Phillip H. Phipps, PhD

Curriculum Vitae

University of Maryland, Baltimore County
Planetary Magnetospheres Lab Code 695
at NASA's Goddard Space Flight Center

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orcid: http://orcid.org/0000-0002-4323-4400

Education

Ph.D. Astronomy, Department of Astronomy, Boston University 2019
M.A. Astronomy, Department of Astronomy, Boston University 2015
B.S. Physics with Honors, North Carolina State University 2013
B.S. Applied Mathematics with Honors, North Carolina State University

Research Experience

- Assistant Research Scientist July 1, 2023 – present

University of Maryland, Baltimore County, with the Center for Research and Exploration in Space Science and Technology (CRESST II) at NASA Goddard Space Flight Center Planetary Magnetospheres Lab Code 695

Radiation environment of the Lunar surface and the effect of topography and Juno radio occultations of the Io plasma torus around Jupiter.

- Postdoctoral Research Associate May 11, 2020 – June 30, 2023

Advisor: Dr. Timothy Stubbs
University of Maryland, Baltimore County, with the Center for Research and Exploration in Space Science and Technology (CRESST II) at NASA Goddard Space Flight Center Planetary Magnetospheres Lab Code 695

Radiation environment of the Lunar surface and the effect of topography.

- Postdoctoral Research Associate May 2019 – May 10, 2020

Advisor: Prof. Paul Withers
Center for Space Physics, Boston University, Boston, MA

Juno radio occultations of the Io plasma torus around Jupiter.

- Graduate Researcher Summer 2015 – April 2019

Advisor: Prof. Paul Withers
Department of Astronomy, Boston University, Boston, MA

Research on the Io Plasma Torus around Jupiter.

- JPL Summer 2017 Internship Summer 2017

Advisor: Dr. Kamal Oudrhiri and Dustin Buccino
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

Worked with Juno radio science instrument team to analyze Juno radio occultations.

- Graduate Researcher Summer 2014 – May 2015

Advisor: Prof. John T. Clarke
Department of Astronomy, Boston University, Boston, MA

Image analysis of Jupiter and Saturn aurora.

- Undergraduate Researcher Fall 2010 – Spring 2013

Advisor: Prof. John M. Blondin
Department of Physics, NC State University, Raleigh, NC

Simulations of white dwarf accretion disks using parallelized Astrophysics hydrodynamic FORTRAN

Teaching Experience

1. Lecturer, AS 102 – The Astronomical Universe — Summer 2019
   Department of Astronomy, Boston University, Boston, MA
   Taught introductory Astronomy to summer students during Boston University's Summer Session II.

For the following Teaching Fellow positions, I led discussion sessions and labs, graded homework and exams, and led night labs during the evenings.

2. Teaching Fellow, AS202 – Principles of Astronomy I — Fall 2015
   Department of Astronomy, Boston University, Boston, MA
3. Teaching Fellow, AS203 – Principles of Astronomy II — Spring 2015
   Department of Astronomy, Boston University, Boston, MA
4. Teaching Fellow, AS202 – Principles of Astronomy I — Fall 2014
   Department of Astronomy, Boston University, Boston, MA
5. Teaching Fellow, AS109 – Cosmology — Spring 2014
   Department of Astronomy, Boston University, Boston, MA
6. Teaching Fellow, AS 105 – Alien Worlds — Fall 2013
   Department of Astronomy, Boston University, Boston, MA
7. Undergraduate Physics Tutor — Spring 2012 – Spring 2013
   Department of Physics, NC State University, Raleigh, NC

Outreach

1. Meet a NASA scientist, Space Week Manteo Elementary School, Virtual — March 18-22, 2024
2. Boston University Open Nights — Spring 2015 – May 2020
   Helped run BU public open nights at Judson B. Coit Observatory
3. Science for kids — June 15, 2018
   Helped run a science event run by the Center for Space Physics, Boston University
4. Science by the pint — January 2016
   Event put on by Harvard Universities Science in the news to discuss science with the general public over a pint.
   http://sitn.hms.harvard.edu/science-by-the-pint/
5. Open night for Metropolitan College group — December 2015
   Managed an open night for the Boston University honor society of metropolitan college.
6. Lunar eclipse viewing — September 2015
   Managed a BU public event for the viewing of the Lunar eclipse at Boston University's Coit Observatory.

Featured Public Articles

1. Mapping the Moon to Shield Astronauts from Radiation, By: Sierra Boucher, EOS, eos.org, 4 January, 2024

Observational Experience

Lowell Observatory, Happy Jack, Arizona, Discovery Channel Telescope, 4.3m Telescope
Judson B. Coit Observatory, Boston University, Boston, MA, 14", 10", 8" reflectors and 6" refractor

Computer Experience

Languages: Python, MatLab, IDL
Research tools: NAIF/SPICE, DS9, MaximDL
Document Preparation: LaTeX, Windows Office
Operating Systems: Linux (Ubuntu), Windows, Mac

Professional Society Memberships

American Geophysical Union, Member	2016 – present
American Astronomical Society, Member	2010 - present
Sigma Pi Sigma honor society member	2013 - present
Society of Physics Students	2009-2016

Awards/Grants

Planetary Science Winter School Goddard Space Flight Center	Spring 2025
Principal Investigator on NASA Juno-PSP award	November 2021
Co-Investigator on NASA NFDAP award (PI: Marissa Vogt)	November 2019
Co-Investigator on NASA NFDAP award (PI: Paul Withers)	March 2019
AAS International Travel Grant	March 2019
For travel to MOP 2019 in Sendai, Japan	
Magnetospheres of Outer Planets (MOP) Travel Grant	April 2017
For Travel to MOP 2017 meeting in Uppsala, Sweden	
JPL Summer 2017 Internship, June 26th - Sept 2nd	March 2017
Astronomy Department Teaching Award	April 2016
Massachusetts Space Grant Consortium Grant	January 2016
AAS International Travel Grant	April 2015
For travel to IAU meeting in Honolulu, Hawaii, August 2015	

Publications

My name is written in bold font (e.g., **Phipps, Phillip H.**).

1. Schmidt, Carl, Sharov, Mikhail, de Kleer, Katherine, Schneider, Nick, de Pater, Imke, **Phipps, Phillip H.,** Conrad, Al, Moore, Luke, Spencer, John, Morgenthaler, Jeff, Ilyin, Ilya, Strassmeier, Klaus, Veillet, Christian, Hill, John, and Brown, Michael (2023) Io's Optical Aurorae in Jupiter's Shadow, The Planetary Science Journal, 4, 36, doi: 10.3847/PSJ/ac85b0
2. **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
3. **Phipps, Phillip H.**, and Bagenal, Frances (2021), Centrifugal Equator in Jupiter's Plasma Sheet, J. Geophys. Res Space Physics, 126, e2020JA028713
4. **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

5. **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
6. **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
7. **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

White Paper Participation

My name is written in bold font (e.g., **Phipps, P. H.**).

1. Killen, R. M., Yeo, L-H., Zheng, Y., McLain, J., Marshall, J., Morrissey, L., Ahrens, C, **Phipps, P. H.**, Graham, Heather, and Stubbs, T. J. (2024), Moon: Handle With Care, Bulletin of the AAS, vol. 56(1), doi:10.3847/25c2cfeb.917b6d52
2. Ahrens, Caitlin, Fagan, A., Petro, N., **Phipps, P. H**., Stubbs, T., Saxena, P., and Waller, D., (2022), Space Weathering at the Moon: Priorities for Interdisciplinary Heliophysical and Planetary Science, Bulletin of the AAS, vol. 55(3), doi:10.3847/25c2cfeb.4de28fb2
3. Kollman, Peter, Allegini, F., Allen, R. C., Andre, N., Azari, A. R., Bagenal, F., Beddingfield, C. B, …, **Phipps, P. H.,** et al. (2021), Magnetospheric Studies: A requirement for addressing interdisciplinary mysteries in the Ice Giant systems, Bulletin of the American Astronomical Society, vol. 53, doi:10.3847/25c2cfeb.d955f654

Abstracts

My name is written in bold font (e.g., **Phipps, P. H.**). *Future meetings in red.*

1. **Phipps, P.H.**, Stubbs, T., Looper, M. D., Spence, H. E., and Townsend, L. (2024), Mapping Primary Radiation Dose around the Apollo Landing Sites, 56th LPSC, Woodlands, T.X., Mar. 10-14
2. Khaksarighiri, S., Wimmer-Schweingruber, R. F., **Phipps, P.H.**, Stubbs, T., Looper, M.D., Guo, J., Ehresmann, B, Matthiae, D., Zeitlin, C., Loewe, J. L., Hassler, D., Berger, T., and Reitz, G. (2024), Zenith Angle Dependence on Zecondary Particle Fluxes in Mars' Surface Radiation Environment, AGU Fall meeting 2024, Washington, D.C., Dec. 9-13
3. **Phipps, P.H.**, Stubbs, T., Looper, M. D., Spence, H. E., and Townsend, L. (2024), Mapping Primary Radiation Dose at the Apollo Landing Sites, AGU Fall meeting 2024, Washington, D.C., Dec. 9-13
4. **Phipps, P.H.,** Withers, P., Buccino, D.R., Parisi, M., Park, R.S., and Bolton, S. J. (2024), Io Plasma Torus Variability Through Perijove 49, MOP 2024, Minneapolis, MN, Jul 8 – Jul 12
5. Stubbs, T. J., Cascioli, G., Withers, P., Mazarico, E., Mao, D., **Phipps, P. H.**, and Gray, C. (2024) LRO Radio Occultation Observations of a Temporally Variable Dense Lunar Ionosphere, European Lunar Symposium, Scotland, UK, Jun. 16-21
6. **Phipps, P.H.,** Stubbs, T. J., Looper, M. D., Spence, H.E., and Townsend, L. W. (2024), Mapping Radiation Exposure around the South Pole of the Moon, European Lunar Symposium, Scotland, UK, Jun. 16-21
7. **Phipps, P.H.,** Stubbs, T. J., Looper, M. D., Spence, H.E., and Townsend, L. W. (2024), Maps of Primary Radiation Dose Around the Lunar South Pole: Preliminary Assessment of Artemis Landing Sites, 55th Lunar and Planetary Science Conference (LPSC), Houston, TX, Mar. 11-16
8. **Phipps, P.H.,** Stubbs, T. J., Looper, M. D., Spence, H.E., and Townsend, L. W. (2023), Mapping Primary Radiation Dose for an Astronaut in the Lunar South Pole Region during an Extreme Solar Energetic Particle (SEP) Event, AGU Fall meeting 2023, San Francisco, CA, Dec 11-16

9. Stubbs, T. J., Cascioli, G., Withers, P., Mazarico, E., Mao, D., **Phipps, P. H.**, and Gray, C. (2023) Radio Occultation Observations of a Variable Dense Lunar Ionosphere, AGU Fall meeting 2023, San Francisco, CA, Dec 11-16
10. Khaksarighiri, S., Wimmer-Schweingruber, R. F., Stubbs, T. J., Guo, J., Looper, M. D., **Phipps, P. H.**, Ehresmann, B., Zeitlin, C., Hassler, D., Matthiae, D., Berger, T., Reitz, G., Loeffler, S., and Loewe, J. L. (2023), Radiation transport through the Martian atmosphere as a function of the zenith angle - Implications for local shielding on Mars, AGU Fall meeting 2023, San Francisco, CA, Dec 11-16
11. Looper, M.D., Mazur, J., Blake, J, Spence, H., Schwadron, N. Wilson, J., Jordan, A., Zeitlin, C., Case, A., Kasper, J., Townsend, L., Stubbs, T., **Phipps, P.H.**, (2023), GLACE (Geant4 Lunar Albedo Computed Environment): A Freely-Available Model of Lunar Energetic-Particle Secondary Radiation and Its Variation with Regolith Hydrogen, AGU Fall meeting 2023, San Francisco, CA, Dec 11-16
12. Looper, M.D., Mazur, J., Blake, J, Spence, H., Schwadron, N. Wilson, J., Jordan, A., Zeitlin, C., Case, A., Kasper, J., Townsend, L., Stubbs, T., **Phipps, P.H.**, (2023), GLACE (Geant4 Lunar Albedo Computed Environment): A Freely-Available Model of Lunar Energetic-Particle Secondary Radiation and Its Variation with Regolith Hydrogen, ASEC 2023, Huntsville, AL, Oct. 9-13
13. **Phipps, P.H.,** Stubbs, T. J., Looper, M. D., Spence, H.E., and Townsend, L. W. (2023), Primary Radiation Dose Around the Artemis III Candidate Landing Sites, Lunar Exploration Analysis Group, JHU-APL, Laurel, MD, Sept 20-22
14. **Phipps, P.H.,** Stubbs, T. J., Looper, M. D., Spence, H.E., and Townsend, L. W. (2023), Radiation Dose around the 13 Candidate Artemis III Landing Sites, NESF 2023, College Park, MD, Jul. 18-20
15. Nerney, E., Bagenal, F., Wilson, R., and **Phipps, P.H.** (2023), Model Comparisons with Juno Observations of the Io Plasma Torus, EGU General Assembly 2023, Vienna, Austria, Apr. 24–28
16. Ahrens, C., **Phipps P.H.**, and Petro, N. (2023), Lunar Science Opportunities and Challenges at the Faustini Rim A Candidate Landing Site, The First Steps in a Bold New Era of Human Discovery: Candidate Artemis III Landing Sites, A Lunar Surface Science Workshop, Virtual, Apr. 4-5
17. **Phipps, P.H.,** Stubbs, T. J., Looper, M. D., Spence, H.E., and Townsend, L. W. (2023), Radiation Dose Around the Lunar South Pole Near the Candidate Landing Sites for the Artemis III Mission, 54th Lunar and Planetary Science Conference (LPSC), Houston, TX, Mar. 13-17
18. **Phipps, P.H.,** Stubbs, T. J., Looper, M. D., Spence, H.E., and Townsend, L. W. (2022), Solar Energetic Radiation Dose Around the Lunar South Pole, Fall meeting American Geophysical Union, Chicago, IL, Dec. 12-16
19. Looper, M., Mazur, J., Blake, B., Spence, H., Schwadron, N., Wilson, J., Jordan, A., Zeitlin, C., Case, A., Kasper, J., Townsend, L., Stubbs, T., and **Phipps, P. H.**, GLACE (Geant4 Lunar Albedo Computed Environment): A Model of Lunar Energetic-Particle Secondary Radiation and its Variation with Regolith Hydrogen, Fall meeting American Geophysical Union, Chicago, IL, Dec. 12-16
20. Yang, Y.-M., Buccino, D., Parisi, M., Oudrhiri, K., Park, R. **Phipps, P. H.** , and Withers, P. (2022) , Radio Occultations of the Io Plasma Torus and Gravity Science Calibrations for the Juno Prime Mission's 35 Orbits of Jupiter, Fall meeting American Geophysical Union, Chicago, IL, Dec. 12-16
21. **Phipps, P.H.,** Stubbs, T. J., Looper, M. D., Spence, H.E., and Townsend, L. W. (2022), Mapping Biologically Relevant Radiation Dose Around the Lunar South Pole, Lunar Exploration Analysis Group, JHU-APL, Laurel, MD, Aug 23-25
22. **Phipps, P.H.,** Withers, P., Buccino, D.R., Parisi, M., Park, R.S., and Bolton, S. J. (2022), Juno Radio Occultations of the Io Plasma Torus through Perijove 25, COSPAR 2022, Athens, Greece, Jul 16 – Jul 24
23. **Phipps, P.H.,** Stubbs, T. J., Looper, M. D., Spence, H.E., and Townsend, L. W. (2022), Solar Energetic Particle Radiation Dosage Around a Simple Lunar Crater, COSPAR 2022, Athens, Greece, Jul 16 – Jun 24

24. **Phipps, P.H.,** Withers, P., Buccino, D.R., Parisi, M., Park, R.S., and Bolton, S. J. (2022), Io Plasma Torus Properties Through Perijove 25 from Juno Radio Occultations, MOP 2022, Liege, Belgium, Jul 10 – Jul 15
25. **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
26. **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
27. **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
28. **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
29. **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
30. Yang, Y-M, Buccino, D., Parisi, M., **Phipps, P. H.**, Folkner, W. M., Kahan, D. S., Withers, P., & Oudrhiri, K., (2020) Recent Advances in the Io Plasma Torus Calibrations for Galileo, Juno, and Europa Clipper Radio Science Measurements, 2020 AGU Fall meeting, Virtual, Dec. 1-17
31. **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
32. **Phipps, P.H.,** Withers, P., Buccino, D. R., Yang, Y-M., Parisi, M., Hinton, P. C., & Bagenal, F. (2019), Io Plasma Torus Variability During the Juno Mission, 2019 AGU Fall meeting abstracts, San Francisco, CA, Dec. 9 - 13
33. Yang, Y-M, Buccino, D., Parisi, M., Folkner, W. M., **Phipps, P. H.**, Kahan, D. S., Withers, P., & Oudrhiri, K., (2019) Juno Radio Science Observations and Gravity Science Calibrations of Io plasma torus: IPT impacts to Europa Gravity Science, 2019 AGU Fall meeting abstracts, San Francisco, CA, Dec. 9 - 13
34. **Phipps, P.H.,** Withers, P., Buccino, D. R., Yang, Y-M., Parisi, M., Hinton, P. C., & Bagenal, F. (2019), Juno Radio Occultations of the Io Plasma Torus, NEROC Symposium, MIT Haystack Observatory, Westford, MA, Nov 1
35. Molrano, A., Zannoni, M., Gomez Casajus, L., Tortora, P., Withers, P., **Phipps, P. H.**, Buccino, D., & Oudrhiri, K. Morphology of the Io Plasma Torus inferred from Dual Uplink-Dual Downlink calibration during Juno Mission, EPSC-DPS Joint Meeting 2019, Geneva, Switzerland, 15-20 Sept.
36. **Phipps, P.H.,** Withers, P., Hinton, P. C., Bagenal, F., Buccino, D. R., Yang, Y-M., & Parisi, M. (2019), The Centrifugal Equator as Seen by Juno Radio Occultations of the Io Plasma Torus, Magnetospheres of the Outer Planets meeting, Sendai, Japan, 3-7 June.
37. Zannoni, M., Gomez Casajus, L., Molrano, A., Tortora, P., **Phipps, P. H.**, Withers, P., Buccino, D., Oudrhiri, K., Durante, D., & Iess, L., (2019), Observations of the Io Plasma Torus with Juno radio science experiment, 21st EGU General Assembly, Vienna, Austria, 7-12 Apr.
38. **Phipps, P.H.,** Withers, P., Buccino, D. R., Yang, Y-M., Hinton, P. C., & Bagenal, F. (2018), Variability in the Io Plasma Torus as Seen by Juno Radio Occultations, Abstract 438966 presented at 2018 Fall Meeting, AGU, Washington, DC, 10-14 Dec.
39. Yang, Y-M, Buccino, D., Parisi, M., Folkner, W. M., **Phipps, P. H.**, Withers, P., Kahan, D. S., & Oudrhiri, K., (2018) Juno Radio Science Observations and Gravity Science Calibrations of Io Plasma Torus and its Impact on Telecommunications Links for Future Missions, 2018 AGU Fall meeting abstracts, Washington, DC, 10-14 Dec.

40. **Phipps, P.H.,** Withers, P., Buccino, D. R., Yang, Y-M., Hinton, P. C., & Bagenal, F. (2018), Io plasma torus geometry from *Juno* radio occultations, Magnetospheres of Outer Planets meeting, Boulder, CO, 9-13 Jul
41. **Phipps, P. H.**, Withers, P., Buccino, D. R., Yang, Y-M., & Hinton, P. C. (2017). Juno Perijove 1 radio occultation of the Io plasma torus, Abstract 279802 presented at 2017 Fall Meeting, AGU, New Orleans, LA, 11-15 Dec.
42. Yang, Y-M, Buccino, D., Folkner, W. M., Oudrhiri, K., **Phipps, P. H.**, Parisi, M., & Kahan, D. S. (2017), Juno Radio Science Observations and Gravity Science Calibrations of Plasma Electron Content in Io Plasma Torus, 2017 AGU Fall Meeting Abstracts, New Orleans, LA, 11-15 Dec.
43. **Phipps, P.H.** & Withers, P. (2017), Radio occultations of the Io plasma torus with the *Juno* Spacecraft: A study of feasibility, Magnetospheres of Outer Planets meeting, Uppsala, Sweden, 12-16 June
44. **Phipps, P.H.** & Withers, P. (2016). Feasibility of Juno radio occultations of the Io plasma torus, Abstract 178300 presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.
45. **Phipps, P.H.** & Clarke, J.T. (2015). Calculation of the Auroral Color Ratio of the Gas Giants Using Images, IAU General Assembly, Meeting #29, #2258018

Invited talks

Future talks in red.

1. Mars Terrain Shielding and Surface Radiation Exposure — December 3, 2024
   Space Environment Seminar series
2. Mapping Radiation Exposure at the Lunar Surface: Implications for Future Science and Exploration — May 8, 2024
   NASA HQ Planetary Lunch and learn
3. Mapping Radiation Dose around a Lunar Crater During Solar Energetic Particle Events, — April 20, 2022
   GSFC Solar System Exploration Spring Seminar Series
4. Juno Observations of the Io plasma torus, — April 17, 2019
   GSFC Solar System Exploration Spring Seminar Series
5. Juno Observations of the Io plasma torus, JPL seminar — October 15, 2018

Spacecraft Mission Involvement

- Lunar Reconnaissance Orbiter (as CRESST II scientist with the CRaTER team)
- Juno Science Team (as NFDAP Co-I and Juno Participating Scientist)
- Juno Magnetospheric Working Group (as NFDAP Co-I and Juno Participating Scientist)
- Juno Gravity Science team (2017 JPL summer intern with Radio Science team)

Professional Service

1. Committees
   - Uranus Flagship Workshop Local Organizing Committee — 2024
2. Conference Session Convener
   - AGU Fall meeting 2023 To the Moon: A New Era of Lunar Science — 2025
   - AGU Fall meeting 2023 To the Moon: A New Era of Lunar Science — 2024
   - AGU Fall meeting 2023 To the Moon: A New Era of Lunar Science — 2023
3. Proposal Review Panel
   - Executive Secretary on NASA review panel — 2020
4. Review responsibilities for articles submitted to scientific journals.
   - Journal of Geophysical Research: Space Physics (2 paper) — 2024

- Journal of Geophysical Research: Space Physics (1 paper) 2023
- Journal of Geophysical Research: Space Physics (2 papers) 2022
- Journal of Geophysical Research: Space Physics (2 papers) 2021
- Geophysical Research Letters 2020
- Journal of Geophysical Research: Space Physics 2019