

William R. Saunders

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Recent Astronomy PhD with expertise in using Earth-based stellar occultations to study the upper atmospheres of Uranus and Neptune. Additional experience in modeling planetary atmospheres.

EDUCATION	Boston University , Boston, MA Ph.D. in Astronomy NASA FINESST Fellow Advisor: Paul Withers GPA: 3.96/4	Defended Feb. 2024, Graduation May 2024
	Boston University , Boston, MA M.A. in Astronomy	May 2020
	University of Pennsylvania , Philadelphia, PA B.A. in Physics & Astronomy, <i>summa cum laude</i> with major honors Advisor: Gary Bernstein Senior Honors Thesis: <i>Development of Efficiency Simulator for Detecting Planet Nine using the Dark Energy Survey</i> Minors: Mathematics, History GPA: 3.81/4	May 2018
RESEARCH POSITIONS	Graduate Research Fellow Boston University, Boston MA Advisor: Paul Withers (BU), Michael Person (MIT) Topics: Stellar occultations, Mars atmosphere, Uranus atmosphere	Sept. 2018 - Present
	Undergraduate Researcher University of Pennsylvania, Philadelphia, PA Advisor: Gary Bernstein Topic: Transient search using the Dark Energy Survey	Sept. 2015 - May 2018
HONORS AND AWARDS	1st Place: Poyiadjis Hospitality Innovation Competition (\$5,000)	2024
	Future Investigators in NASA Earth and Space Science and Technology Fellowship (FINESST) Winner (\$100,000)	2022-2024
	American Geophysical Union Dewan Young Scholarship Winner	2022-2023
	Massachusetts Space Grant Consortium Graduate Fellowship	May - August 2022
	Massachusetts Space Grant Consortium Graduate Fellowship	Jan - May 2022
	DPS Outreach and Education Grant, astro[sound]bites	2021 - 2022
	AGU Sharing Science Grant, astro[sound]bites	2021
	Summer Professional Development Fellowship, Boston University	May - Aug. 2021
	DPS Outreach and Education Grant, astro[sound]bites	2020 - 2021
	Massachusetts Space Grant Consortium Graduate Fellowship	May - Aug. 2021
	Massachusetts Space Grant Consortium Graduate Fellowship	May - Aug. 2020
NSF Graduate Research Fellowship Honorable Mention	April 2020	
AGU Outstanding Student Presentation Award (awarded to top 3.5%)	Dec. 2019	

Pennsylvania Space Grant Consortium Undergraduate Scholarship	2017 - 2018
University Scholar (For Advanced Undergraduate Researchers)	2015 - 2018
Dean's List	2014 - 2018
University Physics Competition Silver Medalist	Jan. 2016
National Merit Scholar (awarded to 8,000 high school seniors)	2014

**TEACHING
POSITIONS**

Instructor of Record	July - Aug. 2022
Boston University, Boston MA	
AS 102: The Astronomical Universe	
Teaching Fellow	Jan. 2021 - May 2021
Boston University, Boston MA	
AS 100: Cosmic Controversies	
Teaching Fellow	Sep. 2021 - Dec. 2021
Boston University, Boston MA	
AS 102: The Astronomical Universe	

**PEER-
REVIEWED
PUBLICATIONS**

First Author

4. **Saunders, W.**, Person, M., Withers, P., French, R., Tubthong, C., (2024, under review). The Upper Atmosphere of Uranus from Stellar Occultations II: Revised Temperatures in the Upper Stratosphere and Lower Thermosphere. *Planetary Science Journal*.
3. **Saunders, W.**, Person, M., Withers, P., French, R., Tubthong, C., (2023). The Upper Atmosphere of Uranus from Stellar Occultations I: Methods and Validation. *Planetary Science Journal*. doi.org/10.3847/PSJ/acfd27.
2. **Saunders, W.**, Person, M., Withers, P., Sayanagi, K., Young, C., Randall, C., Valle, T. (2022). Assessment of the Feasibility of Space-Based Stellar Occultation Observations of Uranus and Neptune. *Planetary and Space Science*. doi.org/10.1016/j.pss.2022.105431.
1. **Saunders, W.**, Person, M., Withers, P., (2021). Observations of Gravity Waves in the Middle Atmosphere of Mars. *The Astronomical Journal*. doi.org/10.3847/1538-3881/abf1ef.

Co-Author

2. Bernardinelli, P., Bernstein, G., Sako, M., Hamilton, S., Gerdes, D., Adams, F., **Saunders, W.**, ... (2021). Testing the Isotropy of the Dark Energy Survey's Extreme Trans-Neptunian Objects. *The Planetary Science Journal*.
1. Bernardinelli, P., Bernstein G., Sako, M., Liu, T., **Saunders, W.**, ... (2020). Trans-Neptunian Objects Found in the First Four Years of the Dark Energy Survey. *The Astrophysical Journal*.

**CONFERENCE
PRESENTATIONS**

First Author, Research

16. (Talk, anticipated) *Stellar Occultation Observations to Constrain the Stratosphere of Uranus for Aerocapture* June 2024
International Planetary Probe Workshop, Williamsburg, VA.
15. (Anticipated) *Revised Upper Atmospheric Temperatures and the Need to Understand Magnetosphere-Ionosphere-Thermosphere Interactions at Uranus* May 2024
Uranus Flagship Meeting, Greenbelt, MD.

14. (Poster) *The Atmosphere of Uranus from Stellar Occultations: Revised Temperatures in the Stratosphere and Lower Thermosphere* Dec. 2023
AGU Meeting, San Francisco, CA.
13. (Dissertation talk) *The Upper Atmosphere of Uranus from Stellar Occultations* Oct. 2023
DPS Meeting, San Antonio, TX.
12. (Poster) *Revised Temperatures in the Upper Stratosphere and Lower Thermosphere of Uranus* Jul. 2023
Uranus Flagship Meeting, Pasadena, CA.
11. (Poster) *Uranus' Lower Themosphere is Cooler than Previously Thought* Dec. 2022
AGU Winter Meeting, Chicago, IL.
10. (Oral) *Uranus' Lower Themosphere is Cooler than Previously Thought* Nov. 2022
NASA Outer Planets Assessment Group, Houston, TX.
9. (Poster) *Uranus Upper-Atmospheric Temperatures from Stellar Occultations* Sep. 2022
EPSC meeting, Granada, Spain.
8. (Poster) *The Feasibility of Space-Based Stellar Occultation Observations of Uranus and Neptune* Dec. 2021
AGU Winter Meeting, New Orleans, LA.
7. (Invited Talk) *Observations of Gravity Waves in the Middle Atmosphere of Mars* Dec. 2020
AGU Winter Meeting, virtual
6. (Talk) *Measuring the Stratospheric Temperature of Uranus Using Archival Stellar Occultations* Dec. 2020
AGU Winter Meeting, virtual.
5. (Talk) *Re-Analysis of the 1976 Mars Occultation of Epsilon Geminorum: Detection of Gravity (Buoyancy) Waves* Oct. 2020
EPSC Meeting, virtual.
4. (Poster) *Re-Analysis of the 1976 Mars Occultation of Epsilon Geminorum* Dec. 2019
AGU Winter Meeting, San Francisco, CA
Winner of the Outstanding Student Presentation Award
3. (Poster) *Initial Results of a Re-Analysis of the 1976 Mars Occultation of Epsilon Geminorum* July 2019
Ninth International Conference on Mars, Pasadena, CA
2. (Poster) *Impact of Ice on the Evolution of Protoplanetary Disks and Formation of Planetary Systems* Jan. 2018
AAS Winter Meeting, Washington, D.C.
1. (Talk) *Optimizing Difference Imaging to Identify Trans-Neptunian Objects using the Dark Energy Survey* Aug. 2016
Astrophilly Conference, Villanova, PA

Outreach

5. (Co-Convener) *Listening to Our World: Sonification Applications in Research, Education, and Outreach* Dec. 2022
AGU Winter Meeting, Chicago, IL.

4. (Talk) *Astro[sound]bites: A new audio resource for informal education* Nov. 2021
Workshop on Astronomy Beyond the Common Senses, virtual.
3. (Talk) *Astro[sound]bites: A new audio resource for conveying recent astronomy research* May 2021
Communicating Astronomy with the Public, virtual.
2. (iPoster and Talk) *Astro[sound]bites: A new audio resource for conveying recent astronomy research* Jan. 2021
AAS Winter Meeting, virtual
Conference proceeding in the Bulletin of the AAS
1. (Talk) *Astro[sound]bites: A new audio resource for conveying recent astronomy research* Oct. 2020
DPS Annual Meeting, virtual.

CONFERENCE PROCEEDINGS

2. **Saunders, W.**, Rice, M., Gagliano, A. (2022). ASTRO[SOUND]BITES: AN AUDIO RESOURCE FOR INFORMAL EDUCATION. 2nd Workshop on Astronomy Beyond the Common Senses for Accessibility and Inclusion. http://www.astroscu.unam.mx/rmaa/RMxAC..54/PDF/RMxAC..54_WSaunders-XIV.pdf.
1. Gagliano, A., Rice, M., **Saunders, W.** (2021). Astro[sound]bites: a New Audio Resource for Conveying Recent Astronomy Research. ASP Conference Series, 531, 111-117. <http://aspbooks.org/publications/531/111.pdf>.

INVITED TALKS & COLLOQUIA

5. *Revised Temperatures for Uranus' Upper Stratosphere and Lower Thermosphere* Nov. 2022
Johns Hopkins University Applied Physics Laboratory, Laurel, MD
4. *The Shadow Chaser: A Mission Concept to Observe Uranus and Neptune Stellar Occultations* Jan. 2022
NASA Langley Research Center, Hampton, VA
3. *The Shadow Chaser: A Mission Concept to Observe Uranus and Neptune Stellar Occultations* Nov. 2021
Hampton Univ., Hampton, VA
2. *Impact of Ice on the Evolution of Protoplanetary Disks and Formation of Planetary Systems* Aug. 2017
Meeting of the National Astrobiology Institute, NASA Ames Research Center, CA
1. *Optimizing Difference Imaging to Identify Trans-Neptunian Objects using the Dark Energy Survey* (plenary talk) Feb. 2017
Yale Undergraduate Research Conference, New Haven, CT

OUTREACH TALKS

2. *Hey, You're in the Way: Measuring Planet Atmospheres When They Align with Stars* July 2020
Astronomy on Tap – Lansing, MI
1. *Hey, You're in the Way: Measuring Planet Atmospheres When They Align with Stars* May 2020
CAS Public Talks, Boston University, Boston, MA

**OTHER
EXPERIENCE**

- BU Meetup Co-Founder** Sep. 2022 - Present
- 1st Place: Poyiadjis Hospitality Innovation Competition, Student Wellbeing Track (2024).
 - Started a program at Boston University to help graduate students meet.
 - Developed and implemented code to match students into groups and maintain databases.
 - Over 2000 participants in 2023-24 academic year.

**SCIENCE
OUTREACH**

- astro[sound]bites Podcast Co-Founder and Co-Host** Nov. 2019 - Present
- Bi-weekly podcast companion to Astrobites.org.
 - Co-hosted by Kiersten Boley, Sabrina Berger, Cormac Larkin, and me (formerly by Malena Rice and Alex Gagliano).
 - Each episode features two Astrobites posts, discussion, and a “space sound”.
 - Available on astrosoundbites.com, Apple Podcasts, Google Play, SoundCloud, Spotify, Amazon Music, and Audible.
 - Over 88 episodes and 25,000 total downloads in over 50 countries.

- Brainspace* Magazine Astronomy Contributor** 2019 - 2022
- *Brainspace* is a quarterly science magazine aimed at children ages nine to fourteen with a readership of approximately 40,000.

Published Works

- “It’s Pi Time” Spring 2022
“Thinking Small: The CubeSat Revolution” Fall 2021
“Cloudy with a Chance of Bacteria” Spring 2021
“Where did the Moon Come From?” Fall 2020
“Bringing Home a Piece of Mars” Winter 2019 - 2020
“Solar Storms” Fall 2019

- Astrobites Administrative Committee** 2021 - 2022
- Developed the first Astrobites webinar panel event: “How to Find an Advisor” in March 2021.
 - Panel attended and viewed by over 40 participants.

ComSciCon Atlanta Podcasting Expert Feb. 2022

- ComSciCon Flagship** Aug. 2021
- Flagship science communication conference for graduate students.
 - Selected as attendee in 2021.

- Astrobites Undergraduate Chair** 2020 - 2021
- Developed the first Astrobites webinar panel event: “How to Find an Advisor” in March 2021.
 - Panel attended and viewed by over 40 participants.

- Astrobites Writing Contributor** 2019 - 2021
- Astrobites is a graduate-student run website that summarizes recent astronomy research at an undergraduate level.
 - Writers publish monthly, and peer-review others’ publications.

Research Peer Advisor 2016 - 2018

- Center for Undergraduate Research and Fellowships, University of Pennsylvania
- Advise undergraduates on first steps to beginning original research.

MEDIA APPEARANCES	REACH, a Science Podcast for Kids Recorded a segment on artificial satellites and the CubeSat revolution. https://reach-a-space-podcast-for-kids.simplecast.com/episodes/reaching-out-what-is-a-satellite-UbxrAEyC	March 2022
	Guest Presenter on In Plain English podcast Listen to In Plain English: inplainenglishpod.org .	Nov. 2021
	GBH Guest Appearance Helped explained the celestial origin of the phrase "dog days of summer" in a segment that aired on GBH. Watch the segment here: https://youtu.be/CZerMXwQJxU .	Sep. 2021
TUTORING & MENTORSHIP	Ben Connect Mentoring two undergraduates as part of the University of Pennsylvania alumni mentorship program.	2020 - 2021
	Physics Unlimited Hosted two "facilitator sessions" for international high school students in the Physics Unlimited summer program to discuss physics and learn about academia.	Aug. 2020
	Center for Undergraduate Research and Mentorship Undergraduate Peer Research Mentor.	2016 - 2018
	Dept. of Physics & Astronomy, University of Pennsylvania Tutor for introductory physics and astronomy courses.	2015 - 2018
PROFESSIONAL MEMBERSHIP	American Astronomical Society Division for Planetary Sciences of the AAS American Geophysical Union National Association of Science Writers Sigma Xi Scientific Research Honor Society Sonification World Chat	