Jacob N. H. Abrahams

214 Segre Pl, Santa Cruz, CA 95060
(312) 890-3302 abrahams@ucsc.edu

Professional Overview

Graduate student, beginning in 2017, in Planetary Science, interested primarily in planetary interiors and evolution, as well as questions of planetary formation. My background is in Physics and I try to leverage those skills to solve problems in Planetary Science.

Education

PhD Student: Planetary Science
University of California Santa Cruz, Santa Cruz, CA

Majors in Physics and Geophysics, Minor in English
California Institute of Technology, Pasadena, CA, class of 2017

- GPA 3.5
- Relevant Coursework: Analytical Mechanics, Planetary Physics, Geodynamics, Programming in Python and C, Waves, Statistical Mechanics, Quantum Mechanics, Physics Labs, Order of Magnitude Physocs
- Treasurer of Bridge Club (2013-2016); Treasurer of Feminist Club (2015-2016); Curriculum Director (2015), Recruitment Officer (2016), and Counselor (2013, 2014, 2015) with Caltech Innoworks, a science camp for middle school students.

Work Experience

Teaching Assistant Spring 2015 and Spring 2016
California Institute of Technology, Pasadena, CA
TAing an introductory Geology class. Involves writing and grading problem sets, running lab sessions, and holding office hours.

Peer Tutor Fall 2015-Spring 2017
California Institute of Technology, Pasadena, CA
Tutoring Caltech students, ∼8 hrs/week, in subjects including Calculus, Classical Mechanics, E&M, Differential Equations, Complex Analysis, Linear Algebra, and Quantum Mechanics.

Teacher Summer 2013
Young Scholars Program, Chicago, IL
Taught group theory, geometry, and programming to talented middle school students.

Research Experience

Research Fellowships
MIT Dep. of Earth, Atmospheric and Planetary Sciences, Cambridge, MA Summer 2016
Computational thermal modelling of partially differentiated planetary bodies, focused on predicting the presence and timing of planetary dynamos. Simulated competing thermal evolution models to determine their agreement with recent paleomagnetic measurements of undifferentiated material which cooled in a magnetic field.

Caltech Department of Geological and Planetary Science, Pasadena, CA Summer 2015
Research on inner-core translation and True Polar Wander for Earth and Mercury. Performed a combination of computations by hand, theoretical physical considerations, and multi-day computations programmed in Python.

Caltech Department of Geological and Planetary Science, Pasadena, CA Summer 2014
Research on Human Magnetoreception. Developed electromagnetic shielding to protect experiments from interference.

Research Student Summer 2012
Israeli Institute of Technology, Haifa, Israel
Researched viability of Solar Sails for manned and unmanned space missions within the solar system and to other solar systems.

Honors

Finalist - Gee Family Poster Competition
Named Summer Undergraduate Research Fellowship
Presented Summer 2016 research at AGU Fall Meeting
Presented Summer 2015 research at Lunar and Planetary Science Conference

Publications

1. **Abrahams, J. N. H.**, & Nimmo, F. (2019). Ferrovolcanism: Iron volcanism on metallic asteroids. *Geophysical Research Letters*. https://doi.org/10.1029/2019GL082542.
2. Bryson, J. F. J.; Weiss, B. P.; Getzin, B.; **Abrahams, J. N. H.**; Nimmo, F.; Scholl, A. (2019) Paleomagnetic Evidence for a Partially Differentiated H Chondrite Parent Planetesimal. *JGR: Planets*. https://doi.org/10.1029/2019JE005951
3. Wang, C. X.; Hillburn, I. A.; Wu, D.; Mizuhara, Y.; Couste, C. P.; **Abrahams, J. N. H.**; Bernstein, S. E.; Matani, A.; Shimojo, S.; Kirschvink, J. L. (2019). Transduction of the Geomagnetic Field as Evidenced from alpha-Band Activity in the Human Brain. *eNeuro*. https://doi.org/10.1523/ENEURO.0483-18.2019

Presentations

1. **Abrahams, J. N. H.**, Brummell, N., Wade, J. B. N, Garrick-Bethell, I., Korre, L. (2019). The Role of a Moderately Conductive Basal Magma Ocean in the Ancient Lunar Dynamo. *AGU Fall Meeting*. #GP43B-0801 (abstract).
2. **Abrahams, J. N. H.** & Garrick-Bethell, I. (2019). The role of electromagnetic coupling in lunar core-mantle differential precession. *The Core of the Moon workshop*.
3. **Abrahams, J. N. H.** & Nimmo, F. (2019). Ferrovolcanism: Iron Volcanism on Metallic Asteroids. *Lunar and Planetary Science Conference L*. #1598 (abstract).
4. **Abrahams, J. N. H.**, Nimmo, F., Kleine, T. (2018). Mechanism and Timing of Volatile Loss on the IVB Parent Body. *AGU Fall Meeting*. #GP21C-0774 (abstract).
5. **Abrahams, J. N. H.**, Nimmo, F., Kleine, T. (2018). Thermal Models of Iron Meteorite Evolution and Comparison with Pd-Ag Volatile-Loss Constraints. *Lunar and Planetary Science Conference IL*. #1711 (abstract).
6. **Abrahams, J. N. H.**; Bryson, J. F. J.; Weiss, B. P.; Nimmo, F. (2016). Thermal Evolution of a Partially Differentiated H Chondrite Parent Body. *AGU Fall Meeting*, #P51A-2124 (abstract).
7. Bryson, J. F. J.; Weiss, B. P.; Scholl, A.; Getzin, B.; **Abrahams, J. N. H.**; Nimmo, F. (2016). Paleomagnetic Evidence for a Partially Differentiated H Chondrite Parent Planetesimal. *AGU Fall Meeting*, #P53D-02 (abstract).
8. **Abrahams, J. N. H.**; Cao, H.; Stevenson, D. J. (2016). Inner Core Translation, True Polar Wander, and Mercury's North-South Asymmetric Magnetic Field. *Lunar and Planetary Science Conference XLVII*, #2502 (abstract).
9. Mitchell, R. N.; Thissen, C.; Kirschvink, J. L.; Schrag, D. P.; Montanari, A.; Coccioni, R.; Slotznick, S. P.; Yamazaki, T.; Penserini, B. D.; **Abrahams, J. N. H.**; Cruz-Heredia, M.; Evans, D. A. (2015). Milankovitch Wobble? *AGU Fall Meeting*, # GP23B-1313 (abstract).