Name: Phillip Phipps

Code: 695

Home institution: University of Maryland, Baltimore County

Name of task: Effect of Terrain on the Radiation Exposure at the Lunar Surface

What do you do for CRESST: I use Lunar Reconnaissance Orbiter Digital Elevation Maps of the lunar surface to determine how much of space radiation is blocked by the lunar terrain. From these maps I determine the sky visibility and combine with models of incident radiation to determine the radiation received at each point on the maps. I use the radiation exposure at the lunar surface to estimate the hazards to future human and robotic exploration of the lunar surface.

Background/ Autobiography?

I grew up in North Carolina where from a young age I was fascinated with the sciences. Through the years my interests shifted from paleontology to marine biology. In middle school I decided to pursue a career in Astronomy. I went to North Carolina State University where I received a B.S. in Physics and Mathematics. In the fall of 2013 I moved to Boston, Massachusetts to start my PhD at Boston University. In the first year of classes I fell in love with the planets and their moons and chose planetary science as my career field. In the summer of 2017, I participated in an internship at the Jet Propulsion Laboratory working with the Juno Radio Science group. I was at JPL during the Voyager 40-year celebration which was fun. I was also able to participate in Cassini's final radio science experiment. During my PhD I used Juno data to study the Io plasma torus and its effect on the Jupiter system. I completed my PhD in May 2019 and I stayed on at Boston University as a postdoc to continue my Juno research. In May 2020 I moved to Maryland to start my position as a CRESST postdoc.

Favorite part of being a CRESST Scientist? Being able to work at NASA with many prominent scientists while also being part of a university.

List of recent presentations:

1. **Phipps, P.H.**, Stubbs, T. J., Looper, M. D., Spence, H.E., and Townsend, L. W. (2021), Solar Energetic Particle Radiation Dosage in Biological Systems Around a Lunar Crater , AGU Fall Meeting 2021, New Orleans, Dec 13 – Dec 17
2. **Phipps, P.H.**, Stubbs, T. J., Looper, M. D., Spence, H.E., and Townsend, L. W. (2021), Radiation Dosage from Solar Energetic Particles Around a Lunar Crater , LEAG 2021, Virtual, Aug 31 – Sept. 2
3. **Phipps, P.H.**, Stubbs, T. J., Looper, M. D., Spence, H.E., and Townsend, L. W. (2021), Solar Energetic Particle Radiation Dosage Near a Simple Lunar Crater, NESF 2021, Virtual, Jul 20-23
4. **Phipps, P.H.**, Stubbs, T. J., Looper, M. D., and Spence, H.E. (2021), Galactic Cosmic Ray Proton Radiation Dosage Near a Simple Lunar Crater, LPSC 2021, Virtual, Mar 15-19
5. **Phipps, P.H.**, Stubbs, T. J., Looper, M. D., and Spence, H.E. (2020), Radiation Exposure in the Vicinity of a Simple Crater on the Moon, 2020 AGU Fall Meeting, Virtual, Dec 1-17

6. **Phipps, P.H.**, Stubbs, T. J., Looper, M. D., and Spense, H.E. (2020), Variations in Radiation Exposure Near a Simple Lunar Crater, Annual Meeting of the Lunar Exploration and Analysis Group 2020 Meeting, Virtual, Sept. 14-16

List of publications:

1. **Phipps, Phillip H.**, Withers, Paul, Buccino, Dustin R., Yang, Yu-Ming, and Parisi, Marzia (2021), Two years of observations of the Io plasma torus by Juno radio occultations: Results from Perijoves 1 to 15, J. Geophys. Res Space Physics, 126, e2020JA028710
2. **Phipps, Phillip H.**, and Bagenal, Frances (2021), Centrifugal Equator in Jupiter's Plasma Sheet, J. Geophys. Res Space Physics, 126, e2020JA028713
3. **Phipps, Phillip H.**, Withers, Paul, Vogt, Marissa, Buccino, Dustin R., Yang, Yu-Ming, Parisi, Marzia, Ranquist, Drake, Kollmann, Peter, and Bolton, Scott (2020), Where is the Io plasma torus? A comparison of observations by Juno radio occultations to predictions from Jovian Magnetic field models, J. Geophys. Res. Space Physics, DOI: 10.1029/2019JA027633
4. **Phipps, Phillip H.**, Withers, Paul, Buccino, Dustin R., Yang, Yu-Ming, and Parisi, Marzia (2019), Variations in the density distribution of the Io plasma torus as seen by radio occultations on Juno Perijoves 3, 6, and 8, J. Geophys. Res. Space Physics, 124, DOI: 10.1029/2018JA026297
5. **Phipps, Phillip H.**, Withers, Paul, Buccino, Dustin R., and Yang, Yu-Ming (2018), Distribution of plasma in the Io plasma torus during Juno Perijove 1, J. Geophys. Res. Space Physics, 123, DOI:10.1029/2017JA025113
6. **Phipps, Phillip H.** and Withers, Paul (2017), Radio occultations of the Io plasma torus by Juno are feasible, J. Geophys. Res. Space Physics, 122, DOI: 10.1002/2016JA023447

List of awards won:

2021 Juno Participating Scientist Proposal
2018 New Frontiers Data Analysis Proposal (Science PI)
2017 JPL Internship

Three fun facts:

During the pandemic I learned to make jams and preserves.
I have joined the Goddard Sailing Association.
I like to collect stress balls from conferences.