# William R. Saunders

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NASA Planetary Scientist and 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 and conducting observations. Extensive presentation and public speaking experience.

## EMPLOYMENT

**Planetary Scientist** June 2024 - Present
NASA Langley Research Center, Hampton, VA
Analytical Mechanics Associates (AMA), Hampton, VA
Advisor: Kunio Sayangi (NASA Langley), Kirk Ayers (AMA)

**Graduate Research Fellow** Sept. 2018 - May 2024
Boston University, Boston MA
Advisor: Paul Withers (BU), Michael Person (MIT)
Topics: Stellar occultations, Mars atmosphere, Uranus atmosphere

## EDUCATION

**Boston University,** Boston, MA
Ph.D. in Astronomy Defended Feb. 2024, Graduation May 2024
NASA FINESST Fellow
Advisor: Paul Withers
GPA: 3.96/4

**Boston University,** Boston, MA
M.A. in Astronomy May 2020

**University of Pennsylvania,** Philadelphia, PA
B.A. in Physics & Astronomy, *summa cum laude* with major honors May 2018
Advisor: Gary Bernstein
Minors: Mathematics, History
GPA: 3.81/4

## HONORS AND AWARDS

Best Presentation Award, International Planetary Probe Workshop 2024
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, in press). 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) *Stellar Occultation Observations to Constrain the Stratosphere of Uranus for Aerocapture* June 2024
International Planetary Probe Workshop, Williamsburg, VA.
**Received Best Presentation Award**
15. (Poster) *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* emphconveying 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**

6. *Presenter and panelist: Uranus section* — Aug. 2024
   AMA Research and Science Symposium, Hampton, VA
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

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| "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 APPEARENCES**

**REACH, a Science Podcast for Kids** March 2022
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

**Guest Presenter on In Plain English podcast** Nov. 2021
Listen to In Plain English: inplainenglishpod.org.

**GBH Guest Appearance** Sep. 2021
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.

**TUTORING & MENTORSHIP**

**Ben Connect** 2020 - 2021
Mentoring two undergraduates as part of the University of Pennsylvania alumni mentorship program.

**Physics Unlimited** Aug. 2020
Hosted two "facilitator sessions" for international high school students in the Physics Unlimited summer program to discuss physics and learn about academia.

**Center for Undergraduate Research and Mentorship** 2016 - 2018
Undergraduate Peer Research Mentor.

**Dept. of Physics & Astronomy, University of Pennsylvania** 2015 - 2018
Tutor for introductory physics and astronomy courses.

**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