Matthew J. Rutala

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Current as of: May 5, 2024

Research Positions

Present – March 2023 — **Postdoctoral Fellow**
Dublin Institute for Advanced Studies (DIAS) | Dublin, Ireland
Experience with multi-spacecraft measurements and models of the outer heliospheric solar wind, and its effects on the magnetospheres of the outer planets using Python, NASA NAIF/SPICE.
Supervisor: Prof. Caitríona Jackman

February 2023 – September 2017 — **Research Fellow**
Boston University (Prof. John Clarke) | Boston, Massachusetts
Experience with HST observations, in-situ measurements, and models of Jupiter's magnetosphere-driven aurorae using IDL, Python, NASA NAIF/SPICE.

May 2017 – September 2015 — **Undergraduate Research Assistant**
Rutgers University (Prof. Jack Hughes) | New Brunswick, New Jersey
Experience with Chandra observations of supernovae remnants using IDL.

August 2015 – June 2015 — **REU Research Assistant**
Boston University (Prof. Catherine Espaillat) | Boston, Massachusetts
Experience with modeling protoplanetary discs using Python.

May 2015 – June 2014 — **Undergraduate Research Assistant**
Rutgers University (Prof. Troy Shinbrot) | New Brunswick, New Jersey
Experience with experimental fluid flows and granular physics.

Teaching Experience

September 2023 — **Guest Lecturer**
PHYC40660 "The Space Environment" at University College Dublin
Gave two, masters-level lectures: an introduction to magnetospheres, and an overview of outer planet magnetospheres.

May 2019 – January 2019 — **Teaching Fellow**
AS100 "Cosmic Controversies" at Boston University
Hosted two, undergraduate-level disccusion sections, including reviewing lecture material and overseeing labs and projects.

December 2018 – September 2018 — **Teaching Fellow**
AS107 "Life Beyond Earth" at Boston University
Hosted five, undergraduate-level discussion sections, including weekly quizzes, reviewing lecture material, and overseeing labs and projects.

December 2017 – January 2017 — **Coadjutant**
Coursera MOOC "Analyzing the Universe" via Rutgers University

Education

February 2023	**Ph.D. in Astronomy** Titled: "Shedding New Light on the Enigmatic Motions of Jupiter's Auroral Main Emission" Boston University | *Boston, Massachusetts* Advisor: Prof. John T. Clarke
September 2019	**M.A. in Astronomy** Boston University | *Boston, Massachusetts* Advisor: Prof. John T. Clarke
May 2017	**B.Sc. in Astrophysics and Linguistics** *summa cum laude* Rutgers University | *New Brunswick, New Jersey* Advisor: Prof. Jack P. Hughes Graduated with Highest Honors in Astrophysics and Honors in Linguistics

Publications

Rutala, M. J., Clarke, J. T., Vogt, M. F. & Nichols, J. D. (2024) *Variation in the Pedersen Conductance near Jupiter's Main Emission Aurora: Comparison of Hubble Space Telescope and Galileo Measurements.* JGR: Space Physics, doi:10.1029/2023JA032122

McEntee, S. C., Jackman, C. M., Weigt, D. M., Louis, C. K., Dunn, W. R., Boudouma, A., Connerney, J. E. P., Kurth, W. S., Kraft, R., Branduardi-Raymont, G., Gladstone, G. R. & **Rutala, M. J.** (2023) *Long Exposure Chandra X-Ray Observation of Jupiter's Auroral Emissions during Juno Plasmasheet Encounters in September 2021.* JGR: Space Physics, doi:10.1029/2023JA031901

Rutala, M. J., Clarke, J. T., Mullins, J. D. & Nichols, J. D. (2022) Illuminating the Motions of Jupiter's Auroral Dawn Storms. JGR: Space Physics, doi:10.1029/2022JA030448

Vogt, M. F., **Rutala, M. J.**, Bonfond, B., Clarke, J. T., Moore, L. & Nichols, J. D. (2022) *Variability of Jupiter's Main Auroral Emission and Satellite Footprints Observed with HST during the Galileo Era.* JGR: Space Physics, doi:10.1029/2021JA030011

Shinbrot, T., **Rutala, M. J.** & Herrmann, H. (2017) *Surface Contact Charging.* Physical Review E, doi:10.1103/PhysRevE.96.032912

Shinbrot, T., **Rutala, M. J.**, Montessori, A., Prestininzi, P. & Succi, S. (2015) *Paradoxical Ratcheting in Cornstarch.* Physics of Fluids, doi:10.1063/1.4934709

Abstracts

April 2024	The Balance of Internal and External Drivers in Gas Giant Magnetospheres **Invited Talk** at the European Geophysical Union conference
December 2023	An Ensemble Modeling Framework for Propagating Solar Wind Conditions to Jupiter **Talk** at the American Geophysical Union Fall conference
July 2022	Shedding New Light on the Enigmatic Motions of Jupiter's Auroral Main Emission **Talk** at the Magnetospheres of the Outer Planets conference
December 2021	The role of Corotation Enforcement Currents in driving the Behavior of Jupiter's Ultraviolet Main Emission **Talk** at the American Geophysical Union Fall conference
July 2021	Illuminating the Physics behind the Motions of Jupiter's Auroral Dawn Storms **Poster** at the Magnetospheres of the Outer Planets conference
December 2020	Illuminating the Physics of Jupiter's Auroral Dawn Storms **Poster** at the American Geophysical Union Fall conference
June 2019	New Insights into Jupiter's Dawn Storms **Poster** at the Magnetospheres of the Outer Planets conference
July 2018	Characterizing Local and Interplanetary Control of Jupiter's Auroral Dawn Storms using HST and Juno **Poster** at the Magnetospheres of the Outer Planets conference
May 2015	Size Segregation in Asteroid Regolith **Poster** at the New Jersey Space Grant Consortium Poster Session
April 2015	Size Segregation in Asteroid Regolith **Poster** at the Aresty Research Symposium
August 2014	Paradoxical Ratcheting in Oobleck **Poster** at the Aresty Summer Research Symposium

Awards

June 2021	**Research Fellowship** Awarded by: The Massachusetts Space Grant Consortium
June 2020	**Research Fellowship** Awarded by: The Massachusetts Space Grant Consortium
May 2019	**Outstanding Teaching Fellow in the Department of Astronomy** Awarded by: Boston University College and Graduate School of Arts and Sciences
May 2017	**Honors Scholar** Awarded by: Rutgers University School of Arts and Sciences
May 2017	**Richard T. Weidner Physics Prize** Awarded by: Rutgers University Department of Physics and Astronomy
March 2016	**Phi Beta Kappa Scholar** Awarded by: The Phi Beta Kappa Society
September 2015	**Herman Y. Carr Scholarship** Awarded by: Rutgers University Department of Physics and Astronomy
October 2014	**Research Fellowship** Awarded by: the New Jersey Space Grant Consortium (NJSGC)

Outreach

Present June 2023	**DIAS Dunsink Observatory Public Visitor Night** Hosted at the DIAS Dunsink Observatory, public visitor nights include tours of the historic observatory buildings, presentation on Ireland's contributions to space sciences, public research lectures, and night sky viewings.
February 2023 September 2017	**Boston University Public Open Night** An event hosted by the graduate students at Boston University which invites the public to view the night sky and learn more about astronomy.
April 2022	**Boston University Academy Open Night** An open-night-like event with physical demonstrations of spectroscopy and plasma dynamics for students of the Boston University Academy interested in studying science and astronomy.
August 2019	**GWISE Open Night** An open-night-like event held for the members of the Graduate Women In Science and Engineering group at Boston University.
July 2018	**Precollege Women Open Night** An open-night-like event for held for precollege women interested in studying science in college.
June 2018	**Space Science for Kids** An educational event for elementary- and middle-school children, coinciding with the 30^{th} anniversary of the Center for Space Physics at Boston University.

Leadership

April 2022 – August 2018 | **Graduate Student Social Event Coordinator**
Helped to coordinate weekly social events, including Friday evening socials and board game nights with pizza provided for students, postdocs, and faculty.

September 2019 – September 2018 | **Graduate Student Representative**
Represented the interests of the graduate students to departmental faculty, so that students could anonymously voice questions or complaints; arranged weekly journal clubs and seminars for students to present their own research; arranged department-sponsored social events to promote student interaction.