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THE SETI INSTITUTE

Carl Sagan Center
Mountain View, CA 94043

NASA AMES RESEARCH CENTER

Space Science & Astrobiology Division
Moffett Field, CA 94035

EDUCATION

- Ph.D. in Chemistry** Brown University, 1994
“Spectroscopic analyses of chemically altered montmorillonites and applications to the soils on Mars”
(advisor: John O. Edwards, co-advisor: Carlé M. Pieters, Geological Sciences)
- M.S. in Applied Earth Science**, Remote Sensing Program Stanford University, 1988
School of Earth Science (advisors: Ronald J. P. Lyon and George A. Parks)
- B.S. in Chemistry** Stanford University, 1988

PROFESSIONAL POSITIONS

- Senior Research Scientist & Science Council, The SETI Institute 2015 - present
(contractor at NASA-Ames)
- Visiting Scientist and Guest Professor, Free University of Berlin & DLR-Berlin 2014 - 2015
- Senior Research Scientist, The SETI Institute (contractor at NASA-Ames) 2010 - 2015
- Research Scientist, The SETI Institute (contractor at NASA-Ames) March 1999 - 2009
- Research Associate, NRC Fellow at NASA-Ames March 1997 - February 1999
- Postdoctoral Research Associate, DLR-Berlin September 1994 - February 1997

SUMMARY OF PUBLICATIONS

h-index: 62 (as of July, 2024) at Google Scholar
Peer-reviewed publications: 168 (as of July, 2024)
Conference presentations: 546 (as of July, 2024)

CURRENT RESEARCH ACTIVITIES

Chair of Planetary Exploration Group and Member of Science Council, Carl Sagan Center: Leading group of ~20 research scientists, including organizing seminars and group discussions, facilitating proposal idea generation and proposal reviews, participating in management decisions at the SETI Institute.

Mars surface composition and processes: Analysis of hyperspectral CRISM imagery and data to characterize surface minerals; Focus on identifying OH/H₂O-bearing minerals (e.g. clays, sulfates) to understand aqueous processes and geochemical environment on Mars; coordinating mineral detections from CRISM imagery with stratigraphy and surface morphology using HiRISE and HRSC; Characterizing iron-bearing and hydrous minerals using Pancam-type multichannel spectral bands; Development of hyperspectral analysis tools together with students/colleagues to design and implement Gaussian modeling techniques and clustering algorithms for spectral analysis.

Mars Analog studies: Analysis of VNIR, mid-IR and Raman laboratory data of analog materials (and minerals found in them) for comparison with spacecraft data of the martian surface; Emphasis on volcanic alteration products (e.g. Hawaii and Iceland), martian meteorites, hydrothermal regions, acidic aqueous sites, and sediments from cold desert environments.

Laboratory alteration experiments: Investigation of the effects of chemical alteration and/or the martian environment on minerals and Mars analog materials.

Relationships between minerals and organisms: Investigation of minerals as energy sources and niches for organisms; Testing detection of organics and salts bound to phyllosilicates.

HONORS & AWARDS

Professional Awards:

Arthur Day Medal, Geological Society of America.	2024
George Brown Lecture Award, the Mineralogical Society of the UK and Ireland	2023
Editor's Choice Award – Best Paper in Astrobiology (co-author), <i>Frontiers in Astronomy and Space Sciences</i> .	2023
Gilbert Award, the Geological Society of America's highest honor in Planetary Geology.	2021
Carl Sagan Center Director's Award, SETI Institute.	2021
Elected as Fellow of the American Geophysical Union.	2020
Elected as Fellow of the Mineralogical Society of America.	2018
Elected as Fellow of the Geological Society of America.	2018
Marion L. and Chrystie M. Jackson Mid-Career Clay Scientist Award.	2016
Elsevier Certificate for Highly Cited Research.	2016
Humboldt Award for research in Germany.	2015
Helmholtz International Fellow Award.	2013
NASA Public Service Award to MRO CRISM Team for developing CRISM instrument	2011
NASA Public Service Award to MRO CRISM Team for significantly advancing our understanding of the martian surface, its composition, and evolution.	2011
Characterization of "Water on Mars" by MRO Team, Top Ten Insights of Decade, <i>Science</i> .	2010
Featured Scientist, <i>Astronomy Magazine</i> , "A Day in the Life of an Astronomer" March issue	2010
Best Paper Award (co-author), IEEE Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing, Grenoble, France.	2009
Kavli Fellow, Kavli Frontiers of Science Symposium, Irvine, CA.	2008
NRC Fellow, NASA-Ames Research Center, Moffett Field, CA.	1997-1999
Alexander von Humboldt Fellow, Berlin, Germany.	1994-1996

Scholarships and Awards:

DPS, Student Travel Award, 27th Annual Meeting	1995
Meteoritic Society, Student Travel Award, 57th Annual Meeting	1994
San Juan Capistrano Research Institute Conference on Infrared Spectroscopy, Student Travel Award,	1991
Meteoritic Society, Student Travel Award, 54th Annual Meeting	1991
Amelia Earhart Fellowship Award, Zonta International Foundation	1993-1994
NASA Graduate Student Researchers Program Fellowship	1990-1994
Research Fellowship, School of Earth Science, Stanford University	1987-1988
Stanford University School of Earth Sciences Undergraduate Research Grant	1986-1987
Fannie and John Hertz Foundation Fellowship	1983-1987
Nahas Foundation Scholarship	1983-1987
General Electric Co. Scholarship for Women in Science	1983-1987
Livermore Boosters Olympian Award: Outstanding Athletics and Academics	1983-1987
Elks Association (Calif.) Most Valuable Student Award: Scholarship & Leadership	1983
Bank of America Achievement Award in Science and Mathematics	1983
Josten's Foundation Award	1983
Valedictorian, Livermore High School	1983

PLANETARY MISSION PARTICIPATION

Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) on Mars Reconnaissance Orbiter (MRO): Co-Investigator working on spectral identification tasks related to hydrated minerals and surface alteration, 2001 to 2022.

International MSR Objectives and Samples Team (iMOST): Invited to join Science Study Team for the investigation of the potential science and engineering value of samples delivered to Earth by Mars sample return, 2018-2019.

Mars Sample Return: Invited to join Science Study Team for the International Mars Exploration Working Group (IMEWG) for scientific planning of Mars Sample Return (MSR), 2017.

Mars Landing Site Characterization: Prepared presentations and reports on potential sites at Juventae Chasma and Mawrth Vallis; attended multiple landing site workshops for Mars Science Lab (MSL), MER, and other missions, 2002-present.

Marsokhod Rover Tests at Silver Lake, CA: participated as remote scientist during rover field activities; assisted in spectral analyses of data collected from mission, 1999.

Center for Mars Exploration (CMEX): participated in projects and meetings on Mars Landing Site development and furthering information technology capability for Martian Missions, 1998-2004.

Pathfinder Mineralogy Science Operations Working Group (SOWG): performed spectral analyses of Martian rocks and soils based on lab spectra of analogues, 1997-1999.

COMMUNITY ACTIVITIES

Journal & Book Editor:

- Cambridge University Press: “Remote Compositional Analysis”, 2019.
- Associate Editor, *American Mineralogist*, 2013- present; Editor, *Icarus*, 2003–2004; Consulting Editor, 2005 – 2021; Special Issue Guest Editor, *Clay Minerals*, 2007-2008.

Scientific Reviewer: Panel member, panel chair, and external reviewer for multiple NASA programs, NSF & European proposal agencies, 1999 - present; Reviewer for journals including *Science*, *Nature*, *JGR*, *Icarus*, *American Mineralogist*, *Clays & Clay Minerals*.

Member: multiple NASA steering groups, 1994-present; NASA’s Astrobiology Institute, 2003-2021; NASA’s Network For Life Detection (NFoLD) Research Coordination Network, 2020-present.

Council Member: *Clay Minerals Society*, 2019-2021.

Student Grants Committee: *Clay Minerals Society*, 2018-2022.

Science Organizing Committee:

The 61st Annual Meeting of the Clay Minerals Society and the 5th Asian Clay Conference, Honolulu, HI, June, 2024. <https://www.clays.org/2024-meeting/>

23rd International Mineralogical Association General Meeting, Lyon, France, July, 2022.

Ninth International Conference on Mars, Pasadena, CA, July, 2019.

“The New Martian Chemistry Workshop”, Tufts University, Boston, July, 2009; <http://www.lpi.usra.edu/meetings/marschem2009/>.

“Workshop on the Microstructure of the Martian Surface”, Copenhagen, August, 2009; <http://www.nbi.ku.dk/forskningsgrupper/mars/english/soil-workshop/>.

“Workshop on Martian Phyllosilicates: Recorders of Aqueous Processes?”, CNES, Paris, October, 2008; http://www.ias.u-psud.fr/Mars_Phyllosilicates/.

Convener:

“Session 20: Investigation of Phyllosilicates on Mars through Remote Sensing, Rover Instruments, and Analog Studies”, Clay Minerals Soc., Honolulu, HI, June, 2024.

“Session 21: Characterization of Phyllosilicates and Their Mineral Assemblages in Asteroids and Meteorites”, Clay Minerals Soc., Honolulu, HI, June, 2024.

“Session 22: Remote Identification of Phyllosilicates for Critical Metals Exploration and Resource Characterization”, Clay Minerals Soc., Honolulu, HI, June, 2024.

“Martian Sulfates Studied Using Orbital, Ground, Laboratory, and Earth Data”, AGU, San Francisco, CA, December, 2023.

“Clay Minerals on Mars and Other Planetary Bodies”, Clay Minerals Soc., Atlanta, GA, June, 2016.

“Earth analogues as case studies for Martian geological materials and processes”, AGU, San Francisco, CA, December, 2015.

“Unraveling Mars: Insights from mineralogy and geochemistry”, EGU, Vienna, Austria, April, 2015.

“Stratigraphy of Aqueous Mineralogy on Mars Through Coordinated Analyses of Mineralogy, Geochemistry and Morphology”, EPSC, Estoril, Portugal, 2014.

“Phyllosilicates on Mars as Indicators of Aqueous Processes and Geochemical Environments”, EPSC, London, UK, 2013.

“What Lurks in the Martian Rocks and Soil? Investigations of Sulfates, Phosphates, and Perchlorates”, AGU, San Francisco, CA, December, 2012.

“Mineralogy as an Indicator of Aqueous Processes on Mars”, Astrobiology Science Conference, Atlanta, GA, April, 2012.

“Coordinated Mineralogy and Morphology Studies of Martian Aqueous Deposits”, AGU, San Francisco, December, 2011.

Invited Speaker:

“Arthur L. Day Medal: Investigating Mineralogy and Geochemistry on Mars Through Lab, Field, and Remote Observations”, GSA Connects, Anaheim, CA, September 24, 2024.

“Characterization of Changing Environments on Ancient Mars using Orbital Hyperspectral Remote Sensing”, *Humboldt Colloquium “Sustainable Futures”*, The Westin San Francisco, February 29-March 2, 2024.

“Juventae Chasma, Mars - Lab Experiments to Identify the Unique Sulfate Minerals Observed with CRISM and Constrain the Aqueous Geochemical Environment”, *STX branch seminar, NASA Ames*, September 12, 2023.

“Invited Plenary Lecture: Characterizing Phyllosilicates on Mars and What They Reveal About Ancient Geochemical Environments”, *Euroclay 2023 International Conference*, Bari, Italy, July 24, 2023.

“The Surface of Mars: Mineralogy as an indicator of water, geochemistry and surface processes”, The SETI Institute REU Program, June 21, 2023.

“Remote Characterization of Minerals on Mars to Uncover Past Aqueous Processes and Potentially Habitable Regions”, *BEACON: Biennial European Astrobiology Conference & EAI General Assembly*, La Palma, Spain, May 12, 2023.

“Mineral Spectroscopy for Planetary Surfaces”, Guest Lecturer, GS 120, Stanford University, Stanford, CA, April 27, 2023.

“Characterizing Aqueous Alteration on Mars Through Coordinated Field, Lab, and Remote Sensing Observations using Vibrational Spectroscopy”, *Earth and Planetary Science Seminars*, University of California, Berkeley, CA September 15, 2022.

“G.K. Gilbert Award Lecture: Coordinating field, lab, theory, and remote observations for spectroscopic mineral identification”, *GSA Connects*, Portland, OR, October 12, 2021.

“The Surface of Mars: Mineralogy as an indicator of water, geochemistry and surface processes”, The SETI Institute REU Program, June 14, 2021.

“Remote characterization of minerals on Mars to track surface weathering and aqueous processes on early Mars”, Invited Speaker at the ASA-CSSA-SSSA International Annual Meeting, 2020.

“Phyllosilicates provide clues about the aqueous environment and climate on early Mars”, Invited Speaker at the Clay Minerals Society Annual Meeting, 2020.

- "The Surface of Mars: Mineralogy as an indicator of water, geochemistry and surface processes", The SETI Institute REU Program, June, 2020.
- "Characterizing the surface of Mars through remote spectral identification of minerals", Keynote Speaker at *9th European Conference on Mineralogy and Spectroscopy*. Prague, Czech Republic., September 11, 2019.
- "The Surface of Mars: Mineralogy as an indicator of water, geochemistry and surface processes", The SETI Institute REU Program, June, 2019.
- "Exploring Mars Using a Rover.", Presentation and demonstration to 7th grade students at Alto International School about martian rovers, Menlo Park, CA, May, 2019.
- "Constraints on the Climate of Early Mars from the Phyllosilicate Record", Colloquium, Department of Geology and Geophysics, Louisiana State University, Baton Rouge, LA, April, 2019.
- "The Places You'll Go...The Things You Can Do: Planning Missions to Mars", Presentation and demonstration to 5th grade students at Alto International School, Menlo Park, CA.
- "Investigating Mars: What We Learn from Analog Sites", Osher Lifelong Learning Institute, Santa Clara University, Santa Clara, CA, April 15, 2019.
- "Clues about the Early Martian climate from the phyllosilicate record: How warm is warm?", Klepser Seminar Series, Department of Earth and Planetary Sciences, University of Tennessee, Knoxville, TN, April, 2019.
- "Coordinated Analyses of Lab, Field and Remote Observations for Understanding Surface Processes on Mars", . Planetary Geoscience Institute Brown Bag Lunch Seminar, Department of Earth and Planetary Sciences, University of Tennessee, Knoxville, TN, April, 2019.
- "The Surface of Mars: Mineralogy as an indicator of water, geochemistry and surface processes", The SETI Institute REU Program, June, 2018.
- "Formation of Surface Clays via Short-Term Warmer and Wetter Climate Excursions on a Largely Cold Ancient Mars", Exobiology Branch Seminar, NASA Ames, June, 2018.
- "Roving on Mars: Revving up for Future Exploration of the Red Planet", SETI Institute Colloquium, Menlo Park, CA, March, 2018.
- "Astrobiology at Mars", Osher Lifelong Learning Institute, University of California, Berkeley, CA, February, 2018.
- "Diverse Early Aqueous Environments and Climate on Mars Revealed by the Phyllosilicate Record", Fourth International Conference on Early Mars, Flagstaff, AZ, October, 2017.
- "The Martian' traverse and what Mark Whatney missed along the way", Doug Duncan's University of Colorado Eclipse Event, Jackson Lake Lodge, Grand Tetons, WY, August, 2017
- "Clays on Mars: How We Found Them and Why They are Important for Astrobiology", SETI Institute Colloquium, November, 2016.
- "Jackson Award Lecture. Clays on Mars: How We Identified Them and What They Tell Us About the Early Environment", Clay Minerals Society Annual Meeting, Atlanta, GA, June, 2016.
- "Astrobiology at Mars", Osher Lifelong Learning Institute, Santa Clara University, Santa Clara, CA, April 21, 2016.
- "Investigating Mars Analog Sites for Understanding Aqueous Outcrops on Mars", Université Claude Bernard , Lyon, France, April, 2015.
- "The Composition of Mars as Determined from Orbital Remote Sensing", Hollabrunn Technical College, Hollabrunn, Austria, April, 2015.
- "CRISM analysis of impact-induced hydrothermal clay outcrops on Mars", Natural History Museum, Berlin, January, 2015.
- "What Hyperspectral Remote Sensing can Tell us about Aqueous Alteration on Mars", Institute for Earth and Environmental Sciences Colloquium, University of Potsdam, Germany, January, 2015.

“Aqueous Alteration at Mawrth Vallis, Mars Through Analysis of Spectral Imagery and Mars Analog Studies“ Astrophysics Colloquium, IAS, Paris, France, November, 2014.

“Mineralogy on Mars with CRISM-based infrared spectroscopy”, Institute of Geological Sciences Colloquium, Free University of Berlin, Berlin, Germany, November, 2014.

“Martian Surface Mineralogy as an Indicator of Geochemical Environments and Potentially Habitable Sites”, Biosignatures Across Space and Time, Bergen, Norway, May, 2014.

“Hyperspectral Imaging of Mars: Mineralogy as an indicator of water, geochemistry and surface processes”, The SETI Institute REU Program, June, 2013.

“Astrobiology at Mars: Mineralogy as an Indicator of Water, Geochemistry and Surface Processes”, Free University of Berlin, Berlin, Germany, July, 2012.

“Characterization of the mineralogy and morphology of geologic units at Libya Montes, Mars”, German Aerospace Agency, Berlin, June, 2012.

“Hyperspectral Imaging of Mars: Mineralogy as an indicator of water, geochemistry and surface processes”, The SETI Institute REU Program, June, 2012.

“Hyperspectral Imaging of Mars: Mineralogy as an indicator of water, geochemistry and surface processes”, Lawrence Livermore National Lab, October, 2011.

“The Search for Life on Mars: Mineralogy as an Indicator of Water and Environmental Conditions”, The SETI Institute REU Program, June, 2010.

“Life in the Antarctic Dry Valleys”, SETICon, Santa Clara, CA, August, 2010

“The Surface of Mars: Mineralogy as an Indicator of Water and Environmental Conditions”, The SETI Institute REU Program, June, 2010.

“Could the Large Phyllosilicate Outcrop at Mawrth Vallis on Mars be Sedimentary in Origin?”, Sedimentology Group, School of Earth Sciences, Stanford University, April, 2010.

“The Search for Life on Mars: Mineralogy as an Indicator of Water and Environmental Conditions”, Astrobiology Space Exploration Course #183, Human Biology Department, Stanford University, February, 2010.

“Aqueous Processes on Mars: What We Have Learned from Spectroscopy”, Whole Earth Seminar, Earth and Planetary Sciences Department, UC Santa Cruz, October, 2009.

“The Surface of Mars: Mineralogy as an Indicator of Water and Environmental Conditions”, SETI Institute Colloquium, July, 2009.

“The Surface of Mars: Mineralogy as an indicator of Water and Environmental Conditions”, Livermore Public Library, sponsored by AAUW, March, 2009.

“Looking at Mars through a CRISM: What we know and how we are learning more”, Summer Science Program, New Mexico Tech., July, 2005.

Outstanding Women Scientists Series Lecture: "*The Surface of Mars: What We Know and How We're Learning More*", Indiana University, October, 2004.

“Are nanophase iron oxides responsible for the red color of Mars?” Geology Department, UC Davis, June, 2003.

Earth Sciences Division, NASA-Ames Research Center, Moffett Field, CA, January, 1999.

Space Sciences Division, NASA-Ames Research Center, Moffett Field, CA, March, 1998.

Planetary Physics Group, DLR-Berlin, (given in German), February, 1997.

Los Alamos National Laboratory, Los Alamos, NM, November, 1996.

Department of Physics, University of Medicine, Luebeck, Germany, (given in German) June, 1996;

Exobiology Branch, NASA-Ames Research Center, Moffett Field, CA, March, 1996

Dept. of Inorganic Chemistry, Academy of Science, Bratislava, Slovak Republic, January, 1996.

Popular Articles, Science Blogs, and Facebook Live Events:

- SETI News: “The SETI Institute at the Division for Planetary Sciences Meeting”, January 3, 2024, <https://www.seti.org/seti-institute-division-planetary-sciences-meeting>
- SETI News: “Chasing Cosmic Chills: Unveiling Extraterrestrial Secrets at the Cold Surfaces Spectroscopy Facility”, December 22, 2023, <https://www.seti.org/chasing-cosmic-chills-unveiling-extraterrestrial-secrets-cold-surfaces-spectroscopy-facility>
- Characterizing Clay Minerals on Mars to Uncover Clues About Ancient Environments, *Phyllosophical News, The Clay Minerals Group Newsletter* (Editors: Megan Baker, Nia Gray-Wannell, Maggie White) Mineralogical Society of the UK and Ireland, Issue 3, August 2023. <https://www.minersoc.org/wp-content/uploads/2023/08/CMG-newsletter-Summer-2023.pdf>
- Interview (in German) for Puls24 Austrian TV: “Enns & Steyr liegen jetzt am Mars” (Enns & Steyr are now on Mars), Interview on Puls24 Austrian TV. <https://www.puls24.at/video/enns-steyr-liegen-jetzt-am-mars/v-cpve2jzln97d>
- Interview (in German) with Austrian newspaper Kronen Zeitung: “Namen für Zwei Krater, Enns und Steyr existieren nun auch auf dem Mars” (Names for Two Craters, Enns and Steyr now exist on Mars), <https://www.krone.at/2901592>
- SETI News: “Two Craters on Mars Receive Official Names”, January 11, 2023, <https://www.seti.org/two-craters-mars-receive-official-names>
- “Searching for Life on Other Worlds”, *Dream Big Dedication Ceremony for new non-profit science center*, Livermore, CA, September 24, 2022. <https://www.livermorechamber.org/events/lvcc-supported-the-official-unveiling-of-the-dream-big-wall-mural#>
- SETI News: “Could Clays Found in Ancient Gale Crater Lake on Mars Once Have Harbored Life?”, July 12, 2021, <https://www.seti.org/could-clays-found-ancient-gale-crater-lake-mars-once-have-harbored-life>
- SETI Live (together with Franck Marchis, Nelly ben Hayoun & ISO) “SETI Live: International Space Orchestra and Kid Cuddy Project!”, July 1, 2021, <https://www.youtube.com/watch?v=jHlwhG5jpuQ&list=PLw6lJozmaWbTt2pRHTFS6ySZmSr97-Wcd&index=4>
- *Backstage Discussion at Drake Awards: “Let’s Talk About Mars”*, May 6, 2021, <https://www.seti.org/event/2021-drake-awards>
- SETI Talks (moderated discussion with Elena Amador-French & Pablo Sobron) “The Search for Life on Mars with Perseverance”, March 24, 2021, <https://www.seti.org/event/seti-talks-search-life-mars-perseverance>.
- SETI Live (together with Franck Marchis & several others) “SETI Live: Mars 2020 – The Perseverance Rover Landing!”, February 18, 2021, <https://www.seti.org/event/seti-live-mars-2020-perseverance-rover-landing>.
- SETI Live “What’s Causing Landslides on Mars?”, February 4, 2021, <https://www.youtube.com/watch?v=XStXfCiyoyQ&list=PLw6lJozmaWbTt2pRHTFS6ySZmSr97-Wcd&index=8>.
- SETI News “Martian Landslides Caused by Underground Salts and Melting Ice?”, February 3, 2021, <https://www.seti.org/press-release/martian-landslides-caused-underground-salts-and-melting-ice>.
- Interviewed for article “Martian landslides may be caused by melting ice and salt under the surface”, by Ashley Strickland, CNN, February 3, 2021, <https://www.cnn.com/2021/02/03/world/martian-landslides-ice-salt-scen/index.html>.

- Interviewed for article *"Mars's mascara-like streaks may be caused by slush and landslides. Beneath its surface, the Red Planet may be slightly mushy"*, by Charlie Wood, Popular Science, February 3, 2021, <https://www.popsci.com/story/science/below-mars-surface-landslides-discovered/>.
- Interview at AstroFest *"Becoming a Super Scientist"*, October 6, 2020, <https://www.youtube.com/watch?v=1yL7kORJmkk>.
- SETI Institute Feature *"Is There a Painted Desert on Mars?"*, September 28, 2020, <https://seti.org/there-painted-desert-mars>.
- Interview on Nelly Boum Show *"Magnetite"*, September 5, 2020, <https://worldwidefm.net/show/nelly-ben-hayoun/>.
- SETI news *"The Avalanches & The International Space Orchestra Share Collaborative Music Video For 'Wherever You Go'"*, August 19, 2020, <https://www.seti.org/press-release/avalanches-international-space-orchestra-collaborative-music>.
- SETI talks *"Perseverance: A Martian Rover to Find Life?"*, August 19, 2020, <https://www.youtube.com/watch?v=6AS3LjrjDk&feature=youtu.be>.
- SETI Institute Special Interview *"Mars 2020 Mission Perseverance Rover"*, July 31, 2020, <https://www.seti.org/mars-2020-mission-perseverance-rover>
- Ssippin' Science Oxford Science Cafe *"Mars 2020: Shades Beyond Red"*, July 27, 2020, <https://podcasts.apple.com/us/podcast/ssippin-science/id1507082060>.
- Stanford News *"Stanford scientists anticipate the Mars 2020 rover launch"*, July 20, 2020, <https://news.stanford.edu/2020/07/20/perseverance-will-look-for-signs-of-life-on-mars/>
- SETI Institute Facebook Live *"Characterizing the surface of Mars remotely - how spectroscopy of minerals can reveal the ancient geochemistry and climate of our neighboring planet"*, Mars 5, 2020, <https://www.facebook.com/SETIInstitute/videos/janice-bishop-will-be-speaking-postdoctoral-fellow-merve-yesilbas-characterizing/533777477258194/>
- SETI Institute Facebook Live *"Mars Rocks!"*, October 3, 2019, part 1 <https://www.facebook.com/SETIInstitute/videos/vb.67487330534/958050031211831/?type=2&heater>, part 2: <https://www.facebook.com/SETIInstitute/videos/vb.67487330534/416177722373340/?type=2&heater>
- SETI Institute Facebook Live *"Women in Astronomy"*, February 11, 2017, <https://www.facebook.com/SETIInstitute/videos/vb.67487330534/1086383658212623/?type=2&theater>
- SETI Institute Facebook Live *"Tour of the Mineral Lab"*, May 11, 2017, <https://www.facebook.com/SETIInstitute/videos/vb.67487330534/10155149430745535/?type=2&theater>
- SETI Institute Feature *"What can soil experiments tell us about Mars?"* November 6, 2018, <https://www.seti.org/what-can-soil-experiments-tell-us-about-mars>
- NASA Astrobiology Research Highlight *"Clay Formation Study Leads to New Model for Early Martian Climate"* March 2, 2018, <https://astrobiology.nasa.gov/news/clay-formation-study-leads-to-new-model-for-early-martian-climate/>
- SETI Institute Feature *"Clay Formation Study Leads to New Model for Early Martian Climate. How 'Warm' is Warm?"* February 27, 2018, <https://seti.org/clay-formation-study-leads-to-new-model-early-martian-climate-how-warm-is-warm>
- NASA Ames Space Science and Astrobiology Weekly Highlight *"Clay Formation Study Leads to New Model for Early Martian Climate"* February 21, 2018, <https://spacescience.arc.nasa.gov/story/2018/02/>

- SETI Institute Feature “*New Studies of Clay Formation Provide Clues about Early Martian Climate*”, February 5, 2018, <https://www.seti.org/seti-institute/press-release/new-studies-clay-formation-provide-clues-about-early-martian-climate>
- SETI Institute Feature “*Orbiter Detects Changing Climate on Early Mars*”, September 7, 2016, <https://www.seti.org/seti-institute/news/orbiter-detects-changing-climate-early-mars>
- SETI Institute Feature “*Potential Habitats for Early Life on Mars*”, May 23, 2016, <https://www.seti.org/seti-institute/press-release/potential-habitats-early-life-mars>
- SETI Institute Feature “*Rock on, Mars*”, Oct., 2015, <http://www.seti.org/mars-week/rock-on-mars>.
- CosmicDiary.org: “*Past History of a Wet Mars Seen at Libya Montes*”, April, 2013, <http://cosmicdiary.org/jbishop/2013/04/24/past-history-of-a-wet-mars-seen-at-libya-montes/>
- SETI Institute Explorer Magazine “*The Clays of Mars*”, May, 2012.
- SETI Institute Press Release “*Young Clays on Mars may have Provided Niches Able to Support Life*” October 3, 2011, http://scienceblogs.com/SETI/2011/10/young_clays_on_mars_may_have_p.php.
- SETI Institute Press Release “*Scientists at the SETI Institute and NASA Ames Discover Evidence of Wet Martian Past in Desert*” posted August 1, 2011, <http://www.seti.org/seti-institute/press-release/scientists-seti-institute-and-nasa-ames-discover-evidence-wet-martian>
- SETI Institute Blog “*Mars: Back Through the Looking Glass*” posted May 19, 2011, <http://www.seti.org/seti-institute/project/details/janice-bishop-%E2%80%94-mars-back-through-looking-glass>.
- Astronomy Now “*Surprise recovery of meteorites from Sudan fireball*” posted March 26, 2009, <http://www.astronomynow.com/090326SurpriserecoveryofmeteoritesfromSudanfireball.html>.
- SETI Institute Press Release “*Martian Clays Tell Story of a Wet Past*” posted August 8, 2008, <http://www.teamseti.org/?pid=1166>
- National Geographic “*Mars Clay “Layer Cake” Adds to Proof of Watery Past*” by B. Handwerk, posted August 7, 2008, <http://news.nationalgeographic.com/news/2008/08/080807-mars-clays.html>
- Space.com: “*Looking for Water on Mars*” posted March 20, 2008, <http://www.space.com/searchforlife/080320-seti-mars-water.html>.
- Space.com: “*Seeing the Invisible colors of Mars*” posted January 29, 2004, <http://www.seti.org/color-of-mars-01-29-2004>.
- Astrobiology Magazine “*Achaean Sunscreen*” posted October 1, 2003, <http://www.astrobio.net/exclusive/613/archaeo-sunscreen>.
- SETI Voices: “*Seeing Red*” posted August 27, 2003, <http://www.seti.org/about-us/voices/bishop-082703.php>.

Educational Outreach Activities:

1. Trustee for the *Summer Science Program, Inc. (SSPI)*, an educational program in math and science for accelerated high school students (www.summerscience.org) 2002-2022.
2. Led multiple science activities and demonstrations, Elementary and Middle School, German American International School & Alto International School, Menlo Park, 2010-2019.
3. Mentor & Speaker, Professional Women’s Night, *Tech Trek Marie Curie Camp for 7th grade girls*, Stanford University, 2013, 2017, 2018.
4. Assistant, *Science on Saturday Lecture Series* for middle school students, sponsored by Lawrence Livermore National Lab and Sigma Xi, Livermore, CA, Saturday mornings February - April, 1998.
5. Panelist, *Tri-Valley Expanding your Horizons Conference*; day-long program for middle school and high school girls to encourage them to pursue careers in science, sponsored by Lawrence Livermore National Lab, at Los Positas College, Livermore, CA, 1985.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

American Geophysical Union	1998 – present
Geological Society of America	1997 – present
Mineralogical Society of America	1997 – present
European Geophysical Society	1995, 2005, 2008, 2015
Clay Minerals Society	1991 – present
Meteoritical Society	1991 – present
Planetary Society	1991 - present
American Chemical Society	1990 - 1994
Sigma Xi, The Scientific Research Society	1990 – 2006

SKILLS & EXPERTISE

Planetary Remote Sensing: spectroscopic analysis of the mineralogy and surface processes on Mars and the Earth using remotely acquired and laboratory spectral data.

Astrobiology: spectral identification of aqueous minerals and organics in geologic samples in preparation for identifying them and characterizing habitable sites on planetary surfaces.

Laboratory: spectroscopic measurement and analysis including visible and infrared reflectance, emittance, Raman, and transmittance spectroscopy of Mars analogs; Quantification experiments using mixtures; Alteration experiments under Mars-like environments.

Field Work: sample collection and *in situ* analysis of clay-, sulfate- and carbonate-bearing rocks, rock alteration and coating formation.

Languages: fluent in German: speaking, reading, writing, lecturing; limited abilities in French.

SUCCESSFUL RESEARCH GRANTS AS PRINCIPLE INVESTIGATOR

“Characterizing Ammonium-Bearing Materials to Constrain Ammonium in the Regoliths of Rocky Bodies in our Solar System” NASA Solar System Workings Program (SSW), 2024-2026.

“Advancing our Understanding of Aqueous Alteration and Gypsum Formation at Olympia Undae Through Analysis of CRISM and HiRISE Imagery” Mars Data Analysis Program (MDAP), 2023-2025.

“Investigating Reflectance and Emissivity Spectra of Minerals and Analogs under Vacuum to Support Analyses of Lunar Spectra” Europlanet Society, Research Travel Grant to DLR in Berlin, 2023.

“Characterization of Low-Hydrate Mg and Fe Sulfates to Support their Detection on Mars” NASA Solar System Workings Program (SSW), 2023-2025.

“Characterizing Variations in the Spectroscopic Features Due to H₂O and/or OH on the Surface of the Moon” Lunar Data Analysis Program (LDAP), 2022-2024.

“Constraining the Mineralogical, Geochemical, and Climatic History of Juventae Chasma” Mars Data Analysis Program (MDAP), 2022-2024.

“Characterizing the Geochemical Conditions Governing Formation and Reaction of Jarosite and Alunite Outcrops on Mars in the Context of Lab Experiments and Field Observations” Mars Data Analysis Program (MDAP), 2019-2022.

“Providing Spectral Library Data to the PDS and CAT” Planetary Data Archiving, Restoration, and Tools (PDART) program, 2019-2022.

“Analysis of the Effects of Aqueous Processes and Impacts in the South Isidis Region from Libya Montes to Tyrrhena Terra” Mars Data Analysis Program, 2018-2021.

“Investigating Evidence of Acidic Alteration on Mars: Analyses of Unique Aqueous Outcrops at Valles Marineris, Noctis Labyrinthus and Mawrth Vallis” Mars Data Analysis Program, 2015-2018.

“Characterizing Nanophase Materials on Mars: A Lab Spectroscopy and XRD Study of Allophane, Hydrated Silica, Iron Oxides/Hydroxides and Fe-Al-Si Oxide Species” Solar System Workings Program, 2015-2018.

- “Low temperature characterization of hydrohalite and related salts essential to life in the Atacama” Exobiology Program, 2013-2015.
- “Investigating the Mineralogy at Libya Montes, Mars, Determining if Carbonates are Present, and Characterizing the Geologic History of the Isidis Planitia Region” Planetary Geology and Geophysics Program, 2012-2015.
- “Investigating the Origin of Layered Outcrops in the Mawrth Vallis Region” Mars Data Analysis Program, 2012-2015.
- “CRISM and HiRISE Investigation of Aqueous Materials at the Juventae Plateau in order to Identify and Characterize a New Landing Site with High Potential for Habitability and Preservation of Biosignatures.” RFP Critical Data Products Program at JPL, 2010-2011.
- “Revealing the Clays on Mars: A Spectral Unmixing Study of Phyllosilicates, Zeolites, Hydrated Silica and Glass “ Mars Fundamental Research Program, 2008-2011.
- “Searching for Aqueous Activity on Mars through Analyses of VNIR Spectral Images” Mars Data Analysis Program, 2006-2010.
- “Formation of Magnetic Minerals on Mars by Alteration of Nanophase Ferric Oxides/ Oxyhydroxides” Mars Fundamental Research Program, 2006-2010.
- “Iron oxide: An early sunscreen for photosynthetic microbes?” Director’s Discretionary Fund research grant, NASA-Ames Research Center, 2002-2004.
- “Organic Reductant as Key to Maghemite Formation on Mars?” Director’s Discretionary Fund research grant, NASA-Ames Research Center, 1999-2001.
- “A Study of Soil Formation and Rock Alteration Models Through Analysis of Spectroscopic, Magnetic and Chemical Data from Mars Pathfinder and S, Fe-bearing Analog Materials” Mars Data Analysis Program, 1999-2003.
- “Spectral Identification of Organics and Carbonates in the Martian Surface Rocks” National Research Council Research Associateship at NASA-Ames Research Center, sponsor: Rocco Mancinelli, 1997-1998.
- “Visible and Infrared Spectroscopic Analyses of Mars Soil Analogs” Alexander von Humboldt Research Fellowship at the DLR-Berlin, Germany, sponsor: Gerhard Neukum, 1994-1996.
- “Spectroscopic Analysis of Iron-rich Montmorillonite as a Mars Soil Analog Material” NASA Graduate Student Researchers Program, sponsor: Sherwood Chang, 1990-1994.

SUCCESSFUL RESEARCH GRANTS AS CO-INVESTIGATOR

- “Analyses of Sulfates in Chaos Regions on Mars” (PI Catherine Wetiz, Planetary Science Institute) Mars Data Analysis Program (MDAP), 2023-2025.
- “Characterizing the Low-Temperature Spectral Properties of Lunar Analogues” Europlanet Society, Research Travel Grant to IPAG in Grenoble, 2023.
- “OptiDrill: The next-generation instrumented drill” (PI Kathryn Bywaters, Honeybee) NASA Planetary Instrument Concepts for the Advancement of Solar System Observations (PICASSO), 2023-2025.
- “Mapping and Analysis of Sulfates at Gale Crater from Orbital Data Sets and Preparing for Future Rover Exploration” (PI Catherine Wetiz, Planetary Science Institute) Mars Data Analysis Program (MDAP), 2019-2022.
- “IceCrystal: Portable instrument protocol to delineate ancient ice and water on Mars using microcrystallinity of volcanic products” (PI Erika Rader, University of Idaho) Planetary Science and Technology from Analog Research Program, 2018-2021.
- “Investigation of Anomalous Terrains on Olympus Mons” (PI Kim Seelos, JHUAPL) Mars Data Analysis Program, 2017-2020.
- “Investigation of Sedimentary and Altered Deposits in and around Ladon Basin” (PI Cathy Weitz, PSI) Mars Data Analysis Program, 2017-2019.

“Constraining the Extent and Causes of Sedimentary Deposition and Aqueous Alteration in Coprates Chasma and Nearby Depressions” (PI Cathy Weitz, PSI) Mars Data Analysis Program, 2013-2016.

“Changing Planetary Environments & the Fingerprints of life” (PI Nathalie Cabrol, SETI Institute) NASA Astrobiology Institute, 2015-2020.

“Unraveling the sedimentary history of gypsum sand in the northern polar sand seas of Mars” (PI Lori Fenton, SETI Institute) Planetary Geology and Geophysics Program, 2012-2015.

“Laboratory and Theoretical Studies Enabling Quantitative Abundance Estimates of Hydrated-Hydroxylated Silicates from Visible and Near-Infrared Orbital Remote Sensing Data of Mars” (PI Ted Roush, NASA-Ames) Mars Fundamental Research Program, 2011-2014.

“Geologic Investigation of Interior Layered Deposits in Hebes Chasma and Noctis Labyrinthus” (PI Cathy Weitz, PSI) Mars Data Analysis Program, 2010-2013.

“The State of Sulfur on Mars: Understanding the Inter-relationships Among the Crystal Structure, Chemistry, and Spectroscopy of Sulfates and Sulfides” (PI Melissa Lane, PSI) Mars Fundamental Research Program, 2010-2013.

“Analysis and Characterization of Phosphates Using Multiple Spectral Techniques” (PI Melissa Lane, PSI) Mars Fundamental Research Program, 2008-2011.

“Integrated Spectroscopy of Synthetic Pyroxenes: Tools to Characterize Igneous Processes on the Inner Planets” (PI Carlé Pieters, Brown) Mars Fundamental Research Program, 2007-2010.

“Further Analysis and Characterization of Sulfates and Sulfides Using Multiple Spectral Techniques” (PI Melissa Lane, PSI) Mars Fundamental Research Program, 2005-2009.

“BIOsphere of Mars: Ancient and Recent Studies” (PI Jill Banfield, U.C. Berkeley) NASA Astrobiology Institute, 2005-2009.

“Planetary Biology, Evolution and Intelligence” (PI Chris Chyba then Rocco Mancinelli, SETI Institute) NASA Astrobiology Institute, 2005-2009.

“Analysis and Characterization of Sulfates and Sulfides Using Multiple Spectral Techniques” (PI Melissa Lane, PSI) Mars Fundamental Research Program, 2004-2005.

“Taking Apart the Rocks of Mars” (PI Carlé Pieters, Brown) Mars Fundamental Research Program, 2004-2007.

“CRISM” (PI Scott Murchie, JHU-APL) MRO Program, 2002-present.

TEACHING EXPERIENCE

Guest Instructor, Planetary Surface Processes: Shaping the Landscapes of the Solar System (taught by Mathieu Lapôtre), Geological Sciences course #120, Stanford University, 2021, 2023.

Guest Instructor, Introduction to Planetary Sciences (taught by Laura Schaefer), Geological Sciences course #124, Stanford University, 2021.

Osher Lifelong Learning Program (OLLI), Lecturer in courses taught by SETI Institute scientists at Santa Clara University, Santa Clara, CA and University of Calif., Berkeley (2016-2019)

Guest Professor and Instructor (Kurs 24320a: Mineralogische Erkundung des Mars mittels VIS/NIR Spektroskopie) course in Geological Sciences, Free University of Berlin, Germany, 2015.

REU (Research Experience for Undergraduates) lectures on Mars and Astrobiology, SETI Institute, 2010 to present.

Guest Lecturer, Astrobiology (taught by Alessandro Airo), Free University, Berlin, 2012.

Guest Lecturer, Astrobiology Space Exploration (taught by Lynn Rothschild), Human Biology, Stanford University, 2010.

Informal lectures on mineral spectroscopy, remote sensing, Mars, soil formation, and aqueous chemistry to students working with me at the SETI Institute and NASA-Ames, 2003-present.

Substitute Lecturer, Remote Sensing (taught by Carlé M. Pieters), Brown University, 1999.

Informal lectures on mineral spectroscopy to students at DLR, Berlin, 1994-1996.

Teaching Certificate, Center for Advancement of College Teaching, Brown University, 1993; course designed to enhance teaching skills for graduate students.

Teaching Assistant, part-time, Volcanology, Brown University, 1992: responsibilities included assisting students and grading assignments.

Teaching Assistant, Introductory Chemistry Laboratory Course, Brown University, 1989-1990; responsibilities included instructing students in the use of laboratory equipment and basic chemistry skills.

Teaching Assistant, Summer Science Program for accelerated high school students in astronomy and physics, Ojai, CA (sponsored then by the Thacher School, Pomona College and Stanford University; now independently operated) June-July, 1986 & 1987. Responsibilities included instructing students in the use of telescopes, dark room, and measuring engines.

STUDENT ADVISING

Advising Graduate Students (14):

1. Katya Yanez, Brown University, Department of Earth, Environmental, and Planetary Sciences, Ph.D. anticipated 2028.
2. Kierra Wilk, Brown University, Department of Earth, Environmental, and Planetary Sciences, Ph.D. anticipated 2026.
3. Arun Saranathan, School of Electrical and Computer Engineering, University of Massachusetts Amherst, Ph.D. 2023.
4. Andrew Foerder, University of Hawai'i, Mānoa, Department of Earth and Planetary Sciences, MS. 2022.
5. Andrew Rodriguez, School of Geosciences, The University of Oklahoma, Ph.D. student.
6. McKayla Meier, Dept of Geography and Geological Sciences, University of Idaho, Ph.D. student.
7. Zachary Burton, School of Earth, Energy & Environ. Sciences, Stanford University, Ph.D. 2020.
8. Jacob Danielsen, Department of Geology, San Jose State Univ., MS., 2020.
9. Christoph Gross, Institute of Geological Sciences, Free University of Berlin, Germany, Ph.D. 2018.
10. Barbara Lafuente, Department of Geosciences, University of Arizona, Ph.D. 2016.
11. Muna Al-Samir, Institute of Geological Sciences, Free University of Berlin, Germany, Ph.D. 2015.
12. Mario Parente, Electrical Engineering Department, Stanford University, M.S. 2005.; Ph.D. 2010.
13. Nancy McKeown, Department of Earth and Planetary Sciences, University of California Santa Cruz, Ph.D. 2010.
14. Heather Makarewicz, Mathematics Department, University of Kansas, M.S. 2009; Computer Science and Engineering Department, University of Kansas, M.S. 2010.

Advising Undergraduate Students (27):

- 1 Gisele Tjan, Colgate University, summer 2024.
- 2 Katya Yanez, California State University Northridge, summer 2022.
- 3 Kierra Wilk, Rensselaer Polytechnic Institute, summer-fall 2020.
- 4 Fiona Grant, University of California Los Angeles, summer-fall 2020.
- 5 Gabriela Usabal, Brown University, summer 2018.
- 6 Jasper Miura, Brown University, summer 2018.
- 7 Tatiana Gibson, California Polytechnic State University, summer 2018.
- 8 Selena Perrin, Stanford University, 2016-2018.
- 9 Jacob Danielsen, San Jose State Univ., 2016-2017.
- 10 Sara King, Sacramento State Univ., 2013-2014.
- 11 April Davis, MiraCosta College, 2013-2014.

- 12 Alicia Noel, UC Davis, 2012-2013.
- 13 Shital Patel, San Jose State University, 2012-2013.
- 14 Ian Szumila, Rensselaer Polytechnic Institute, summer 2012.
- 15 Amanda Aguilera, San Jose State University, 2011-2012.
- 16 Lee Saper, Brown University, summer 2010.
- 17 Bill Freeman, Louisiana State University, summer 2010.
- 18 Lauren Hunkins, University of South Florida, summers 2009-2011.
- 19 Laura Bayley, Brown University, summer 2009.
- 20 Kaysea Perry, California Polytechnic State University, summer 2009.
- 21 Elena Amador, University of California Santa Cruz, summer 2008.
- 22 Alicia Muirhead, University of California Santa Cruz, summer 2008.
- 23 Trevor Clark, University of California Davis, summer 2007.
- 24 Nancy Garcia, Texas A & M University, summer 2007.
- 25 Andrew Honma, University of Hawaii, summer 2007.
- 26 Heather Makarewicz, Nazarene University, summer 2007.
- 27 Rebecca Sullivan, University of Texas El Paso, summer, 2004.

Student Advising at the Summer Science Program:

- Teaching Assistant and Residence Assistant at 6-week astronomy Summer Science Program for rising high school seniors, (<https://summerscience.org>), 1986-1987. Instructed students in use of telescopes for observing asteroids, dark room for developing plates, and measuring engines for determining distances between their asteroid and stars in their study region. Assisted students with homework in calculus, physics, and astronomy, and provided guidance for calculations to determine the orbit of their asteroid. Responsibilities also included counseling, mentoring, and leading extracurricular activities (e.g., card games, sports, hikes, talent show).

Student Advising while at Stanford University:

- Residence Assistant at Haus Mitteleuropa (German Language Theme Residence), 1987-1988. Selected for highly competitive position as student leader and liaison between student dormitory and residential management. Responsibilities included counseling, mentoring, and working with dormitory staff.
- Academic Advisor, 1985-1987. Selected to work jointly with faculty advisor to provide advice on a variety of academic issues including courses, major, and career directions. Met once per week with group of six freshman students.
- Math Tutor, 1984-1985. Selected from Freshman Honors Math course to provide tutoring in calculus and introductory math to students needing extra assistance.

Total Peer-Reviewed Publications: 168

Peer-Reviewed Book Chapters: 12

1. **Bishop J.L.** (2019) Chapter 4: Visible and near-infrared reflectance spectroscopy of geologic materials. In: *Remote Compositional Analysis: Techniques for Understanding Spectroscopy, Mineralogy, and Geochemistry of Planetary Surfaces*, eds. J. L. Bishop, J. F. Bell, III and J. E. Moersch (Cambridge University Press, Cambridge, UK), 68-101.
2. Lane M.D. & **Bishop J.L.** (2019) Chapter 3: Mid-infrared (thermal) emission and reflectance spectroscopy. In: *Remote Compositional Analysis: Techniques for Understanding Spectroscopy, Mineralogy, and Geochemistry of Planetary Surfaces*, eds. J. L. Bishop, J. F. Bell, III and J. E. Moersch (Cambridge University Press, Cambridge, UK), 42-67.
3. Murchie S.L., Bibring J.P., Arvidson R.E., **Bishop J.L.**, Carter J., Ehlmann B.L., Langevin Y., Mustard J.F., Poulet F., Riu L., Seelos K.D. & Viviano C.E. (2019) Chapter 23. Visible to short-wave Infrared spectral analyses of Mars from orbit using CRISM and OMEGA. In: *Remote Compositional Analysis: Techniques for Understanding Spectroscopy, Mineralogy, and Geochemistry of Planetary Surfaces*, eds. J. L. Bishop, J. F. Bell, III and J. E. Moersch (Cambridge University Press, Cambridge, UK), 453-483.
4. **Bishop J.L.** (2018) Chapter 3: Remote detection of phyllosilicates on Mars and implications for climate and habitability. In: *From Habitability and Life on Mars*, eds. N.A. Cabrol & E. A. Grin, (Elsevier, The Netherlands) pp. 37-75.
5. **Bishop J.L.**, Michalski J.R. and J. Carter (2017) Remote detection of clay minerals. In: *Infrared and Raman Spectroscopy of Clay Minerals*, eds. W. Gates, T. Klopogrogge, J. Madejova, and F. Bergaya (Elsevier, The Netherlands) pp. 482-514.
6. Farrand W.H., Bell J.F. III, Johnson J.R., **Bishop J.L.** and Morris R.V. (2008) Multispectral imaging from Mars Pathfinder. In: *The Martian Surface*, ed. J. F. Bell, III (Cambridge University Press, Cambridge) pp. 265-280.
7. **Bishop J.L.** (2005) Hydrated Minerals on Mars. In: *Water on Mars and Life*, ed. T. Tokano, Advances in Astrobiology and Biogeophysics Series, Springer-Verlag, Berlin, pp. 65-96.
8. Schiffman P., Southard R., Eberl, D.D. and **Bishop J.L.** (2002) Distinguishing palagonitized from pedogenically-altered basaltic tephra: Mineralogical and geochemical criteria. In: *Volcano-Ice Interactions on Earth and Mars*, eds. J. L. Smellie and M. G. Chapman (Geological Society, Special Pub. No. 202) London, 393-405.
9. **Bishop J.L.** and Murad E. (2002) Spectroscopic and Geochemical Analyses of Ferrihydrite from Hydrothermal Springs in Iceland and Applications to Mars. In: *Volcano-Ice Interactions on Earth and Mars*, eds. J. L. Smellie and M. G. Chapman (Geological Society, Special Pub. No. 202) London, pp. 357-370.
10. **Bishop J.L.**, Schiffman P., Southard R. (2002) Geochemical and mineralogical analyses of palagonitic tuffs and altered rinds of pillow lavas on Iceland and applications to Mars. In: *Volcano-Ice Interactions on Earth and Mars*, eds. J. L. Smellie and M. G. Chapman (Geological Society, Special Pub. No. 202) London, pp. 371-392.
11. **Bishop J.L.** and Murad E. (1996) Schwertmannite on Mars? Spectroscopic analyses of schwertmannite, its relationship to other ferric minerals, and its possible presence in the surface material on Mars. In: *Mineral Spectroscopy: A tribute to Roger G. Burns*, eds. M. D. Dyar, C. McCammon and M. W. Schaefer (The Geochem. Soc., Special Pub. No. 5) pp. 337-358.

12. Coyne L.M., **Bishop J.L.**, Scattergood T., Banin A., Carle G. and Orenberg J. (1990) Near-infrared correlation spectroscopy, quantifying iron and surface water in a series of variably cation-exchanged montmorillonite clays. In: *Spectroscopic Characterization of Minerals and Their Surfaces*, eds. L Coyne, S. McKeever, D. Blake (American Chemical Society, Washington, DC) pp. 407-429.

Peer-Reviewed Journal Articles: 156 (student authors underlined)

1. **Bishop J. L.**, Tirsch D., Viviano C. E., Lane M. D., Tornabene L. L., Sacks L., Voigt J. R. C., Ojha L., Loizeau D., Grant F. H., Seelos K. D. & Seelos F. P. (2024) Unraveling Geologic Processes and Aqueous Alteration at Tyrrhena Terra, Mars. *Journal of Geophysical Research*, under review.
2. Lane M. D., **Bishop J. L.**, Viviano C. E., Tirsch D., Tornabene L. L., Loizeau D., Sacks L. & Voigt J. (2024) Identifying two distinct olivine compositions in the Libya Montes and Tyrrhena Terra regions of Mars. *Journal of Geophysical Research*, under review.
3. Reeder A., Rader E. & **Bishop J.L.** (2024) Glass, crystallinity, and VNIR reflectance from vent to margin at Jordan Craters, OR USA. *Journal of Volcanology and Geothermal Research*, **447**, 108035.
4. Eng A. M., Rice M. S., Farrand W. H., Johnson J. R., Jacob S. R., Rampe E. B., Thompson L., St. Clair M., Applin D., **Bishop J. L.**, Cloutis E., Gabbert M., Haber J., Lap K., Rudolph A., Seeger C. H. & Sheppard R. Y. (2024) A Mastcam multispectral investigation of rock variability in Gale crater, Mars: Implications for alteration in the clay-sulfate transition of Mount Sharp. *Journal of Geophysical Research: Planets*, **129**, in press, e2023JE008033.
5. Gross C., Al-Samir M., **Bishop J. L.**, Poulet F., Postberg F. & Schubert D. (2024) Prospecting in-situ resources for future crewed missions to Mars. *Acta Astronautica*, **223**, 15-24.
6. **Bishop J. L.**, Schiffman P., Murad E., Southard R. J., Gruendler L., Dyar M. D. & Lane M. D. (2024) Solfataric alteration at the South Sulfur Bank, Kilauea, Hawaii, as a mechanism for formation of sulfates, phyllosilicates, and silica on Mars *American Mineralogist*, in press.
7. Foerder A. B., Englert P. A. J., **Bishop J. L.**, Koeberl C., Burton Z. F. M., Patel S. & Gibson E. K. (2024) Don Juan Basin, Antarctica: A chemically-altering environment with martian analog potential. *American Mineralogist*, **109**, 682-700.
8. Wilk K. A., **Bishop J. L.**, Weitz C. M., Parente M., Saranathan A. M., Itoh Y., Gross C., Flahaut J. & Seelos F. P. (2024) Characterization of aqueous alteration and formation of salty exposures at Ius Chasma, Mars *Icarus*, **408**, 11580.
9. Geyer C. J., Elwood Madden A. S., Rodriguez A., **Bishop J. L.**, Mason D. & Elwood Madden M. E. (2023) The role of sulfate in cation exchange reactions: applications to clay-brine interactions on Mars. *Planetary Science Journal*, **4**, 48.
10. Warren-Rhodes K., Cabrol N. A., Phillips M., Cayo C. T., Kalaitzis F., Ayma D., Demergasso C., Chong-Diaz G., Lee K. C., Hinman N., Rhodes K. L., Ng Boyle L., **Bishop J. L.**, Hofmann M. H., Hutchinson N., Javiera C., Moersch J., Mondro C., Nofke N., Parro V., Rodriguez C., Sobron P., Sarazzain P., Wettergreen D., Zacny K. & the SETI Institute NAI Team. (2023) Orbit to Ground Framework to Decode and Predict Biosignature Patterns in a Martian Analog. *Nature Astronomy*, **7**, 406-422. doi: 10.1038/s41550-022-01882-x.
11. Burton Z. F. M., **Bishop J. L.**, Englert P. A. J., Szykiewicz A., Koeberl C., Dera P., Mckenzie W. & Gibson E. K. (2022) A shallow salt pond analog for aqueous alteration on ancient Mars: Spectroscopy, mineralogy, and geochemistry of sediments from Antarctica's Dry Valleys *American Mineralogist*, **108**, 1017-1031.
http://www.minsocam.org/msa/ammin/AM_Preprints/8381BurtonPreprint.pdf.

12. Weitz C. M., **Bishop J. L.**, Grant J. A., Wilson S. A., Irwin R. P., Saranathan A. M., Itoh Y. & Parente M. (2022) Clay sediments derived from fluvial activity in and around Ladon basin, Mars. *Icarus*, **384**, 115090.
13. Weitz C. M., Lewis K. W., **Bishop J. L.**, Thomson B. J., Arvidson R. E., Grant J. A., Seelos K. D. & Ettenborough I. (2022) Orbital observations of a marker horizon at Gale crater. *Journal of Geophysical Research Planets*, **127**, e2022JE007211.
14. Rader E., Ackiss S., Sehlke A., **Bishop J.**, Orrill B., Odegaard K., Meier M. & Doloughan A. (2022) Average VNIR reflectance: A rapid, sample-free method to estimate glass content and crystallinity of fresh basaltic lava. *Icarus*, **383**, 115084.
15. Hinman N., Hofmann M.H., Warren-Rhodes K., Phillips M.S., Noffke N., Cabrol N.A., Chong G., Demergasso C., Tebes C., Cabestrero O., **Bishop J.L.**, Gulick V.C., Summers D.M., Sobron P., McInenly M., Moersch J., Rodriguez C., Sarazzin P., Rhodes K.J. & Parro V. (2022) Surface Morphologies in a Mars-analog Ca-sulfate Salar, High Andes, Northern Chile. *Frontiers in Astronomy and Space Sciences*, **8**, Article 797591.
16. Cuadros J., Michalski J.R., **Bishop J.L.**, Mavris C., Fiore S. & Dekov V. (2022) Mars-rover cameras evaluation of laboratory spectra of Fe-bearing Mars analog samples. *Icarus*, **371**, 114704.
17. Hess M., Wöhler C., Berezhnoy A. A., **Bishop J. L.** & Shevchenko V. V. (2022) Dependence of the hydration of the lunar surface on the concentrations of TiO₂, plagioclase, and spinel. *Remote Sensing*, **14**, 47.
18. Lapôtre M.G.A., **Bishop J. L.**, Ielpi A., Lowe D.R., Siebach K.L., Sleep N.H. & Tikoo S.M. (2022) Mars as a time machine to precambrian Earth. *Geological Society of London Special Publications in Earth Evolution through a Tectono-metamorphic Lens: a Record of Tectonic and Biogeochemical Evolution*, Journal of the Geological Society, <https://doi.org/10.1144/jgs2022-047>.
19. **Bishop J. L.**, King S. J., Lane M. D., Brown A. J., Lafuente B., Hiroi T., Roberts R., Swayze G. A., Lin J.-F. & Sánchez Román M. (2021) Spectral properties of anhydrous carbonates and nitrates. *Earth and Space Science*, **8**, e2021EA001844.
20. Szykiewicz A. & **Bishop J. L.** (2021) Assessment of sulfate sources under cold conditions as a geochemical proxy for the origin of sulfates in the circumpolar dunes on Mars. *Minerals*, **11**, 507.
21. Losa-Adams E., Gil-Lozano C., Fairén A. G., **Bishop J. L.**, Rampe E. B. & Gago-Duport L. (2021) Long lasting habitable periods in an ancient lake of Mars constrained by glauconitic clays. *Nature Astronomy*, 10.1038/s41550-021-01397-x.
22. Hinman N.W., **Bishop J.L.**, Gulick V.E., Kotler Dettmann J.M., Morkner P., Berlanga, G., Henneberger R.M., Bergquist P., Richardson C.D., Walter M.R., MacKenzie L.A., Anitori R.P. & Scott J.R. (2021) Targeting mixtures of jarosite and clay minerals for Mars exploration. *American Mineralogist*, **106 (8)**, 1237–1254.
23. Grosch E.G., **Bishop J.L.**, Mielke C., Maturilli A. & Helbert J. (2021) Early Archean alteration minerals in mafic-ultramafic rocks of the Barberton greenstone belt as petrological analogues for clay mineralogy on Mars. *American Mineralogist*, **106 (5)**, 672-684.
24. Jeute T., Baker L. L., **Bishop J. L.**, Abidin Z. & Rampe E. B. (2021) Spectroscopic analysis of allophane and imogolite samples with variable Fe abundance for characterizing the poorly crystalline components on Mars. *American Mineralogist*, **106 (4)**, 527-540.
25. **Bishop J. L.**, Yeşilbaş M., Hinman N. W., Burton Z. F. M., Englert P. A. J., Toner J. D., McEwen A. S., Gulick V. C., Gibson E. K. & Koeberl C. (2021) Martian subsurface cryosalt expansion and collapse as trigger for landslides. *Science Advances*, **7(6)**, abe4459.
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1. Parente M., Bishop J. L., Saranathan A. M. & Itoh Y. (2024) Orbital CRISM Mineral Predictions of Mg-smectite, Carbonate, and Hydrated Silica at Jezero Crater Confirmed by Perseverance Rover. *AGU Fall Meeting*, Abstract #.
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4. Bishop J. L. (2024) Arthur L. Day Medal: Investigating Mineralogy and Geochemistry on Mars Through Lab, Field, and Remote Observations. *GSA Connects*, Abstract #168-8.
5. Phua Y. Y., Ehlmann B. L., Siljeström S., Bishop J. L., Rampe E. B. & Pandey A. (2024) Hydrated sulfates on Mars. *GSA Connects*, Abstract #168-9.
6. Bishop J. L., Meusburger J. M., Talla D., Weitz C. M., Parente M., Gross C., Saranathan A. M., Itoh Y., Gruendler M. R. D., Howells A. E. G., Yeşilbaş M., Hiroi T., Schmitt B., Maturilli A., Al-Samir M., Bristow T. F., Lafuente B. & Wildner M. (2024) Characterizing the New Mineral FeSO₄OH on Mars and Describing its Geochemical History and Association with Other Sulfates *Europlanet Science Congress*, Abstract #289.
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