Carl A. Schmidt

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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

Appointments

Research Assistant Professor, Boston University	2021 - Present
Research Scientist, Boston University	2017 - 2021
Research Associate, CNRS/LATMOS 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

Research Areas: Planetary exospheres, plasma interactions with surfaces and atmospheres, Monte-Carlo modelling, telescope-based observation and instrumentation

Teaching Experience

Instructor, Boston Univ. — 2022 (Fall term) & 2023 (Spring term)

- *AS865 & AS866 Graduate Research Seminar I & II* Weekly seminar offering astronomy graduate students the skills and practice needed for oral presentations on current research topics and to receive peer and expert feedback, 2 credits

Guest Lecturer, Boston Univ. — 2022 (Fall term)

- *CC111 Core Natural Science I: Origins- of the Big Bang, Earth, Life and Humanity* 5 lectures in a team-taught course in Boston University's Core Curriculum program. Targeted at incoming students fulfilling scientific inquiry, quantitative reasoning and teamwork/collaboration requirements, 4 credits, expected enrollement is roughly 100 students.

Instructor, Boston Univ. — 2018 - 2021 (Summer term, annually)

- *AS101 The Solar System* course in Boston University's Astronomy Dept 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 (Spring term)

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

Undergraduate Research Advisor:

- Chase Young (Spring - Summer 2018)
- Mikhail Sharov (Fall 2018 - Spring 2021)
- Cameron Moye (Univ. Maryland, NASA SUPPR intern, Summer 2020)
- Aishwarya Ganesh (Univ. Texas, NASA SUPPR intern, Summer 2021)
- Patrick Lierle (Summer 2019 - Summer 2022)

Graduate Research Advisor:

- Emma Lovett (Fall 2021 -)
- Patrick Lierle (Fall 2022 -)

Journal Articles Under Review (students underlined)

- 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*. Nature Astronomy, *under review*
- Q. Zhang, K. Battams, Q. Ye, M. Knight and C. Schmidt (2023) *Sodium Brightening of (3200) Phaethon Near Perihelion*. The Planetary Science Journal, *under review*
- 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, *under review*

Peer-Reviewed Book Chapters (students underlined)

- 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.

Peer-Reviewed Journal Articles (students underlined)

- 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, *in press.*
- 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, Vol. 3, 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, Vol. 372, 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, Vol. 126, 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, Vol. 217, 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, Vol. 1, 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*, 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, 377, 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*, 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, 23-32, DOI.
- C. Schmidt, N. Schneider, F. Leblanc, C. Gray, J. Morgenthaler, J. Turner and C. Grava (2018) *Optical Measurements of Io's Plasma Torus in the Hisaki Epoch*. Journal of Geophysical Research: Space Physics, 123, 7, 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, p. 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, Vol 458 (4), p.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, Vol 265, p. 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*. Astrophysical Journal, Vol 809 (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, Vol 120 (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, Vol 247, p. 313-318, DOI.
- C. Schmidt (2013) *Monte-Carlo Modeling of North-South Asymmetries in Mercury's Sodium Exosphere*, Journal of Geophysical Research, Vol 118, 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, Vol 117, A03301, DOI.
- C. Schmidt, J. Wilson, J. Baumgardner and M. Mendillo (2010) *Orbital Effects on Mercury's Escaping Sodium Exosphere*, Icarus, Vol 207 (1), p. 9-16, DOI.

Conference Proceedings and Abstracts (students underlined)

- Nixon C. A. and 36 co-authors including Schmidt, C. (2023) *Observations of Clouds on Titan with JWST/NIRCam and Keck/NIRC-2*, European Geophysical Union Meeting, held 23–28 April in Vienna, Austria.
- Clarke, J. T., Bhattacharyya, D., Mayyasi, M., Shematovich, V., Bisikalo, D., Chaufray, J. Y., Thiemann, E., Halekas, J., Schmidt, C., Bertaux, J. L., Chaffin, M. S. and Schneider, N. M. (2023) *Evidence of Hot Hydrogen in the Exosphere of Mars Resulting in Enhanced Water Loss*. European Geophysical Union Meeting, held 23–28 April in Vienna, Austria.

- Cartwright, R., de Kleer, K., Schmidt, C. A., Villanueva, G. L., Beddingfield, C. B., Nordheim, T. A., Hand, K. P., Glein, C. R., Emery J. P., Hanley, J. and Thieberger, C. (2023) *Investigating the Nature and Origin of Hydrated Salts on Europa*. 54th Lunar and Planetary Science Conference, held March 13–17 in The Woodlands, TX.
- Nixon C. A. and 36 co-authors including Schmidt, C. (2022) *First Observations of Titan with the James Webb Space Telescope*. American Geophysical Union Fall Meeting held 12-16 Dec. in Chicago, IL, abstract #P52D-1572.
- Morgenthaler J., Schmidt, C., Marconi, M., Vogt, M., Schneider, N. (2022) Find Your Favorite Io Volcanic Enhancement! A Global View of the Jovian Magnetosphere During the Juno Mission as Recorded by PSI's Io Input/Output Observatory (IoIO). American Geophysical Union Fall Meeting held 12-16 Dec. in Chicago, IL, abstract #SM42F-2232.
- Solorio, W., Merkel, A. W., Brain, D. A., Schmidt, C. (2022) Understanding the Role of Mercury in Investigating the Connection Between Planetary Habitability, Atmospheres, and Magnetic Fields. American Geophysical Union Fall Meeting held 12-16 Dec. in Chicago, IL, abstract #P42E-2442.
- Schmidt, C. (2022) Na and K Absorption in Solar System Transit Spectroscopy, Exoplanets in Our Backyard 2.0, held 2-4 Nov in Albuquerque, NM, LPI 2687, 3033 link.
- Milby, M., de Kleer, K., Schmidt, C., Camarca, M., Brown, M. (2022) Discovery of New Oxygen Aurora on Europa, Ganymede and Callisto. American Astronomical Society, DPS meeting #54, held 2-7 October in London, Ontario, id.513.08
- de Kleer, K., Milby, M., Schmidt, C., Camarca, M., Brown, M. (2022) The Red/Green Oxygen Aurorae of Europa and Ganymede. American Astronomical Society, DPS meeting #54, held 2-7 October in London, Ontario, id.513.09
- Moore, L., Stallard, T., O'Donoghue, J., Melin, H., Chowdhury, N., Johnson, R., Vogt, M., Schmidt, C. and Orton, G. (2022) Ionospheric temperature variability above Jupiter's Great Red Spot, EPSC2022-564. EPSC Meeting, held 18-23 Sept 2022 in Granada, Spain, link.
- Morgenthaler J., Marconi, M., Schmidt, C., Vogt, M., Schneider, N. (2022) Using the Io plasma torus as a probe of Io's exosphere, Magnetospheres of the Outer Planets, held July 11-15, 2022 in Liege, BE, link.
- Morgenthaler J., Marconi, M., Schmidt, C., Vogt, M., Schneider, N. (2022) Using Io Input/Output observatory (IoIO) observations to determine if mass flow in Jupiter's magnetosphere driven by internal or external processes, Magnetospheres of the Outer Planets, held July 11-15, 2022 in Liege, BE, link.
- Schmidt, C., Cassidy, T., Merkel, A., Jasinski, J., Burger, M. (2022) Impact Events Observed by MESSENGER UVVS, Mercury 2022: Current and future science of the innermost planet, held 7-10 June 2022 in Orléans, France. link.
- Mangano, V., Schmidt, C., Vervack, R., Morgenthaler, J., Leblanc, F., Lierle, P., Del Moro, D. (2022) Coordinated Campaign of Ground-Based Observations of Mercury's

Exosphere in 2021, Mercury 2022: Current and future science of the innermost planet, held 7-10 June 2022 in Orléans, France. link.

- Oza, A., Gebek, A., Seidel, J., Hoeijmakers, J., Unni, A., Thirupathi, S., Schmidt, C., Baker, A., de Kleer, K., Lopes, R., Johnson, R. E. (2022) Transient Sodium and Potassium Clouds at Candidate Exomoon Systems, Exoplanets IV, held 1-6 May in Las Vegas, NV, Bulletin of the American Astronomical Society, Vol. 54 (5), link.
- Schmidt, C., Lierle, P., Mangano, V., Leblanc, F., Morgenthaler, J., Vervack, R. (2022) Coordinated Ground-Based Measurements of Mercury's Exosphere, Mercury Exploration Assessment Group, held Feb 1–3, 2022, Virtual, link.
- Schmidt, C. (2022) UVVS Measurements of Impactor Plumes: New Insights and Open Questions, Mercury's Surface Response to the Interplanetary Environment: Identifying Needed Studies in Laboratory Astrophysics, held Jan 24–27, 2022, Virtual, link.
- Sharov, M., Schmidt, C., Gray, C., Schneider, C., Withers, P. (2021) An ARCES study of Io's Aurora in Jupiter's Shadow. APO Science Symposium, held virtually 26-28 July, link.
- Morgenthaler J., Vogt, M., Schmidt, C., Schneider, N. (2021) Using Io Input/Output Observatory (IoIO) Observations to Provide an New Approach to Resolving the Question: Is Mass Flow in Jupiter's Magnetosphere Driven by Internal or External Processes? Magnetospheres of the Outer Planets, held July 12-16, 2021, virtual, link.
- Schmidt, C., Cassidy, T., Merkel, A., Jasinski, J., Burger, M. (2021) Simulating Impulsive Events in the Mercury Exosphere as Observed by MESSENGER UVVS. Mercury Exploration Assessment Group, held Feb 3–5, 2021, Virtual, link.
- Schmidt, C. (2020) The Io-Torus Interaction as Seen Through a Telescope, Outer Planet Moon-Magnetosphere Interaction Workshop, #24, held Nov 5-6 2020, ESA/ESTEC, Noorwijk, The Netherlands, link.
- Moye, C., Schmidt, C., Roth, L., Ivchenko, N., Saur, J., & Retherford, K. (2020). Evidence for an Ionic Pathway in Oxygen and Sulfur Atoms Escaping Io. Bulletin of the AAS, 52(6), link.
- Baumgardner, J., Luettgen, S., Schmidt, C., Mayyasi, M., Smith, S., Martinis, C., Wroten, J., Moore, L., Mendillo, M. (2020) A new long-term study of the Moon's extended tail of sodium atoms. American Geophysical Union, Fall Meeting 2020, abstract #SM33F-3282.
- Lierle, P., Schmidt, C., Baumgardner, J., Moore, L., Swindle, R. (2020) The Brightness of Mercury's Potassium Exosphere. Europlanet Science Congress, Vol.14, EPSC2020-493, held 21 Sept - 9 Oct, Virtual, DOI.
- Sharov, M., Schmidt, C., Gray, C., Schneider, C., Withers, P. (2020) Io's Optical Airglow in Jovian Eclipse. Europlanet Science Congress, Vol.14, EPSC2020-457, 2020, held 21 Sept - 9 Oct, Virtual, DOI.
- Schmidt, C., Moullet, A., de Kleer, K., Spencer J., Roth, L. (2019) A Multi-Wavelength Study of Io's Atomic Oxygen and Sulfur Emission. American Geophysical Union, Fall Meeting 2019, abstract #SM33F-3282.

- Spencer J., Grundy, W., Schmidt C. (2019) Rapid Temporal Variability of Condensed Oxygen on Europa? EPSC-DPS Joint Meeting, held 15-20 Sept 2019 in Geneva, Switzerland, link.
- Mangano V., Zender, J., Huovelin, J., Schmidt, C., Killen, R., Kameda, S. (2019) Sodium exosphere of Mercury: a call for new Earth-based telescopes and observers. EPSC-DPS Joint Meeting, held 15-20 Sept 2019 in Geneva, Switzerland, link.
- Bhattacharyya, D., Clarke, J., Mayyasi, M., Chaufray, J.-Y., Schmidt, C., Johnson, R. E., Bertaux, J.-L., Moore, L., Chaffin, M., Groeller, H., Schneider, N. (2019) Evidence of Hot Hydrogen in the Exosphere of Mars. EPSC-DPS Joint Meeting, held 15-20 Sept 2019 in Geneva, Switzerland, link.
- Oza, A. and 14 co-authors including Schmidt C. (2019) Alkaline Signatures of an Active Exomoon, Extreme Solar Systems 4, id. 306.05. Bulletin of the American Astronomical Society, Vol. 51, No. 6, link.
- Baumgardner, J., Schmidt, C., Moore, L., Mendillo M., Mayyasi M. (2019) 20 Years of Observations of the Lunar Sodium Tail. 50th Lunar and Planetary Science Conference, held 18-22 March, 2019 in Woodlands, Texas. LPI id.1940, link.
- Morgenthaler J. & Schmidt, C. (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). American Geophysical Union, Fall Meeting 2018, abstract #SM52A-04
- Baumgardner, J., Schmidt, C., Moore, L., Swindle, R., Shaw, C. (2018) Concurrent Lucky Imaging and Spectroscopy of the Mercury Exosphere with the Rapid Imaging Planetary Spectrograph. American Geophysical Union, Fall Meeting 2018, abstract #P22B-05
- Johnson, R. E., Oza, A., Schmidt, C., Leblanc, F. (2018) Plasma and Thermal Processing of Europa's Surface, Europa Deep Dive: Chemical Composition of Europa and State of Laboratory Data, held 9-11 Oct, 2018 in Houston, Texas, id.3041, link.
- Oza, A. and 11 co-authors including Schmidt C. (2018) Exogenic Volatiles in the Extended Exospheres of Extrasolar Giant Planets, European Planetary Science Congress 2018, held 16-21 September 2018 at TU Berlin, Germany, id.EPSC2018-1199, link.
- Schmidt, C., Baumgardner, J., Moore, L., Bida, T. (2018) Ground-Based BepiColombo Support with the Rapid Imaging Planetary Spectrograph, European Planetary Science Congress 2018, held 16-21 September 2018 at TU Berlin, Germany, id.EPSC2018-1216, link.
- Schneider, N., Schmidt C., Kagitani, M., Kasaba, Y., Kimura, T., Murakami, G., Tsuchiya, F., Yamakazi, I, Yoshikawa, I, Yoshioka, K. (2018) A Search for Ion Scale Height Variability in Hisaki Io Torus Observations, Magnetospheres of the Outer Planets, held July 8-11, 2018 at University of Colorado, link.
- Schmidt C., (2018) Visible Wavelength Spectroscopy of the Io Torus During the Hisaki Mission, Magnetospheres of the Outer Planets, held July 8-11, 2018 at University of Colorado, link.
- Schmidt C., Leblanc, F., Reardon, K., Killen, R., Gary D. E., Ahn, K. (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, MD, 2047, link.

- Nerney, E. G., Bagenal, F., Yoshioka, K., Schmidt, C. (2017) Constraining Plasma Conditions of the IPT via Spectral Analysis of UV & Visible Emissions and Comparing with a Physical Chemistry Model, American Geophysical Union, Fall Meeting 2017, abstract #SM33C-2672
- Oza, A. V., Leblanc, F., Chaufray, J. Y., Schmidt, C., Roth, L., Johnson, R. E., Cassidy, T. A., Leclercq, L., Modolo, R. (2017) Europa and Ganymede's Water-Product Exospheres. European Planetary Science Congress 2017, held 17-22 September, 2017 in Riga Latvia, id. EPSC2017-626, link.
- Schmidt, C., Leblanc, F., Moore, L., Bida, T. A. (2017) Detection of Mercury's Potassium Tail. American Astronomical Society, DPS meeting #49, id.422.01
- Schmidt, C. (2017) Absorption By Mercury's Atmosphere During Solar Transit. Transiting Exoplanets, held 17-21 July at Keele University, UK, link.
- Schmidt, C., Reardon, K., Killen, R. M., Gary, D. E., Ahn, K., Leblanc, F., Baumgardner, J. L., Mendillo, M., Beck, C., Mangano, V. (2016) Absorption by Mercury's Exosphere During the May 9th, 2016 Solar Transit. American Geophysical Union, Fall General Assembly 2016, abstract #P53B-2198.
- Nerney, E. G., Bagenal, F., Schmidt, C., Yoshioka, K., Steffl, A., Schneider, N. M. (2016) Observations of Ion Composition in the Io Plasma Torus. American Geophysical Union, Fall General Assembly 2016, abstract #P23C-2177
- Raouafi, N. E., Lisse, C. M., Stenborg, G., Jones, G., Schmidt, C. (2016) Dynamics of HVECs emitted from comet C/2011 L4 as observed by STEREO. American Geophysical Union, Fall General Assembly 2016, #P43B-2114
- Leblanc, F., Oza, A., Schmidt, C., Leclercq, L., Modolo, R., Chaufray, J.-Y. (2016) 3D multispecies collisional model of Ganymede's atmosphere. American Astronomical Society, DPS meeting #48, id.429.09
- Skrutskie, M., Nelson, M., Schmidt, C. (2016) Monitoring the Near-infrared Volcanic Flux from Io's Jupiter-facing Hemisphere from Fan Mountain Observatory. American Astronomical Society, DPS meeting #48, id.429.22
- Leclercq, L., Chanteur, G., Modolo, R., Leblanc, F., Schmidt, C., Langlais, B., Thebault, E. (2016) Study of the internal magnetic field of Mercury through 3D hybrid simulations. American Astronomical Society, DPS meeting #48, id.117.01
- Oza, A. Leblanc, F., Schmidt, C., Johnson R. E. (2016) Origin and Evolution of Europa's Oxygen Exosphere. American Astronomical Society, DPS meeting #48, id.517.05
- Schmidt, C., Johnson, R. E., Mendillo, M., Baumgardner, J. L., Moore, L., O'Donoghue, J., Leblanc, F. (2015) Evidence for a Plasma Interaction with Europa's Sodium Clouds from High Resolution Integral Field Spectroscopy. American Geophysical Union, Fall Meeting 2015, abstract #SM31B-2491

- Lisse, C. M., Raouafi, N. E., Stenborg, G., Jones, G. H., Schmidt, C. (2015) Dynamics of High-Velocity Evanescent Clumps (HVECs) Emitted from Comet C/2011 L4 (Pan-STARRS) as Observed by STEREO. American Geophysical Union, Fall Meeting 2015, abstract #SM31D-2542
- Schmidt, C., Johnson, R. E., Mendillo, M., Baumgardner, J., Leblanc, F. (2015) Neutral and Plasma Distributions in the Coma of Comet C/2012 S1 ISON: Narrowband Imaging and Integral-Field Spectroscopy. European Planetary Science Congress, held 27 Sept - 2 Oct, 2015 in Nantes, France, link.
- Schneider N., and 11 co-authors including Schmidt C., (2015) Plasma Parameters in Io's Torus: Measurements from Apache Point Observatory. European Planetary Science Congress, held 27 Sept - 2 Oct, 2015 in Nantes, France, link.
- Schmidt, Schneider, Turner, Johnson, Chaffin, Rugenski, McNeil (2015) Optical Spectroscopy of the Io Plasma Torus in Support of Hisaki/EXCEED. Magnetospheres of the Outer Planets, held June 1-5, 2015 at Georgia Tech.
- Schmidt, C., Johnson, R. E., Mendillo, M., Baumgardner, J. L. (2014) Velocity-Resolved Multi-Scale Imaging of Na Escape from Io. American Geophysical Union, Fall Meeting 2014, abstract #P21A-3901
- Turner, J., Schmidt, C., Schneider, N., Chaffin, M., McNeil, E., Chanover, N., Oza, A., Rugenski, S., Thelen, A., Johnson, R. E., Bittle, L., King, P. (2014) Plasma Parameters in Io's Torus: Measurements from Apache Point Observatory. American Geophysical Union, Fall Meeting 2014, abstract #P13E-07
- Schmidt, C., Johnson R. E., Baumgardner, J., Mendillo M., (2014) Gas Distributions in Comet ISON's Coma: Concurrent Integral-Field Spectroscopy and Narrow-band Imaging, American Astronomical Society, DPS meeting #46, id.113.02
- Johnson R. E., Oza, A., Young, L., Volkov, A., Schmidt C. (2014) Volatile Loss and Classification of Kuiper Belt Objects. American Astronomical Society, DPS meeting #46, id.510.01
- Schmidt C., Mendillo M., Baumgardner, J., Johnson, R. E. (2013) Sodium Escape in Mercury's Atmosphere: Ground-Based Observations in Support of MESSENGER, American Astronomical Society, DPS meeting #45, id.102.07
- Bhattacharyya, D., Clarke, J. T., Bertaux, J., Chaufray, J., Montgomery, J., Schmidt, C. (2013) Analyzing HST observations of the Martian Corona with different modeling techniques, American Astronomical Society, DPS meeting #45, id.313.15
- Schmidt C., Baumgardner, J., Mendillo, M. (2012) Hemispheric Asymmetries in Mercury's Exosphere, American Astronomical Society, DPS meeting #44, id.410.05
- Clarke, J. T., Bhattacharyya, D., Montgomery, J., Bertaux, J., Chaufray, J., Gladstone, R., Quemerais, E., Wilson, J., Schmidt, C., Mendillo, M (2012) HST observations and modeling of the Martian hydrogen corona, American Astronomical Society, DPS meeting #44, id.214.01
- Schmidt C., Baumgardner, J., Mendillo, M., Sundberg, T., Walsh B. (2012) Hemispheric Asymmetries in Mercury's Exosphere Due to the Offset Magnetic Dipole, American Geophysical Union, Fall Meeting 2012, abstract #P33B-1931

- Schmidt C., Baumgardner, J., Mendillo, M., Wilson J. K. (2011), Escape rates and variability constraints for high-energy sodium sources at Mercury, EPSC-DPS Joint Meeting 2011, held 2-7 Oct 2011 in Nantes, France, Vol. 6, EPSC-DPS2011-100.
- Mangano V. and 19 co-authors including Schmidt, C. (2010) The sodium emission from Mercury's exosphere as detected by the IMW coordinated campaign in June 2006, 38th COSPAR Scientific Assembly, held 18-15 July 2010, in Bremen, Germany, p.5, B07-0022-10.
- Schmidt, C., Baumgardner, J., Mendillo, M., Davis, C., Musgrave, I. (2010) Observations of Extended Emissions at Mercury by the STEREO Spacecraft, European Planetary Science Congress, held 20-24 Sept in Rome, Italy, Vol. 5, EPSC2010-419.
- Schmidt, C., Baumgardner, J., Mendillo, M., Davis, C., Musgrave, I. (2010) Observations of tail structures at Mercury with the STEREO spacecraft, Joint MESSENGER / BepiColombo Workshop, held, Nov 2-5, in Boulder, CO, Abstract 2.2.1.
- Schmidt, Wilson, Baumgardner, J., Mendillo (2009) Variability in Mercury's Escaping Sodium Atmosphere, American Astronomical Society, DPS meeting #41, id.35.01
- Schmidt, Wilson, Baumgardner, J., Mendillo (2008) Wide Field Observations of Variability in Mercury's Comet-like Sodium Tail, American Astronomical Society, DPS meeting #40, id.51.09; Bulletin of the American Astronomical Society, Vol. 40, p.491
- Schmidt, Wilson, Baumgardner, J., Mendillo (2008) Wide Field Observations of Mercury's Extended Sodium Exosphere, 37th COSPAR Scientific Assembly, held 13-20 July 2008 in Montreal, Canada, p.2775, B07-0036-08
- Schmidt, Baumgardner (2007) Boston University Calibration Facility for Optical Aeronomy. CEDAR Meeting Abstract

Non-Peer-Reviewed Publications

- 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 Heliophysics Decadal Survey, 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 and 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 Colloquia

Solar System Context in the Hunt for Exomoons, NASA JPL, Pasadena, CA, USA	2023
The Lunar Sodium Exosphere, Taiwan Space Union, Taiwan	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

Grants, Awards & Fellowships

- 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.), 2010.0+3.15 to 2013.03.15. 10-Planet10F-0041. Total budget / funding to BU: $90,000

Telescope Time Awarded

WIYN, NASA NExScI	2022
Hubble Space Telescope, STScI (as US PI, PI L. Roth)	2022
Keck I & II, NASA NExScI (as PI & Co-I, PI L. Moore)	2022, 2023
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 Solar Telescope, SOLARNET (as Co-I, PI V. Mangano)	2019, 2020
Big Bear Solar Observatory	2019
GREGOR Solar Telescope	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 Solar Telescope, SOLARNET (as Co-I, PI V. Mangano)	2016
Very Large Telescope, ESO (as Co-I, PI B. Bonfond)	2015

Via Institutions Partnerships: Large Binocular Telescope, IRTF, Apache Point 3.5m, Lowell Discovery Telescope

Service & Team Activity

- Instrument Science PI: Rapid Imaging Planetary Spectrograph: http://carlschmidt.science/RIPS.html
- Mission Science Co-I: ESA/JAXA BepiColombo mission
- Institutional Representative: Massachusetts Space Grant Consortium (2020 -)
- Team Lead: Nationwide Eclipse Ballooning Project, Massachusetts Team
- 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)
- Journal Reviews: Icarus (outstanding reviewer award 2017), 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).
- Local Organizing Committees: Cool Stars 20 Conference, Boston University (2018), DPS Conference, Providence 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

Public Outreach

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: *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