

JESSICA ANNE ARNOLD

Curriculum Vitae

Carnegie Institution for Science, Department of Terrestrial Magnetism (DTM),
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EMPLOYMENT HISTORY

Carnegie Institution for Science, Department of Terrestrial Magnetism (DTM)
May 2017-Present: Postdoctoral Associate

At Carnegie DTM I will focus on using computational models of light scattering to understand the properties of dust in circumstellar debris disks. Studying debris disks provides insight into solar system evolution and planet formation.

University of Oxford
Nov 2014-Feb 2017: Postdoctoral Researcher

My current research aims to understand how the thermal environments characteristic of airless solar system objects impact estimates of surface composition gathered via remote thermal infrared spectroscopy.

Stony Brook University
May 2014-Nov 2014: Postdoctoral Researcher
2010-May 2014: Graduate Research Assistant
2009-2010: Graduate Teaching Assistant

My dissertation work focused on bringing together computational modeling and laboratory measurements to improve the utility of thermal infrared remote sensing data. This project had three aspects: 1) compositional investigations of the lunar surface using data from the Diviner Lunar Radiometer on board the Lunar Reconnaissance Orbiter, 2) modeling the effects of particle size on thermal infrared spectra and 3) measuring indices of refraction of geologically relevant minerals for use in spectroscopic models.

EDUCATION

Ph.D., Geosciences, Stony Brook University, 2014
B.S., Astrophysics and Planetary Science, California Institute of Technology, 2009

TEACHING AND MENTORING

Lab Demonstrator: Physics Computing Practical in MATLAB, Fall 2015 and Spring 2016
Graduate Mentor: Summer project with an M.A. Teaching Student, Summer 2011
Teaching Assistant: Structural Geology, Spring 2010
Teaching Assistant: Society and Gender in Science and Engineering, Fall 2009

AWARDS AND HONORS

NASA Group Achievement Award for Diviner Lunar Radiometer Experiment, 2013
Stony Brook University David E. King Field Work Award, 2010

PROFESSIONAL SERVICE

Journal Reviewer: *J. Geophys. Res. Planets, Icarus*

Reviewer: Lunar Data Analysis Program (LDAP), Solar System Working Program (SSW)

External Reviewer: NASA Postdoctoral Program (NPP), NASA Earth and Space Science Fellowship (NESSF)

PROFESSIONAL MEMBERSHIP

American Geophysical Union, Mineralogical Society of America, Royal Astronomical Society

PUBLICATIONS

- **Arnold, J.A.**, Bowles, N.E., Donaldson Hanna, K., and Lucey, P.G. (2017) Changes in lunar thermal infrared spectra due to space weathering, *J. Geophys. Res.*, *Manuscript in preparation*.
- **Arnold, J.A.**, Glotch, T.D., Lucey, P.G., Song, E., Thomas, I.R., and Bowles, N.E. (2016) Olivine-bearing areas of the Moon as seen by Diviner and M³, *J. Geophys. Res. Planets*, 121.
- **Arnold, J.A.**, Glotch, T.D. and Plonka, A.M. (2014) Mid-infrared optical constants of clinopyroxene and orthoclase derived from oriented single-crystal reflectance spectra, *Am. Miner.*, 99(10), 1942-1955.
- Ito, G., **Arnold, J.A.**, and Glotch, T.D. (2016) Calculation of scattering properties and radiative transfer models for particulate surfaces, *J. Geophys. Res. Planets*, *manuscript in review*.
- Lucey, P.G., Greenhagen, B.T., Song, E., **Arnold, J.A.**, Lemelin, M., Donaldson-Hanna, K., Bowles, N., Glotch, T. (2017) Space weathering effects in Diviner Radiometer measurements of the lunar Christiansen Feature: Characteristics and Mitigation, *Icarus*, 283, 343-351.
- Hardgrove, C.J., Rogers, A.D., Glotch, T.D. and **Arnold, J.A.** (2016) Thermal emission spectroscopy of microcrystalline sedimentary phases: Effects of natural surface roughness on spectral feature shape, *J. Geophys. Res. Planets*, 121, 542–555.
- Glotch, T.D., Bandfield, J.L., Wolff, M.J., **Arnold, J.A.** and Che, C. (2016) Constraints on the composition and particle size of chloride salt-bearing deposits on Mars, *J. Geophys. Res. Planets*, 121, 454–471.
- Glotch, T.D., Bandfield, J.L., Lucey, P.G., Hayne, P.O., Greenhagen, B.T., Ghent, R.R., **Arnold, J.A.** and Paige, D.A. (2014) Formation of lunar swirls by magnetic field standoff of the solar wind, *Nature Communications*, 6, 6189.
- Glotch, T.D., Hagerty, J.J., Lucey, P.G., Hawke, B.R., Giguere, T.A., **Arnold, J.A.**, Williams, J., Jolliff, B.L. and Paige, D.A. (2011) The Mairan domes: Silicic volcanic constructs on the Moon, *Geophys. Res. Lett.*, 38, L21204.
- Greenhagen, B.T., Lucey, P.G., Wyatt, M.B., Glotch, T.D., Allen, C.C., **Arnold, J.A.**, Bandfield, J.L., Bowles, N.E., Donaldson-Hanna, K., Hayne, P.O., Song, E., Thomas, I.R., Paige, D.A. (2010) Global Silicate Mineralogy of the Moon from the Diviner Lunar Radiometer, *Science*, 329: 1507-1509.
- Conselice, C.J. and **Arnold, J.A.** (2009) The Structures of Distant Galaxies - II: Diverse Galaxy Structures and Local Environments at $z = 4 - 6$; Implications for Early Galaxy Assembly, *MNRAS*, 397(1).

SELECTED CONFERENCE ABSTRACTS

- **Arnold, J.A.** (2016) Modelling Thermal Infrared Spectra in a Lunar-Like Environment, *European Lunar Symposium*, Amsterdam, The Netherlands.
- **Arnold, J.A.**, Schr apler R., Donaldson Hanna, K.L., Lindsay, S.S., Bowles, N.E., and Blum, J. (2016) The effect of porosity on infrared spectra, *47th Lunar and Planetary Science Conference*, The Woodlands, TX.

- Warren, T.J., **Arnold, J.A.**, Greenhagen, B.T., Bowles, N.E. (2015) Investigating surface roughness effects on the directional emissivity of surfaces using the Oxford Space Environment Goniometer, *46th Lunar and Planetary Science Conference*. The Woodlands, TX.
- **Arnold, J.A.**, Rucks, M.J., Glotch, T.D. (2015) Mid-IR optical constants of triclinic materials, *46th Lunar and Planetary Science Conference*. The Woodlands, TX.
- **J.A. Arnold** (2015) The Oxford Thermal Emissivity for Regolith Model: Comparison with Laboratory Measurements, *Thermal Models for Planetary Science II*, Tenerife, Spain.
- Glotch, T.D., Bandfield, J.L., Lucey, P.G., Hayne, P.O., Greenhagen, B.T., **Arnold, J.A.**, Ghent, R.R., and Paige, D.A. (2014), Spectral and thermophysical properties of lunar swirls from the Diviner Lunar Radiometer, *LEAG Annual Meeting*, SSERVI Publication # SSERVI-2014-183.
- **Arnold, J.A.**, Glotch, T.D., Lucey, P.G., and Song, E. (2014) Comparison of M³(VNIR) and Diviner(MIR) data of olivine-bearing regions of the Moon, *45th Lunar and Planetary Science Conference*, The Woodlands, TX.
- Glotch, T.D., **Arnold, J.A.**, Greenhagen, B.T., Thomas, I.R., Bowles, N.E., and the Diviner Science Team (2013) Enhanced compositional analysis of the Moon using Diviner's long-wavelength channels, *NASA Lunar Science Forum*, Virtual conference.
- **Arnold, J.A.**, Glotch, T.D., Greenhagen, B.T., Thomas, I.R., and Bowles, N.E. (2013) Enhanced Compositional Analysis of the Moon using Diviner's Long Wavelength Channels, *European Planetary Science Congress*, UCL, London, UK.
- Glotch, T.D., Bandfield, J.L., Wolff, M.J., and **Arnold, J.A.** (2013) Chloride salt deposits on Mars – no longer “putative”, *44th Lunar and Planetary Science Conference*, The Woodlands, TX.
- **Arnold, J.A.**, Glotch, T.D., Thomas, I.R., and Bowles, N.E. (2013) Plagioclase-olivine mixtures in a simulated lunar environment, *44th Lunar and Planetary Science Conference*, The Woodlands, TX.
- **Arnold, J.A.**, Glotch, T.D., and Wolff, M.J. (2012) Exact calculation of the scattering properties of wavelength-sized particulates, *43rd Lunar and Planetary Science Conference*, The Woodlands, TX.
- **Arnold, J.A.**, Glotch, T.D., and the LRO Diviner Science Team (2011) Olivine-enriched regions as seen by Diviner, *NASA Lunar Science Forum*, Moffett Field, CA.
- **Arnold, J.A.** and Glotch, T.D. (2011) Mid-IR optical constants of anisotropic materials, *42nd Lunar and Planetary Science Conference*, The Woodlands, TX.
- Greenhagen, B.T., Lucey, P.G., Wyatt, M.B., Glotch, T.D., Allen, C.C., **Arnold, J.**, Bandfield, J.L., Bowles, N.E., Donaldson-Hanna, K.L., Hayne, P.O., Song, E., Thomas, I.R., and Paige, D.A. (2010) The LRO Diviner Lunar Radiometer compositional investigation after one year of mapping, *42nd Annual Meeting of the Division for Planetary Sciences of the American Astronomical Society*, Pasadena, CA.
- **Arnold, J.A.**, Glotch, T.D., Bandfield, J.L., Greenhagen, B.T., Lucey, P.G., Wyatt, M., Paige, D.A. (2010) Mafic Mineralogy of Large Impact Basins, *NASA Lunar Science Forum*, Moffett Field, CA.
- **Arnold, J.A.**, Glotch, T.D., Bandfield, J.L., Greenhagen, B.T., Lucey, P.G., Wyatt, M., and Paige, D.A. (2010) Local-scale Spectral Variability of the South Pole-Aitken Basin, *41st Lunar and Planetary Science Conference*, The Woodlands, TX.
- Pathare, A.V., **Arnold, J.A.**, and Murray, B.C. (2008) Stratigraphic anomalies in the Martian North Polar Layered Deposits, *39th Lunar and Planetary Science Conference*, The Woodlands, TX.