Saira Sidra Hamid

550 E Tyler Mall
Physical Sciences Center F-Wing, Room F660B
Tempe, AZ 85281

Email: sshamid1@asu.edu
Web: https://saira-hamid.com/

Research Interests

Planetary Atmospheres and Climate Dynamics
Surface–Atmosphere Interactions (Dust, Volcanism, Aerosols, Microbial Transport)
Lunar Geology and Exploration

Education

2024 Ph.D. in Geological Sciences, Arizona State University
Dissertation: Exploring the Effects of Volcanic Emissions on the Atmosphere, Climate, and Surface Environment of Mars (Advisor: Amanda B. Clarke)

2022 M.S. in Geological Sciences, Arizona State University
Thesis: A long-lived lunar magnetic field powered by convection in the core and a basal magma ocean (Advisor: Joseph G. O'Rourke)

2018 B.S. in Geosciences, Georgia State University

2017 Geographic Information Science Certificate, Georgia State University

Awards and Recognition

2025–present	Presidential Postdoctoral Fellowship, Arizona State University
2021–2024	National Science Foundation (NSF) Graduate Research Fellowship
2021–2023	NSF Collaborative Research Proposal, awarded ~$300,000 (PI: Dr. Amanda Clarke) (Contributor)
Nov 2022	Gerald A. Soffen Memorial Fund Travel Grant, NASA Academy Alumni Association
May 2022	American Collegiate Rowing Association All-American Academic 1st Team
Apr 2022	Graduate Excellence Award, Arizona State University
Jan, Nov 2022	Graduate & Professional Student Association Individual Travel Grant, Arizona State University
Summer 2021	Summer Exploration Graduate Fellowship, Arizona State University
2020–2021	Graduate College Fellowship (Featured in ASU News), Arizona State University

2019–2020	University Graduate Fellowship, Arizona State University
2019–2020	Interdisciplinary Enrichment Fellowship, Arizona State University
2018	Sally Ride Internship, NASA Goddard Space Flight Center
2017	Ernest Fritz Memorial Field Camp Scholarship

Professional Experience

Jan 2025–present Presidential Postdoctoral Fellow, Arizona State University

- Lead multidisciplinary research on aerosol–climate–microbiome interactions, including Saharan dust impacts on atmospheric and ocean systems.
- Investigate dispersal processes in the Martian atmosphere using planetary climate modeling.

Jun 2020–Aug 2023 Intern, NASA Jet Propulsion Laboratory

- Conducted planetary climate modeling research integrated into PhD dissertation (Summer Internship Program; Visiting Student Research Program).
- Modified the LMD Planetary Climate Model to simulate volcanic water, ash, and sulfuric acid emissions and assess impacts on Martian surface ice stability and atmospheric evolution.

Jan 2018–Apr 2018 Intern, NASA Goddard Space Flight Center

- Analyzed volcanic geomorphology of the Tharsis Montes (Mars) using Context Camera (CTX) and Mars Orbiter Laser Altimeter (MOLA) datasets in ArcGIS; mapped and classified lava channel emplacement styles.

Aug 2017–Dec 2017 Intern, NASA Ames Research Center

- Conducted geomorphological and mineralogical analysis of West Palikir crater gullies (Mars) using HiRISE DTMs, CRISM data, ENVI, and ArcGIS.
- Quantified gully morphology (volume, slope, sinuosity, concavity index, stream order/magnitude) to evaluate aqueous formation processes.

Jul–Aug 2017 Intern, National Center for Volcanology, Canary Islands Volcanological Institute

- Geophysical magnetotelluric survey for geothermal exploration at the island of Gran Canaria.
- Mapped resistivity anomalies associated with geothermal structures

including cap rock and magma reservoir morphology.

Mission Involvement

Jan 2025–present — South Pole-Aitken Basin Sample Return and eXploration (SPARX) Science Definition Team (SDT), Committee Member

- Contribute to mission science traceability matrix and define high-priority lunar science objectives for sample return.
- Evaluate sampling strategies and instrument requirements to constrain lunar dynamo history, basin formation, age determinations, and crustal evolution. Featured on NASA, ASU News

Jan 2024–present — AERosols and Ocean Science Expeditions (AEROSE)
Science Team Lead, Science Team Collaborator

- Lead the design and execution of ship-based aerosol, oceanographic, and microbiological science campaigns across the tropical Atlantic, overseeing experimental planning, sampling strategies, and at-sea science operations.
- Expedition participation: NOAA RV Gordon Gunter (Jan–Feb 2024, 3 weeks); NOAA RV Ronald H. Brown (June 2026, 4 weeks).

Nov 2019–Apr 2023 — Instrument Operator, Arizona State University

- Conducted telemetry monitoring and real-time data acquisition of internal component temperatures, pressures, and functional parameters during thermal vacuum chamber (TVAC) instrument testing and pre-launch Mission Operations Long Duration Test.
- Calibrated sensors and validated instrument performance under space-like conditions during TVAC testing.
- Supported testing for multiple NASA/spaceflight instruments including Emirates Mars Infrared Spectrometer (EMIRS), LUCY Thermal Infrared Spectrometer (L'TES), Europa Thermal Emission Imaging System (E-THEMIS), and VISible and Infrared ObservatioN System (VISIONS).

Teaching Experience

Fall 2024	Astronomy 111 Teaching Assistant, Arizona State University
Mar 2022	Invited lecture; An Introduction to Global Climate Models; Geology of Venus, Arizona State University
Aug 2020– May 2021	Geology 103 Teaching Assistant, Arizona State University
Jan 2016–May 2017	Supplemental Instruction Leader, Georgia State University

Service

Mar 2025	Dwornik Award Judge, Lunar and Planetary Science Conference ● Evaluated student posters and presentations, providing constructive feedback and identifying areas for improvement.
Aug 2023–Dec 2024	Committee Member, Inclusive Community Committee, School of Earth and Space Exploration, Arizona State University ● Created and implemented action items that address issues facing graduate students in SESE concerning equity, diversity, inclusion, and student rights. ● Co-authored Graduate Student Bill of Rights (in review)
2020–2025	Executive Secretary and External Panel Reviewer, Various Organizations ● Served as executive secretary for Lunar Surface Science Workshops (including Heritage Sites, Exploration Infrastructure, and Artemis III Landing Sites), the Lunar Petrology and Landed Instruments Interchange Workshop, and the Accelerating Space Science With Nuclear Technology Workshop producing formal reports to guide mission planning and planetary protection policy. ● Supported multiple NASA proposal review panels by documenting reviewer discussions, drafting reports, and assisting with dual-anonymous peer review assessments of intellectual merit.
2019–2022	Peer Reviewer, Graduate & Professional Student Association, Arizona State University ● Served as a reviewer for the Teaching Excellence award, Outstanding Research award, travel grant, and research grant programs. Reviewed, processed, and scored applications on a monthly basis. Reviewed ~50 applications to date.
Oct 2021	Delegate, Space Generation Congress ● Collaborated with international students and NASA experts on Artemis site planning and strategic goals, contributing recommendations in a final report to the Space Generation Advisory Council, the United Nations Committee on the Peaceful Uses of Outer Space, and NASA HQ.
Fall 2019	Member, Arizona Science Policy Network ● Engaged in science policy with legislators at the Arizona State Capitol, Historic Supreme Court.
Oct 2019	Volunteer, Mars on National Mall, Washington D.C.

- Installed and presented a basketball court–sized Mars map on the National Mall in Washington, D.C.
- Engaged the public, congressional staff, and NASA scientists by sharing Mars science and promoting youth participation in the Mars 2020 "Name the Rover" contest (Featured in ASU News)

Publications

Peer reviewed:

1. **Hamid, S. S.**, Kerber, L., & Clarke, A. B. (2025). Precipitation induced by explosive volcanism on Mars and its implications for unexpected equatorial ice. Nature Communications. https://doi.org/10.1038/s41467-025-63518-8
    a. Interviewed for NewScientist; ASU News; Space.com
    b. Featured in Scimex; Phys.org; Universe Today; Earth.com
2. **Hamid, S. S.**, Kerber, L., Varnam, M., Hamilton, C. W., & Clarke, A. B. (2025). Warming, cooling, and surface ice accumulation initiated by the release of water from the Athabasca Valles flood lava eruption on Mars. Earth and Planetary Science Letters, 671, 119651. https://doi.org/10.1016/j.epsl.2025.119651
    a. Interviewed and featured in ASU News
3. Braude, A. S., Kerber, L., Lefèvre, F., Jaziri, A. Y., **Hamid, S. S.**, Millour, E., & Forget, F. (2025). Modelling the effect of volcanic outgassing of sulphur on early Martian surface temperatures using a 3-D Global Climate Model. Icarus, Article 116568. https://doi.org/10.1016/j.icarus.2025.116568
4. **Hamid, S. S.**, Kerber, L., Clarke, A. B., & Forget, F. (2024). The delivery of water ice to the Martian surface by passive degassing. Icarus Special Issue: Ices in the Solar System; origin, evolution, and distribution (416), 116084. https://doi.org/10.1016/j.icarus.2024.116084
5. **Hamid, S. S.**, O'Rourke, J. G., & Soderlund, K. M. (2023). A long-lived lunar magnetic field powered by convection in the core and a basal magma ocean. Planetary Science Journal, 4(5), Article 88. https://doi.org/10.3847/PSJ/accb99

Review articles:

1. **Hamid S.**, O'Rourke J.G. (2022) Modeling of the Lunar Magma Ocean. In: Cudnik B. (eds) Encyclopedia of Lunar Science. Springer, Cham. https://doi.org/10.1007/978-3-319-05546-6_28-1

Book Chapters:

1. Mather, T. A., Shorttle, O., **Hamid, S.**, Gaillard, F., & Noack, L. (In press) Volcanism and Planetary Atmospheres: Earth, Our Solar System, and Beyond. The Encyclopedia of Volcanoes, Third Edition. [Author of subsection: "Volcanism, atmospheres, and long-term planetary climate."]

2. **Hamid, S.** (2019). “Volcanoes”, Global Treks and Adventures Reykjavík Day Hikes. Amazon Kindle Direct Publishing, pg. 52-57.

Workshops & Reports:

1. Reuter, T., Myers, R., Christensen, P., Dudzinski, L., & Polzin, K. (2023). Accelerating Space Science with Nuclear Technology: The Tempe Workshop. Institute for Space Science and Development. https://i-ssd.org. (Contributor; served as Executive Secretary)
2. Space Generation Advisory Council (2021). Space Generation Congress Dubai 2021 Report: Artemis Site Planning and Strategic Goals for a Global Return to the Moon. Served as a delegate, working group: Artemis Site Planning and Strategic Goals. https://spacegeneration.org/wp-content/uploads/2024/02/SGC-DUBAI-2021-Report-1.pdf

Conference Proceedings

1. Schnell, J., Mardi, A. H., **Hamid, S.**, Zhang, Y., Katz, D., Song, Y. (2025, December). The Living Atmosphere: Advances in Monitoring, Modeling, and Sampling of Airborne Bioaerosols. Oral and Poster Session Convener and Oral Session Chair at the American Geophysical Union Fall Meeting.
2. Braude, A., Kerber, L., Lefèvre, F., Jaziri, Y., **Hamid, S. S.**, Maurice, M., Lefèvre, M., Millour, E., & Forget, F. (2024, September). Modelling the effect of the sulphur cycle on episodic climatic changes on early Mars (EPSC 2024-135). Oral presentation at the Europlanet Science Congress 2024, Berlin, Germany. https://doi.org/10.5194/epsc2024-135
3. **Hamid, S. S.**, Clarke, A. B., & Kerber, L. (2024, July). Precipitation induced by explosive volcanism on early Mars and its implications for ice in unusual equatorial regions (Abstract #3416). Oral presentation at the Tenth International Conference on Mars (LPI Contribution No. 3007). Lunar and Planetary Institute. https://www.hou.usra.edu/meetings/tenthmars2024/pdf/3416.pdf
4. Braude, A. S., Kerber, L., Lefèvre, F., Jaziri, A. Y., **Hamid, S. S.**, Millour, E., & Forget, F. (2024, July). Modelling the sulphur cycle on Early Mars. Poster presentation at the Tenth International Conference on Mars (LPI Contribution No. 3007, Abstract 3030). Lunar and Planetary Institute. https://www.hou.usra.edu/meetings/tenthmars2024/pdf/3030.pdf
5. Braude, A. S., Kerber, L., Lefèvre, F., Jaziri, A. Y., **Hamid, S. S.**, Millour, E., & Forget, F. (2024, March). Modeling the effect of volcanic outgassing of sulfur on early Martian climate and geology (Abstract #1582). Oral presentation at the 55th Lunar and Planetary Science Conference. Lunar and Planetary Institute. https://www.hou.usra.edu/meetings/lpsc2024/pdf/1582.pdf
6. **Hamid, S. S.**, Kerber, L., & Clarke, A. B. (2023, March). Volcanic degassing a potential source of surface water ice near Martian volcanoes (Abstract #2890). Oral presentation at

the 54th Lunar and Planetary Science Conference. Lunar and Planetary Institute. https://www.hou.usra.edu/meetings/lpsc2023/pdf/2890.pdf

7. **Hamid, S. S.**, Kerber, L., & Clarke, A. B. (2023, February). Volcanic degassing: A potential source of water ice on Mars (Abstract #1073). Poster presentation at the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) Scientific Assembly. https://www.iavceivolcano.org/content/uploads/2021/03/iavcei-2023-book-of-abstracts.pdf
8. **Hamid, S. S.**, O'Rourke, J. G., & Soderlund, K. M. (2021, December). A Lunar Dynamo Powered by Core Convection and a Basal Magma Ocean. Oral presentation at the American Geophysical Union Fall Meeting. https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/900575
9. **Hamid, S. S.**, O'Rourke, J. G., & Soderlund, K. M. (2021, March). A lunar dynamo powered by core convection and a basal magma ocean (Abstract #2038). Oral presentation at the 52nd Lunar and Planetary Science Conference (LPI Contribution No. 2548). Lunar and Planetary Institute. https://www.hou.usra.edu/meetings/lpsc2021/pdf/2038.pdf
10. **Hamid, S. S.**, & Gulick, V. C. (2018, March). Geomorphological analysis of gullies along western slopes of Palikir Crater. Poster presentation at the 49th Lunar and Planetary Science Conference (LPI Contribution No. 2083, Abstract #2644). Lunar and Planetary Institute. https://www.hou.usra.edu/meetings/lpsc2018/pdf/2644.pdf

Public Engagement

Invited talks:

1. "Real stories, Real Impact", Science Opportunities and Profession Exploration (SCOPE), invited talk, Scottsdale Community College, 13 February 2026.
2. "Circumstances." Story Collider, invited talk, ASU Kerr, 5 May 2025.
3. "What a Trip." Gather Storytelling, invited talk, ASU Kerr, 12 April 2024.

Interviews:

1. Interview with Sebastian Müller, Geo-log (YouTube), "Explosive volcanic eruptions and ice deposition on early Mars", published October 14 2025. https://www.youtube.com/watch?v=ICai9z2CG5s

Field Experience

2019–2023 Arizona State University

- Conducted multi-site field investigations of volcanic and impact terrains across the southwestern U.S., Mexico, and New Zealand, emphasizing terrestrial analogs for Martian and lunar surface processes.
- Quantified eruptive parameters (e.g., density, mass eruption rate,

column height, welding) and constructed stratigraphic columns, integrating field observations with thermal and remote sensing datasets to reconstruct volcanic evolution.

Apr 2018 — Field Assistant, NASA SSERVI RIS4E and NASA Goddard Space Flight Center

- Participated in NASA analog campaign evaluating portable LIBS, XRF, and LiDAR instruments for human planetary exploration.
- Assessed volcanic flow morphology and maar crater structures in the Potrillo Volcanic Field as analogs to planetary lava terrains.

Jun–Jul 2017 — Field Camp, Georgia State University

- Completed intensive geologic mapping, stratigraphic logging, and structural analysis using GPS and Brunton compass.
- Interpreted igneous, metamorphic, and sedimentary systems in remote field environments.

May 2017 — Field Volcanology Study Abroad, Georgia State University

- Conducted field investigations at volcanic centers in Costa Rica (Poás, Barva) examining tectonics, volcanism, and hazard processes.

Skills

Scanning electron microscopy (SEM); Energy Dispersive X-ray spectroscopy (EDS); Remote sensing & GIS (ArcGIS, QGIS, JMARS, ENVI); DEM generation (Ames Stereo Pipeline, SOCET SET); planetary climate modeling (LMD PCM); programming (Python, MATLAB, Fortran); thermochemical convection modeling.