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, 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) *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

"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