

EVA L. SCHELLER

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EDUCATION

California Institute of Technology

PhD in Geological and Planetary Sciences 2022

- ♦ Primary advisors: Prof. Bethany Ehlmann and Prof. John Grotzinger

M.Sc. in Geology 2020

Copenhagen University

B.Sc. in Geology-Geoscience 2017

- ♦ Bachelor's thesis project with Prof. Tod E. Waight

California Institute of Technology

Caltech study abroad program of fall term Fall 2015

Sudbury Impact Field School Fall 2019

MISSION EXPERIENCE

Mars 2020 Return Sample Science Team member 2022 – Present

Mars 2020 SHERLOC Payload Uplink/Downlink Lead **2021 – Present**

SHERLOC Science Team collaborator 2020 – Present

Mars 2020 Mastcam-Z Payload Downlink Lead 2021 – 2022

Sample Analysis at Mars Science Team collaborator 2019 – 2022

CRISM Science Team collaborator 2017 – 2022

Mastcam-Z Science Team collaborator 2017 – 2022

Mars 2020 Strategic Process Planning Lead **2020 – 2021**

Mars 2020 Team Mapping Effort Lead **2019 – 2020**

Mars 2020 NE Syrtis Landing Site Working Group collaborator 2017–2018

Mars 2020 Science Team collaborator 2017– Present

PROFESSIONAL EXPERIENCE

Massachusetts Institute of Technology 2022 – Present

Heising-Simons 51 Pegasi B Postdoctoral Fellow

California Institute of Technology 2017 – 2022

NASA Earth and Space Science Fellow

Sustainable Global Summer 2020

Technical research fellow

- Data scientist with focus on gas emissions statistical and computer vision ML algorithms

Natural History Museum of Denmark, Copenhagen University 2016-2017

Undergraduate researcher at Section of Geobiology and Mineralogy

- Laboratory analysis and management involving, mass spectrometers, XRF, and petrography

Ramboll/Environ 2016-2017

Student intern

- Environmental consultancy for site-solutions clean-up and health risk assessments

Caltech Summer Undergraduate Research Fellowship Summer 2016

Undergraduate researcher

- Laboratory research on X-ray crystallography and applications for Mars rovers

Geological Survey of Denmark and Greenland 2014-2015
Assistant geological mapper

- Field assistant to the quaternary mapping of Denmark

GRANTS, FELLOWSHIPS, AND AWARDS

Heising-Simons Foundation 51 Pegasi b Fellowship 2022
MIT Distinguished Postdoc Program (finalist, but then declined) 2022
John W. Jarve Seed Fund for Science Innovation 2021
(main proposal contributor but not listed as Co-I due to postdoctoral associate status)
NASA Earth and Space Science Fellowship 2018
Henry Shaws Grant for study abroad 2015
Julie Marie Vinter Hansens Grant for study abroad 2015
Copenhagen University Internationalization Grant for study abroad 2015
Marie og M. B. Richters Grant for study abroad 2015
Hotelejer Anders Månsson og hustrus Grant for study abroad 2015
Danske Bank Award for Nærum high school valedictorian 2013
Volunteer Award for services to the Red Cross 2013

PROFESSIONAL SERVICE AND AFFILIATIONS

Astrobiology Ideation Factory Summer 2023
Reviewer for *Nature Astronomy* Summer 2022
Reviewer for *Earth and Planetary Science Letters* Spring 2022
Reviewer for NASA research proposals Winter 2022
Reviewer for *Nature Geoscience* Winter 2022
Keck Institute of Space Sciences – Revolutionizing Access to the Martian Surface Workshop Spring 2021
Lunar and Planetary Science Conference Dwornik judge Winter 2021
Reviewer for *Icarus* Summer 2020
Keck Institute of Space Sciences: Graduate student affiliate 2018 – 2022
American Geophysical Union 2020 – Present
Geological Society of America member 2018 – 2019
Geological Society of Denmark member 2014 – 2017

PUBLICATIONS

(* I contributed part of main discoveries, (**) I acted as advisor on this project

In prep

Scheller, E. L., Bosak, T., McCubbin F., Bykov, S., Williford, K., Bykov, S., Siljestrom, S., Jakubek, R., Kizovski, T., Liu, Y., Asher, S., Beyssac, O., Berger, E., Ehlmann, B., Farley, K. A., Fox, A., Hand, K., Henneke, J., Pedersen, D. A. L., Roppel, R., Sharma, S., Steele, A., Weiss, B. W., On the origin of luminescent materials in the crater floor and delta of Jezero crater, Mars. *Intended for Science Advances*.

In review

Siljestrom, S. (...) **Scheller, E. L.** et al. (in review). Evidence of Sulfate-Rich Fluid Alteration in Jezero Crater Floor, Mars. *JGR Planets*.
Wogslund, B. (...) **Scheller, E. L.** et al. (in review). Science and Science-Enabling Activities of the SHERLOC and WATSON Imaging Systems in Jezero Crater, Mars. *JGR Planets*.

Published

- Scheller, E. L.**, Ingalls, M., Eiler, J., Grotzinger, J., and Ryb, U. (2023). The mechanisms and stable isotope effects of transforming hydrated carbonate into calcite pseudomorphs. *Geochemica Cosmochemica Acta*, 354, 146-164.
- (*)Corpolongo, A. (...) **Scheller, E. L.** et al. (2023). SHERLOC Raman mineral detections of the Mars 2020

- Crater Floor Campaign. *JGR Planets*, 128, e2022JE007455.
11. Scheller, E. L., Razzell-Hollis, J., et al. (2022). Aqueous alteration processes and implications for organic geochemistry in Jezero crater, Mars. *Science*, 378, doi: 10.1126/science.abo5204.
 10. Bell, J. (...) Scheller, E. L. et al. (2022). Geological and Meteorological Imaging Results from the Mars 2020 Perseverance Rover in Jezero Crater. *Science Advances*, 8, doi: 10.1126/sciadv.abo4856
 9. (*)Farley, K. (...) Scheller, E. L. et al. (2022). Aqueously-altered igneous and sedimentary rocks on the floor of Jezero crater, Mars. *Science*, doi: 10.1126/science.abo2196.
 8. Razzell-Hollis, J. (...) Scheller, E. L. et al., (2022). A Deep-Ultraviolet Raman and Fluorescence Spectral Library of 62 Minerals for the SHERLOC instrument onboard Mars 2020. *Planetary and Space Science* 209, doi: 10.1016/j.pss.2021.105356.
 7. Scheller, E. L., Grotzinger, J., Ingalls, M. (2021). Guttulatic calcite: A carbonate microtexture that reveals frigid formation temperatures. *Geology*. doi: 10.1130/G49312.1
 6. Scheller, E. L., Swindle, C., Grotzinger, J., Barnhart, H., Bhattacharjee S., Ehlmann, B. L., Farley, K., Fischer, W. W., Greenberger, R., Ingalls, M., Martin, P. E., Osorio-Rodriguez, D., and Smith, B. P., (2021). Formation of magnesium carbonates on Earth and implications for Mars. *JGR: Planets* 126, e2021JE006828
 5. (***)Gao, A. F. (...), Scheller, E. L. et al. (2021). Generalized Unsupervised Clustering of Hyperspectral Images of Geological Targets in the Near Infrared. *IEEE Perception Beyond the Visible Spectrum workshop series (PBV)*.
 4. Scheller, E. L., Ehlmann, B. L., Hu, R., Adams, D., Yung, Y. (2021). Long-term drying of Mars by sequestration of ocean-scale volumes of water in the crust. *Science*, 372, 56-62.
 3. (*)Stack, K. M. (...) Scheller, E. L. et al. (2020). Photogeologic Map of the Perseverance Rover Field Site in Jezero Crater Constructed by the Mars 2020 Science Team. *Space Science Reviews* 216, 127.
 2. Scheller, E. L. and Ehlmann, B. L. (2020). Composition, Stratigraphy, and Geological History of the Noachian Basement Surrounding the Isidis Impact Basin. *JGR: Planets* 125, e2019JE006190.
 1. Scheller, E. L., Dickson, A. J., Canfield, D. E., Korte, C., Kristiansen K. K., Dahl, T. W. (2018). Ocean redox conditions between the snowballs – Geochemical constraints from Arena Formation, East Greenland. *Precambrian* 319, 173-186.

INVITED TALKS

Seminar, University of Texas at Austin	2023
Seminar, MIT (Planetary Sciences)	2023
Seminar, MIT	2023
Seminar, Penn State	2022
Seminar, Stony Brook University	2022
Seminar, Georgia Tech	2022
Seminar, University of Pennsylvania	2022
Seminar, Brown University	2022
Conference talk, AGU Fall Meeting (carbonates in modern environments)	2021
Seminar, University of Chicago	2021
Seminar, University of Southern California	2021
Lecture, Astronomical Society of Denmark	2021
Seminar, Lunar and Planetary Science Institute	2021
Seminar, NASA Goddard Institute for Space Studies	2021
Seminar, UC Santa Cruz	2021

FIRST AUTHOR TALKS

Scheller, E. L. et al. SHERLOC investigations of the Jezero delta reveals preservation of organic compounds, <i>AGU Annual Meeting</i> , Abstract# 1068963	2022
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Scheller, E. L. et al. First-Results from the Perseverance SHERLOC Investigation: Aqueous Alteration Processes and Implications for Organic Geochemistry in Jezero Crater, Mars, *LPSC 53*, Abstract# 1652 2022

Scheller, E. L. et al., Crustal Hydration of Ocean-scale Water Volumes Controlled Martian Climate and Habitability, *AGU Annual Meeting*, Abstract# 684085. 2020

Scheller, E. L. et al., Crustal Hydration of Ocean-scale Water Volumes Controlled Martian Climate and Habitability, *DPS Annual Meeting*, Abstract# 308.05. 2020

Scheller, E. L. et al., Clumped Isotope Thermometry of Hydrated Carbonate Transformation *Goldschmidt (cancelled due to COVID-19)*, Abstract# 20200016640. 2020

Scheller, E. L. et al., The History of Water on Mars as constrained Through Hydrogen Isotopes, *Caltech Planetary Science Seminar*. 2020

Scheller, E. L. et al., The History of Water on Mars as Constrained Through Hydrogen Isotopes *LPSC 51 (cancelled due to COVID-19)*, Abstract# 2326. 2020

Scheller, E. L. et al., Clumped Isotope Thermometry of Hydrated Carbonate Transformation *Caltech Geoclub*. 2019

Scheller, E. L. and Ehlmann, B. L., Composition and Impact Deformation of Noachian Basement West of Isidis, *Mastcam-Z Team Meeting*. 2019

Scheller, E. L. and Ehlmann, Isidis Megabreccia Composition, Size, and Formation History, *LPSC 50*, 2019, Abstract #2033. 2019

Scheller, E. L. and Ehlmann, B. L. Composition and Impact Deformation of Noachian Basement Surrounding the Isidis Basin, Mars, *GSA Annual Meeting*, Abstract #322778. 2018

Scheller, E. L. et al., Composition, Impact Deformation, and Geological History of Noachian Basement in the Surrounding of the Isidis Impact Basin, *Mars 2020 4th Landing Site Workshop*. 2018

Scheller, E. L. and Ehlmann, B. L. , Composition and Impact Deformation of Noachian Basement West of Isidis, *LPSC 49*, Abstract #1385. 2018

Scheller, E. L. et al. Ocean Redox Conditions between the Snowballs – Geochemical Constraints from Arena Formation, East Greenland. *Goldschmidt*, Abstract #2018002204. 2018

FIRST AUTHOR POSTERS

Scheller, E. L. et al., How hydrated carbonate pseudomorphs track frigid paleoclimatic conditions: Paragenesis and clumped isotope systematics, *AGU Annual Meeting*, Abstract# 806224 2021

Scheller, E. L. et al., Crustal Hydration of Ocean-scale Water Volumes Controlled Martian Climate and Habitability, *LPSC 52*. 2021

Scheller, E. L. et al., A Novel Approach To Integrated Time Series Analysis of Anthropogenic Gas Emissions, *AGU Annual Meeting*, Abstract # 683693. 2020

Scheller, E. L. and Ehlmann, B. L., Stratigraphy and Geological History of the Noachian Basement on the Western Rim of Isidis Basin, *LPSC 50*, Abstract #1515. 2019

Scheller, E. L. and Waight, T., Mineral Chemistry of the Hohonu Dike Swarm. *Nordic Magma Chamber Processes Meeting* 2017

SELECTED CO-AUTHOR PRESENTATIONS WITH MAJOR CONTRIBUTIONS

Beegle, L. (...) **Scheller, E. L.** et al., An overview of SHERLOC Raman and fluorescence spectroscopy results obtained during Perseverance's Green Zone Campaign at Jezero crater, Mars. *AGU Annual Meeting*, Abstract #924652. 2021

Gao, A. (...) **Scheller, E. L.** et al., Generalized Unsupervised Clustering of Hyperspectral Images of Geological Targets in the Near Infrared using Autoencoders. *AGU Annual Meeting*, Abstract #806089. 2021

Pinkston, D. (...) **Scheller, E. L.** et al., WISER - A Customizable, Extendable Visualization and Analysis Tool for Imaging Spectroscopy Data. *AGU Annual Meeting*, Abstract #953619. 2021

Alwmark, S. (...) **Scheller, E. L.** et al., Detailed orbital mapping highlights relationships among Jezero Crater Floor units. *GSA*, Abstract #369062. 2021

Simon, J., **Scheller, E. L.** et al., Characterizing the Stratigraphy of the Nili Planum Region outside Jezero crater: Implications for Mars 2020 Strategic Planning. *LPSC 52*. 2021

Pinkston, D., Greenberger, R. N., Thompson, D. R., **Scheller, E. L.**, Rasmussen, B., Ehlmann, B. L., 2020
 A WISER Software Toolkit for Imaging Spectroscopy Visualization and Analysis, *AGU Annual Meeting*.
 Kah, L., **Scheller, E. L.**, et al., Depositional Relationships Between Crater Floor Materials in Jezero 2020
 Crater, Mars. *LPSC 51 (cancelled due to COVID-19)*.
 Weiss, B. P., **Scheller, E. L.** et al., Megabreccia at Northeast Syrtis major and its importance for 2018
 Mars science, *LPSC 49*.

TEACHING

Caltech Teaching Assistant, Ge151: Planetary Surfaces 2019
 Caltech Teaching Assistant, Ge157c: Remote Sensing for Environmental and Geological Applications 2018
 My Academy professional tutor for college, high school, and middle school 2014-2017
Taught maths, chemistry, physics, English, Danish, and natural geography
 Nærum High School professional chemistry A levels tutor 2012 - 2013

OUTREACH AND VOLUNTEER WORK

Expert interviews at newspapers (Times Magazine, MIT Review, National Geographic, BBC, ABC, etc.), TV news stations (BBC World & Danish National News), podcasts (Strange New Worlds, We Martians), and youtube videos (NASA – ask a scientist series, JPL, geopop) 2021 – Present
LPSC: LPSC Live outreach panelist 2022
Caltech: Convocation speaker 2021
Scholastic: Science advisor to the Real World Math: Space Exploration book by Scholastic 2020 – Present
Caltech Graduate Student Council member (international student council and the athletics committee) 2019 – Present
Caltech: Volunteer online tutor 2020 – Present
Caltech: International orientation leader Fall 2020
Future Engineers: Judge for the Mars 2020 naming contest 2019
Letters to a Pre-scientist: Mentor of middle schoolers from low-income families 2018
Danish Youth Science Association: Organizer of lecture series in science topics 2015-2016
Danish Red Cross: Founder and manager of the youth section of Red Cross Lyngby 2011-2014