Dany Waller

Email: dany.waller@jhuapl.edu
Website: danywaller.github.io
LinkedIn: @danywaller

Email: dany.waller@jhuapl.edu
Website: danywaller.github.io
LinkedIn: @danywaller

Research Interests

Remote Sensing

Computational Physics

Education

Applied Physics (M.S.)
Johns Hopkins University
May 2022

Mathematics (B.S.)
University of Kentucky
May 2019

Physics (B.A.)
University of Kentucky
May 2019

Publications

ORCiD

Google Scholar

Professional Societies

American Geophysical Union

American Physical Society

Sigma Pi Sigma
($\Sigma\Pi\Sigma$)

Experience

September 2020 – Present

Graduate Student & Research Assistant Contractor
ADECCO/JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY (APL)

Under the supervision of Dr. Joshua Cahill, I study lunar geology, spectroscopy, and magnetism. I focus on the intersection of these observations to interpret how space weathering manifests upon the lunar regolith. My responsibilities include:

- Supporting execution of PI-Cahill's NASA Lunar Data Analysis Program (LDAP) grant objectives by exploring the rate and spatial variation of lunar regolith maturation.
- Utilizing MATLAB, ArcGIS, and IDL to model Lunar Prospector derived 'at-surface' magnetic fields and examine magnetic anomalies relative to NASA's Lunar Reconnaissance Orbiter (LRO) ultraviolet (i.e., Lyman Alpha Mapping Project (LAMP) and LROC Wide-Angle Camera (WAC)) data sets.
  Relevant Publications:
  +**Waller, D.,** Cahill, J.T.S., Wirth-Singh, A.A. (In Prep). Investigation Of Magnetic Fields Associated With Lunar Swirls of Varying Near- and Far-Ultraviolet Characteristics. *Geophysical Research Letters*.
  +**Waller, D.,** Cahill, J.T.S., Wirth-Singh, A.A. (2021). Investigation Of Magnetic Fields Associated With Various Lunar Swirls Observed In The Far-Ultraviolet. *Joint NASA Exploration Science Forum & European Lunar Symposium*.
  +Blewett, D.T., Halekas, J., **Waller, D.,** Cahill, J.T.S., Deutsch, A., Glotch, T.D., Regoli, L., Tikoo, S., Vines, S., Wang, X. (2020). Science Case for a Lander or Rover Mission to a Lunar Magnetic Anomaly and Swirl. *Bulletin of the AAS, 53(4)*.
- Supporting proof-of-concept work by Anna Wirth-Singh of destriping/denoising nighttime Lyman-alpha global albedo products using spectral subtraction methods.
  Relevant Publications:
  +Wirth-Singh, A.A., Cahill, J.T.S., **Waller, D.** (2021). Fourier Transform De-Striping Of LRO LAMP Data Products. *5th Planetary Data Workshop and Planetary Science Informatics and Data Analytics (PSIDA) Meeting, Abstract #7065*.

August 2020 – Present

Scientific Analyst II
SCIENCE SYSTEMS & APPLICATIONS, INC (SSAI)/NASA GODDARD SPACE FLIGHT CENTER (GSFC)

Under the supervision of Bryan Blair and Dr. Michael Barker, I provide programming support for the Hazard Detection Lidar (HDL) team at GSFC. Following the Autonomous Landing Hazard Avoidance Technology (ALHAT) program, HDL is part of NASA's new precision landing technology suite, Safe and Precise Landing – Integrated Capabilities Evolution (SPLICE). My responsibilities include:

- Optimizing lidar simulations and digital elevation map (DEM) analysis in Octave and MATLAB.
- Creating and verifying new algorithms for image and data analysis, including hazard identification and instrument performance.
- Understanding and advising customers on hazard classifications for future lunar landings.

May 2019 – August 2020

Planetarium Director + Earth & Space Science Program Coordinator
THE LIVING ARTS & SCIENCE CENTER (LASC)

I managed the Farish Planetarium and the LASC Earth & Space Science program, and I reported to the executive director Lori Halligan. My responsibilities included:

- Hosting weekly public planetarium shows.
- Coordinating daily field trips and visitor groups to the planetarium.
- Creating new planetarium content, workshops, and lesson plans while ensuring scientific accuracy in our products.

June 2018 – May 2019

Junior Software Engineer
UNIVERSITY OF KENTUCKY CENTER FOR MUSCLE BIOLOGY (CMB)

Under the supervision of Dr. Charlotte Peterson and Dr. Kenneth Campbell, I supported the CMB's MyoVision and FiberVision software. My responsibilities included:

- Designing and implementing MyoVision and FiberVision software updates based on user feedback.
- Writing user documentation and distributing literature to CMB partners.
- Maintaining servers and computers in the CMB.

February 2017 – May 2019

Planetary Science Research Assistant
UNIVERSITY OF KENTUCKY DEPARTMENT OF GEOLOGY

Under the supervision of Dr. Dhananjay Ravat, I studied planetary magnetism and space weathering effects, with particular focus on the Moon and Mars. My responsibilities included:

- Analyzed Lunar Prospector and Kaguya magnetometer data by computing minimum and maximum altitude thresholds, solar wind exposure, identifying poor SNR orbits, and implementing along-track noise reduction using gradient techniques to create refined datasets using MATLAB and Python, in support of PI-Ravat's modelling of 'at-surface' magnetic fields.
  Relevant Publications:
  +Waller, D., Ravat, D. (2018). Our Magnetic Moon. *85th Annual Meeting of the APS Southeastern Section, Abstract #D05.00072.*
- Combining and processing monthly downlinks of raw MAVEN magnetometer data to produce high-resolution global datasets and maps using Python and GMT.
- Modelling global & regional lunar crustal magnetic anomalies using Fortran and GMT to explore potential lunar swirl formation processes.
- Mentoring undergraduates Lillie Cole, Zach Esenbock, and Hunter Lohre on the MAVEN and LP/Kaguya projects, and assisting Dr. Ravat's graduate student Rachel Durham with magnetic modelling for her M.S. thesis.

Skills

- Experience with languages and software including: MATLAB, Python, Fortran, GMT, JMARS, ArcGIS/QGIS, CloudCompare, Slurm Workload Manager, and C/C++.

- Skilled in grant writing and administrative management.
- Excellent teamwork skills and mentorship experience.

References

Dr. Joshua Cahill
Deputy Director of the Lunar Surface
Innovation Consortium
JHU/APL
Joshua.Cahill@jhuapl.edu

Mrs. Lori Halligan
Executive Director
Living Arts & Science Center
lhalligan@lasclex.org