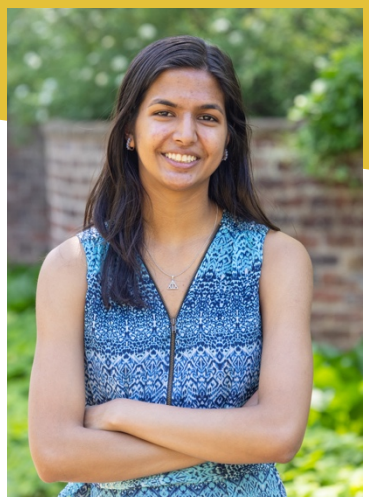
Medha Prakash

Curriculum Vitae

medhaprakash@utexas.edu | www.linkedin.com/in/medhaprakash | medhageo.com



I am a PhD candidate at the University of Texas at Austin interested in astrobiology, impact processes, remote sensing, and the philosophy and cultural evolution of science, with experience in a variety of remote sensing and field techniques.
My research spans the martian cryosphere, lunar south pole, prebiotic Earth, and the micro-habitats created in extant impact-induced hydrothermal systems. I extend the interdisciplinary nature of my interests in space exploration through art, poetry, history, and public outreach.

EDUCATION- *Wahoowa and Hook'em!*

University of Texas at Austin (UT Austin), Austin, TX
Ph.D. in Geosciences, advised by: Dr. Sean Gulick and Dr. Cyril Grima — Expected Graduation: May 2028

- **Selected Coursework:** Astrobiology; Remote Sensing; Marine Geology and Geophysics; Planetary Geology and Geophysics; Ice Sheets, Sediments, and Sea Level

University of Virginia (UVA), Charlottesville, VA
B.S., Double major in Environmental Sciences and Statistics, Astronomy Minor — May 2023

- *Summa Cum Laude*, Honors Thesis*: Morphometric comparison of terrestrial eskers and martian sinuous ridges*, Advised by Dr. Lauren Simkins and Dr. Ajay Limaye
- Mathematical Statistics Concentration
- **Selected Coursework:** Nonparametric and Rank-Based Statistics; Stochastic Processes; Glaciers and Ice Sheets; Fundamentals of Geology/Lab; Planetary Geology/Lab; Regression Analysis; Organic Chemistry/Lab; Differential Equations

RESEARCH EXPERIENCE- *my way of traveling to times and places unknown*

The University of Texas Institute for Geophysics (UTIG), Austin, TX
PhD Candidate, Feb 2025 — Present (*PhD student/Graduate Fellow since Sept. 2023)*

- Working with Drs. Sean Gulick and Cyril Grima on the IMAGES Project funded by NASA LDAP to:
  - Integrate analyses of morphological data, spectroscopic data, and high-resolution imagery to construct the shallow subsurface stratigraphy of Schrödinger basin and infer possible depositional mechanisms of relevant impactites in the basin.
  - Will combine Lunar Radar Sounder (LRS) reflectometry data with various bands of radar data from Mini-RF alongside Kristian Chan and Wes Patterson to understand the scattering regimes of the shallow subsurface of Schrödinger Basin.
  - Will investigate the compositional crustal structure of South Pole Aitkin basin using spectral data from Schrödinger and neighboring areas.
- Investigating the hydrothermal system of Rochechouart Impact Structure through VNIR and FTIR spectroscopy on hydrothermally altered regions of drill cores alongside Ralph Milliken, Katya Yanez, Philippe Lambert, Gulick, and Grima
- Investigating the evolution in how cultures personify the environment through mythology, literature, and science alongside Mike Wong at the Carnegie Science Institute.

Ice and Ocean Research Group, Charlottesville, VA
Undergraduate Researcher, Aug 2020 — May 2023

- Worked under the supervision of Dr. Lauren Simkins, Dr. Ajay Limaye, and Dr. Marion McKenzie
- Conducted my distinguished major's thesis on morphometrics and spatial properties of terrestrial eskers and martian ridges in order to quantitatively compare both feature types using tools in ArcGIS and JMARS.

- Designed code in R to statistically analyze aforementioned morphometrics by acquiring summary statistics, creating visuals, and hypothesis testing in order to improve understanding of martian glaciology and hydrology
- Analyzed clast characteristics with the Image Processing toolbox in MATLAB of outcrops in Washington State to better understand depositional environments of the Cordilleran Ice Sheet (CIS) by designing code to identify and outline clasts in a sediment matrix.
- Led group meetings and discussions about economic accessibility in field studies and relevance of glacial research to astrobiology

NASA Goddard Space Flight Center, Greensboro, MA *(Remote)*
Student Intern, Aug 2021 – Dec 2021

- Used File Transfer Protocol (FTP) and the CReSIS toolbox on MATLAB to analyze radar data and trace snow layers from flights over the Greenland Ice Sheet under the supervision of Dr. Thomas Overly from the Cryospheric Lab

NASA Jet Propulsion Laboratory, Pasadena, CA *(Remote)*
Student Intern, Feb 2021 — Aug 2021

- Worked with Dr. Jessica Weber, Dr. Laurie Barge of the Origins and Habitability Lab (OHL), and Dr. Yuk Yung (Caltech) to study carbon reduction reactions in the geologic context of early Earth and Mars
- Designed and compiled a database related to minerals catalyzing carbon reductions and serpentinization including 40 publications [1]
- Presented two one-hour talks at OHL group meetings presenting research findings
- Facilitated discussions on research papers related to early Mars, carbon reduction, serpentinization, and hydrothermal vents in the Astrobiology Literature Club
    - (Liu, J, Michalski, JR, Tan, W, He, H, Ye, B and Xiao, L (2021) Anoxic chemical weathering on a reducing greenhouse on Mars. Nature Astronomy 5, 503–509)

Applied Metabolism and Physiology Lab, Charlottesville, VA
Research Assistant, Nov 2019 — July 2020

- Collected and recorded data from studies involving the "exercise prescription" delegated to participants at risk of, or having, metabolic syndrome

PEER-REVIEWED PUBLICATIONS- *writing my science*

Published:

Prakash, M.; Weber, J. M.; Rodriguez, L. E.; Sheppard, R. Y.; Barge, L. M. "Database on Mineral Mediated Carbon Reduction: Implications for Future Research." *International Journal of Astrobiology,* Volume 21, Issue 6, pp. 423-440, 2022, 1-18, https://www.doi.org/10.1017/S1473550422000052 [1]

Weber, J.; Marlin, T.; **Prakash, M.;** Teece, B.; Dzurilla, K. & Barge, L. A Review on Hypothesized Metabolic Pathways on Europa and Enceladus: Space-Flight Detection Considerations. *Life* **2023,** 13(8), https://doi.org/10.3390/life13081726

In preparation:

Prakash, M.; Miller, L.; McKenzie, M.; Limaye, A.; "Assessing the glacial hypothesis for sinuous ridges on Mars by comparison to a global-scale database of terrestrial eskers." *Geology,* **2025**, *In prep for submission*

Prakash, M.; Gulick, S. P. S.; Grima, C.; Jordan, M.T. K.; Kramer, G.Y.; Gerekos, C. "Evidence for a lateral flow mechanism on a cliff-forming impactite layer in Schrödinger Basin." *Geology***, 2025**, *In prep for submission*

Jordan, M. T. K.; Gulick, S. P. S.; Grima, C.; **Prakash, M.;** Kramer, G.Y.; Gerekos, C. "" **JGR Planets, 2025,** *in-prep for submission.*

CONFERENCE ABSTRACTS- *presenting my science*

- Poster: **"The Planetary Peer Network at UT Austin,"** *56th Lunar and Planetary Science Conference*, The Woodlands, TX, March 2025 LPSC, Abstract #: 1748
- Oral: "**Remote Sensing Investigations of Suevite in Schrödinger Basin**," *American Geophysical Union Fall Meeting, Session P42B,* Washington, D.C., December 2024, Abstract #: P42B-05

- Oral: **"Investigations of a Potential Cliff-Forming Suevite Layer in Schrödinger Basin,"** *86th Annual Meeting of the Meteoritical Society,* Brussels, Belgium, August 2024, Abstract #: 6311
- Poster: **"Investigating impactoclastic and volcanic deposits in Schrödinger Basin,"** *55th Lunar and Planetary Science Conference*, The Woodlands, TX, March 2024, Abstract #: 1784
- Oral: **"Using Terrestrial Esker Analogs to Understand Subglacial Water Drainage on Mars,"** *American Geophysical Union Fall Meeting, Session EP024*, Chicago, IL, December 2022 Abstract #: EP35B-08
- Oral**:** "**Morphology and Process-Based Implications of Martian Ridges and Terrestrial Eskers**," *Geological Society of America Northeastern Section Meeting*. Lancaster, PA, March 2022 https://doi.org/10.1130/abs/2022NE-374536

Select Additional Abstracts:

- *M. Jordan, C. Grima, S. P.S. Gulick, **M. Prakash**, C. Gerekos, and G. Y. Kramer **"Calibration of Lunar Radar Sounder Surface Reflectivity."** *55th Lunar and Planetary Science Conference*, The Woodlands, TX, March 2024, Abstract #: 1609
- *M. Jordan, C. Grima, S. P.S. Gulick, **M. Prakash**, C. Gerekos, and G. Y. Kramer **"Utilizing Heterogeneities in Lunar Radar Sounder Surface Reflectivity to Identify Metallic Oxides in the Procellarum KREEP Terrane."** *American Geophysical Union Fall Meeting, Session P13H*, Washington, D.C., December 2024, Abstract #: P13H-05
- S. P. S. Gulick, S. Tikoo, S. Alfred, V. J. Bray, C. S. Cockell, G. S. Collins, C. Grima, M. A. Hesse, E. Hiatt, N. McCall, U. Nicholson, L. L. Perez-Cruz, **M. Prakash**, A. Rae, J. U. Fucugauchi, **"Role of terrestrial impact structures and scientific drilling in understanding impact processes and planetary evolution"** *American Geophysical Union Fall Meeting, Session U32B,* Washington, D.C., December 2024, Abstract #: U32B-07

***indicates mentee**

COLLOQUIUM PRESENTATIONS- *keeping my community in the loop*

- Oral: **"Moon Ballin': How the game of tennis would change on the Moon"** *UTIG Discussion Hour (Pseudoscience Day)*, Austin, TX, April 2025
- Poster: "**Investigating impactoclastic and volcanic deposits in Schrödinger Impact Basin"** *Jackson School of Geosciences Annual Research Symposium*, Austin, TX, February 2025
- Oral: **"Using terrestrial esker analogs to understand subglacial water drainage on mars"** *UTIG Discussion Hour*, Austin, TX, April 2024
- Poster: "**A layer of cliff-forming suevite in Schrödinger Basin?"** *Jackson School of Geosciences Annual Research Symposium*, Austin, TX, February 2024
- Oral: **"Planets are Food"** *UTIG Discussion Hour (Pseudoscience Day)*, Austin, TX, February 2024
- Oral: **"Morphometric comparison of terrestrial eskers and martian sinuous ridges,"** *Distinguished Majors Thesis Defense,* Charlottesville, VA, May 2023
- Poster: "**Morphometric comparison of terrestrial eskers and martian sinuous ridges,"** *Virginia Space Grant Consortium Symposium,* Norfolk, VA, April 2023
- Poster: "**Utilizing Image Analysis to Characterize Glacial Sediments in Washington State**," *Undergraduate Research Symposium.* University of Virginia, Charlottesville, VA, April 2022
- Oral: "**Morphology of terrestrial eskers and martian ridges**," *URNTalks*, University of Virginia, Charlottesville, VA, April 2022
- Oral: "**Eskers and their Implications for Comparative Planetology**," *EnviroDay Research Symposium*. University of Virginia, Charlottesville, VA, February 2022.
- Oral: "**Snow Volume Change from Radar Layer Tracking**," *NASA Goddard Space Flight Center Intern Final Presentations.* Goddard Space Flight Center, Online, December 2021
- Oral: "**Database on Carbon Reduction Reactions**," *NASA Jet Propulsion Laboratory Intern Final Presentations*. NASA Jet Propulsion Laboratory, Online, July 2021
- Oral: "**Mineral Reactivity with Oxidized Carbon Sources**," *Origins and Habitability Lab Group Meeting*. NASA Jet Propulsion Laboratory, Online, April 2021

ACCOLADES AND HONORS- *sometimes, people think I am cool*

Lewis and Clark Field Research Scholar in Astrobiology (2025): Awarded by American Philosophical Society/NASA Astrobiology

- Received $5,000 for proposed fieldwork in Rochechouart in the Summer of 2025

Sigma Xi Associate Member, awarded by: Sigma Xi Society **(2025)**

- For research aptitude demonstrated by conducting independent investigation and writing a report

Planetary Habitability Student Award, awarded by: The Center for Planetary Systems Habitability (2024)

- Money to support a student-led organization meant to connect the planetary sciences (PPN)

NASA Planetary Sciences Division Travel Grants, awarded by NASA (2024) ($1,500

- Money awarded to support travel to the Annual Meteoritical Society Meeting in Brussels

Bianchi John & John Boone Endowed Presidential Fellowship, awarded by: The Jackson School of Geosciences (2023)

- Fellowship to fund my first year of graduate studies based on academic merit

Wilbur A. Nelson Award, awarded by: Department of Environmental Sciences (2023)

- For high academic achievement in the geosciences

Richard Scott Mitchell Award, awarded by: Department of Environmental Sciences (2022)

- For high academic achievement and advanced geosciences coursework

VSGC Undergraduate STEM Research Scholarship, awarded by: Virginia Space Grant Consortium (2022)

- For high academic achievement and promise in research

Undergraduate Research Scholar Fellowship, awarded by: Undergraduate Research and Mentorship Program (2022)

- For good academic standing and development of a research project

Raven Society inductee

- The most prestigious honorary society at the University of Virginia

Double Hoos Research Award, awarded by: Office of Undergraduate Research (2021)

- For developing a research project with my mentor

Dean's List, awarded by: College of Arts and Sciences (Fall 2019, 2021)

Echols Scholar, awarded by: Echols Scholars Program (2020)

Paul Tudor Jones II Jefferson Scholarship, awarded by: The Jefferson Scholars Foundation (2019)

TEACHING AND MENTORSHIP- *passing my experiences forward*

~RESEARCH MENTEES:

Mercedes Jordan: Sept 2023 — Present, Honors thesis **"The Calibration of Lunar Radar Sounder Surface Reflectivity"**

- Successfully graduated in December 2024, and is now a Research Engineering and Scientist Associate at UT Institute for Geophysics

~PEER TO PEER:

GSEC Peer Mentor, Austin, TX

Sept 2024 — Present

- Help orient first-year graduate students in the geoscience department to the school, providing career and course advice, and connecting them with individuals in the department
    - Mentee, 2024 - 2025: Romal Ramadhan

Mission to Mars (ASTR 3450), Charlottesville, VA

Teaching Assistant, Jan 2022 — May 2022

- Coordinated the peer review process and provided feedback for a course that is centered around future exploration of Mars as well as the history of space exploration

Principles of Chemical Structure (**CHEM 1810)**, Charlottesville, VA

Head Teaching Assistant, Aug 2020 — Present

- Facilitated discussions and assisting first-year college students in understanding and applying advanced chemistry concepts

- Organized logistics between multiple teaching assistants to effectively help and answer questions for over 100 hundred students

SKILLS- *what gets me through the week*

Software: Python, GIS (ArcGIS Pro, QGIS), ENVI, JMARS, Microsoft Office (Word, Excel, PowerPoint), R, MATLAB, iWork, QuickBooks, Responsive Web Design, Adobe Photoshop, Paradigm
Laboratory: Titration, recrystallization, distillation, chemical identification, IR spectroscopy, NMR
Field: Differential GPS, Grab samples
Language: English (native or bilingual proficiency), Hindi (native or bilingual proficiency), Spanish (limited working proficiency), French (basic proficiency)
Certifications: CPR, Wilderness Training (by May 2025)

COMMUNITY INVOLVEMENT AND OUTREACH- *fostering positivity and departmental support*

Planetary Peer Network, *Austin, TX*
Founder, May 2024 -- Present

- Organizing graduate students across multiple departments to initiate a mentorship network designed to build community and provide career development opportunities to early career researchers and students interested in the planetary sciences
- Coordinating mentorship pods, social events, workshops, and panels demystifying the graduate, post-doc position, and job application process and proposal writing process
- Was a panelist in talking about pursuing summer research and enrichment opportunities for students
- Expanded membership to 30+ individuals in the first year, and led creation of a repository of resources for summer opportunities and graduate school applications

CPSH Research Retreats, *Austin, TX*
Student Organizer, May 2024-August 2024

- Helped organize the first student-post doctoral research retreat funded by the Center for Planetary Systems Habitability at UT Austin
- Facilitated interdisciplinary collaboration between the biology, chemistry, astronomy, and geoscience departments.

Planetary Geoscience Meetings, *Austin, TX*
Organizer, Jan 2023 — Present

- Organizing bi-weekly Planetary Geoscience meetings across the Department of Earth and Planetary Sciences and UTIG that enable the community to present research, obtain useful feedback, and collectively improve aspects of our professional development

Graduate Student Executive Council (GSEC), *Austin*, *TX*
Secretary (Formerly First Year Liaison), Sep 2023 — Present

- Improving the experiences of graduate student orientation and prospective student weekend by gathering data and feedback from students and working with Jackson School administration
- Maintaining meeting minutes and organized dissemination of information within the department through monthly newsletters and Discord server facilitation
- Volunteer to host and help coordinate social events and help run the Graduate Research Symposium
- Facilitate the annual GSEC Survey in order to provide a means to directly interface with administration to improve the graduate student experience in the department

ENRICHMENT- SUMMER SCHOOLS AND FIELDWORK- *learning from peers and the environment*

Exoplanets by the Lake Summer School II, *Herrsching Am Ammersee, Germany*
Alumnus, July 2024

- Was selected as one of 20 researchers/students internationally to attend a week-long program receiving lectures on magmatic degassing, early Earth, exoplanets, and solar system formation history
- Learned about the state of the art in coupling of the evolution of planetary interiors to atmospheres
- Running the Alumni Network Linkedin page

Marine Geology and Geophysics Field Course, *Port Aransas, TX*

Student, May 2024

- Collected and processed field data including sediment cores, grab samples, Differential GPS, seismic, chirp, bathymetric, and backscattered imagery data
- Mentored 3 undergraduate students as a part of a group to complete a final project examining paleo and modern morphologies of tidal channels in Aransas Bay

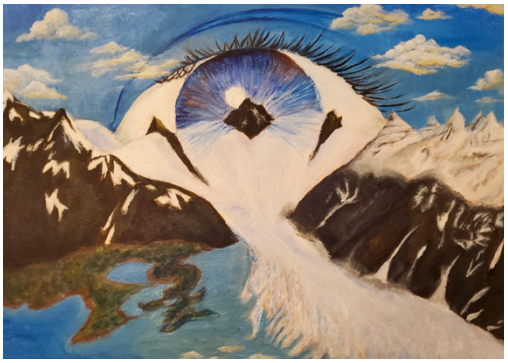
Ice Sheets, Sediments and Sea Level, *San Salvador Island, The Bahamas*
Student, Feb 2024

- Collected and processed LiDAR data and differential GPS of foreshore to dune transitions to enhance understanding of peak sea level rise in The Bahamas during Marine Isotope Stage 5e
- Compared our data with various ice-model results to understand what combination of parameters best fit our observations

Geosciences in the Field, various geologic sites in the Northeast United States,
Meal Logistics Coordinator/Student, Feb 2022 — Mar 2022

- Spent spring break on the road in harsh weather conditions, contributed to a field guide about various geologic sites in the Northeast
- Coordinated meal logistics for 22 people

BROADER IMPACTS- *expanding the influence of my work*



~ INTERSECTION OF ART AND SCIENCES: I have submitted artwork to the department annual art exhibit, specifically a painting titled "glacial sorrow," explored the parallels between human existence and environmental phenomena through geopoetry. I am collaborating with photographer Mark Chen in accompanying his photography with geopoetry. In collaboration with Kellum Jones, we are convening a Town Hall in AGU 2025 allowing artists and geoscientists to publicize their work.

~ K-12 OUTREACH: I spend weekends performing outreach in the local community and UT Community, through events such as The Project Kids Fair and UT Stem Girls day, to educate young students and get them excited about Earth and planetary science questions, but have also partaken in initiatives and organizations meant to enhance STEM education.

Science Olympiad at UVA (SOUVA), Charlottesville, VA
Outreach Chair, Feb 2022 — May 2023

- Enhanced university student participation in the Virginia State Science Olympiad competition through social media outreach and solidifying a consistent volunteer base through this organization
- Volunteering at virtual and in-person state and invitational Science Olympiad Competitions
- Helping facilitate the first UVA-Virginia Tech virtual invitational tournament in the fall through assisting in planning, test writing, encouraging volunteers

WOURLD™, Charlottesville, VA
Lesson Developer, Sep 2020 — May 2022

- Developed lessons to explain environmental science principles that are concise, educational, and engaging with a startup company devoted to education of a variety of populations on climate change issues and providing solutions to help rebuild forests in endangered areas such as the Amazon basin
- Facilitated and led discussions and assimilated feedback for the Sustainable Living Panel during the first, international WOURLD Climate Education Conference
- Developed content for a blog on sustainable living, climate science careers, and current research

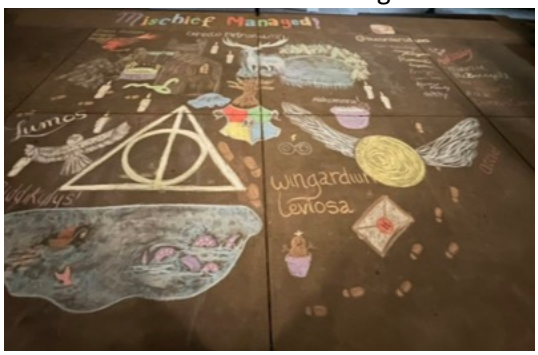
~ AAPIIG: I am an active member of the Asian American and Pacific Islander in Geosciences (AAPIIG) Community, and have coordinated conference meet ups.

BROADER INTERESTS- *science is only 90% of my personality*

Ektaal A cappella, Charlottesville, VA
President (Formerly Music Director), Sep 2019 — May 2023

- Expanding on my experiences receiving a Sangeet Visharad degree in Hindustani Vocal Music, I resided over a group of 18 singers to put on semester concerts, perform at local and cultural gigs, and compete in national competitions (earned 2nd place at North Carolina State University's Sangeet Sagar, as well as reaching over 25,000 listeners on Spotify)
- Led remote and in person practices, wrote medleys of South Asian and Western music using MuseScore, helped members learn arrangements, mixed audio using Audacity, Garage Band, and Logic Pro, leading to our debut album, Safar.
- Worked for and advocated for the inclusion of smaller, lesser known groups, as well as cultural appreciation arts organizations on Grounds
- Sparked a major period of holistic growth of our group in popularizing our music, increasing the amount of members, incorporating choreography into our arrangements, acquiring funding through unique fundraisers, connecting with other Desi a cappella groups across the nation, as well as worked to release a single and EP.

The Order, Charlottesville, VA
Headmaster (Vice President), Sep 2020 — May 2023



- A secret society at the University of Virginia purely devoted to the fandom of Harry Potter
- Managed the application process and welcome of new recruits to the Order, ensured we engage in philanthropy every semester, and planned major events for the club
- My personal pride: left a gigantic chalk mural depicting Harry Potter references on Grounds

UVA in Italy: Photography and Art History, Rome/Castiglion Fiorentino/Florence/Venice, Italy
Student, May 2022- Jun 2022

- Spent 4 weeks examining churches, cathedrals, and galleries of Rome, Florence, Venice and various Tuscan towns through the lens of Art History and Photography. Attended the Biennale and critiqued the Chilean exhibit on peat bogs.
- Produced a photobook titled Contrast

Independent Study Abroad Project, Italy, Turkey, Greece, The United Kingdom, Ireland
May 2022 — August 2022

- Using photography and creative writing to examine how ancient mythology such as Greek, Roman, Celtic, and Arthurian manifest in contemporary locations and culture.

South Asian Athletes Project, Remote
Sep 2022 – January 2024

- Interviewed Rajeev Ram, the former #1 Men's Doubles Tennis Player, to ask about his experiences as an athlete, his connection with his South Asian identity, and how the sport has impacted his connection and vice versa.