Stanford University

THOM CHAFFEE

941-586-5260 | thomc@stanford.edu | thom.rocks

EDUCATION

Stanford University - PhD Candidate in Geophysics, 2020 - expected 2025

Stanford Leland Junior University (Stanford), Stanford, CA

- Researching lunar paleomagnetism in the lab of Dr. Sonia Tikoo.
- Coursework focused on planetary science, geophysical modeling, and applied mathematics.
- National Science Foundation Graduate Research Fellow, 2020-ongoing.
- Additional focus on outreach and education including high school and undergraduate mentoring.

Caltech - B.S. Geology, Minor: Environmental Science and Engineering, received 2018

California Institute of Technology (Caltech), Pasadena, CA

- 3 years of geophysical lab research experience resulting in 1 journal paper and 2 conference presentations.

RESEARCH AND WORK EXPERIENCE

PhD Candidate in the lab of Dr. Sonia Tikoo, Stanford University, September 2020 – Present

- Thermal modeling of cooling lunar impact ejecta bodies.
- Magnetic field modeling in 3 dimensions in Python.
- Inverse modeling of satellite magnetic field data using MATLAB.
- Paleomagnetism laboratory techniques focused on analysis of extraterrestrial samples.
- Development and implementation of new cutting-edge paleomagnetism laboratory equipment.
- Lab Safety Coordinator responsible for oversight, safety training, and chemical management.

Research Project in the lab of Dr. Laura Schaefer, Stanford University, January 2022-Present

- Thermochemical modeling of lunar magma ocean crystallization and trace element partitioning.

GIS Technician, City of Tallahassee, Tallahassee Florida, 2018-2020

- Created and maintained digital databases, maps, and records of city utilities projects.
- Extensive experience with ESRI ArcGIS geospatial platform.

Undergraduate Research Fellow in the lab of Dr. Joe Kirschvink, Caltech, 2015 – 2017

Worked full-time during summer fellowships and part-time while taking classes.

2017: Extended Late-Cretaceous Magnetostratigraphy of the James Ross Basin Island

- Completed a paleomagnetic study of Antarctic sediment cores for high-precision biostratigraphic dating.

2016: Investigating the Death of the Moyero River Superchron

- Concluded research project on Estonian paleostratigraphy, sample processing and data analysis.
- 2nd author on paper published in the journal Palaeogeography, Palaeoclimatology, Palaeoecology.

2015: Investigating the Role of Magnetite in Cryopreservation

- Introductory project on paleomagnetic methods with industrial and medical applications.

PUBLICATIONS

In review: **Chaffee, Thom**, Tikoo, Sonia M., Maxwell, Rachel, and Garrick-Bethell, Ian. “Testing the Robustness of Parker’s method against Complexly Magnetized Sources and Implications for Lunar and Planetary Paleopole Determinations.” Journal of Geophysical Research: Planets.

In preparation: **Chaffee, Thom**, Tikoo, Sonia M., Boeschen, Sam G., Abubo, Raisha, and Weiss, Benjamin P. “Null Paleointensities of Young Lunar Impactites.” Target journal: Science Advances. Planned submission 2025.

In preparation: **Chaffee, Thom** and Schaefer, Laura. “Oxygen Fugacity in the Lunar Magma Ocean.” Planned submission 2025.

Grappone, J. M., **T. Chaffee**, Y. Isozaki, H. Bauert, and J. L. Kirschvink. "Investigating the duration and termination of the Early Paleozoic Moyero reversed polarity Superchron: Middle Ordovician paleomagnetism from Estonia." Palaeogeography, Palaeoclimatology, Palaeoecology 485 (2017): 673-686.

PRESENTATIONS

Chaffee, Thom, Sonia M. Tikoo, Sam G. Boeschen, Ji-In Jung, and Benjamin P. Weiss. “Null Paleointensities of 2Ma Lunar Impactite Glass from South Ray Crater”. Presented at LunaSCOPE meeting, August 7 2024.

Chaffee, Thom, Sonia M. Tikoo, Rachel Elise Maxwell, and Ian Garrick-Bethell. “Crustal Magnetic Anomalies Preclude a Stable Selenocentric Axial Dipole Structure for the Ancient Lunar Dynamo.” In *55th Lunar and Planetary Science Conference,* no. 3040, p. 2237, March 13 2024.

Chaffee, Thom M., Sonia Tikoo, Sam G. Boeschen, Raisha Abubo, Benjamin P. Weiss. “No Evidence of Magnetization from Impact-Generated Fields in 2 Ma Lunar Impact Melt Glasses.” GP24A-08 presented at 2023 Fall Meeting, AGU, 11-15 Dec.

Chaffee, Thom, Sonia Tikoo, Rachel Elise Maxwell, and Ian Garrick-Bethell. “Testing the Robustness of Parker’s Method Against Complexly Magnetized Sources and Implications for Lunar and Planetary Paleopole Determinations”. Bay Area Planetary Science Conference, 19 September 2023

Chaffee, Thom, Sonia M. Tikoo, Raisha Abubo, Sam G. Boeschen, Benjamin P. Weiss. “Testing Whether Lunar Melt Glasses Preserve Records of Impact-Generated Magnetic Fields.” Lunar and Planetary Science Conference, March 2023

Chaffee, Thom M., Sonia Tikoo, Rachel Elise Maxwell, and Ian Garrick-Bethell “Testing the Robustness of Parker’s Method Against Complexly Magnetized Sources and Implications for Lunar and Planetary Paleopole Determinations” GP32B-0350 presented at 2022 Fall Meeting, AGU, 12-16 Dec.

Chaffee, Thom M. and Laura Schaefer. “Oxygen Fugacity in the Lunar Magma Ocean” DI35B-0037 presented at 2022 Fall Meeting, AGU, 12-16 Dec.

Chaffee, Thomas M., and Sonia M. Tikoo. "Size Thresholds for Unidirectional Remanence Within Lunar Magnetic Anomalies." In *52nd Lunar and Planetary Science Conference*, no. 2548, p. 1642. 2021.

Chaffee, Thomas M., Ross Mitchell, Sarah P. Slotznick, Jennifer Buz, Joseph Biasi, Joseph O'Rourke, Frank Sousa, David Flannery, Roger R. Fu, and Joseph L. Kirschvink. "Extended Late-Cretaceous Magnetostratigraphy of the James Ross Basin Island, Antarctica." In *AGU Fall Meeting Abstracts*, vol. 2017, pp. GP43A-0972. 2017.

Chaffee, Thom M., Joseph L. Kirschvink, and Atsuko K. Kobayashi. "Magnetic Dinner Salads: The Role of Biogenic Magnetite in Cryopreservation for Common Food Plants." In *AGU Fall Meeting Abstracts*, vol. 2015, pp. GP51A-1308. 2015.

AWARDS, TEACHING, SERVICE, AND IDEA

Awards:

Stanford Centennial Teaching Award, 2024
Nominated by the Geophysics department for commitment to teaching & excellent student feedback.

Lunar and Planetary Science Conference 2023 Lunar and Planetary Institute Career Development Award
For outstanding first-author abstract submission to the 54th Lunar and Planetary Science Conference.

Lunar and Planetary Science Conference 2023 Dwornik Award, Honorable Mention
Award for 2nd-best student presentation at the conference.

National Science Foundation Graduate Research Fellow (NSF GRFP), 2020-2025
Three years of full PhD funding for a research proposal on lunar magnetic anomalies.

Students:

Mateo Chavez, student at Foothill College, Palo Alto, working in the Tikoo lab under my supervision, Summer 2024

Raisha Abubo, Stanford undergraduate working in the Tikoo lab under my supervision, 2022-2023

Sam Boeschen, Stanford undergraduate (coterm) working in the Tikoo lab under my supervision, 2022-ongoing
Mentored in developing a novel research project on passive extraction of lunar volatiles for spaceflight.

Vivian Bahn, high school intern via Stanford Earth Young Investigators program, Summer 2022

Service:

Science Explorer (SciX) Ambassador, 2024-ongoing
Outreach and education role for the digital library and database managed by the Smithsonian Astrophysical Observatory under a NASA cooperative agreement.

Committee on Graduate Studies, Stanford, 2023-ongoing
Voting member of the faculty senate committee charged with formulating policy on graduate education and reviewing interdisciplinary degree-granting programs.

Stanford Wellness Program Co-Administrator, 2022-2023
Wellness role focused on the larger community for the entire Stanford Doerr School of Sustainability.

Stanford Geophysics Wellness Liaison, 2021-2023
Co-ran department student wellness program, organized student physical and mental health support, workshops for learning wellness skills, and social events.

Teaching:

Associate, Center for the Integration of Research, Teaching, and Learning
Certification in undergraduate education through the multi-institutional CIRTL Network, including coursework on STEM pedagogy at Stanford.

Speaker, Planetary Science and Exploration Seminar, Stanford, March 2024
50 minute science lecture and Q&A with Geophysics and Aero/Astro graduate departments.

Guest lecturer, Formation and Dynamics of Planets course at Stanford, Nov 2024
90 minute guest lecture on planetary formation and core differentiation for a graduate course with a focus on active learning techniques.

Teaching Assistant, Stanford Earth & Planetary Sciences, “Introduction to Geology”, Spring 2024. 15 students.
Ran and graded weekly lab sections and assisted with field exercises and exam grading. 20 hrs/wk.

Teaching Assistant, Stanford Geophysics, “Introduction to Planetary Science”, Spring 2023. 10 students.
Gave lectures, graded problem sets, ran weekly office hours. 20 hrs/wk.

Volunteer, Stanford GeoKids, 2022-ongoing. 40-80 students.
Run weekly Earth science educational activities for 3 classrooms of 2nd-4th graders. 5 hrs/wk.

Stanford Geophysics, graduate student mentor, 2021-ongoing. 1 student / year

Provide mentorship and assistance to new graduate students their first year in the department.

Teaching Assistant, Caltech Geology, “Earth and the Environment”, 2015, 2016, 2017. 12-18 students. 20 hrs/wk.
Designed and supervised teaching labs, assisted students with content, oversaw field expeditions.

Inclusion, Diversity, Equity, and Access:

Participant in Center for Integration of Research, Teaching, and Learning IDEAL Pedagogy course, Stanford, 2024
Ten-week course on using modern, evidence-based pedagogy to meet a diverse range of student needs in the classroom.

Bargaining Representative, Stanford Graduate Workers Union, 2023-2024
Elected labor advocate for LGBTQIA+, disabled, immigrant, and first-generation/low-income students

Participant in student-run “Diversity in Geophysics” course, Stanford, 2020
Project on opening up the hidden curriculum of higher education to first-generation/low-income students.

Accessibility Aide, Caltech, 2017-2018
Selected by the Deans’ Office as an assistant to interpret figures, scribe, and assist vision impaired graduate student.