

Valerie Payré

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Research Experiences

- 2022 **Assistant Professor**, Department of Earth and Environmental Sciences, University of Iowa, IA, USA
- 2020 **Postdoctoral Research Scholar, Mars Science Laboratory Science Team Member**, Department of Astronomy and Planetary Science, Northern Arizona University, Flagstaff, AZ, USA
- 2018 **Wiess Postdoctoral Research Associate**, Department of Earth, Environmental and Planetary Science, Rice University, Houston, TX, USA
- 2017 **Staff Scientist, Mars Science Laboratory Science Team Collaborator, ChemCam Payload Downlink Lead**, Centre National de la Recherche Scientifique (CNRS) – IRAP – GeoRessources, Nancy, France
- 2014 **Ph.D., Mars Science Laboratory Science Team Collaborator, ChemCam Payload Downlink Lead**, GeoRessources, Nancy, France
Advisors, Cécile Fabre and Violaine Sautter.
‘Contribution of the ChemCam instrument to the understanding of the primitive martian crust and weathering processes at the surface of Mars – Alkaline and metal trace element quantifications using LIBS (Li, Sr, Rb, Ba and Cu)’
Technical skills: Laser Induced Breakdown Spectroscopy (LIBS), sample preparation, igneous glass synthesis, electronic microprobe, SEM, LA-ICP-MS, X-ray computed tomography, univariate calibration, Matlab.
Summary: LIBS calibrations of Li, Sr, Rb, Ba, and Cu and major elements using univariate models – Understanding of processes causing elevated Li, Rb, Sr and Ba concentrations along Curiosity traverse in the first 1000 sols - Constrain the origin of copper enrichments at Kimberley – Understanding of the primitive martian crust using Gale igneous alkaline rocks, the igneous clasts from the martian breccia NWA7533/7034, and orbital data – Comparison between the primitive martian crust and the Archean crust - Characterization of ‘Bathurst-like’ rocks.
- 2014 **Grad. Student Research Assistant**, Isotope Stable, IPGP, Paris, France
Advisors, Isabelle Martinez and Mathilde Cannat.
‘Carbonation of natural serpentines retrieved from the Indian Ocean ridge.’
Technical skills: Microprobe, SEM, DRX, Raman, FIB sampling preparation, TEM, autoclave experiments.
Summary: Constraining tectonic and hydrothermal contexts for natural serpentine carbonation
- 2013 **Grad. Student Research Assistant**, GPS, Caltech, CA, USA

Advisors, Sarah Lambart, Mike Baker and Ed Stolper.

'Characterization of volcanic samples collected during the deepest phase of the Hawaii Drilling Project (HSDP-2).'

Technical skills: Sampling preparation, electronic microprobe (calibrations and analyzes), alphaMELTS.

Summary: Analyses of major element and S contents in glasses and minerals from the deepest part of the HSDP-2 core coming from the Mauna Kea volcano in Hawaii - comparison with the composition of shallower samples from HSDP-2 – Constraints of fractionation path, functioning of the magma chamber, and primary magma composition using alphaMELTS.

- 2012 **Undergrad. Student Research Assistant**, ISTEP, University of Pierre and Marie Curie (Paris VI), France
Advisors, Benoît Villemant and Benoît Caron
'Characterization of volcanic samples collected during IODP 340 in the Caribbean sea.'
Technical skills: Sampling preparation, electronic microprobe.
Summary: Analyses of major elements in minerals and glasses of samples from IODP-340 core coming from the Caribbean sea, off the coast of Martinique and Dominica - Identify the volcanic source of each sample.

Education

- 2017 **Ph.D.** Geosciences obtained with honors
GeoRessources laboratory, University of Lorraine, Nancy, France
- 2014 **Master's Degree** Geochemistry obtained with honors
École Normale Supérieure Ulm (ENS) and Institut de Physique du Globe de Paris (IPGP), Paris, France
Majors: Geochemistry, Petrology, Geophysics, Geodynamics, Numerical modeling
- 2012 **Bachelor's Degree** Geosciences
École Normale Supérieure Ulm (ENS), Paris, France
- 2011 **Classe Préparatoire Certificate** obtained with honors
Majors: Biology, Chemistry, Physics, and Earth Sciences (BCPST)
'Classe Préparatoire aux Grandes Écoles' (CPGE) Pierre de Fermat, Toulouse, France
- 2009 **High School Diploma** Sciences, major Math, obtained with honors
N-D de Bon Secours High School, Perpignan, France

Teaching Experiences and Advising

- Fall 2022 **EES 2410: Mineralogy**, University of Iowa, IA
- 2021 - 2022 **Master Research Assistant Co-Advisor**, University of Liverpool, Liverpool, UK
'Evolution of Effusive Volcanism in Syrtis Major, Mars: an Orbital Study'
- 2021 **Research Experience of Undergraduate (REU) Mentor**, Northern Arizona University, AZ, USA
'Evolution of water ice at the South pole of Mars as seen from Orbit'
- 2020 **Undergrad. Research Assistant Advisor**, Rice University, Houston, TX, USA

- 'Identification of igneous mineral end-members within the eolian Stimson formation, Gale crater, Mars'*
- 2020 **NASA SEES (STEM Enhancement in Earth Sciences) Mentor**
Roving Mars and Mars 2020
- 2019 - 2020 **Instructor**, Rice University, Houston, TX, USA
ESCI 557: Water on Mars (graduate students)
ESCI 114: Discoveries in Earth, Environmental and Planetary Sciences (undergraduate students)
- 2019 **Undergrad. Research Assistant Advisor**, Rice University, Houston, TX, USA
'Incongruent dissolution of plagioclases within Iceland sediments'
- 2015 - 2016 **Teaching Assistant**, University of Lorraine, Nancy, France
'General Geology', 'Field Mapping' and 'Petrology' (undergraduate students)
- 2016 **Undergrad. Research Assistant Advisor**, GeoRessources laboratory, University of Lorraine, France
'Bathurst rocks in Gale Crater, Mars: are they sandstones or volcanoclastic rocks?'
- 2015 **Master Research Assistant Advisor**, École Nationale Supérieure de Géologie (ENSG), France
'Composition of martian rocks along the Curiosity traverse in Gale crater, Mars'
- 2011 - 2012 **School Support and Individual Tutoring**, Math, Physics and Biology
- 2007 - 2009 **Individual Tutoring**, Math, Biology and Earth Sciences

Professional Experiences

- Served as chair of the Session "Petrology, Petrogenesis, and Geochemistry of Martian Meteorites, Crust, and Mantle", Lunar and Planetary Science Conference, 2022
- Served on the Program Committee of the Lunar and Planetary Science Conference
- Served on four different NASA Proposal Review Panels as a panelist
- Served on one NASA Proposal External Review Panel as an external reviewer
- Served on a Postdoc Research Committee, Northern Arizona University, AZ, USA
- Served on a Graduate Committee, Ecole Nationale Supérieure de Géologie (ENSG), Nancy, France
- Peer-review for Science Advances, GRL, JGR: Planets, Icarus, Earth and Space Science, Space Science Reviews, Earth Surface Processes and Landforms, Applied Optics, Geosciences
- Peer-review for the Mars 2020 SuperCam Planetary Data System (PDS) Raw Data Archive

Submitted Proposals

- 2022 **PI, NASA/Solar System Working (SSW)**
Exploration of Igneous Rocks at the Surface of Mars Combining Experimental Petrology and Remote Sensing
- 2020 **Co-I, NASA/Mars Data Analysis Program (MDAP)**
Investigating the Morphological and Magmatic Evolution of Large Volcanic Planitia on Mars

PI: Mark R. Salvatore

2020

Science PI, NASA/Solar System Working (SSW)

Evolution of Magmatic Processes on Mars: Insights into the Nature of the Crust and its Formation

PI: Kirsten L. Siebach

Awards, Fellowships, and Certificates

Culturally Inclusive Planetary Engagement Certificate, Planetary ReaCH (2022)

Women in Natural Sciences Travel Award, WiNS (2019)

Wiess postdoctoral fellowship, Earth Environmental and Planetary Sciences (EEPS), Rice University, Houston, TX, USA (2018)

Best poster presentation, *LIBS 2016, 9th International Conference on Laser Induced Breakdown Spectroscopy*, France (2016)

NASA Group Achievement Award, MSL Science Office Development and Operations Team (2015)

Ph.D scholarship 'MESR' for a three years of full-time funding (2014)

Ecole Normale Supérieure (ENS) award in Geosciences (2014)

Peer-Reviewed Publications (24 Publications)

Submitted

Newsom, E. H., et al. (including **Payré, V.**). A buried aeolian lag deposit and associated diagenesis at an erosional unconformity between the Murray and Stimson formations at Maria Pass in Gale Crater, Mars. Subm. in *GSA Geosphere*.

Payré, V., Nachon, M., Wiens, R.C., Lasue, J., Salvatore, M. R., Ollila, A. M., Lanza, N. L., and Meslin, P.- Y. Transition Metals in Gale crater, Mars: Perspectives on global abundances and future exploration, Subm. in *Earth and Space Science*.

<https://doi.org/10.1002/essoar.10508032.1>

In Revision

Payré, V., Salvatore, M. R., and Edwards, C. S. An evolved early crust exposed on Mars revealed through spectroscopy, in *GRL*.

Goetz, W. et al. (including **Payré, V.**) Detection of copper by the ChemCam instrument along Curiosity's traverse in Gale crater, Mars: Elevated abundances in Glen Torridon, in *JGR: Planets*.

Published

24. **Payré, V.**, Siebach, K. L., Thorpe, M. T., Antoshechkina, P., and Rampe, E. B. Tridymite in a lacustrine mudstone in Gale crater, Mars: Evidence of an explosive silicic eruption during the Hesperian, *EPSL* 594, 117694.

<https://doi.org/10.1016/j.epsl.2022.117694>

23. Lagain, A., Bouley, S., Zanda, B., Miljković, K., Rajšić, A., Baratoux, D., **Payré, V.**, Doucet, L. S., Timms, N. E., Hewins, R., Benedix, G. K., Malarewicz, V., Servis, K., and Bland, P. A. Early crustal processes revealed by the ejection site of the martian regolith breccia NWA 7034, *Nature Communication* 13, 3782.

<https://doi.org/10.1038/s41467-022-31444-8>

22. **Payré, V.**, and Dasgupta, R. Effects of phosphorus on partial melting of the martian mantle and compositions of the martian crust, *GCA* 327, 229-246.

<https://doi.org/10.1016/j.gca.2022.03.034>

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21. Ostwald, A., Udry, A., **Payré, V.**, Gazel, E., and Wu, P. The role of assimilation and fractional crystallization in the evolution of the Mars crust, *EPSL*. <https://doi.org/10.1016/j.epsl.2022.117514>
 20. Sautter, V. and **Payré, V.** Alkali magmatism on Mars: an unexpected diversity. (2021) Special Issue: *Alkaline Magmas, Comptes-rendus – Geosciences, Académie des Sciences*, pp. 1-30. <https://doi.org/10.5802/crgeos.64>
 19. **Payré, V.**, Siebach, K. L., Dasgupta, R., Udry, A. Morrison, S. M., and Rampe, E. B. (2020) Constraining ancient magmatic evolution on Mars using crystal chemistry of detrital igneous minerals in the sedimentary Bradbury group, Gale crater, Mars, *JGR: Planet*, e2020JE006467. <https://doi.org/10.1029/2020JE006467>
 18. Frydenvang, J., et al. (including **Payré, V.**) (2020) The chemostratigraphy of the Murray formation and role of diagenesis at Vera Rubin ridge in Gale crater, Mars, as observed by the ChemCam instrument, *JGR: Planet*, e2019JE006320. <https://doi.org/10.1029/2019JE006320>
 17. Wiens, R. C., et al. (including **Payré, V.**) (2020) Origin and composition of three heterolithic boulder and cobble deposits overlying the Murray and Stimson formations, Gale crater, Mars, *Icarus*, 113897. <https://doi.org/10.1016/j.icarus.2020.113897>
 16. Bouley, S., Keane, J., Baratoux, D., Langlais, B., Matsuyama, I., Costard, F., Hewins, R., **Payré, V.**, Sautter, V., Séjourné, A., Vanderhaeghe, O., Zanda, B. (2020) A thick crustal block revealed by reconstructions of early Mars highlands, *Nature Geoscience*, 13, 105-109. <https://doi.org/10.1038/s41561-019-0512-6>
 15. **Payré, V.**, Fabre, C., Sautter, V., Cousin, A., Mangold, N., Le Deit, L., Forni, O., Goeltz, W., Gasnault, O., Wiens, R. C., Meslin, P. -Y., Lasue, J., Rapin, W., Clark, B., Nachon, M., Lanza, N. L., Maurice, S. (2018). Copper enrichments in the Kimberley formation in Gale crater, Mars: Evidence of an ore deposit at the source. *Icarus*, 321, 736-751. <https://doi.org/10.1016/j.icarus.2018.12.015>
 14. **Payré, V.**, Fabre, C., Cousin, A., Sautter, V., Wiens, R. C., Forni, O., ... Clegg, S. (2017). Alkali trace elements in Gale crater, Mars, with ChemCam: Calibration update and geological implications. *Journal of Geophysical Research: Planets*, 2016JE005201. <https://doi.org/10.1002/2016JE005201>
 13. Guezenc, J., **Payré, V.**, Fabre, C., Sylvilay, D., Cousin, A., Gallet-Budynek, A., Bousquet, B. (2019) Variable selection in Laser-Induced Breakdown Spectroscopy assisted by multivariate analysis: an alternative to multi-peak fitting. *Spect. Acta. Part B*, 152, 6-13. <https://doi.org/10.1016/j.sab.2018.12.001>
 12. Stein, N., Grotzinger, J. P., Schieber, J., Mangold, N., Hallet, B., Newsom, H., ... **Payré, V.**, Dehouck, E. (2018). Desiccation cracks provide evidence of lake drying on Mars, Sutton Island member, Murray formation, Gale Crater. *Geology*.
 11. Cousin, A., Sautter, V., **Payré, V.**, Forni, O., Mangold, N., Gasnault, O., ... Rapin, W. (2017). Classification of igneous rocks analyzed by ChemCam at Gale crater, Mars. *Icarus*, 288, 265–283. <https://doi.org/10.1016/j.icarus.2017.01.014>
 10. L'Haridon, J., Mangold, N., Meslin, P.-Y., Johnson, J., Rapin, W., Forni, O., Cousin, A., **Payré, V.**, ... Wiens, R.C. (2017) Chemical variability in mineralized veins observed by ChemCam on the lower slopes of Mount Sharp in Gale crater, Mars. *Icarus*. <https://doi.org/10.1016/j.icarus.2018.01.028>
 9. Clegg, S. M., Wiens, R. C., Anderson, R., Forni, O., Frydenvang, J., Lasue, J., Cousin, A., **Payré, V.**, ... Maurice, S. (2017). Recalibration of the Mars Science Laboratory ChemCam instrument with an expanded geochemical database. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 129, 64–85. <https://doi.org/10.1016/j.sab.2016.12.003>

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8. Cousin, A., Dehouck, E., Meslin, P.-Y., Forni, O., Williams, A. J., Stein, N., Gasnault, O., Bridges, N., Ehlmann, B., Schröder, S., **Payré V.**, ... Wiens, R. C. (2017). Geochemistry of the Bagnold dune field as observed by ChemCam and comparison with other aeolian deposits at Gale crater. *Journal of Geophysical Research: Planets*. <https://doi.org/10.1002/2017JE005261>
 7. Nachon, M., Mangold, N., Forni, O., Kah, L. C., Cousin, A., Wiens, R. C., ... **Payré, V.**, Rapin, W., Schröder, S., Stack, K., Sumner, D. (2017). Chemistry of diagenetic features analyzed by ChemCam at Pahrump Hills, Gale crater, Mars. *Icarus*, 281, 121–136. <https://doi.org/10.1016/j.icarus.2016.08.026>
 6. Wiens, R. C., Rubin, D. M., Goetz, W., Fairén, A. G., Schwenzer, S. P., Johnson, J. R., ... **Payré, V.**, Fabre, C., Nachon, M., Le Mouélic, S., Sautter, V., Johnstone, S., Calef, F., Vasavada, A. R., Grotzinger, J. P. (2017). Centimeter to decimeter hollow concretions and voids in Gale Crater sediments, Mars. *Icarus*, 289, 144–156. <https://doi.org/10.1016/j.icarus.2017.02.003>
 5. Frydenvang, J., Gasda, P. J., Hurowitz, J. A., Grotzinger, J. P., Wiens, R. C., Newsom, H. E., ... **Payré, V.**, Vaniman, D., Blake, D. F., Lanza, N. L., Gupta, S., Van Beek, J., Sautter, V., Meslin, P.-Y., Rice, M., Milliken, R., Gellert, R., Thompson, L., Clark, B. C., Sumner, D. Y., Fraeman, A. A., Kinch, K. M., Madsen, M. B., Mitrofanov, I. G., Jun, I., Calef, F., Vasavada, A. R. (2017). Diagenetic silica enrichment and late-stage groundwater activity in Gale crater, Mars: Silica Enriching Diagenesis, Gale, Mars. *Geophysical Research Letters*, 44(10), 4716–4724. <https://doi.org/10.1002/2017GL073323>
 4. Maurice, S., Clegg, S. M., Wiens, R. C., Gasnault, O., Rapin, W., Forni, O., Cousin, A., Sautter, V., Mangold, N., Le Deit, L., Nachon, M., Anderson, R. B., Lanza, N. L., Fabre, C., **Payré, V.**, ... Vasavada, A. R. (2016). ChemCam activities and discoveries during the nominal mission of the Mars Science Laboratory in Gale crater, Mars. *Journal of Analytical Atomic Spectrometry*, 31(4), 863–889. <https://doi.org/10.1039/C5JA00417A>
 3. Sautter, V., Toplis, M. J., Beck, P., Mangold, N., Wiens, R., Pinet, P., ... **Payré, V.**, Rapin, W., Le Mouélic, S. (2016). Magmatic complexity on early Mars as seen through a combination of orbital, in-situ and meteorite data. *Lithos*, 254–255, 36–52. <https://doi.org/10.1016/j.lithos.2016.02.023>
 2. Lasue, J., Clegg, S. M., Forni, O., Cousin, A., Wiens, R. C., Lanza, N., ... **Payré, V.**, Rapin, W., Sumner, D. Y. (2016). Observation of > 5 wt % zinc at the Kimberley outcrop, Gale crater, Mars. *Journal of Geophysical Research: Planets*, 121(3), 2015JE004946. <https://doi.org/10.1002/2015JE004946>
 1. Le Deit, L., Mangold, N., Forni, O., Cousin, A., Lasue, J., Schröder, S., ... **Payré, V.**, Rapin, W., Rice, M., Sautter, V., Treiman, A. H. (2016). The potassic sedimentary rocks in Gale Crater, Mars, as seen by ChemCam on board Curiosity. *Journal of Geophysical Research: Planets*, 121(5), 2015JE004987. <https://doi.org/10.1002/2015JE004987>

Oral Presentations

Invited talks

- 03/2022 “Mars Magmatism and its Early Crust”, University of Liverpool, UK
- 03/2022 “Depicting the Nature of Mars Crust: an End-Member in the Solar System?”, University of Iowa, IA, USA
- 03/2022 “Diversity of Mars Magmatism: Insights from Rover and Orbital Observations”, Brown Bag Seminar, University of Iowa, IA, USA

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- 03/2021 “Nature and Formation Mechanisms of the Martian Crust”, Centre National de Recherche Scientifique (CNRS), France
- 03/2021 “Why Mars magmatism is such intriguing?”, University of Liverpool, UK
- 02/2021 “Evolution of Mars Magmatism: Implications on the Interior of Mars”, Université de Lyon – Ecole Normale Supérieure de Lyon, France
- 01/2018 “The Early Martian Crust and its Alteration Processes”, Rice University, Houston, TX
- 02/2018 “Trace element distribution in Gale crater, Mars: Understanding the early martian crust and its alteration processes”, Centre de Recherches Pétrographiques et Géochimiques (CRPG), France

Conference Presentations

- Payré, V.,** Salvatore, M. R., and Edwards, C. S. Feldspar-rich Terrains in Terra Cimmeria/Sirenum, Mars: an Evolved Crust in Early Mars? In *Lunar and Planetary Science Conference*, 2022.
- Payré, V.,** Salvatore, M. R., and Edwards, C. S. Feldspar-rich Terrains in the Terra Cimmeria-Sirenum Region: a Differentiated Crust on Early Mars? In AGU, 2021.
- Payré, V.,** Siebach, K. L., Thorpe, M. T., Antoshechkina, P., and Rampe, R. B. Is tridymite in Gale crater a witness of explosive volcanism in Early Mars? In *Lunar and Planetary Science Conference*, 2021.
- Payré, V.,** and Dasgupta, R. Effects of phosphorus on martian magma genesis: An experimental study. In *Lunar and Planetary Science Conference*, 2021.
- Payré, V.,** Siebach, K. L., Thorpe, M. T., Antoshechkina, P., and Rampe, R. B. Tridymite in Gale crater: Witness of explosive volcanism in Early Mars? In *AGU Fall Meeting*, 2020.
- Payré, V.,** and Dasgupta, R. Effects of phosphorus on partial melting of model martian mantle: Implications for generation of the martian igneous crust. In *GSA*, 2020.
- Payré, V.,** Siebach, K. L., Thorpe, M. T., Antoshechkina, P., and Rampe, R. B. Tridymite in Gale crater: Witness of explosive volcanism in Early Mars? In *EPSC*, 2020.
- Payré, V.,** and Dasgupta, R. Effects of phosphorus on martian magmas: an experimental study. In *EPSC*, 2020.
- Payré, V.,** and Dasgupta, R. Effects of phosphorus on martian magmas: an experimental study. in *Lunar and Planetary Science Conference*, 2020.
- Payré, V.,** Siebach, K. L., Dasgupta, R., Udry, A., Rampe, E. B., and Morrison, S. M. Investigation of magmatic activities on early Mars using igneous mineral chemistry in Gale crater, Mars. in *Lunar and Planetary Science Conference*, 2020.
- Payré, V.,** Siebach, K. L., Dasgupta, R., Smith, P. M., Rampe, E. B. Explosive volcanism in early Mars: Explaining the tridymite layer in Gale crater, Mars. In *AGU Fall Meeting*, 2019.
- Payré, V.,** Siebach, K. L., Dasgupta, R., Morrison, S. M., Rampe, E. B., and Udry, A. Constraints of ancient magmatic processes using mineral chemistry of sedimentary rocks in Gale crater, Mars. In *The 9th International Conference on Mars*, 2019.
- Payré, V.,** Siebach, K. L., Dasgupta, R., and Rampe, E. B. Using mineral chemistry in Gale crater sedimentary rocks to constrain ancient magmatic processes on Mars. in *Lunar and Planetary Science Conference*, 50, 2562, 2019.
- Payré, V.,** Sautter, V, Cousin, A., Fabre, C., Wiens, R.C., Gasnault, O., Maurice, S. Has the early Mars experienced several evolved sources ? in *Lunar and Planetary Science Conference*, 49, 2071, 2018.

- Payré, V.**, Fabre, C., Sautter, V., Mangold, N., et al. Heavy metal enrichments in the Kimberley bedrocks: evidence of an ore deposit at the source? In *AGU Fall Meeting*, 2017.
- Payré, V.**, Fabre, C., Cousin, A., Forni, O., Mangold, N., Le Deit, L., ... Clegg, S. Copper Enrichments at Kimberley, Gale Crater, Mars. In *Lunar and Planetary Science Conference*, 48, 2097, 2017.
- Payré, V.**, Cousin, A., Anderson, D., Thomas, N., Rapin, W., Beck, P., ... & Nachon, M. Review of Trace and Minor Elements Analyzed by ChemCam: Detection and Quantification Using Laser Induced Breakdown Spectroscopy. In *Lunar and Planetary Science Conference*, 48, 1963, 2017.
- Payré, V.**, Fabre, C., Cousin, A., Gasnault, O., Forni, O., Sautter, V., ... Clegg, S. M. Trace elements in Gale Crater, Mars: Li, Sr, Rb and Ba updated calibrations and quantifications using ChemCam data, *9th International Conference on Laser Induced Breakdown Spectroscopy*, 2016.
- Payré, V.**, Fabre, C., Cousin, A., Forni, O., Gasnault, O., Rapin, W., Goetz, W., Nachon, M., Sautter, V., Le Deit, L. Copper abundances in Gale crater: First ChemCam calibration and quantification, *Lunar and Planetary Science Conference*, 47, 1347, 2016.
- Payré, V.**, Fabre, C., Cousin, A., Forni, O., Gasnault, O., Sautter, V., Meslin, P.- Y., Lasue, J., Wiens, R. C., Clegg, S. Trace elements in Gale crater: Li, Sr, Rb and Ba updated calibrations and quantifications using ChemCam data, *9th International Conference on Laser Induced Breakdown Spectroscopy*, 2016.
- Payré, V.**, Fabre, C., Cousin, A., Sautter, V., Meslin, P.- Y., Rapin, W., Wiens, R. C., Maurice, S. Searching for lead and copper on Mars, *8th Euro-Mediterranean Symposium on Laser-Induced Breakdown Spectroscopy*, 2015.
- Seales, J., and **Payré, V.** Compositional Variations of Martian Primary Magmas due to the Water Loss from the Martian Mantle. In *LPSC*, 2021.
- Sautter, V., **Payré, V.**, Baratoux, D., Toplis, M., Cousin, A., Bouley, S., Beck, P., and Krämer Ruggiu, L., Remanant of early Noachian crust on Mars from martian meteorite, in situ and remote sensing data. In *The 9th International Conference on Mars*, 2019.
- Goetz, W., **Payré, V.**, Wiens, R.C., Clegg, S.M., Gasnault O., ... Gellert, R. Detection of copper in Gale crater, Mars, by the ChemCam instrument onboard the Curiosity rover. In *Lunar and Planetary Science Conference*, 50, 2679, 2019.
- Goetz, W., **Payré, V.**, Wiens, R.C., Clegg, S.M., Gasnault O., ... Clark, B. Detection of copper by the ChemCam instrument onboard the Curiosity rover and search for copper-hosting minerals in Gale crater. In *Lunar and Planetary Science Conference*, 49, 2679, 2018.
- Goetz, W., **Payré, V.**, Wiens, R. C., Gasnault, O., Gellert, R., Newsom, H., ... Team, M. S. Detection of Copper by the ChemCam Instrument Along the Traverse of the Curiosity Rover, Gale Crater, Mars. In *Lunar and Planetary Science Conference*, 48, 2894, 2017.
- Ollila, A. M., **Payré, V.**, Cousin, A., & Wiens, R. C. Identification of chromium in rocks and soils using ChemCam's laser induced breakdown spectroscopy instrument, *Lunar and Planetary Science Conference*, 2017.
- Goetz, W., **Payré, V.**, Wiens, R. C., Gasnault, O., Gellert, R., Newsom, H., Fabre, C., Forni, O., Lasue, J., Meslin, P.- Y., Maurice, S. Strong Enrichment in Copper in the Kimberley Area, Gale Crater, Mars, *Lunar and Planetary Science Conference*, 47, 2942, 2016.
- Cannat, M., **Payré, V.**, Martinez, I. Prior Tectonic Brecciation Favors Carbonation of Abyssal Serpentinites: a Petrographic and Stable Isotope Study of Southwest Indian Ridge Dredged Samples, *AGU Fall Meeting*, Abstracts, 2014.

- Cousin, A., Sautter, V., **Payré, V.**, ... Rapin, W. Classification of igneous rocks analyzed by ChemCam in Gale crater, Mars. In *The 9th International Conference on Mars*, 2019.
- Deng, F., Levander, A., and **Payré, V.** Autocorrelation reflectivity of Mars. In *AGU Fall Meeting*, 2019.
- Ostwald, A. M., Udry, A., **Payré, V.**, Gazel, E., and Wu, P. The role of assimilation and fractional crystallization in the formation of the Mars crust, *Lunar and Planetary Science Conference*, 2022.
- Ostwald, A. M., Udry, A., Gazel, E., **Payré, V.**, and Wu, P. The role of assimilation and fractional crystallization in evolved martian crustal compositions, *Lunar and Planetary Science Conference*, 2021.
- Ostwald, A. M., Udry, A., Gazel, E., and **Payré, V.** Assimilation-fractional crystallization on Mars as a formation process for felsic rocks, *Lunar and Planetary Science Conference*, 2020.
- Mangold, N., Cousin, A., Meslin, P-Y., **Payré, V.**, Dehouck, E., Newsom, HE., Forni, O., Frydevang, J., Flahaut, J., L'Haridon, J. Chemcam Analysis of Aqueous Processes on Polygonal Cracks at Gale Crater, Mars, *Lunar and Planetary Science Conference*, 48, 2017.
- Wiens, R. C., Mangold, N., Gasnault, O., **Payré, V.**, Stack-Morgan, K., House, C., Fedo, C., Edgett, K., Watkins, J., Grotzinger, J. Bimbe and related blocky geomorphic units in Gale crater: heterogeneous compositional units overlying Murray and Stimson, *Lunar and Planetary Science Conference*, 48, 2017.
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- Frydenvang, J., and 20 others (including **Payré, V.**), The role of large-scale diagenesis in the formation of Vera Rubin Ridge in Gale crater, Mars, as implied by ChemCam observations. In *Lunar and Planetary Science Conference*, 50, 1863, 2019.
- Forni, O., and 12 others (including **Payré, V.**), Phyllosilicate identification through ChemCam elemental correlation. In *Lunar and Planetary Science Conference*, 49, 1410, 2018.
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- Nellessen, M. A., and 27 others (including **Payré, V.**), Distribution and analysis of calcium sulfate-cemented sandstones along the MSL traverse, Gale crater, Mars, *Lunar and Planetary Science Conference*, 49, 2858, 2018.
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- L'Haridon, J., and 13 others (including **Payré, V.**), Iron and Magnesium Enrichments in Ca-Sulfate Veins as Observed by ChemCam at Gale Crater, Mars, *Lunar and Planetary Science Conference*, 48, 2017.
- Frydenvang, J., and 40 others (including **Payré, V.**), Discovery of Silica-Rich Lacustrine and Eolian Sedimentary Rocks in Gale Crater, Mars, *Lunar and Planetary Science Conference*, 47, 2016.
- Newsom, H. E., and 47 others (including **Payré, V.**), The Materials at an Unconformity Between the Murray and Stimson Formations at Marias Pass, Gale Crater, Mars, *Lunar and Planetary Science Conference*, 47, 2016.
- Cousin, A., and 15 others (including **Payré, V.**), Igneous Rock Classification at Gale (Sols 13-800) *Lunar and Planetary Science Conference*, 46, 2015.
- Wiens, R.C., Mangold, N., Maurice, S., Gasnault, O., ... **Payré, V.** Major-Element Compositions seen by ChemCam along the Curiosity rover traverse: the first 8,000 observations, *Lunar and Planetary Science Conference*, 47, 2016.
- Wiens, R.C., and 29 others (including **Payré, V.**), *Curiosity* at Gale Crater's Hematite Ridge: High Mn and P Near the Ridge show Chemical Evidence for Generation by an Oxidation Front, *AGU Fall Meeting*, Abstracts, 2017.
- Frydenvang, J., and 31 others (including **Payré, V.**), ChemCam First Discovery of High Silica Sediments in Gale Crater, *AGU Fall Meeting*, Abstracts, 2015.
- Newsom, H. E., and 31 others (including **Payré, V.**), Chemistry of the Materials Above and Below an Unconformity Between the Murray and Stimson Formations in Gale Crater, Mars, *AGU Fall Meeting*, Abstracts, 2015.
- Blaney, D.L., and 31 others (including **Payré, V.**), ChemCam at Gale Crater: Highlights and Discoveries from Three Years of Chemical Measurements on Mars, *DPS Meeting*, 2015.
- Sautter, V., and 16 others (including **Payré, V.**), Mafic and felsic igneous rocks at Gale crater, *EGU General Assembly*, 2015.

Space Missions – Team Meetings

- 2020 – Today Mars Science Laboratory Science Team Member
- 2014 – 2018 Mars Science Laboratory Science and Operation Team Member
ChemCam Payload Downlink Lead

SuperCam Team Meeting, November 2016, CNES, France

MSL Science Team Meetings, February 2015, April 2016, and January 2017 at Caltech, CA, June 2015 at MNHN, France, October 2021 (Virtual), February 2022 (Virtual).

ChemCam Science Team Meetings, February 2015, April 2016, and January 2017 at Caltech, CA, June 2015 at MNHN, France, November 2015 at USGS, Flagstaff, AZ.

Outreach Activities

“A Tour on Mars”, Science Café, Iowa City, IA, September 2022
Interview for KNAU Station, September 2022
Interview for SETI Institute, September 2022
Interview for KJZZ Phoenix, July 2022
Space Exploration Festival, Riverside Elementary School (Underrepresented School), Phoenix, AZ, April 2022
Interview “Searching for ‘ground truth’ on Mars with NASA’s Curiosity Rover – NAU”, Prescott eNews, March 2022,
<https://prescottnews.com/index.php/2022/03/28/searching-for-ground-truth-on-mars-with-nasas-curiosity-rover-nau/>
“Mars Pendulum” Sculpture Project, Collaboration on a Master project, Ecole des Arts Décoratifs de Paris, France, 2021-2022
Interview for “Ciel au Pluriel” Podcast (*French*), “How the *Perseverance* rover is doing?”, April 2021
“Scientifiques en Herbe” Workshop Session, “Let’s drive on Mars!”, Consulate of France in Houston, Houston, TX, USA, April 2021
Interview for Scientific Newsletter, French Embassy in the United States, February 2021,
<https://youtu.be/3Xp2gcBcl8M> and <https://france-science.com/valerie-payre-une-geochimiste-specialiste-de-la-planete-mars/>
Interview for Wiess School of Natural Sciences, Rice University, September 2020,
<https://naturalsciences.rice.edu/graduate-student-and-postdoc-research-profiles/valerie-payre>
Women in Science, January 2021, Consulate of France in Houston, Houston, TX, USA
NASA SEES Mentor, “Roving on Mars and Mars 2020”, Summer 2020, NASA JSC, Houston, TX, USA
Reach for the stars! STEM Festival workshop, “Let’s walk on Mars!”, October 2019, Rice University, Houston, TX, USA
Interview for “A Fleur de Terre” Podcast (*French*), September 2019
Public Conference “Mars, an archive of the Earth”, Consulate of France in Houston, December 2018, Houston, TX, USA
Philogaia Orchestra “Earth Sciences for all”, November 2016, ‘*Festival des idées*’, Paris, France
High School Conference “Geology on Mars”, December 2015, N.-D. de Bon Secours high school, Perpignan, France

Professional Association

American Geophysical Union

Additional Skills

Computing	Microsoft Office NASA MSLICE, IDL/ENVI, ISIS, JMARS (jmars.asu.edu) Matlab, Python, Davinci (davinci.asu.edu) Adobe Illustrator, Adobe Photoshop, ImageJ AlphaMELTS
Languages	French (native), English (fluent), Spanish (intermediate)
