America Abstracts with Programs*. Vol 53, No. 6, <https://doi.org/10.1130/abs/2021AM-367976>
- 2019 **Czaja AD**. Variable morphological and geochemical preservation of Neoproterozoic organic-walled microfossils: Implications for biosignature detection on Mars and in returned samples. NASA Astrobiology Science Conference, Seattle, WA.
- 2018 **Czaja AD**, Gangidine A, Lorber KN, and Osterhout JT. Diagenesis of organic microfossils and their mineral matrices: Implications for biosignature preservation on Earth and Mars. American Geophysical Union Fall Meeting, Washington, DC. (**Invited**)

- 2018 **Czaja AD.** Searching for signs of life: Morphological and geochemical biosignatures on Earth (and Mars?). Gordon Research Conference on Geobiology, Galveston, TX. **(Invited)**
- 2016 **Czaja AD** and Riedman LA. Mineralogical control on apparent thermal alteration of ancient organic matter as measured by Raman spectroscopy. Geological Society of America Annual Meeting, Denver, CO. *Abstracts with Programs*, Vol. 48, 7.
- 2015 **Czaja AD**, Osterhout JT, and Beukes NJ. Exceptionally large Neoproterozoic spheroidal microfossils from South Africa: possible contributors to the GOE. Geological Society of America Annual Meeting, Baltimore, MD. *Abstracts with Programs*. Vol. 47, No. 7.
- 2014 **Czaja AD**, and Lorber KN. *In situ* Raman spectroscopy and confocal microscopy of 2.5 billion-year-old fossil microorganisms: viable nondestructive techniques for the study of returned Martian samples. American Geophysical Union Fall Meeting, San Francisco, CA. **(Invited)**
- 2013 **Czaja AD**, Johnson CM, Beard BL, Roden EE, Li W, and Moorbath S. Anoxygenic photosynthesis recorded in 3.8 Ga BIFs of the Isua Supracrustal Belt. NASA Astrobiology Institute Early Earth Focus Group, Workshop without Walls.
- 2012 **Czaja AD**, Johnson CM, Beard BL, and Moorbath S. Early Archean Fe oxidation revealed by meso- and micron-scale Fe isotope analyses of the 3.7–3.8 Ga Isua BIFs. *Mineralogical Magazine*, 76(6): 1612. Abstracts of the 22<sup>nd</sup> Annual V.M. Goldschmidt Conference Montreal, Quebec Canada.
- 2012 **Czaja AD**, Johnson CM, and Beard BL. Meso- and micron-scale Fe isotope analyses of the 3.7–3.8 Ga Isua BIFs reveal Early Archean Fe oxidation. NASA Astrobiology Science Conference, Atlanta, GA.
- 2011 **Czaja AD**, Johnson CM, Roden EE, Beard BL, Voegelin AR, Nägler TF, Beukes NJ, and Wille M. Evidence for free oxygen in the Neoproterozoic ocean based on coupled iron–molybdenum isotope fractionation. American Geophysical Union Fall Meeting, San Francisco, CA.
- 2011 **Czaja AD**, Johnson CM, Roden EE, Beard BL, Voegelin AR, Nägler TF, Beukes NJ, and Wille M. Evidence for free oxygen in the Neoproterozoic ocean. Gordon Research Conference, Geobiology, Ventura, CA. **(Invited)**
- 2010 **Czaja AD**, Johnson CM, Beard BL, and Van Kranendonk MJ. Iron isotopes reveal an abiogenic origin for a 2.75 Ga BIF from the Yilgarn Craton, Western Australia. *Geochimica et Cosmochimica Acta*, 74 (12, S1): A201. Abstracts of the 20<sup>th</sup> Annual V.M. Goldschmidt Conference Knoxville, TN.
- 2010 **Czaja AD**, Johnson CM, Beard BL, Eigenbrode JL, Freeman KH, and Yamaguchi KE. Iron and carbon isotope evidence for ecosystem and environmental diversity in the ~2.7 to 2.5 Ga Hamersley Province, Western Australia. NASA Astrobiology Science Conference, League City, TX.
- 2009 **Czaja AD**, Johnson CM, Beard BL, Eigenbrode JL, Freeman KH, and Yamaguchi KE. Iron and carbon isotope evidence for ecosystem and environmental diversity in the ~2.7 to 2.5 Ga Hamersley Province, Western Australia. Geological Society of America Annual Meeting, Portland, OR.

- 2008 **Czaja AD**, Kudryavtsev AB, Cody GD, and Schopf JW. Similar fossil ferns having dissimilar organic geochemical preservation, *Geochimica et Cosmochimica Acta*, 72 (12, S1): A193. Abstracts of the 18th Annual Goldschmidt Conference Vancouver, Canada.
- 2007 **Czaja AD**, Kudryavtsev AB, Cody GD, and Schopf JW. Comparison of fossil fern kerogen from two Eocene cherts. Geological Society of America Annual Meeting, Denver, CO.
- 2007 **Czaja AD**, Kudryavtsev AB, Cody GD, and Schopf JW. Fine-scale analysis of permineralized kerogen. 3<sup>rd</sup> Astrobiology Graduate Conference, San Juan, Puerto Rico.
- 2006 **Czaja AD**. Raman spectroscopic analysis of permineralized organic-walled fossils, Eocene to Archean. 3<sup>rd</sup> Annual Southern California Geobiology Symposium, University of California, Riverside. Riverside, CA.
- 2005 **Czaja AD**, Kudryavtsev AB, and Cody GD. Toward a better understanding of the paleontological afterlife: a spectroscopic comparison of modern and permineralized plant axes. Geological Society of America Annual Meeting, Salt Lake City, UT.
- 2005 **Czaja AD**. Fossil organic matter: a better understanding of its history. Astrobiology Graduate Conference, Scripps Institution of Oceanography, La Jolla, CA.
- 2004 **Czaja AD**, Cody GD, Kudryavtsev AB, and Schopf JW. Turning ferns into fossils: biogeochemical alchemy. Geological Society of America Annual Meeting, Denver, CO.

First author poster presentations at conferences

- 2024 **Czaja AD**, Corpolongo A, Orrill B, Dillon E, and Anderson J. Constraining the biogenicity of ancient organic material with collocated Raman and O-PTIR spectroscopy and imaging. Astrobiology Science Conference 2024, Providence, RI.
- 2023 **Czaja AD**, Zorzano M-P, Kminek G, Meyer MA, Beaty DW, Sefton-Nash E, Carrier BL, Thiessen F, Haltigin T, Bouvier A, Dauphas N, French KL, Hallis LJ, Harris RL, Hauber E, Rodriguez LE, Schwenzer SP, Steele A, Tait KT, Thorpe MT, Usui T, Vanhomwegen J, Velbel MA, Edwin S, Farley KA, Glavin DP, Harrington AD, Hays LE, Hutzler A, and Wadhwa M. Outcomes of the science community workshop on the Mars 2020 mission first sample depot for the Mars Sample Return Campaign. 54th Lunar and Planetary Science Conference 2023, The Woodlands, TX, USA (LPI Contrib. No. 2806)
- 2018 **Czaja AD**, Osterhout JT, and Gangidine AJ. Mineralogical control of organic matter thermal alteration: Implications for biosignature preservation in returned martian samples, 2<sup>nd</sup> International Mars Sample Return Conference, Berlin, Germany.
- 2015 **Czaja AD**, Osterhout JT, and Beukes NJ. Fossil evidence of possible contributors to the Great Oxidation Event: Exceptionally large Neoproterozoic microfossils from South Africa. Fourth Annual Midwest Geobiology Symposium, Bloomington, IN.
- 2015 **Czaja AD**, Osterhout JT, and Beukes NJ. Large planktonic microfossils preserved in a deep water facies of the 2.52-Ga-old Gamohaan Formation, South Africa. NASA Astrobiology Science Conference, Chicago, IL.

- 2014 **Czaja AD**, Lorber KN, and Beukes NJ. Filamentous microfossils from the Neoproterozoic Gamohaan Formation of South Africa: Implications for the history of photoautotrophy. Origins2014 Meeting, Nara, Japan.
- 2010 **Czaja AD**, Johnson CM, Beard BL, and Van Kranendonk MJ. Iron isotope evidence for an abiological origin of a BIF from the Yilgarn Craton, Western Australia. 5<sup>th</sup> International Archean Symposium, Perth, WA, Australia.
- 2008 **Czaja AD**, Kudryavtsev AB, Cody GD, and Schopf JW. Geochemical characterization of permineralized kerogen: similar fossils having dissimilar degrees of preservation. NASA Astrobiology Science Conference, San Jose, CA.
- 2006 **Czaja AD** and Kudryavtsev AB. Raman spectroscopic characterization of the thermal history of permineralized fossils. NASA Astrobiology Science Conference, Washington, DC.
- 2006 **Czaja AD**. Spectroscopic analysis of the thermal alteration of permineralized organic matter. *Origins of Life and Evolution of the Biosphere*, 36(3): 311. Abstracts of the 14<sup>th</sup> International Conference on the Origin of Life and 11th International Society for the Study of the Origin of Life (ISSOL) Meeting, Tsinghua University. Beijing, PRC.
- 2005 **Czaja AD**, Kudryavtsev AB, and Cody GD. Raman spectroscopic analysis of the thermal alteration of permineralized organic matter. NASA Astrobiology Institute Conference, University of Colorado at Boulder, Boulder, CO.
- 2004 **Czaja AD**, Cody GD, and Schopf JW. Turning ferns into fossils: biogeochemical alchemy. *International Journal of Astrobiology*, 3(Suppl. S1): 27. Abstracts of the Astrobiology Science Conference, NASA Ames Research Center, Moffett Field, CA
- 2003 **Czaja AD**, Schopf JW, Storrie-Lombardi MC, and Cody GD. Multi-spectra analysis of geochemical alteration through natural and artificial fossilization. NASA Astrobiology Institute Conference, Arizona State University. Tempe, AZ.
- 2002 **Czaja AD**, Schopf JW, Storrie-Lombardi MC, Kudryavtsev AB, and Bhartia R. Laser Raman spectroscopic analysis of chemical changes caused by fossilization. 13<sup>th</sup> International Conference on the Origin of Life and 10<sup>th</sup> International Society for the Study of the Origin of Life (ISSOL) Meeting, Oaxaca, Mexico.
- 2002 **Czaja AD**, Schopf JW, Storrie-Lombardi MC, Kudryavtsev AB, and Bhartia R. Laser Raman spectroscopic analysis of biochemical changes caused by fossilization. Astrobiology Science Conference, NASA Ames Research Center, Moffett Field, CA.

Student presentations at conferences (\* – graduate; † – undergraduate)

- 2024 \*Copolongo A, **Czaja AD**, †George A, and Jakubek R. Comparing relative peak positions in DUV and visible Raman spectra of biogenic calcite, Mg-calcite, and dolomite to support SHERLOC data interpretation. Astrobiology Science Conference 2024, Providence, RI.
- 2024 \*Hall SF and **Czaja AD**. Understanding the thermal maturity and preservation of Neoproterozoic organic microfossils. Astrobiology Science Conference 2024, Providence, RI.



- 2024 \*Orrill BI, **Czaja AD**, Tice M, and Zawaski MJ. Searching for evidence of in situ oxidation in the 3.2 Ga deltaic sediments of the Moodies Group. Astrobiology Science Conference 2024, Providence, RI.
- 2023 \*Corpolongo A, **Czaja AD**, Jakubek R, \*George A, and \*Kohl J. Morphological and Geochemical Analyses of Neoproterozoic Microbialites Inform the Search for Life on Mars. Origins 2023, Quito, Ecuador.
- 2023 †George A, **Czaja AD**, Corpolongo A. Archean paleontology as an analog for possible martian life. University of Cincinnati, Undergraduate Scholarly Showcase. Cincinnati, OH.
- 2023 \*Orrill B, Czaja AD, Tice M, and Zawaski MJ. Biosignatures in 3.2 Ga Deltaic Sediments of the Moodies Group. Origins 2023, Quito, Ecuador.
- 2023 \*Orrill BI, **Czaja AD**, Tice M, and Zawaski MJ. 3.2 Ga biosignatures in deltaic microbial mats of the Moodies Group. Microbialites: Formation, Evolution and Diagenesis (M-FED 2023) conference, Leysin, Switzerland.
- 2022 \*Corpolongo A, Jakubek RS, Abbey W, Asher SA, Baker D, Beegle LW, Berger EL, Bhartia R, Brown AJ, Burton AS, Bykov SV, Cardarelli E, Cloutis EA, Conrad P, **Czaja AD**, DeFlores L, Flannery D, Fornaro T, Fries M, Haney NC, Hickman-Lewis K, Kah L, Lee C, McCubbin FM, Minitti M, Morris RV, Hollis JR, Roppel R, Scheller EL, Sharma S, Shkoylar S, Siljeström S, Steadman K, Steele A, Uckert K, Wogsland BV, and Yanchilina A. SHERLOC Raman Mineral Detections of the Mars 2020 Crater Floor Campaign, American Geophysical Union Conference, Chicago, IL.
- 2022 \*Corpolongo A and **Czaja AD**. Evaluating Neoproterozoic microbial communities through three-dimensional visualization of microbialite structures. Astrobiology Science Conference 2022, Atlanta, GA.
- 2022 \*Corpolongo A and **Czaja AD**. Deep ultraviolet Raman spectroscopy of Neoproterozoic microbialites as analogs to possible Mars 2020 samples. Geological Society of America *Abstracts with Programs*. Vol. 54, No. 4. <http://doi.org/10.1130/abs/2022NC-374826>
- 2022 \*Goland C and **Czaja AD**. Using Raman spectroscopy of ancient kerogen to understand thermal alteration and biosignature preservation. Geological Society of America *Abstracts with Programs*. Vol. 54, No. 4. <http://doi.org/10.1130/abs/2022NC-375464>
- 2022 †Kohl J, \*Corpolongo A, and **Czaja AD**. Using 3D projections to understand Precambrian microbialite morphology. Geological Society of America *Abstracts with Programs*. Vol. 54, No. 4. <http://doi.org/10.1130/abs/2022NC-375599>
- 2022 †Kohl J, **Czaja AD**, \*Corpolongo A, Sturmer D, and Diefendorf A. Sources of silica and carbon in organic-rich cherts from the Neoproterozoic Gamohaan Formation, South Africa. Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 <http://doi.org/10.1130/abs/2022AM-382419>
- 2021 \*Corpolongo A and **Czaja AD**. Neoproterozoic microorganisms took advantage of a sub-wavebase O<sub>2</sub> gradient approximately 100–200 million years prior to the GOE, Geological

Society of America *Abstracts with Programs*. Vol 53, no. 6.

<https://doi.org/10.1130/abs/2021AM-368740>

- 2021 †Jones B, Manning-Berg AR, Roney R, Santamaria J, and **Czaja AD**. Stromatolitic fabrics within chert nodules in the Knox Group of northwest Georgia, Geological Society of America *Abstracts with Programs*. Vol 53, no. 6. <https://doi.org/10.1130/abs/2021AM-371149>
- 2020 \*Corpolongo A and **Czaja AD**. Neoproterozoic microfossils in silicified sub-wavebase microbial mats from the Campbellrand-Malmani Carbonate Platform, South Africa. Geological Society of America Conference, Virtual Meeting.
- 2020 \*Corpolongo A and **Czaja AD**. Sub-tidal microfossils of the 2.5 Ga Campbellrand-Malmani carbonate platform, Kaapvaal Craton, South Africa. AbGradE Virtual Meeting.
- 2020 \*Tingle K, Porter S, and **Czaja AD**. Organic Preservation of Vase-Shaped Microfossils from the Late Tonian Chuar Group, Grand Canyon, AZ. Geological Society of America Conference, Virtual Meeting.
- 2019 \*Corpolongo A and **Czaja AD**. Organic-walled microfossils from basinal to supratidal microbialite facies across the Campbellrand-Malmani carbonate platform, Kaapvaal craton, South Africa. Geological Society of America Conference, Phoenix, AZ.
- 2019 \*Corpolongo A and **Czaja AD**. Extra-large and morphologically unique microfossils of the 2.52 Ga Gamohaan Formation, South Africa. NASA Astrobiology Science Conference, Seattle, WA.
- 2019 \*Gangidine AJ, **Czaja AD**, and Havig JR. A trace element biosignature for life on early Earth and Mars. NASA Astrobiology Science Conference, Seattle, WA.
- 2019 \*Gangidine AJ, Walter M, Havig JR, and **Czaja AD**. Living on the edge: Searching for life in the Jezero crater rim. Impacts and Their Role in the Evolution of Life Conference, Tällberg, Sweden.
- 2018 \*Gangidine AJ, **Czaja AD**, and Havig JR. The preservation of trace elements in hydrothermal deposits. American Geophysical Union Conference, Washington DC, USA.
- 2018 \*Gangidine AJ, **Czaja AD**, and Havig J. Developing a trace element biosignature for early Earth and Mars. 2<sup>nd</sup> International Mars Sample Return Conference, Berlin, Germany.
- 2017 \*Gangidine AJ, **Czaja AD**, and Havig J. A novel trace element biosignature for life on early Earth and Mars. NASA Astrobiology Science Conference, Mesa, AZ.
- 2017 \*Manning-Berg AR, Tuite M, Williford K, **Czaja AD**, and Kah LC. Exceptional preservation of biomarkers in the 1.2 Ga Angmaat Formation chert, Bylot Supergroup, Baffin Island. NASA Astrobiology Science Conference, Mesa, AZ.
- 2017 \*Osterhout JT and **Czaja AD**. Stable isotope geochemistry of a late Archean microbial ecosystem: Diversity in the pre-GOE oceans, Geological Society of America Annual Meeting, Seattle, WA.

- 2017 †Perfetta C, **Czaja AD**, and Lentz D. Contaminated water and the collapse of the ancient Maya: Microbiome analyses of reservoir sediments from Tikal. Undergraduate Research Forum, University of Cincinnati, OH.
- 2016 \*Gangidine AJ, **Czaja AD**, and Havig J. Developing a trace element biosignature in modern and ancient silica deposits – implications for the search for ancient life on Mars. Fifth Annual Midwest Geobiology Symposium, Cincinnati, OH.
- 2016 \*Lorber KN, **Czaja AD**, and Lee P. Variations in Biosignature Preservation: Geochemical Analysis of Kerogen Comparing Two Mars Analog Environments. Biosignature Preservation and Detection in Mars Analog Environments Conference, Lake Tahoe, NV.
- 2016 \*Osterhout JT and **Czaja AD**. Organic geochemistry of a 1.4-billion-year-old evaporitic lake: insights for the Mars 2020 SHERLOC instrument. Biosignature Preservation and Detection in Mars Analog Environments Conference, Lake Tahoe, NV.
- 2016 \*Vrazo MB, Diefendorf AF, Crowley BE, and **Czaja AD**. Late Cretaceous marine arthropods relied on terrestrial organic matter as a food source: geochemical evidence from the Coon Creek lagerstätte in the Mississippian embayment. Geological Society of America Annual Meeting, Denver, CO. *Abstracts with Programs*, 48(7).
- 2015 \*Holbrook C, **Czaja AD**, and Boolchand P. Topological phases in modified oxides, 14th International Conference on the Physics of Non-Crystalline Solids, Niagara Falls, NY.
- 2015 \*Holbrook C, Boolchand P, and **Czaja AD**. Onset of rigidity and thresholds in physical properties of barium-borate glasses, XXIV International Materials Research Congress, Cancun, Mexico.
- 2015 \*Holbrook C, Boolchand P, and **Czaja AD**. Topological phases in Ba-borate glasses. American Physical Society March Meeting, San Antonio, TX.
- 2015 \*Lorber KN, **Czaja AD**, and Beukes NJ. Geochemical analysis of 2.5 billion-year-old microfossils exhibiting varying degrees of preservation. Fourth Annual Midwest Geobiology Symposium, Bloomington, IN.
- 2015 \*Lorber KN, **Czaja AD**, and Beukes NJ. Preservational variations of 2.5 billion-year-old filamentous microfossils from the Gamohaam Formation of South Africa. NASA Astrobiology Science Conference, Chicago, IL.
- 2015 \*Osterhout JT, **Czaja AD**, and Beukes NJ. Isotopic evidence of photoautotrophy in an open marine ecosystem preceding the Great Oxygenation Event. Geological Society of America Annual Meeting, Baltimore, MD. *Abstracts with Programs*. 47(7): 705.
- 2015 \*Osterhout JT, **Czaja AD**, and Fralick, PW. Organic geochemistry of stromatolites in a 1.4 billion-year-old evaporitic lacustrine ecosystem. Fourth Annual Midwest Geobiology Symposium, Bloomington, IN.
- 2015 \*Osterhout JT, **Czaja AD**, and Beukes NJ. Morphological and geochemical diversity of deep water microfossils from the 2.52 Ga-old Gamohaam Formation, South Africa. NASA Astrobiology Science Conference, Chicago, IL.

- 2014 \*Lorber KN, and **Czaja AD**. Investigation of Archean microfossil preservation for defining science objectives for Mars sample return missions. American Geophysical Union Fall Meeting, San Francisco, CA.
- 2014 \*Lorber KN, and **Czaja AD**. Current and future technologies employed in the search for Precambrian fossils with possible implications for astrobiology. Gordon Research Conference on the Origin of Life, Galveston, TX.

*Selected coauthored presentations at conferences*

- 2024 Tice M, Zawaski MJ, Bostick B, **Czaja AD**, Marin-Carbonne J, \*Orrill BI, Shapiro R, Watanabe K. Potential detrital and authigenic paleoredox probes for Paleoarchean oxidative processes in 3.22-gyr-old fluvio-deltaic sandstones, Moodies Group, South Africa. Astrobiology Science Conference 2024, Providence, RI.
- 2023 Benison KC, Bosak T, Clark BC, **Czaja AD**, Fornaro T, Gill KK, Gómez F, Herd CDK, Madsen MB, Martinez-Frias J, Núñez JI, Randazzo N, and Siljeström S. Biosignature potential and possible environmental indicators of sulfate-rich rocks from Hogwallow Flats and Yori Pass, Jezero crater Delta Front, Mars. 54th Lunar and Planetary Science Conference 2023, The Woodlands, TX, USA (LPI Contrib. No. 2806)
- 2023 Connell SA, Wiens RC, Cardarelli EL, Deen R, Mandon L, Sharma S, Beyssac O, Clavé E, Siljeström S, **Czaja AD**, Pilleri P, Gasnault O, Lopez-Reyes G, Johnson JR, Bhartia R, Maurice S, SuperCam and SHERLOC teams. Analysis of co-located SuperCam and SHERLOC observations on abrasion patches in Jezero crater. 54th Lunar and Planetary Science Conference 2023, The Woodlands, TX, USA (LPI Contrib. No. 2806)
- 2023 Fornaro T, Brucato JR, Poggiali G, Alberini A, Garcia Florentino C, Jakubek RS, Fries M, Sharma S, Murphy AE, Coloma L, Aramendia J, Madariaga JM, Steele A, Siljeström S, **Czaja AD**, Bhartia R, Ollila A, Clegg S, Lopez-Reyes G, Manrique JA, Beyssac O, Bernard S, Clavé E, Brown A, and Wiens RC. Laboratory investigations of spectroscopic features for organo-sulfate complexes to support organics identification in the samples analyzed by the Mars 2020 Perseverance rover and inspect the astrobiological relevance of the samples to be returned to Earth. 54th Lunar and Planetary Science Conference 2023, The Woodlands, TX, USA (LPI Contrib. No. 2806)
- 2023 Hausrath EM, Sullivan R, Goreva Y, Zorzano M-P, Cardarelli E, Vaughan A, Cousin A, Siljeström S, Shumway A, VanBommel S, Martinez G, Johnson J, Bechtold A, Paar G, Poulet F, Herd CDK, Benison K, Sephton M, Madariaga JM, Lasue J, Wiens RC, Martinez-Frias J., Bell JF III, **Czaja AD**, Adcock CT, and Randazzo N. The first regolith samples from Mars. 54th Lunar and Planetary Science Conference 2023, The Woodlands, TX, USA (LPI Contrib. No. 2806)
- 2023 Herd CDK, Bosak T, Farley KA, Stack KM, Benison KC, Cohen BA, **Czaja AD**, Debaille V, Goreva Y, Hausrath EM, Hickman-Lewis K, Mansbach EN, Mayhew LE, Sephton MA, Randazzo N, Shuster DL, Siljeström S, Simon JI, Wadhwa M, Weiss BP, and Zorzano M-P, and Brown AJ. Sampling by the NASA Perseverance rover for Mars sample return. 54th Lunar and Planetary Science Conference 2023, The Woodlands, TX, USA (LPI Contrib. No. 2806)

- 2023 Siljeström S, **Czaja AD**, Corpolongo A, Berger EL, Cardarelli E, Bhartia R, Bykov S, Sharma S, Steele A, Conrad P, Roppel R, Jakubek R, Li AY, Scheller E, Razzell Hollis J, Morris RV, Fornaro T, Asher S, Moore K, Liu Y, Randazzo N, Steadman K, Fox A, DeFlores L, Yanchilina A, Abbey W, Lee C, Rodriguez C, Wu M, Winchell K, Imbeah S, Bleefeld B, and Minitti M. Sulfate alteration in the crater floor of Jezero crater, Mars as observed by Mars 2020 SHERLOC and PIXL instruments. 54th Lunar and Planetary Science Conference 2023, The Woodlands, TX, USA (LPI Contrib. No. 2806)
- 2022 Simon JI, Amundsen HEF, Beegle LW, Bell J, Benison KC, Berger EL, Bosak T, Casademont TM, **Czaja AD**, Cohen BA, Debaille V, Fairen AG, Farley KA, Fox AC, Goreva Y, Hand K, Hamran S-E, Hausrath EM, Herd CDK, Horgan B, Hurowitz J, Lee CH, Mandon L, Maurice S, Madariaga JM, Mayhew LE, McLennan S, Moeller RC, Scheller EL, Sharma S, Siljeström S, Sun VZ, Shuster DL, Stack KM, Udry A, VanBommel S, Wadhwa M, Weiss BP, Wiens R, Williams A, Willis PA, Zorzano M-P, and Mars 2020 Team. Collecting Samples from the Máaz Formation of Jezero Crater with the Mars 2020 Perseverance Rover. COSPAR 2022, 44<sup>th</sup> Scientific Assembly, Athens, Greece.
- 2022 Hickman-Lewis K, Benison KC, Bosak T, Cohen BA, **Czaja AD**, Debaille V, Hausrath EM, Herd CDK, Mayhew LE, Sephton MA, Shuster DL, Siljeström S, Simon JI, Weiss BP, Zorzano M-P, Shkolyar S, Bell JF III, Kah LC, Madariaga JM, Wadhwa M, Hand KP, Sun VZ, Stack KM, Farley KA. Mars 2020 Perseverance rover sampling activities at Séítah, Jezero crater. COSPAR2022, 44<sup>th</sup> Scientific Assembly, Athens, Greece.
- 2022 Sharma S, Beegle LW, Bhartia R, Shkolyar S, Berger EL, Corpolongo A, **Czaja AD**, Murphy A, Fairen A, Cloutis E, Siljeström S, Steele A, Yanchilina A, Conrad P, Moore K, Williams A, and the Mars 2020 Science Team. On the Hunt for Detectable Biosignatures in Jezero Crater: What to Look for and Where. AbSciCon, Atlanta, GA, USA.
- 2022 Hausrath EM, Adcock CT, Benison KC, Carman NA, **Czaja AD**, Debaille V, Herd CDK, Mayhew LE, Maurice S, Rice M, Sephton M, Siljeström S, Simon J, Wiens R, Zorzano M-P. Exploring past aqueous alteration in Jezero crater samples using reactive transport modeling. American Geophysical Union Meeting, Chicago, IL, USA.
- 2022 Fornaro T, Brucato JR, Poggiali G, Alberini A, Garcia Florentino C, Jakubek R, Fries M, Sharma S, Murphy AE, Coloma L, Aramendia J, Madariaga JM, Steele A, Siljeström S, **Czaja AD**, Bhartia R, Olilla A, Clegg S, Beyssac O, Bernard S, Wiens R. Laboratory Analog Experiments to Support Detection of Organics by the Mars 2020 Perseverance Rover, American Geophysical Union Meeting, Chicago, IL, USA.
- 2022 Sharma S, Roppel RD, and 49 others. Mapping organic–mineral associations in Jezero crater. American Geophysical Union Meeting, Chicago, IL, USA.
- 2022 Simon JI, Amundsen HEF, Beegle LW, Bell J, Benison KC, Berger EL, Bosak T, Casademont TM, **Czaja AD**, Cohen BA, Debaille V, Fairen AG, Farley KA, Fox AC, Goreva Y, Hand K, Hamran S-E, Hausrath EM, Herd CDK, Horgan B, Hurowitz J, Lee CH, Mandon L, Sylvestre M, Madariaga JM, Mayhew LE, McLennan S, Moeller RC, Scheller EL, Sharma S, Siljeström S, Sun V, Shuster DL, Stack KM, Udry A, VanBommel S, Wadhwa M, Weiss BP, Wiens R, Williams A, Willis PA, Zorzano M-P,



- and Mars 2020 Team. Sampling of Jezero crater Máaz formation by Mars 2020 Perseverance rover. The 53rd Lunar and Planetary Science Conference, The Woodlands, TX, USA
- 2021 Hickman-Lewis K, Herd CDK, Bosak T, Stack KM, Sun VZ, Benison KC, Cohen BA, **Czaja AD**, Debaille V, Hausrath EM, Mayhew LE, Moynier F, Sephton MA, Shuster DL, Siljeström S, Simon JI, Weiss BP, Smith CL, Steele A, Flannery DT, Goreva YS, Gupta S, Kah LC, Minitti ME, McLennan SM, Madariaga JM, Brown AJ, Williford KH, and Farley KA. Perseverance rover notional caches for Mars Sample Return. Goldschmidt Conference, Virtual Meeting.
- 2021 Herd CDK, Bosak T, Stack KM, Sun VZ, Benison KC, Cohen BA, **Czaja AD**, Debaille V, Hausrath EM, Hickman-Lewis K, Mayhew LE, Moynier F, Sephton MA, Shuster DL, Siljeström S, Simon JI, Weiss BP, Flannery DT, Goreva YS, Gupta S, Kah LC, Minitti ME, McLennan SM, Madariaga JM, Brown AJ, Williford KH, and Farley KA. Sampling Mars: notional caches from Mars 2020 strategic planning. 52<sup>nd</sup> Lunar and Planetary Science Conference, Virtual Conference, Abstract #1987
- 2018 Van Kranendonk M, Baumgartner R, Boyd E, Cady S, Campbell K, **Czaja A**, Damer B, Deamer D, Djokic T, Fiorentini M, Gangidine A, Havig J, Mulkidjanian A, Ruff S, Thordarson P. Terrestrial hot springs and the origin of life: Implications for the search for life beyond Earth. 49<sup>th</sup> Lunar and Planetary Science Conference, The Woodlands, TX
- 2017 Porter S, Riedman LA, **Czaja AD**, Calver C. Early Neoproterozoic biostratigraphy: life before the Cryogenian glaciations. International Meeting of Sedimentology, Toulouse, France.
- 2017 Returned Sample Science Board (Carrier BL, Beaty DW, McSween HY, **Czaja AD**, Goreva YS, Hausrath EM, Herd CDK, Humayun M, McCubbin FM, McLennan SM, Pratt LM, Sephton MA, Steele A, and Weiss BP). Strategies for investigating early Mars using returned samples. 4<sup>th</sup> Conference on Early Mars, abs. #3051.
- 2017 Smith AJB, Beukes NJ, Gutzmer J, Johnson CM, **Czaja AD**, and De Beer FC. Insights into oncoidal morphology and sedimentology of a Mesoarchean granular iron formation from southern Africa using 3D X-ray computed tomography ( $\mu$ XCT), Abstracts of the V.M. Goldschmidt Conference Paris, France.
- 2017 Farley KA, Williford KH, Beaty DW, McSween HY, **Czaja AD**, Goreva YS, Hausrath EM, Hays LE, Herd CDK, Humayun M, McCubbin FM, McLennan SM, Pratt LM, Sephton MA, Steele A, and Weiss BP. Contamination knowledge strategy for the Mars 2020 sample-collecting rover. 48<sup>th</sup> Lunar and Planetary Science Conference, The Woodlands, TX, abs. #2535.
- 2016 Beaty DW, Weiss BP, McSween HY, **Czaja AD**, Goreva YS, Hausrath EM, Herd CDK, Humayun M, McCubbin FM, McLennan SM, Pratt LM, Sephton MA, Steele A, Hays LE, and Meyer MA. Planning for the Paleomagnetic Investigations of Returned Samples from Mars, American Geophysical Union Fall Meeting, abs. #GP23C-1350.
- 2016 Beaty DW, McSween HY, **Czaja AD**, Goreva YS, Hausrath EM, Herd CDK, Humayun M, McCubbin FM, McLennan SM, Pratt LM, Sephton MA, Steele A, Weiss BP and Hays LE. Planning for the collection of a compelling set of Mars samples in support of a

potential future Mars sample return. Geological Society of America Annual Meeting, Denver, CO. *Abstracts with Programs*. Vol. 48, No. 7

- 2016 Beaty DW, McSween HY, **Czaja AD**, Goreva YS, Hausrath EM, Herd CDK, Humayun M, McCubbin FM, McLennan SM, Pratt LM, Sephton MA, Steele A, Weiss BP and Hays LE. Recommended maximum temperature for Mars returned samples. 47<sup>th</sup> Lunar and Planetary Science Conference, The Woodlands, TX.
- 2013 Zambito JJ IV, Benison KC, **Czaja AD**, and Lorber KN. Possibly ubiquitous preservation of microbes in Permian halite. Geological Society of America Annual Meeting, Denver, CO.

## Research Funding

### Pending External Grants

none

### Funded External Grants

2020–2024	NASA Exobiology Program, “Oxidizing Oases in the Paleoproterozoic Moodies Group, Barberton Greenstone Belt, South Africa”	Co-I	\$431K (UC portion)
2020–2023* Extended to 2024	NSF – Sedimentary Geology and Paleobiology, “Life on an oxidizing planet: Microbial ecosystems of a Neoproterozoic carbonate platform”	PI	\$312K
2019–2023* Extended to 2024	NASA Mars 2020 mission Returned Sample Science Participating Scientist Program, “Searching for morphological and geochemical biosignatures on Mars to return to Earth”	PI	\$342,430
2016–2017	National Science Foundation, “Novel Molecular and Geochemical Approaches to Watershed Analysis”	Co-I	\$34,937
2014–2015	National Geographic Society (Waitt Grant for Exploration), “Exploration of the 2.5-billion-year-old Biosphere of South Africa”	PI	\$10,680
2016	Paleontological Society (Meeting Fund), “Midwest Geobiology Symposium”	PI	\$1,000
2016	Agouron Institute, “Midwest Geobiology Symposium”	Co-I	\$8,000
2016	Ohio Space Grant Consortium, “Midwest Geobiology Symposium”	Co-I	\$2,000
2015–2016	Paleontological Society (Outreach/Education Program), “Exploring invisible worlds with students using homemade microscopes”	PI	\$2,500
2010	American Philosophical Society, Lewis and Clark Field Scholar in Astrobiology, “Field trip to explore Archean and Proterozoic geology of Western Australia”	PI	\$4,925

### Funded Internal Grants

2023	UC Office of Research Space Research Institute, “Initial development of Center for Astrobiology, Planetary Science and Ancient Life (CAPSAL)”	PI	\$200K
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2017	UC Faculty Development Council Individual Grant, “Attending NASA Astrobiology Conference, 2019”	PI	\$1,209
2017–2018	UC Research Council Interdisciplinary Faculty Collaboration Grant, “Water Quality and Its Impact on Pre-Industrial Civilization: Diatom, Microbiome and Microbotanical Analyses of Reservoir Sediments from the Ancient Maya City of Tikal”	PI	\$49,627
2017	UC Faculty Development Council Individual Grant, “Attending Gordon Research Conference on Geobiology”	PI	\$1,825
2017	UC Faculty Development Council Individual Grant, “Attending NASA Astrobiology Conference, 2017”	PI	\$1,300
2014	UC Faculty Development Council Individual Grant, “Learning about the Origin of Life – Conference in Nara, Japan”	PI	\$3,745
2013	UC Faculty Development Council Individual Grant, “SERC Workshop for Early Career Geoscience Faculty”	PI	\$1,390

Student/Postdoctoral Grants and Fellowships

2005	University of California, Los Angeles, Dissertation Year Fellowship
2005	Eugene Waggoner Scholarship for Sustained Academic Achievement, UCLA, Dept. of Earth & Space Sciences
2004	Geological Society of America, Student Research Grant
2002	Sigma Xi, Grants-in-Aid of Research (Fall and Spring)
2000	National Science Foundation, Graduate Research Fellowship
2000	Institute of Geophysics and Planetary Physics, Center for the Study of Evolution and the Origin of Life Fellowship (UCLA)

Grants Received By My Students

2022	American Philosophical Society, Lewis and Clark Field Scholar in Astrobiology (Corpolongo)	\$4,380
2020	NSF Graduate Research Fellowship Program (Corpolongo)	\$35K/yr
2019	Sigma Xi Grants in Aid of Research Award (Gangidine)	\$1,000
2019	NASA Early Career Collaboration Award (Corpolongo)	\$5,000
2019	Paleontological Society, Student Research Grant (Corpolongo)	\$1,200
2019	Ohio Space Grant Consortium SICHOP (Gangidine)	\$5,000
2018	NASA Early Career Collaboration Award (Gangidine)	\$5,000
2018	Ohio Space Grant Consortium SICHOP (Gangidine)	\$5,000
2018	Sigma Xi UC Chapter Grants in Aid of Research Award (Gangidine)	\$2,500
2018	2 <sup>nd</sup> International Mars Sample Return Conference travel award (Gangidine)	\$3,000
2018	Geological Society of America, Student Research Grant (Gangidine)	\$1,650

2017	American Philosophical Society, Lewis and Clark Field Scholar in Astrobiology (Gangidine)	\$2,600
2017	Geological Society of America, Student Research Grant (Gangidine)	\$1,775
2017	Ohio Space Grant Consortium, Student Grant (Gangidine)	\$5,000
2017	Paleontological Society, Student Research Grant (Gangidine)	\$800
2017	Mars 2020 3 <sup>rd</sup> Landing Site Workshop, Travel Award (Gangidine)	\$750
2016	University of Cincinnati Graduate Student Governance Association Research Fellowship (Gangidine)	\$1,200
2016	Sigma Xi, UC Chapter Grants in Aid of Research award (Osterhout)	\$3,000
2015	Geological Society of America, Student Research Grant (Osterhout)	\$2,500
2015	NASA Early Career Collaboration Award (Osterhout)	\$5,000
2015	NASA Early Career Collaboration Award (Lorber)	\$5,000
2014	UC Graduate Student Governance Association, Travel Grant (Osterhout)	\$1,120

## **TEACHING**

### **Summary of Teaching at the University of Cincinnati**

<b>Course</b>	<b>Level</b>	<b>Terms taught</b>
Astrobiology (GEOL 1016)	Introductory	Sp 2013, Fa 2013, Fa 2014, Fa 2015, Fa 2016, Fa 2017, Fa 2018, Fa 2019, Fa 2020, Fa 2022, Fa 2023
Geochemistry (GEOL 3002/7010)	Upper level undergrad/Graduate	Fa 2017, Fa 2018, Fa 2019, Fa 2020, Fa 2021, Fa 2022, Fa 2023
Earth's Early Biosphere (GEOL 4037/6037)	Upper level undergrad/Graduate	Sp 2015, Sp 2018, Sp 2021, Sp 2023
Exploring Mars (GEOL 4059/6059)	Upper-Level Undergrad/Graduate	Sp. 2022
Microscopy and Raman Spectroscopy for the Geosciences (GEOL 4049C/6049C)	Upper level undergrad/Graduate	Sp 2016
Geology Colloquium (GEOL 4052/7025)	Undergrad/Graduate	Fa 2013 – Sp 2017
Earth History, Life History: The Record of Deep Time (co-taught with Carl Brett) (GEOL 1001C)	Introductory	Fa 2015
Planetary Geology Seminar	Upper level undergrad/Graduate	Fa 2018

### Other Courses Taught

- 2007           **Lecturer**, UCLA, Dept. of Earth and Space Sciences  
*ESS 5 – Environmental Geology of Los Angeles (Two academic quarters)*
- 2006–2007   **Lecturer**, California State University, Fullerton, Dept. of Geological Sciences  
*GEOL 101 – Physical Geology (three semesters)*  
*GEOL 101L – Physical Geology Laboratory (three semesters)*
- 2000–2005   **Teaching Assistant**, UCLA  
Dept. of Earth and Space Sciences  
*ESS 1 – Introduction to Earth Science; ESS 16 – Major Events in the History of Life; ESS 17 – Dinosaurs and Their Relatives; ESS 116 – Paleontology*  
Dept. of Ecology and Evolutionary Biology  
*OBEE 152 – Functional Plant Anatomy*  
Honors College  
*HC 70B – Non-Life to Life, Microbes to Man: Nature is Not Compartmentalized*

### Students Mentored

#### As primary advisor

- Kira Lorber, Ph.D. (Left program in 2016)  
Jeffrey T. Osterhout, M.S. 2016, "Diversity of Microfossils and Preservation of Thermally Altered Stromatolites from Anomalous Precambrian Paleoenvironments"  
Andrew J. Gangidine, Ph.D. 2020, "Trace Element Concentrations in Microbial Fossils as a Novel Biosignature for Life on Ancient Earth and Beyond"  
Andrea Corpolongo, Ph.D. (expected to finish in Summer 2024)  
Camden Goland, M.S. (left program in Summer 2023)  
Desirée Baker, Ph.D. (left program in Summer 2022)  
Brianna Orrill, Ph.D. (expected to finish in Spring 2026)  
Samuel Hall, Ph.D. (expected to finish in Spring 2027)

#### As a committee member

- Mike Lees, M.S. 2017, "Corrosion of Brass Meters in Drinking Water: The Influence of Alloy Composition and Water Chemistry on Metal Release and Corrosion Scale"  
Abigail Padgett, M.S. 2018, "Early-Middle Holocene Cultural and Climate Shifts in NW Africa: Paleoenvironmental Reconstruction Using Stable Isotopes of Land Snail Shells"  
Evan New, M.S. 2018, "Aminochemistry and Time-Averaging of Quaternary Land Snail Assemblages from Colluvial Soils in The Madeira Archipelago"  
Cory Perfetta, M.S. 2019 (Biological Sciences), "Diatom Analysis of Tikal's Reservoir Sediments"  
Keyron Hickman-Lewis, Ph.D. 2019 (Université of Orléans, France), "Coupling instrumentation and methodology in the search for traces of life on the early Earth and Mars", (Rapporteur)  
Kelly Tingle, M.S. 2021 (University of California, Santa Barbara), "Organic Preservation of Vase-Shaped Microfossils from the Late Tonian Chuar Group, Grand Canyon, Arizona"  
Leah Trutschel, Ph.D. 2023 (UC Biological Sciences)  
Watts Dietrich, M.S. 2023 (UC Geosciences)  
Mehdi Alibeglouei, M.S. (UC Biological Sciences, expected to finish in Summer 2024)



Martin Welych-Flanagan, M.S. (UC Geosciences, expected to finish in Spring 2025)

## **SERVICE**

### **Professional service**

2022–present Member of the NASA/ESA MSR Campaign Science Group (MCSG)  
 2024 Scientific Organizing Committee member, 10<sup>th</sup> International Mars Conference  
 2024 Scientific Organizing Committee member, Abiological Signatures workshop  
 2020–2024 NASA review panelist  
 2019–2024 Editor for the journal *Life* (astrobiology section)  
 2015–2018 Member of the Mars 2020 mission Returned Sample Science Board  
 2015–2018 Member of the Mars 2020 mission Landing Site Working Group  
 2015 NSF proposal review panelist  
 2014–2024 Geological Society of America Campus Representative  
 2014 Organized and chaired proposal sub-panel for the NASA PICASSO program  
 2013–present NASA Astrobiology Institute Early Earth Focus Group co-chair  
 2008 NASA ASTID program proposal review panelist

### Ad hoc proposal reviewer

National Science Foundation, NASA Exobiology, Department of Energy, ACS Petroleum Research Fund

### Ad hoc manuscript reviewer

*BioResources*

*Chemical Geology*

*Earth and Planetary Science Letters*

*Environmental Geochemistry and Health*

*European Journal of Mineralogy*

*Geobiology*

*Geochimica et Cosmochimica Acta*

*GSA Bulletin*

*Geology*

*Geomicrobiology Journal*

*Geosciences*

*Icarus*

*Jour. Geophysical Research, Biogeosciences*

*Nature Communications*

*Nature Geoscience*

*Nature Astronomy*

*Palaeogeography, Palaeoclimatology,*

*Palaeoecology (P-cubed)*

*Palaios*

*Planetary and Space Science*

*Precambrian Research*

*PNAS*

*Science*

*Science Advances*

*Sedimentary Geology*

*Sedimentology*

*South Africa Journal of Geosciences,*

Reviewed chapters for the books:

*Biosignatures in Astrobiology*

*Iron Geochemistry: An Isotopic Perspective*

### Professional Meeting Service

2012–2024 NASA Astrobiology Science Conference, session chair

2015, 2024 NASA Astrobiology Science Conference Student poster judge and meeting mentor for high school students

2010, '12, '21 Goldschmidt Conference, session co-chair

- 2011, '14, '18 AGU OSPA Judge for student presentation competition
- 2015–2017 American Geophysical Union (AGU), session co-chair
- 2016 Co-organized the Midwest Geobiology Symposium at the University of Cincinnati
- 2013 Co-organized a NASA Astrobiology “Workshop without Walls” on the topic of the Hadean Earth
- 2007 Geological Society of America Annual Meeting, session co-chair

### Professional Affiliations

American Geophysical Union, Geochemical Society, Geological Society of America, International Society for the Study of the Origin of Life, Paleontological Society, Phi Beta Kappa, Sigma Xi

### **University/Departmental Service**

- 2024 Took over as Department Graduate Program Director
- 2023–2024 Helped organize Interpretation Training for the department
- 2023 Instrumentation Specialist hiring committee
- 2022–2023 UC College of Arts and Sciences RPT committee
- 2021–2023 Seeding Diversity in the Geosciences Program to increase diversity in our department
- 2021–present Organized a committee and planned new geochemistry labs in the geology department. Received funding from ITIE and an alumnus
- 2020–2022 UC Department of Geology DE&I committee member
- 2020 Participated in the UC Mental Health Champions program
- 2018 UC Department of Geology Graduate Program Review Committee member
- 2017–2018 Member of UC College of Arts & Sciences Gateway Concentration Committee
- 2017 Volunteer for *UC Helping Hands* (helping with undergrad move-in day)
- 2016–2017 Departmental STEM Fee Award selection committee member
- 2016 Lead discussion of academic paths for UC Preparing Future Faculty program
- 2014–2016 UC Department of Geology curriculum committee member
- 2014 UC Department of Geology doctoral qualifying exam review committee member
- 2014 Organized a student trip to the University of Kentucky for lecture by Prof. Andrew Knoll of Harvard, Spring 2014
- 2013 UC Department of Geology doctoral enhancement grant committee member
- 2012–present Faculty Advisor to UC Graduate Geoclub
- 2012 Reviewed UC University Research Council student grant proposals at departmental level

### **Education/Public Outreach**

- 2024 Designed activity stations for the UC Public Engagement With Science 6<sup>th</sup> grade visit to our department
- 2023 UC OLLI program about Mars 2020 mission
- 2022 Geoscience in Plain Language presentation for the North-central/Southeast GSA section meeting: **Czaja AD** (2022) The Ancient Earth was an alien planet. Geological Society of America *Abstracts with Programs*. Vol. 54, No. 4. <http://doi.org/10.1130/abs/2022NC-375531>
- 2022 Geoscience in Plain Language presentation for the North-central/Southeast GSA section meeting: Corpolongo A and **Czaja AD** (2022) NASA's Perseverance rover is searching for

- signs of ancient life on Mars. *Geological Society of America Abstracts with Programs*. Vol. 54, No. 4. <http://doi.org/10.1130/abs/2022NC-374826>
- 2021 Presentations about the Mars 2020 mission to the Cincinnati Friends of the Observatory, and Science on Tap (both virtual), and the Cincinnati Astronomical Society (in-person)
- 2021 Virtual presentations to two elementary school classes about the Mars 2020 mission
- 2020 Virtual presentations to two middle school classes about the Mars 2020 mission
- 2019 Interviewed on Cincinnati 700 WLW about impact of Chinese Moon landing.
- 2018 Lecture on Mars 2020 mission to the Milford, OH Junior High School Engineering Club
- 2017 Interviewed on Cincinnati Public Radio (91.7 WVXU) about my participation on the Mars 2020 rover project (See below)
- 2017 Judge for junior high school science fair at Annunciation Catholic School (Cincinnati, OH)
- 2016 Presentation on “Time and Space” to Our Lady of Grace Catholic School (Cincinnati, OH)
- 2015 All-day presentation on the “Invisible World” to 4 sixth grade science classes at Clifton-Fairview School (Cincinnati, OH). I instructed students on how to build and use smartphone microscopes. Materials bought with a grant from the Paleontological Society.
- 2015 Lecture on “Life as a Precambrian Paleobiologist/Astrobiologist” for students at North Adams High School. Short lecture and Q&A session by video conference (Cincinnati, OH)

### Media Attention

*My work with the Mars 2020 Returned Sample Science Board and Landing Site Working Group*

Miller, M. “[Mars or bust](http://magazine.uc.edu/editors_picks/recent_features/mars2020.html)”, University of Cincinnati Magazine, online edition, June 22, 2017, [http://magazine.uc.edu/editors\\_picks/recent\\_features/mars2020.html](http://magazine.uc.edu/editors_picks/recent_features/mars2020.html)

Heyne, M. “In Search Of Life On Mars” Radio interview, Cincinnati Edition 91.7 FM WVXU, July 12, 2017, <http://wvxu.org/post/search-life-mars#stream/0>

*Press for my 2016 paper in Geology on 2.52-billion-year-old sulfur-oxidizing bacteria*

Schefft, M. “Life before oxygen”, University of Cincinnati Magazine, online edition, November 28, 2016, [http://magazine.uc.edu/editors\\_picks/recent\\_features/bacteria.html](http://magazine.uc.edu/editors_picks/recent_features/bacteria.html).

Pappas, S. “2.5-Billion-Year-Old Fossils Predate Earth's Oxygen”, Live Science, December 1, 2016, <https://www.livescience.com/57051-ancient-life-fossils-predate-earth-oxygen.html>

Schefft, M. “Geologist uncovers 2.5 billion-year-old fossils of bacteria that predate the formation of oxygen” Phys.org, November 29, 2017 <https://phys.org/news/2016-11-geologist-uncovers-billion-year-old-fossils-bacteria.html>.

Shivni, R. “How Early Life Thrived without Oxygen”, Biotechniques News, January 11, 2017 <http://www.biotechniques.com/news/How-Early-Life-Thrived-without-Oxygen/biotechniques-365418.html?autnID=344275#.WHUKXJL89mU>.

O’Hare, R. “Life before oxygen: Fossils of 2.5 billion-year-old bacteria reveal organisms thrived despite early Earth's harsh conditions”, DailyMail.com, November 30, 2016, <http://www.dailymail.co.uk/sciencetech/article-3985582/Life-oxygen-Fossils-2-5-billion-year-old-bacteria-reveal-organisms-thrived-despite-early-Earth-s-harsh-conditions.html>.

TimesLive (South Africa) <http://www.timeslive.co.za/scitech/2016/11/30/Ancient-fossil-find-in-Northern-Cape-rocks-geologists-world>