Carl A. Schmidt

BU Center for Space Physics
725 Commonwealth Ave
Room 506
Boston, MA 02215

Tel: (617) 981-3087
Email: schmidtc@bu.edu
Web: http://carlschmidt.science
Citizenship: United States

Education

Ph.D., Astronomy, Boston University 2013
Thesis: *Mercury's Sodium Exosphere* (M. Mendillo Advisor)
M.A., Astronomy, Boston University 2008
B.A., Physics, University of Colorado 2005

Research Appointments

Research Scientist, Boston Univ. 2017 - Present

- Monte-Carlo modeling of planetary exospheres: Mercury, the Moon, comets
- Comissioning the Rapid Imaging Planetary Spectrograph, a visiting instrument at Lowell Observatory, the Dunn Solar Telescope, and the Advanced Electro Optical System Telescope
- Spectroscopy of Io's atmosphere & plasma torus w/ HST, SOFIA, Keck, LBT & APO

Research Associate, CNRS/LATMOS Paris (F. Leblanc Supervisor) 2015 - 2017

- Simulated Mercury's exopshere using Monte-Carlo and hybrid codes
- Led ground-based observation & analysis of the Io, Europa and Mercury environments

Research Associate, Univ. of Virginia (R. E. Johnson Supervisor) 2013 - 2015

- Mapped gas distributions in cometary coma: Integral-field spectroscopy, narrow-band imaging, numeric and analytic modeling
- Observed Io's plasma torus, volcanic activity and neutral clouds

Graduate Research Assistant, Boston Univ. (M. Mendillo Supervisor) 2006 - 2013

- Observed, analyzed and simulated Mercury's atmospheric escape
- Assisted in design and testing of the imaging spectrograph at Poker Flat Observatory and two standard spectrographs for mobile calibration

Undergraduate Research Assistant, Univ. Colorado (F. Hearty Supervisor) 2002 - 2005

- Comissioned the Near-Infrared Camera and Fabry-Perot Spectrometer at Apache Point Observatory

Teaching Appointments

Lecturer, Boston Univ. 2018 - 2021

- *AS101 The Solar System* course in Boston University's Astronomy Dept, summer term, targeted at undergraduate non-majors fulfilling a laboratory science requirement, 4 credits, typically 16 students enrolled with 1 teaching assistant.

Teaching Assistant, Boston Univ. 2007

- Lab instructor for *AS101 The Solar System* undergraduate course

Undergraduate Research Advisor: Chase Young, Mikhail Sharov, Patrick Lierle (Boston University), Cameron Moye (Univ. Maryland, NASA SUPPR intern)

Peer-Reviewed Publications

- 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, J. Morgenthaler (2021) Comparative Na and K Mercury and Moon exospheres. Space Science Reviews, under review.
- 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, Vol. 126, 3.
- 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, Vol. 217, 23.
- 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. Planetary Science Journal, Vol. 1, 4.
- A. Oza and 14 co-authors including C. Schmidt (2019) Sodium and Potassium as Remnants of Volcanic Satellites Orbiting Close-in Gas Giant Exoplanets, Astrophysical Journal, V885(2)
- 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, 377.
- 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, Vol. 215 (1), article id. 20.
- J. Morgenthaler, J. Rathbun, C. Schmidt, J. Baumgardner and N. Schneider (2019) Large Volcanic Event on Io Inferred from Jovian Sodium Nebula Brightening, Astrophysical Journal Letters, AAS14911.

- A. Oza, F. Leblanc, R. E. Johnson, C. Schmidt, L. Leclercq, T. Cassidy, J.-Y. Chaufray (2019) Dusk Over Dawn O_2 Asymmetry in Europa's Near-Surface Atmosphere. Planetary & Space Science, Vol. 167, p. 23-32.
- C. Schmidt, N. Schneider, F. Leblanc, C. Gray, J. Morgenthaler, J. Turner, C. Grava (2018) Optical Measurements of Io's Plasma Torus in the Hisaki Epoch. Journal of Geophysical Research: Space Physics, V.123, 7, pp. 5610-5624.
- F. Leblanc, A. Oza, L. Leclercq, C. Schmidt, T. Cassidy, R. Modolo, J.Y. Chaufray, R. E. Johnson (2017) On the Orbital Variability of Ganymede's Atmsophere. Icarus, Vol. 293, p. 185-198.
- J. D. Turner, D. Christie, P. Arras, R. E. Johnson, C. Schmidt (2016) Investigation of the environment around close-in transiting exoplanets using CLOUDY. Monthly Notices fo the Royal Astronomical Society, Vol 458 (4), p.3880-3891.
- C. Schmidt (2016) High Resolution Integral-Field Spectroscopy of Gas and Ion Distributions in the Coma of Comet C/2012 S1 ISON. Icarus, Vol 265, p. 35-41.
- R.E. Johnson, A. Oza, L.A. Young, A.N. Volkov, C. Schmidt (2015) Volatile Loss and Classification of Kuiper Belt Objects. Astrophysical Journal, Vol 809 (1), article id. 43.
- N.-E. Raouafi, C. M. Lisse, G. Stenborg, G. H. Jones, C. Schmidt (2015) Dynamics of HVECs emitted from comet C/2011 L4 as observed by STEREO. Journal of Geophysical Research, Vol 120 (7), pp. 5329-5340.
- C. Schmidt, R.E. Johnson, J. Baumgardner, M. Mendillo (2015) Observations of Sodium in the Coma of Comet C/2012 S1 (ISON) During Outburst. Icarus, Vol 247, p. 313-318.
- C. Schmidt (2013) Monte-Carlo Modeling of North-South Asymmetries in Mercury's Sodium Exosphere, Journal of Geophysical Research, Vol 118, A50396.
- C. Schmidt, J. Baumgardner, M. Mendillo., J. Wilson (2012) Escape rates and variability constraints for high-energy sodium sources at Mercury, Journal of Geophysical Research, Vol 117, A03301.
- C. Schmidt, J. Wilson, J. Baumgardner, M. Mendillo (2010) Orbital Effects on Mercury's Escaping Sodium Exosphere, Icarus, Vol 207 (1), p. 9-16.
- F. Hearty and 11 co-authors including C. Schmidt (2005) Colorado's Near-Infrared Camera (AKA NIC-FPS) Commissioning on the ARC 3.5M Telescope, Proc. SPIE, Vol 5904, p. 199-211.

Conference Proceedings and Abstracts

- Schmidt, Cassidy, Merkel, Jasinski, M. Burger (2021) Simulating Impulsive Events in the Mercury Exosphere as Observed by MESSENGER UVVS. Mercury Exploration Assessment Group.
- Schmidt (2020) The Io-Torus Interaction as Seen Through a Telescope, Outer Planet Moon-Magnetosphere Interaction Workshop at ESA/ESTEC.

- Moye, Schmidt, Roth, Ivchenko, Saur, Retherford (2020) Evidence for an Ionic Pathway in Oxygen and Sulfur Atoms Escaping Io. DPS Meeting Abstract.
- Baumgardner, Luettgen, Schmidt, Mayyasi, Smith, Martinis, Wroten, Moore, Mendillo (2020) A new long-term study of the Moon's extended tail of sodium atoms. AGU Meeting Abstract.
- Lierle, Schmidt, Baumgardner, Moore, Swindle (2020) The Brightness of Mercury's Potassium Exosphere. EPSC Meeting Abstract.
- Sharov, Schmidt, Gray, Schneider, Withers (2020) Io's Optical Airglow in Jovian Eclipse. EPSC Meeting Abstract.
- Schmidt, Moullet, de Kleer, Spencer, Roth (2019) A Multi-Wavelength Study of Io's Atomic Oxygen and Sulfur Emission. AGU Meeting Abstract.
- Spencer, Grundy, Schmidt (2019) Rapid Temporal Variability of Condensed Oxygen on Europa? EPSC Meeting Abstract.
- Mangano, Zender, Huovelin, Schmidt, Killen Kameda (2019) Sodium exosphere of Mercury: a call for new Earth-based telescopes and observers. EPSC Meeting Abstract.
- Bhattacharyya, Clarke, Mayyasi, Chaufray, Schmidt, Johnson, Bertaux, Moore, Chaffin, Groeller, Schneider (2019) Evidence of Hot Hydrogen in the Exosphere of Mars. EPSC Meeting Abstract.
- Baumgardner, Schmidt, Moore, Mendillo, Mayyasi (2019) 20 Years of Observations of the Lunar Sodium Tail. 50th Lunar and Planetary Science Conference, held 18-22 March, 2019 at The Woodlands, Texas. LPI Contribution No. 2132, id.1940
- Morgenthaler & Schmidt (2018) Evidence for a large Volcanic Outburst on Io in Early January 2018 from Ground-Based Sodium Observations by the Io Input/Output facility (IoIO). AGU Meeting Abstract.
- Baumgardner, Schmidt, Moore, Swindle, Shaw (2018) Concurrent Lucky Imaging and Spectroscopy of the Mercury Exosphere with the Rapid Imaging Planetary Spectrograph. AGU Meeting Abstract.
- Johnson, Oza, Schmidt, Leblanc (2018) Plasma and Thermal Processing of Europa's Surface, Europa Deep Dive: Chemical Composition of Europa and State of Laboratory Data, held 9-11 October, 2018 in Houston, Texas. 2100, id.3041
- Oza and 11 co-authors including Schmidt (2018) Exogenic Volatiles in the Extended Exospheres of Extrasolar Giant Planets, EPSC Meeting Abstract.
- Schmidt, Baumgardner, Moore, Bida (2018) Ground-Based BepiColombo Support with the Rapid Imaging Planetary Spectrograph, EPSC Meeting Abstract.
- Schmidt, Leblanc, Reardon, Killen, Gary, Ahn (2018) Absorption Spectroscopy of Mercury's Exosphere During the 2016 Solar Transit, Mercury: Current and Future Science of the Innermost Planet, Proceedings of the conference held 1-3 May, 2018 in Columbia, Maryland, 2047, 2018, id.602
- Nerney, Bagenal, Yoshioka, Schmidt (2017) Constraining Plasma Conditions of the IPT via Spectral Analysis of UV & Visible Emissions and Comparing with a Physical Chemistry Model, AGU Meeting Abstract.

- Oza, Leblanc, Chaufray, Schmidt, Roth, Johnson, Cassidy, Leclercq, Modolo (2017) Europa and Ganymede's Water-Product Exospheres. EPSC Meeting Abstract.
- Schmidt, Leblanc, Moore, Bida (2017) Detection of Mercury's Potassium Tail. DPS Meeting Abstract.
- Schmidt (2017) Absorption By Mercury's Atmosphere During Solar Transit. Transiting Exoplanet Conference. Keele, UK.
- Schmidt, Reardon, Killen, Gary, Ahn, Leblanc, Baumgardner, Mendillo, Beck, Mangano (2016) Absorption by Mercury's Exosphere During the May 9th, 2016 Solar Transit. AGU Meeting Abstract.
- Nerney, Bagenal, Schmidt, Yoshioka, Steffl, Schneider (2016) Observations of Ion Composition in the Io Plasma Torus. AGU Meeting Abstract.
- Raouafi, Lisse, Stenborg, Jones, and Schmidt (2016) Dynamics of HVECs emitted from comet C/2011 L4 as observed by STEREO. AGU Meeting Abstract.
- Schmidt, Schneider, Leblanc, Johnson (2016) Characteristics of the SII ribbon in the Io Plasma Torus from Visible Wavelength Spectroscopy. ISSI Workshop on the influence of Io on Jupiter's magnetosphere in Berne, Switzerland.
- Leblanc, Oza, Schmidt, Leclercq, Modolo, Chaufray (2016) 3D multispecies collisional model of Ganymede's atmosphere. EPSC/DPS Meeting Abstract.
- Skrutskie, Nelson, Schmidt (2016) Monitoring the Near-infrared Volcanic Flux from Io's Jupiter-facing Hemisphere from Fan Mountain Observatory. EPSC/DPS Meeting Abstract.
- Leclercq, Chanteur, Modolo, Leblanc, Schmidt, Langlais, Thebault (2016) Study of the internal magnetic field of Mercury through 3D hybrid simulations. EPSC/DPS Meeting Abstract.
- Oza, Leblanc,Schmidt, Johnson (2016) Origin and Evolution of Europa's Oxygen Exosphere. EPSC/DPS Meeting Abstract.
- Schmidt, Leblanc, Johnson, Mendillo, Baumgardner (2015) Evidence for a Plasma Interaction with Europa's Sodium Clouds from High Resolution Integral Field Spectroscopy. AGU Meeting Abstract.
- Raouafi, Lisse, Stenborg, Jones, and Schmidt (2015) Dynamics of High-Velocity Evanescent Clumps (HVECs) Emitted from Comet C/2011 L4 (Pan-STARRS) as Observed by STEREO. AGU Meeting Abstract.
- Schmidt, Johnson, Mendillo, Baumgardner, Leblanc (2015) Neutral and Plasma Distributions in the Coma of Comet C/2012 S1 ISON: Narrowband Imaging and Integral-Field Spectroscopy. EPSC Meeting Abstract.
- Schneider and 11 co-authors including Schmidt (2015) Plasma Parameters in Io's Torus: Measurements from Apache Point Observatory. EPSC Meeting Abstract.
- Schmidt, Schneider, Turner, Johnson, Chaffin, Rugenski, McNeil (2015) Optical Spectroscopy of the Io Plasma Torus in Support of Hisaki/EXCEED. MOP Meeting Abstract.

- Schmidt, Johnson, Mendillo, Baumgardner (2014) Velocity-Resolved Multi-Scale Imaging of Na Escape from Io. AGU Meeting Abstract.
- Turner and 11 co-authors including Schmidt (2014) Plasma Parameters in Io's Torus: Measurements from Apache Point Observatory. AGU Meeting Abstract.
- Schmidt, Johnson, Baumgardner, Mendillo (2014) Gas Distributions in Comet ISON's Coma: Concurrent Integral-Field Spectroscopy and Narrow-band Imaging, DPS Meeting Abstract DPS2014-113.02.
- Johnson, Oza, Young, Volkov, Schmidt (2014) Volatile Loss and Classification of Kuiper Belt Objects, DPS Meeting Abstract DPS2014-510.01.
- Schmidt, Mendillo, Baumgardner, Johnson (2013) Sodium Escape in Mercury's Atmosphere: Ground-Based Observations in Support of MESSENGER, DPS Meeting Abstract DPS2013-102.07.
- Schmidt, Baumgardner, Mendillo (2012) Hemispheric Asymmetries in Mercury's Exosphere, DPS Meeting Abstract DPS2012-410.05.
- Clarke and 9 co-authors including Schmidt (2012) HST observations and modeling of the Martian hydrogen corona, DPS Meeting Abstract DPS2012-214.01.
- Schmidt, Baumgardner, Mendillo, Sundberg, Walsh (2012) Hemispheric Asymmetries in Mercury's Exosphere Due to the Offset Magnetic Dipole, AGU Meeting Abstract P33B-1931
- Schmidt, Baumgardner, Mendillo, Wilson (2011), Escape rates and variability constraints for high-energy sodium sources at Mercury, Joint EPSC/DPS Meeting Abstract EPSC-DPS2011-100.
- Mangano and 19 co-authors including Schmidt (2010) The sodium emission from Mercury's exosphere as detected by the IMW coordinated campaign in June 2006, COSPAR Paper B07-0022-10.
- Schmidt, Baumgardner, Mendillo, Davis, Musgrave (2010) Observations of Extended Emissions at Mercury by the STEREO Spacecraft, EPSC proceedings p419.
- Schmidt, Baumgardner, Mendillo, Davis, Musgrave (2010) Observations of tail structures at Mercury with the STEREO spacecraft, Joint MESSENGER / BepiColombo Workshop Abstract 2.2.1.
- Schmidt, Wilson, Baumgardner, Mendillo (2009) Variability in Mercury's Escaping Sodium Atmosphere, DPS Meeting Abstract DPS2009-35.01
- Schmidt, Wilson, Baumgardner, Mendillo (2008) Wide Field Observations of Variability in Mercury's Comet-like Sodium Tail, DPS Meeting Abstract DPS2008-51.09
- Schmidt, Wilson, Baumgardner, Mendillo (2008) Wide Field Observations of Mercury's Extended Sodium Exosphere, COSPAR paper B07-0036-08
- Schmidt, Baumgardner (2007) Boston University Calibration Facility for Optical Aeronomy. CEDAR Meeting Abstract

Non-Peer-Reviewed Publications

- J. Clarke, C. Schmidt, J. Baumgarder, C. Carveth, M. Matta, M. Mendillo, L. Moore, and P. Withers (2013) White Paper on Comparative Planetary Exospheres. National Research Council Decadal Survey. Solar and Space Physics: A Science for a Technological Society. National Academies Press.

Invited Seminars & Lectures

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 Telescopes 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

Grants, Awards & Fellowships

- NASA Science Mission Directorate *Characterizing Mercury's Exosphere with BepiColombo-PHEBUS: US-based Co-Investigators*, PI, 2020.10.13 to 2025.10.12, SMDSS20-0011. $226,061
- NASA 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. $11,775.
- NASA New Frontiers Data Analysis Program *The plasma distribution in the Io torus during the Juno epoch*, Co-I (PI P. Withers), 2019.03.21 to 2022.02.28. NFDAP18-2-0022, $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. $16,700.
- NASA NN-EXPLORE WIYN PI Data Award *Confirming a High Velocity Exo-Exosphere at HD 80606b*, PI, 2019.02.01 to 2021.01.31. N0223. $10,100.
- NASA Keck Award *Juno Support: Io's Auroral Emissions in Jovian Eclipse*, PI, 2019.02.01 to 2020.01.31. 84-208B-N110. $10,062.
- Hubble Space Telescope Cycle 26 *Auroral and magnetospheric context for Juno in situ instruments during Cycle 26.*, Co-I (PI D. Grodent), 2019.03.01 to 2020.02.28. HST-GO-15638. TBD.

- NASA Solar System Workings *Physical Processes Governing Mercury's Alkali Exosphere*, PI, 2018.11.01 to 2021.03.31. 17-SSW17-0206. $352,275.
- NASA Solar System Observations *Ground-based observations of Mercury's exosphere in the post-MESSENGER era*, PI, 2018.03.01 to 2021.02.28. 17-SSO17-2-0040. $507,403.
- 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 J. Morgenthaler), 2017.08.23 to 2020.08.22. SSW16-2-0086. $526,604.
- Hubble Space Telescope Cycle 25 *Extreme Doppler Shifting of Io's Neutral Jets*, PI, 2018.03.01 to 2019.02.28. HST-GO-15147. $39,999.
- NSF Astronomy and Astrophysics Research Grant *The Influence of Mercury's Magnetosphere on Its Outermost Atmosphere*, Science PI (PI L. Moore), 2016.07.15 to 2019.06.30. AST-1614903. $374,407.
- NASA Earth and Space Sciences Fellowship. *Mercury's Escaping Atmosphere*, Science PI (PI M. Mendillo), 2010.03.15 to 2013.03.15. 10-Planet10F-0041. $90,000.

Telescope Time Awarded

Keck I & II, NASA NExScI (as Co-I, PIs L. Moore & K. de Kleer)	2021
Very Large Telescope, ESO (as Co-I, PI A. Oza)	2020
Keck I & II, NASA NExScI (as PI & Co-I, PI M. Vogt)	2020
THEMIS, SOLARNET (as Co-I, PI V. Mangano)	2019, 2020
Big Bear Solar Observatory	2019
GREGOR	2019
SOFIA, USRA	2019
IRTF, NASA (as Co-I, PI L. Moore)	2019
WIYN, NASA NExScI	2019
Keck I, NASA NExScI (as PI & Co-I, PI K. de Kleer)	2019
Hubble Space Telescope, STScI (as Co-I, PI D. Grodent)	2019
Hubble Space Telescope, STScI	2018
Dunn Solar Telescope, National Solar Observatory	2016
Vacuum Tube Telescope, SOLARNET	2016
GREGOR, SOLARNET (as Co-I, PI V. Mangano)	2016
Very Large Telescope, ESO (as Co-I, PI B. Bonfond)	2015

Via Internal TACs: Large Binocular Telescope, IRTF, Apache Point 3.5m, Discovery Channel Telescope

Team Activities & Professional Service

- Science PI, Rapid Imaging Planetary Spectrograph
- ESA/JAXA BepiColombo mission, Co-Investigator
- Journal Reviews: Icarus (outstanding reviewer award 2017), Journal of Geophysical Research, Geophysical Research Letters, Nature, Astronomy & Astrophysics

- NASA Panelist: DDAP, PMDAP, CDAP, RDAP, OPR, GI, PDS, PICASSO, MatISSE, SSW, Keck Time Allocation Committee
- Representative: Massachusetts Space Grant Consortium (2020-)
- Local Organizing Committees: Cool Stars 20 Conference, Boston University (2018), DPS Conference, Provience RI (2021)
- Scientific Organizing Committees: Jupiter Day, Boston University (2018)
- Session Chair: AGU, Dynamics of the Io-Jupiter System (2014), Io plasma torus splinter meetings at MOP (2017 & 2018), Exosphere/Magnetosphere, Mercury: Current and Future Science of the Innermost Planet, USRA (2018)
- Memberships: American Astronomical Society, International Astronomical Union, American Geophysical Union
- 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), Exosphere-Surface Interactions (2021-2022)

Public Outreach, Press & Media

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
Host, Navajo-Hopi Astronomy Outreach Program, Lowell Observatory 2018
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
Lecturer, Fan Mountain Observatory Public Night 2014 - 2015
Radio Interview, Science Straight Up, WTJU FM 2014
Science Fair Judge, Virginia Piedmont Regionals, Charlottesville, VA 2014
Lab Instructor, Upward Bound program, Boston University 2010
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
Science Fair Judge, O'Bryant School for Math and Science, Roxbury, MA 2009
Workshop Coordinator, Sprout, www.thesprouts.org, Somerville, MA 2009 - 2013