Allyson R. Trussell

Curriculum Vitae

Education

Ph.D. in Geological Sciences, Arizona State University — *Expected June 2027*
B.S. in Geology, California Institute of Technology — June 2021

Professional Employment

Graduate Research Assistant, Arizona State University — 2022 – Present
Planetary Geoscientist Intern, NASA Jet Propulsion Laboratory — 2019 – 2022
Teaching Assistant, California Institute of Technology — 2019 – 2021
Undergraduate Researcher, California Institute of Technology — 2018 – 2019

Selected Research Projects

Modeling the erosion of canali and sinuous rilles on Venus — 2023 – Present
Mineralogical investigations of Mars using MRO CRISM — 2023 – 2025
Mastcam calibration and multispectral analysis for Curiosity, MSL — 2022 – 2025
Three Forks sample depot and landing site certification, Mars Sample Return — 2022
Geological hazard map of Jezero Crater, Mars 2020 landing site — 2020 – 2021
Geomorphological analysis of blanket ejecta of Corinto secondary craters, Mars — 2019
Size-frequency distribution of rocks around InSight lander — 2019
FTIR spectroscopy of minerals to update Caltech's spectral library — 2018 – 2019
Scanning electron microscopy of Caltech's meteorite collection — 2018 – 2019
Mineral separation of zircon and oxygen isotope analysis — 2018

Publications

Peer-Reviewed

Trussell, A. R., Bell III, J. F., et al. (2025). Dark-Toned Halite-Enriched Veins Above the Marker Band Record a Drying Environment in Gale Crater. Journal of Geophysical Research: Planets, 130(10), e2025JE009244.

Trussell, A. R., O'Rourke, J. G., Williams, D. A., Flynn, I. T.W., Black, B. A., & Borrelli, M. E. (2025). The importance of carbonatite lavas in outgassing Venus' modern-day atmosphere. Science Advances, 11(32), eadw1621.

Farrand, W. H., Eng, A. M., **Trussell, A. R**., et al. (2025). Multispectral Properties of Rocks in Marker Band Valley and Evidence for an Alteration Unit Below the Amapari Marker Band at Gale Crater, Mars. *Journal of Geophysical Research: Planets*, *130*(4), e2024JE008645.

Golombek, M. P., **Trussell, A. R.**, et al. (2021). Rock Size-Frequency Distributions at the InSight Landing Site, Mars. *Earth and Space Science*, *8*(12), e2021EA001959.

Grant, J., Wilson, S., Golombek, M., **Trussell, A. R.**, et al. (2021). Degradation at the InSight Landing Site, Homestead Hollow, Mars: Constraints From Rock Heights and Shapes. *Earth and Space Science*, *9*(2), e2021EA001953.

Golombek, …, **Trussell, A. R.**, et al. (2020). Geology of the InSight landing site on Mars. *Nature Communications*, 11, Article: 1014.

Conference Abstracts

Trussell, A. R., O'Rourke, J. G., Black, B.A., Mukhopadhyay, S. (2026). Modeling Cryptic Degassing From Intrusive Magmatism on Venus. European Geosciences Union (EGU) General Assembly 2026. *Submitted.*

Trussell, A. R., O'Rourke, J. G, Williams, D. A., Flynn, I. T.W. (2026). Sinuous Rilles as a Mantle Thermometer for Venus: Erosion by Komatiite Lavas and Spatial Clustering Around Coronae. 57th Lunar and Planetary Science Conference. *Submitted.*

Trussell, A. R., O'Rourke, J. G, Williams, D. A., Flynn, I. T.W. (2025). New Global Map of Rilles on Venus and Models of Their Erosion. VEXAG 2025 Annual Meeting.

Trussell, A. R., Bell III, J., et al. (2025). Dark-Toned Halite Veins as a Record of a Drying Environment in Gale Crater. 56th Lunar and Planetary Science Conference, #1560. (Poster)

Trussell, A. R., O'Rourke, J., et al. (2024) Erosion of Canali by Carbonatite Lavas: A Potential Major Source of CO_2 in Venus's Modern Atmosphere. AGU 2024, 169250. (Talk)

Trussell, A. R., O'Rourke, J., et al. (2024). Modeling the Thermo-Mechanical Erosion of Canali on Venus by Different Lava Types. COSPAR 2024. (Talk)

Trussell, A. R., Douglass, B., et al. (2024). Mastcam Multispectral Analysis of Dark-Toned Veins Above the Marker Band in Gale Crater, Mars. 55th Lunar and Planetary Science Conference, #2023 (Talk)

Trussell, A. R., Adler, J., Bell III, J. (2023). Mineralogical Investigation of Potentially Erosional Landforms in Southern Chryse Planitia, Mars. AGU 2023, 1344879. (Poster)

Farrand, B., **Trussell, A. R.**, et al. (2023). Curiosity Rover Mastcam Multispectral Measurements of Rocks from Marker Band Valley and Beyond. AGU 2023, 1355477.

Russo, F., **Trussell, A. R.**, Brooks C., et al. (2023). Mapping Rock Heights for the Mars Sample Return Landing Site and Depot Sites in Three Forks, Jezero Crater. LPSC 2023, LPI Contrib. No. 2631.

Golombek, M., **Trussell, A. R.**, Williams, N., et al. (2022). Rocks at the InSight Landing Site Also Identified in HiRISE Images at the Scale of a Pixel. *LPSC 2022*, LPI Contrib. No. 2180.

Grant, J., Wilson S., Golombek, M., **Trussell, A. R.**, et al. (2022). Constraints on Degradation at the InSight Landing Site, Homestead Hollow, from Rock Heights and Shapes. *LPSC 2022*. LPI Contrib. No. 2215.

Trussell, A. R., Golombek, M., Williams, N., et al. (2021). InSight Rock Size Frequency Distributions on Mars. *LPSC 2021*, LPI Contrib. No. 2548. (Poster)

Trussell, A. R., Golombek, M., Charalambous, C., et al. (2019). Size-Frequency Distribution of Rocks at the InSight Landing Site, *GSA 2019*, Abstract 246- 8. (Talk)

Awards & Fellowships

National Science Foundation Graduate Research Fellowship, 2024: Five-year fellowship awarded to graduate students that demonstrate the potential to be high achieving scientists.
Ian Campbell Award, 2021: Awarded for outstanding performance in field geology courses.
Howard Reynolds Memorial Prize in Geology, 2020: Awarded to one who demonstrates the potential to excel in the field of geology and actively contributes to the quality of student life at Caltech.

NASA Summer Undergraduate Program for Planetary Research (SUPPR), 2019: Funded 8-week summer internship at JPL investigating Insight and Mars 2020 landing sites, mentored by Dr. Matthew P. Golombek.
Kiyo and Eiko Tomiyasu SURF Scholar, 2018: Funded 10-week summer research project investigating the geochemistry of strongly peraluminous granites across the Archean-Proterozoic transition, mentored by Dr. Claire E. Bucholz.

Workshops

NASA Planetary Science Summer School (PSSS)	2025
University of Arizona Planetary Photogrammetry Workshop	2024

Teaching Experience

Mastcam Calibration Mentor, Arizona State University	2023
Peer Mentor, NASA Jet Propulsion Laboratory	2022
Teaching Assistant, Caltech: Ge 1, Earth and Environment	2020 – 2021
Teaching Assistant, Caltech: Ge 114a, Mineralogy	2019
Math Instructor, Mathnasium	2016 – 2018

Field Experience

Bishop Tuff, California – Volcanology & Planetary Analogs	2025
ASD FieldSpec Operator, Arizona State University	
Trail Bridge Reservoir, Oregon – Volcanology & Planetary Analogs	2024
ASD FieldSpec Operator, Arizona State University	
Tobacco Root Mountains, Montana – Structural Geology & Mapping	2020
Field Camp, Indiana University	
Eastern Sierra Nevada, California – Igneous Petrology	2018
Field Assistant, Caltech	
Superior Province, Ontario, Canada - Igneous & Metamorphic Petrology	2018
Field Assistant, Caltech	

Outreach

Association for Women Geoscientists, Saguaro Chapter	2023 – Present
Caltech Women in Geological & Planetary Science (WinG)	2018 – 2021