Carl A. Schmidt

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Appointments

Research Assistant Professor, Boston University	2021 - Present
Research Scientist, Boston University	2017 - 2021
Research Associate, Sorbonne Univ. CNRS, Paris (F. Leblanc Supervisor)	2015 - 2017
Research Associate, Univ. of Virginia (R. E. Johnson Supervisor)	2013 - 2015
Graduate Research Assistant, Boston Univ. (M. Mendillo Supervisor)	2006 - 2013
Undergraduate Research Assistant, Univ. Colorado (F. Hearty Supervisor)	2002 - 2005

Expertise: Planetary aeronomy, Monte-Carlo modelling, telescope-based spectroscopy & instrumentation, aurorae & plasmas

Education

Ph.D., Astronomy, Boston University	2013
Thesis: *Mercury's Sodium Exosphere* (M. Mendillo Advisor)	
B.A., Physics, University of Colorado	2005

Advising

Post-Doctoral and Research Scientists:

- Yudai Suzuki (Fall 2025 -) JSPS Postdoctoral Fellow
- Candace Gray (Fall 2025 -) Research Scientist
- Quanzhi Ye (Fall 2022 -) Visiting Researcher (Joint appt w/ Univ. of Maryland)

Graduate Research Advisor:

- Patrick Lierle (Fall 2022 -)
- Emma Lovett (Fall 2021 -) NASA FINESST Graduate Fellow

Undergraduate Research Advisor:

- Madison Jordan (Summer 2024) North Carolina A&T, NSF PAARE internship
- Aishwarya Ganesh (Summer 2021) Univ. Texas, NASA SUPPR internship
- Cameron Moye (Summer 2020) Univ. Maryland, NASA SUPPR internship

- Patrick Lierle (Summer 2019 - Summer 2022)
- Mikhail Sharov (Fall 2018 - Spring 2021)
- Chase Young (Spring - Summer 2018)

Peer-Reviewed Journal Articles

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53 articles, students underlined.

- Z. Milby, K. de Kleer, **C. Schmidt** (2026) *Variability of Callisto's Optical Aurora in Eclipse*, The Planetary Science Journal, *in press*
- A. V. Oza, R. E. Johnson, **C. A. Schmidt**, W. M. Calvin (2026) *Plasma and Thermal Processing Leading to Spatial and Temporal Variability of the Trapped O_2 at Europa and Ganymede*, Astrobiology, *in press*
- **C. Schmidt**, L. Roth, S. Mendenhall, K. Retherford, J. Spencer (2026) *A Lack of Carbon at Io and its Plasma Torus*, Icarus, V454, 117088, DOI.
- Z. Milby, K. de Kleer, **C. Schmidt**, M. Camarca (2026) *Variability of Europa's Optical Aurora on Orbital and Multiyear Timescales.* The Planetary Science Journal, V7, 60, DOI.
- K. L. Knowles, H. Melin, T. S. Stallard, L. Moore, J. O'Donoghue, **C. Schmidt**, J. R. Szalay, P. I. Tiranti, K. Roberts, R. E. Johnson, E. M. Thomas (2026) *Short-Term Variability of Jupiter's Satellite Footprints with JWST*, Geophysical Research Letters, V53 (5), e2025GL118553, DOI.
- K. Roberts, L. Moore, J. O'Donoghue, H. Melin, T. S. Stallard, I. Muller-Wodarg, O. Agiwal, K. L. Knowles, P. I. Tiranti, K. Mohamed, **C. Schmidt** (2026) *A Global View of Jupiter's Upper Atmosphere Through H_3^+*, Astrophysical Journal Letters, V998, L13, DOI.
- L. Moore, H. Melin, T. S. Stallard, J. O'Donoghue, K. Roberts, P. I. Tiranti, K. Mohamed, O. Agiwal, I. Muller-Wodarg, K. L. Knowles, P. Withers, D. Coffin, R. Wang, **C. Schmidt** (2025) *Photochemistry in Jupiter's Ionosphere: Insights from Simultaneous H_3^+ and Electron Density Observations During Juno Perijove 54.* The Planetary Science Journal, V7 (1), 25, DOI.
- L. Naesenius, L. Roth, N. Ivchenko, S. Carberry Mogan, P. M. Molyneux, K. D. Retherford, J. Saur, **C. Schmidt**, S. Bergman (2026) *Lyman-a observations of Ganymede emerging from eclipse reveal a stable hydrogen exosphere.* Monthly Notices of the Royal Astronomical Society, V545 (4), staf2204, DOI.
- I. de Pater, D. F. Strobel, A. G. Davies, J. Saur, L. Roth, K. de Kleer, E. Lellouch, Z. Milby, **C. Schmidt**, T. Fouchet, M. H. Wong, L. N. Fletcher, J. Harkett, M. Roman, R. J. Cartwright, J. E. Perry, J. Renaud-Kim, C. Jordan, S. Schlegel, D. A. Williams, D. M. Nelson (2025) *First Detection of [S I] in Near-IR JWST Observations of Io in Eclipse, and Comparison with SO Emissions, Evolving Volcanic Eruptions, and prior UV HST-STIS [S I] emissions.* Journal of Geophysical Research: Planets, V130(11), e2024JE008850, DOI.

- A. V. Oza, A. Gebek, M. Meyer zu Westram, A. Tokadjian, A. Piro, R. Hu, A. Unni, R. Chari, Aaron Bello-Arufe, **C. Schmidt**, A. Louca, Y. Miguel, R. Estrela, J. Yang, M. Damiano, Y. Hasegawa, L. Welbanks, D. Powell, Y. K. Yung (2025) *Volcanic Satellites Tidally Venting Na, K, SO_2 in Optical & Infrared Light*, Monthly Notices of the Royal Astronomical Society, staf1526, DOI.
- P. R. Lierle, E. Lovett, **C. Schmidt**, A. Merkel (2025) *Characterizing Dynamical Processes in Surface-Bound Exospheres Via Resolved Sodium D Emissions*, Frontiers in Astronomy and Space Sciences, V12, 1585683, DOI.
- Z. Milby, K. de Kleer, **C. Schmidt** (2025) *Detection of New Auroral Emissions at Io and Implications for Its Interaction with the Plasma Torus*, The Planetary Science Journal, V6, 181, DOI.
- E. Lovett, **C. Schmidt**, P. R. Lierle (2025) *Europa's Sodium and Potassium Exosphere during Juno's Flyby*, The Planetary Science Journal, V6, 178, DOI.
- P. R. Lierle & **C. Schmidt** (2025) *Sodium and Potassium Linewidths as an Atmospheric Escape Diagnostic at Mercury*, Journal of Geophysical Research: Planets, V130 (7), e2025JE008975, DOI.
- C. Nixon and 38 co-authors, including **C. Schmidt** (2025) *Titan's Atmosphere in Late Northern Summer from JWST and Keck Observations.* Nature Astronomy, V9, pp. 969-981, DOI.
- A. Unni, A. V. Oza, S. Thirupathi, H. J. Hoeijmakers, J. V. Seidel, **C. A. Schmidt**, K. de Kleer, A. D. Baker, B. Manjunath, A. Gebek, M. Meyer zu Westram (2025) *Doppler Shifted Transient Sodium Detection by KECK/HIRES*, Monthly Notices of the Royal Astronomical Society: Letters, V540, L48–L53, DOI.
- K. Roberts, L. Moore, J. O'Donoghue, H. Melin, T. Stallard, K. Knowles, **C. Schmidt**, P. Tiranti (2025) *Spatiotemporal Variations of Temperature in Jupiter's Upper Atmosphere.* The Planetary Science Journal, V6, 92, DOI.
- L. Roth, A. Blöcker, K. de Kleer, D. Goldstein, E. Lellouch, J. Saur, **C. Schmidt**, D.F. Strobel, C. Tao, F. Tsuchiya, V. Dols, H. Huybrighs, A. Mura, J. R. Szalay, S. V. Badman, I. de Pater, A.-C. Dott, M. Kagitani, L. Klaiber, R. Koga, A. McEwen, Z. Milby, K.D. Retherford, S. Schlegel, N. Thomas, W.L. Tseng, A. Vorburger (2025) *Mass Supply from Io to Jupiter's magnetosphere.* Space Science Reviews, 221, 13, arXiv, DOI.
- C. Gray, K. Peter, M. Pätzold, S. Tellmann, T. Nordheim, **C. Schmidt**, N Chanover and P. Withers (2025) *Venus' O 5577Å Oxygen Green Line: A Global Diffuse Proton-induced Aurora.* Journal of Geophysical Research: Space Physics, V130 (2), e2024JA032851, DOI.
- E. G. Nerney, F. Bagenal, **C. Schmidt** (2024) *Simulations of Optical Emissions in Io's Plasma Torus.* Journal of Geophysical Research: Space Physics, V130 (1), e2024JA033232, DOI.
- **C. Schmidt** (2024) *On the Implications of Ground-Based High-Definition Imaging of Io's Surface.* Geophysical Research Letters, V51, 21, e2024GL112169, DOI.

- A. V. Oza, J. V. Seidel, H. J. Hoeijmakers, A. Unni, A. Y. Kesseli, **C. Schmidt**, S. Thirupathi, A. Gebek, M. Meyer zu Westram, S. Sousa, A. Bello-Arufe, R. Lopes, R. Hu, C. Fisher, S. Charnoz, A. D. Baker, S. P. Halverson, K. de Kleer, N. Schneider, A. Psaridi, M. Lendl, A. Wyttenbach, I. Bhatnagar and R. E. Johnson (2024) *Redshifted Sodium Transient Near Exoplanet Transit*, The Astrophysical Journal Letters, 973, L53, DOI.
- M. Yoneda, F. Tsuchiya, **C. Schmidt**, M. Kagitani and T. Sakanoi (2024) *Major Brightening Events in Jupiter's Sodium Nebula during Juno era.* Icarus, V425, DOI.
- Z. Milby, K. de Kleer, **C. Schmidt**, and F. Leblanc (2024) *Short-Timescale Spatial Variability of Ganymede's Optical Aurora*, The Planetary Science Journal, V5, 153, DOI.
- J. Morgenthaler, J. Rathbun, **C. Schmidt**, J. Baumgardner and N. Schneider (2024) *Erratum: 'Large Volcanic Event on Io Inferred from Jovian Sodium Nebula Brightening' (ApJL 871:L23)*, The Astrophysical Journal Letters, 966 (2), L40, DOI.
- J. Morgenthaler, **C. Schmidt**, M. F. Vogt, N. M. Schneider and M. Marconi (2024) *Jovian Sodium Nebula and Io plasma torus S^+ and Brightnesses 2017 – 2023: Insights into Volcanic vs. Sublimation Supply.* Journal of Geophysical Research: Space Physics, 129, 3, DOI.
- D. Bhattacharyya, J. T. Clarke, M. Mayyasi, V. Shematovich, D. Bisikalo, J. Y. Chaufray, E. Thiemann, J. Halekas, **C. Schmidt**, J. L. Bertaux, M. S. Chaffin, and N. M. Schneider (2023) *Evidence of Hot Hydrogen in the Exosphere of Mars Resulting in Enhanced Water Loss.* Journal of Geophysical Research: Planets, 128, 8, DOI.
- P. Lierle, **C. Schmidt**, J. Baumgardner, L. Moore and E. Lovett (2023) *The Rapid Imaging Planetary Spectrograph.* Publications of the Astronomical Society of the Pacific, 135, 095002, arXiv, DOI.
- Q. Zhang, K. Battams, Q. Ye, M. Knight and **C. Schmidt** (2023) *Sodium Brightening of (3200) Phaethon Near Perihelion.* The Planetary Science Journal, V4, 70, DOI.
- K. de Kleer, Z. Milby, **C. Schmidt**, M. Camarca and M. Brown (2023) *The Optical and Near-Infrared Aurorae of Europa, Ganymede and Callisto.* The Planetary Science Journal, V4, 37, DOI.
- **C. Schmidt**, M. Sharov, K. de Kleer, N. Schneider, I. de Pater, P.H. Phipps, A. Conrad, L. Moore, P. Withers, J. Spencer, J. Morgenthaler, I. Ilyin, K. Strassmeier, C. Veillet, J. Hill, and M. Brown (2023) *Io's Optical Aurorae in Jupiter's Shadow.* The Planetary Science Journal, V4, 36, DOI.
- P. R. Lierle, **C. Schmidt**, J. Baumgardner, L. Moore, T. Bida and R. Swindle (2022) *The Spatial Distribution and Temperature of Mercury's Potassium Exosphere.* The Planetary Science Journal, V3, 87, DOI.
- **C. Schmidt** (2022) *Doppler-Shifted Alkali D Absorption as Indirect Evidence for Exomoons.* Frontiers in Astronomy and Space Sciences, Vol. 9, 801873, DOI.
- A. L. E. Werner, S. Aizawa, F. Leblanc, J. Y. Chaufray, R. Modolo, J. M. Raines, W. Exner, U. Motschmann and **C. Schmidt** (2022) *Ion density and phase space density*

distribution of planetary ions Na^+, O^+ and He^+ in Mercury's magnetosphere. Icarus, V372, 114734, DOI.

- T. Cassidy, **C. Schmidt**, A. Merkel, J. Jasinski and M. Burger (2021) *Detection of Large Exospheric Enhancements at Mercury due to Meteoroid Impacts*, The Planetary Science Journal, Vol. 2, 175, DOI.
- J. Baumgardner, S. Luettgen, **C. Schmidt**, M. Mayyasi, S. Smith, C. Martinis, J. Wroten, L. Moore and M. Mendillo (2021) *Long-Term Observations and Physical Processes in the Moon's Extended Sodium Tail*, Journal of Geophysical Research: Planets, V126, 3, DOI.
- V. Mangano and 61 co-authors including C. Schmidt (2021) *BepiColombo science investigations during cruise and flybys at the Earth, Venus and Mercury*, Space Science Reviews, V217, 23, DOI.
- **C. Schmidt**, J. Baumgardner, L. Moore, T. A. Bida, R. Swindle and P. Lierle (2020) *The Rapid Imaging Planetary Spectrograph: Observations of Mercury's Sodium Exosphere in Twilight.* The Planetary Science Journal, V1, 4, DOI.
- A. Oza, R.E. Johnson, E. Lellouch, **C. Schmidt**, N. Schneider, C. Huang, D. Gamborino, A. Gebek, A. Wyttenbach and B-O Demory. (2019) *Sodium and Potassium as Remnants of Volcanic Satellites Orbiting Close-in Gas Giant Exoplanets*, The Astrophysical Journal, V885, 2, DOI.
- L. Moore, H. Melin, T. Stallard, J. O'Donoghue, J. Moses, S. Miller and **C. Schmidt** (2019) *Modelling H_3^+ in Planetary Atmospheres: Effects of Vertical Gradients on Observed Quantities*, Philosophical Transactions of the Royal Society A, V377, 2154, DOI.
- R.E. Johnson, A. Oza, F. Leblanc, **C. Schmidt** and T.A. Nordheim (2019) *The Origin and Fate of O_2 in Europa's Ice: An Atmospheric Perspective.* Space Science Reviews, 215 (1), 20, DOI.
- J. Morgenthaler, J. Rathbun, **C. Schmidt**, J. Baumgardner and N. Schneider (2019) *Large Volcanic Event on Io Inferred from Jovian Sodium Nebula Brightening*, The Astrophysical Journal Letters, 871 (2), L23, DOI.
- A. Oza, F. Leblanc, R. E. Johnson, **C. Schmidt**, L. Leclercq, T. Cassidy and J.-Y. Chaufray (2019) *Dusk Over Dawn O_2 Asymmetry in Europa's Near-Surface Atmosphere.* Planetary & Space Science, 167, pp. 23-32, DOI.
- **C. Schmidt**, N. Schneider, F. Leblanc, C. Gray, J. Morgenthaler, J. Turner and C. Grava (2018) *A Survey of Visible S^+ Emission in Io's Plasma Torus During the Hisaki Epoch.* Journal of Geophysical Research: Space Physics, 123, 7, pp. 5610-5624, DOI.
- F. Leblanc, A. Oza, L. Leclercq, **C. Schmidt**, T. Cassidy, R. Modolo, J.Y. Chaufray and R. E. Johnson (2017) *On the Orbital Variability of Ganymede's Atmsophere.* Icarus, Vol. 293, pp. 185-198, DOI.
- J. D. Turner, D. Christie, P. Arras, R. E. Johnson and **C. Schmidt** (2016) *Investigation of the environment around close-in transiting exoplanets using CLOUDY.* Monthly Notices of the Royal Astronomical Society, V458 (4), pp. 3880-3891, DOI.
- **C. Schmidt** (2016) *High Resolution Integral-Field Spectroscopy of Gas and Ion Distributions in the Coma of Comet C/2012 S1 ISON.* Icarus, V265, pp. 35-41, DOI.

- R.E. Johnson, A. Oza, L.A. Young, A.N. Volkov and **C. Schmidt** (2015) *Volatile Loss and Classification of Kuiper Belt Objects.* The Astrophysical Journal, V809 (1), 43, DOI.
- N.-E. Raouafi, C. M. Lisse, G. Stenborg, G. H. Jones and **C. Schmidt** (2015) *Dynamics of HVECs emitted from comet C/2011 L4 as observed by STEREO.* Journal of Geophysical Research, V120 (7), pp. 5329-5340, DOI.
- **C. Schmidt**, R.E. Johnson, J. Baumgardner and M. Mendillo (2015) *Observations of Sodium in the Coma of Comet C/2012 S1 (ISON) During Outburst.* Icarus, V247, pp. 313-318, DOI.
- **C. Schmidt** (2013) *Monte-Carlo Modeling of North-South Asymmetries in Mercury's Sodium Exosphere*, Journal of Geophysical Research, V118, A50396, DOI.
- **C. Schmidt**, J. Baumgardner, M. Mendillo and J. Wilson (2012) *Escape rates and variability constraints for high-energy sodium sources at Mercury*, Journal of Geophysical Research, V117, A03301, DOI.
- **C. Schmidt**, J. Wilson, J. Baumgardner and M. Mendillo (2010) *Orbital Effects on Mercury's Escaping Sodium Exosphere*, Icarus, Vol 207 (1), pp. 9-16, DOI.

Articles Under Review

- E. Lovett, **C. Schmidt**, Z. Milby, S. Ellis, J. Szalay (2026) *Europa's Neutral Sodium Cloud is Non-Collisional and Stable Over Decades*, Journal of Geophysical Research: Space Physics, *under review*

Peer-Reviewed Book Chapters

- **C. Schmidt** and J. Baumgardner (2022) *Lunar Atmosphere, Alkali Lunar Exosphere* in *Encyclopedia of Lunar Science*, Editors B. Cudnik & C. Ahrens, Springer, DOI.
- F. Leblanc, **C. Schmidt**, V. Mangano, A. Mura, G. Cremonese, J. M. Raines, J.M. Jasinski, M. Sarantos, A. Milillo, R.M. Killen, S. Massetti, T. Cassidy, R.J. Vervack Jr., S. Kameda, M.T. Capria, M. Horanyi, D. Janches, A. Berezhnoy, A. Christou, T. Hirai, P. Lierle and J. Morgenthaler (2022) *Comparative Na and K Mercury and Moon exospheres* in *Surface Bounded Exospheres and Interactions in the Solar System*, Space Sciences Series of ISSI, Springer. Jointly published in Space Science Reviews, Vol 218, 2, DOI.

Non-Peer-Reviewed Publications

- Zhang, Q., Knight, M., Ye, Q., Schmidt, C., Battams, K. (2026) *Preliminary Nucleus Size Estimate for Kreutz Sungrazer C/2026 A1 (MAPS)*, Research Notes of the AAS, V10, Issue 3, 57, DOI.

- Chanover, N., Schmidt, C., DeColibus, D. (2021) *The Continued Relevance of 4m Class Telescopes to Planetary Science in the 2020s*, White paper #497 submitted to the Decadal Survey in Planetary Science and Astrobiology 2023-2032, Bulletin of the AAS, 53(4), DOI.
- P. Prem, A. Kereszturi, A. Deutsch, C. Hibbitts, C. Schmidt and 36 co-authors (2021) *Lunar Volatiles and Solar System Science*, White paper #68 submitted to the Decadal Survey in Planetary Science and Astrobiology 2023-2032, Bulletin of the AAS, 53(4), ArXiv, DOI.
- A. Deutsch, N. Chabot, A. Maiti, A. Luspay-Kuti, A. Kereszturi, A. Lucchetti, A. Virkki, A. Colaprete, A. Vorburger, B. Byron, B. Jones, B. Anzures, B. Butler, C. Schmidt and 59 co-authors (2021) *Science Opportunities offered by Mercury's Ice-Bearing Polar Deposits*. Whitepaper #69 submitted to the Planetary Science and Astrobiology Decadal Survey 2023-2032, Bulletin of the AAS, 53(4), DOI.
- J. Clarke, C. Schmidt, J. Baumgarder, C. Carveth, M. Matta, M. Mendillo, L. Moore, and P. Withers (2013) White Paper on Comparative Planetary Exospheres. White paper submitted to Solar and Space Physics Decadal Survey, ref, link.
- F. Hearty, S. Beland, J. Green, N. Cunningham, J. Barentine, M. Drosback, R. Valentine, A. Bondarenko, C. Schmidt, J. Walawender, C. Froning, J. Morse, P. Hartigan (2005) Colorado's Near-Infrared Camera (AKA NIC-FPS) Commissioning on the ARC 3.5M Telescope, Proc. SPIE, Vol 5904, p. 199-211, DOI.

Invited Talks and Colloquia

Mercury's Sodium Exosphere, Mercury 2026, Leuven, BE	2026
Lunar Sodium Exosphere Imaging, Taiwan Lunar Symposium, TW	2026
Intro to the Jupiter System, NASA Community College Network, Virtual	2025
The Io Plasma Torus, Union College, Schenectady, NY, USA	2024
Io's Atmosphere, Ionosphere, and Plasma Torus, LATMOS, FR	2023
Solar System Context in the Hunt for Exomoons, NASA JPL, Pasadena, CA, USA	2023
Alkali Emissions in the Lunar Atmosphere, UMASS, Lowell, MA, USA	2023
The Lunar Sodium Exosphere, Taiwan Space Union, TW	2023
The Io-Jupiter Interaction, UMD, College Park, MD, USA	2022
Io's Atmosphere and Plasma Torus, Boise State University, Boise, ID, USA	2022
Optical Spectroscopy of Jupiter's Moons, AAVSO, Cambridge, MA, USA	2021
Observing the Exospheres of Mercury & the Moon, UMASS, Lowell, MA, USA	2020
Io's Escaping Atmosphere & Plasma Torus, Boston College, Boston, MA, USA	2018
Solar Transit Spectroscopy of Mercury's Exosphere, Universiteit van Amsterdam, NL	2018
Io's Escaping Atmosphere & Plasma Torus, Universität zu Köln, DE	2018
Io's Volcanic Atmosphere and Plasma Torus, Boston University, Boston, MA, USA	2018
Io's Plasma Torus Density & the S^+ Ribbon, Royal Institute of Technology, SE	2017
Small Telescope Applications: Mercury, Io & Comets, Université de Liège, BE	2017
Planetary Applications for Small Telescopes, Institute of Astronomy, Sofia, BG	2017
Visible Spectroscopy of the Io Plasma Torus, LESIA, l'Observatoire de Paris, FR	2016

Observations of Io, its Plasma Torus and Neutral Clouds, Lancaster Univ, UK 2016
Modern Planetary Applications for Small Telescopes, UMD, College Park, MD, USA 2015
Characteristics of Sodium Escape at Mercury, SERENA-HEWG, Killarney, IRL 2014
Atmospheric Escape in Our Solar System, Space Challenges, Sofia, BG 2013
Mercury's Sodium Atmosphere, AOSS, Univ. of Michigan, Ann Arbor, MI, USA 2012
Mercury's Tenuous Atmosphere, Heliophysics, NASA GSFC, Greenbelt, MD, USA 2012

Contributed Talks and Conference Proceedings

As of 2026: 27 first author, 84 co-author, 17 student led

Grant Awards & Fellowships

27 grants ($5.0M total, $3.2M to Boston University)

- NASA/NExSCI Keck Award *Plasma drivers of Io's SO emission via joint Keck and JWST observations*, PI, 2026.02.01 to 2027.01.31. 7/2026A-N076. Total budget / funding to BU: $10,250.
- James Webb Space Telescope Cycle 4 *Io's Auroral Emissions as a Tool to Investigate Atmosphere-Plasma Torus Interactions"*, Co-I (PI Zac Milby, Caltech), 2025.07.01 to 2028.06.30, JWST-GO-08857. Total budget: $110,475. Funding to BU: $19,999
- Hubble Space Telescope Cycle 32 *A UV eclipse test for Callisto's atmosphere, plasma interaction and water ocean*, Co-I (PI Kurt Retherford, SwRI), 2025.03.01 to 2028.02.28. HST-GO-17739. Total budget: $63,963. Funding to BU: $5,000
- NASA/NExSCI Keck Award *Joint Keck-Juno observations of Jupiter, its moons and its magnetosphere*, PI, 2024.08.01 to 2026.07.30. 80NSSC22K0954 (renewal). Total budget / funding to BU: $120,000
- Hubble Space Telescope Cycle 31 *HST-Juno Io Campaign: Connecting Volcanos to the Plasma Environment*, Co-I (PI Kurt Retherford, SwRI), 2023.12.01 to 2026.11.30. HST-GO-17470. Total budget: $268,968. Funding to BU: $13,160
- NSF AST PAARE *Accessing the dark Arizona skies for research and education, a NCAT-BU partnership*, Co-PI (PI Dan Clemens, BU), 2023.08.24-2026.08.23. Total budget / funding to BU: $256,696
- NASA/NExSCI Keck Award *Recoil Heating in Mercury's Alkali Exotail*, PI (Science PI Patrick Lierle, BU), 2024.02.01 to 2025.01.31. Total budget / funding to BU: $13,375.
- NASA FINESST PI for Emma Lovett's Graduate Fellowship *Characterizing and Simulating Alkalis in Europa's Exosphere*, PI, 2023.09.01 to 2026.08.31. 22-PLANET22-0198. Total budget / funding to BU: $150,000
- Hubble Space Telescope Cycle 30 *Ganymede's water atmosphere in eclipse*, PI, 2023.06.01 to 2026.05.31. HST-GO-17099. Total budget: $75,414. Funding to BU: $55,643

- NASA Discovery Data Analysis Program *Mercury's escaping sodium tail*, PI, 2022.09.15 to 2025.09.14. 80NSSC22K1303. Total budget: $525,000. Funding to BU: $393,997
- NASA/NExSCI Keck Award *Joint Keck-Juno observations of Jupiter, its moons and its magnetosphere*, PI, 2022.08.01 to 2024.07.30. 80NSSC22K0954. Total budget / funding to BU: $150,000
- NSF Astronomy and Astrophysics Research Grant. *Mass transport in Jupiter's magnetosphere: driven by internal or external processes?* Co-I/Institutional PI (PI Jeff Morgenthaler, Planetary Science Institute), 2021.09.01 to 2024.08.30. AST-2108416. Funding to BU: $94,720
- NASA Solar System Observations *Dynamic Processes on the Galilean Satellites*, Co-I/Institutional PI (PI John Spencer, Southwest Research Institute), 2021.08.01 to 2024.07.31. 80NSSC21K1138. Funding to BU: $59,981
- NASA Discovery Data Analysis Program *Investigating the Impactor Contribution to Mercury's Exosphere*, Co-I/Institutional PI (PI Aimee Merkel, Univ. Colorado), 2021.05.21 to 2024.04.30. 80NSSC21K1019. Total budget: $551,469. Funding to BU: $131,866
- NASA Science Mission Directorate *Characterizing Mercury's Exosphere with BepiColombo-PHEBUS: US-based Co-Investigators*, PI, 2020.10.13 to 2025.10.12, 80NSSC21K0051. Total budget / funding to BU: $226,061
- NASA/NExSCI Keck Award *Response of Io's atomic atmosphere and ionosphere to Jovian eclipse: joint observations with HIRES and HST*, PI, 2020.02.01 to 2020.09.30. 87/2020A-N079. Total budget / funding to BU: $11,775
- NASA New Frontiers Data Analysis Program *The plasma distribution in the Io torus during the Juno epoch*, Co-I (PI Paul Withers, Boston Univ.), 2019.03.21 to 2022.02.28. 80NSSC19K0818. Total budget / funding to BU: $289,272
- SOFIA Guest Observer Cycle 7 *Io's Atomic Sulfur Atmosphere in the Mid-IR*, PI, 2019.04.01 to 2020.03.31. 07-0221. Total budget / funding to BU: $16,700
- NASA/NExSCI NN-EXPLORE WIYN PI Data Award *Confirming a High Velocity Exo-Exosphere at HD 80606b*, PI, 2019.02.01 to 2021.01.31. N0223. Total budget / funding to BU: $10,100
- NASA/NExSCI Keck Award *Juno Support: Io's Auroral Emissions in Jovian Eclipse*, PI, 2019.02.01 to 2020.01.31. 84-208B-N110. Total budget / funding to BU: $10,062
- Hubble Space Telescope Cycle 26 *Auroral and magnetospheric context for Juno in situ instruments during Cycle 26*, Co-I (PI Denis Grodent, Univ. Liege), 2019.03.01 to 2020.02.28. HST-GO-15638. Total budget / funding to BU: $134,087
- NASA Solar System Workings *Physical Processes Governing Mercury's Alkali Exosphere*, PI, 2018.11.01 to 2021.03.31. 80NSSC19K0790. Total budget: $352,275. Funding to BU: $203,872
- NASA Solar System Observations *Ground-based observations of Mercury's exosphere in the post-MESSENGER era*, PI, 2018.03.01 to 2021.02.28. 80NSSC18K0857. Total budget: $507,403. Funding to BU: $165,281

- NASA Solar System Workings *The Ins and Outs of the Io Plasma Torus: understanding mass and energy transport using two decades of optical and radio observations*, Co-I (PI Jeff Morgenthaler, Planetary Science Institute), 2017.08.23 to 2020.08.22. 80NSSC17K0733. Total budget: $526,604. Funding to BU: $115,358
- Hubble Space Telescope Cycle 25 *Extreme Doppler Shifting of Io's Neutral Jets*, PI, 2018.03.01 to 2019.02.28. HST-GO-15147. Total budget: $39,999. Funding to BU: $28,006
- NSF Astronomy and Astrophysics Research Grant *The Influence of Mercury's Magnetosphere on Its Outermost Atmosphere*, Science PI (PI Luke Moore, Boston Univ.), 2016.07.15 to 2019.06.30. AST-1614903. Total budget / funding to BU: $374,407
- NASA Earth and Space Sciences Fellowship *Mercury's Escaping Atmosphere*, Science PI (PI Michael Mendillo, Boston Univ.), 2010.03.15 to 2013.03.15. 10-Planet10F-0041. Total budget / funding to BU: $90,000

Telescope Time Awarded

JWST, STScI (Co-I, PI Q. Zhang)	2026
Keck II, NASA NExScI (PI)	2026
JWST, STScI (Co-I, PI Z. Milby)	2025
IRTF, NASA (Co-I, PI R. Cartwright)	2024
Hubble Space Telescope, STScI (Co-I, PI L. Roth)	2024
Keck I & II (Co-I, PIs P. Lierle and L. Moore)	2024, 2025
HST & JWST joint program, STScI (Co-I, PI K. Retherford)	2023
WIYN, NASA NExScI (PI)	2022
Hubble Space Telescope, STScI (US PI, PI L. Roth)	2022
Keck I & II, NASA NExScI (PI & Co-I, PI L. Moore)	2022, 2023
Keck I & II, NASA NExScI (Co-I, PIs L. Moore & K. de Kleer)	2021
Very Large Telescope, ESO (Co-I, PI A. Oza)	2020
Keck I & II, NASA NExScI (PI & Co-I, PI M. Vogt)	2020
THEMIS Solar Telescope, SOLARNET (Co-I, PI V. Mangano)	2019, 2020
Big Bear Solar Observatory (PI)	2019
GREGOR Solar Telescope (PI)	2019
SOFIA, USRA (PI)	2019
IRTF, NASA (Co-I, PI L. Moore)	2019
WIYN, NASA NExScI (PI)	2019
Keck I, NASA NExScI (PI & Co-I, PI K. de Kleer)	2019
Hubble Space Telescope, STScI (Co-I, PI D. Grodent)	2019
Hubble Space Telescope, STScI (PI)	2018
Dunn Solar Telescope, National Solar Observatory (PI)	2016
Vacuum Tube Telescope, SOLARNET (PI)	2016
GREGOR Solar Telescope, SOLARNET (Co-I, PI V. Mangano)	2016
Very Large Telescope, ESO (Co-I, PI B. Bonfond)	2015

Teaching

- AS851 *Graduate Literature Seminar II* (10 students, Spring 2026)
- AS865 & AS866 *Graduate Research Seminar I & II* (∼15 students. Fall & Spring 2022 - 2025)
- CC111 *Core Natural Science I: Origins- of the Big Bang, Earth, Life and Humanity* (96 students. Fall 2022)
- AS101 *The Solar System* (∼16 students, Summer 2018 - 2021)

Service (Academic)

PhD Dissertation Committees:

- Abigal Tadlock (PhD candidate, Boston University) *TBD*
- Lou Baya Ould Rouis (PhD candidate, Boston University) *TBD*
- Alec Daly (PhD 2025, Boston University) *Unraveling Jupiter's Magnetospheric Dynamics: Characteristics and Impacts of Interchange and Injection Events*
- Rozenn Robidel (PhD 2023, Université Paris-Saclay) *Study of the exosphere of Mercury with the PHEBUS spectrograph on the BepiColombo mission*

Service (Professional)

- Organizing Committee of the IAU G5 Comission on Stellar & Planetary Atmospheres (2024 - 2027)
- Private sector advisor to the Group of Friends on Dark and Quiet Skies for the UN Committee on the Peaceful Uses of Outer Space (2024)
- Institutional Representative: Massachusetts Space Grant Consortium (2020 -)
- Journal Reviews: Plantery Science Journal, Icarus (outstanding reviewer award), Journal of Geophysical Research, Geophysical Research Letters, Nature, Astronomy & Astrophysics
- Panelist for federal programs: 12x Research Opportunities in Space and Earth Science (ROSES) programs, Keck Time Allocation Committee, PDS Derived Data Review, Discovery Mission Extension Review, CNRS DIM-ORIGINES (France).
- Session Chair: AGU: Dynamics of the Io-Jupiter System (2014) and Dynamic Exospheres of Terrestrial bodies through the Solar System (2023-2025), DPS/EPSC: Fire and Ice: Io and Beyond (2023), Io plasma torus splinter meetings at MOP (2017 & 2018), Exosphere/Magnetosphere, Mercury: Current and Future Science of the Innermost Planet, USRA (2018)

Team Activities & Memberships

- Rapid Imaging Planetary Spectrograph, ground-based instrument, PI
- ESA/JAXA BepiColombo mission, Co-I, PHEBUS instrument
- NASA's Commercial Lunar Payload Services, Co-I, Lunar Environment Heliospheric X-ray Imager
- NASA SBIR Phase I & II to LambdaMetrics for development of the Serpentine Integrated Grating Spectrometer for Extreme Precision Radial Velocimetry, private consultant.
- International Space Science Institute Teams: The influence of Io on Jupiter's Magnetosphere (2016 - 2017), Surface Bounded Exospheres and Interactions in the Solar System (2020), Mass loss from Io's unique atmosphere: Do volcanoes really control Jupiter's magnetosphere? (2021 - 2022)
- Keck SCALES solar system science definition team
- Memberships: American Astronomical Society, International Astronomical Union, American Geophysical Union

Public Outreach

Subject Matter Expert, NASA Community College Network	2023 –
Volunteer Astronomer, High Rock Tower & Observatory, City of Lynn, MA	2022 –
Spectroscopy Lab Instructor, ISS Downlink Day, Boston University	2022
Lab Instructor, BU Academy Dept Visit, Boston Univ.	2022
Host, Navajo-Hopi Astronomy Outreach Program, Lowell Observatory	2018
Lecturer / Volunteer Astronomer, J.B. Coit Observatory, Boston Univ.	2017 –
Lecturer, Fan Mountain Observatory Public Nights, Univ. Virginia	2014 – 2015
Science Fair Judge, Virginia Piedmont Regionals, Charlottesville, VA	2014
Lecturer, McCormick Observatory Public Nights, Univ. Virginia	2013 – 2015
Lab Instructor, Upward Bound program, Boston Univ.	2010
Science Fair Judge, O'Bryant School for Math and Science, Roxbury, MA	2009
Workshop Coordinator, Sprout, www.thesprouts.org, Somerville, MA	2009 – 2013

Press & Media

NY Times: *Auroras Spotted on Neptune for the First Time, Lead to a New Mystery*	2025
Astronomy Magazine: *Scientists view Ganymede's aurorae dancing during eclipse*	2024
NY Times: *Europa, Thought to Be Habitable, May Be Oxygen-Starved*	2024
Astronomy Magazine: *Aurorae throughout our solar system and beyond*	2023
Live TV Interview, Hopewell Meteorite, Russian Television International (RTVi)	2023
AAS NOVA *Pizza Aurorae: Northern (and/or Southern) Lights on Io*	2023
NY Times: *New Auroras Found Glowing in the Skies of Jupiter's Moons*	2023
NY Times: *Telescopes Team Up to Forecast an Alien Storm on Titan*	2022
Boston Globe: *Bad weather may hurt viewing of rare lunar eclipse Friday in Mass.*	2021
Swedish National Public Television: *Today a storm from the moon pulls past the earth*	2021
NY Times: *The Moon Has a Comet-Like Tail*	2021

Wall Street Journal: *Comet Neowise as Seen Around the World* 2020
Sky & Telescope: *Comet NEOWISE Dazzles at Dusk* 2020
Fox News: *Comet NEOWISE may have sodium tail, new images suggest* 2020
TV Interview, *Space Challenges Documentary*, Bulgarian National Public Television 2017
TV Interview, NASA ScienceCast: *The 2016 Transit of Mercury* 2016
Content Advisor, Science in the News, Harvard University GSAS 2013 - 2016
Radio Interview, Science Straight Up, WTJU FM 2014
Phys.org: *Mercury's comet-like appearance spotted by satellites looking at the Sun* 2010
Universe Today: *STEREO Catches Mercury Acting Like a Comet* 2010