

# Todd S. Anderson

PHD · EARTH AND SPACE SCIENCES

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## Education

### University of Washington

Seattle, WA, USA

PHD EARTH AND SPACE SCIENCES

2015 - 2023

- Advisor: Dr. Robert Holzworth
- Dissertation: "Sensing impacts to the Earth-ionosphere waveguide from terrestrial and space weather".

### Dartmouth College

Hanover, NH, USA

BA PHYSICS

2010 - 2014

- Honors thesis/undergrad research advisor: Dr. Kristina Lynch

## Professional Experience

- 2015-2023 Graduate Research Assistant**, Earth and Space Sciences, University of Washington. Primary research activities: **(1)** remote sensing of solar flare and energetic particle precipitation signatures in the Earth-ionosphere waveguide using the World Wide Lightning Location Network (WWLLN); **(2)** quantifying the thunderstorm contribution to Earth's global electric circuit through simultaneous measurements of the stratospheric return current in the global electric circuit. Also contributed to WWLLN hardware support and validation of the vector electric field instrument on the 2015 Charged Aerosol Release Experiment II sounding rocket.
- 2012-2014 Undergraduate Research Assistant**, Physics, Dartmouth College. Undergraduate research on design of a deployment scheme to optimize coherence of an auroral cubesat swarm.
- Summer 2009 & 2011 Research Assistant**, Chemistry, University of Utah. Research work on synthesis techniques for cadmium chalcogenide photonic nanoparticles.

## Publications

PUBLISHED & PEER-REVIEWED total citations: 41 (Google Scholar)

- Anderson, T. S.**, McCarthy, M. P., & Holzworth, R. H. (2020). Detection of VLF attenuation in the Earth-ionosphere waveguide caused by X-class solar flares using a global lightning location network. *Space Weather*, 18, e2019SW002408. DOI:10.1029/2019SW002408. Citations: 2
- Holzworth, R. H., Brundell, J. B., McCarthy, M. P., Jacobson, A. R., Rodger, C. J., & **Anderson, T. S.** (2021). Lightning in the Arctic. *Geophysical Research Letters*, 48, e2020GL091366. DOI:10.1029/2020GL091366. Citations: 48
- A. Probst, **T. Anderson**, A. O. Farrish, C. B. Kjellstrand, A. Newheart, S.A. Thaller, S. A. Q. Young, M. Akhavan-Tafti, A. Chartier, G.Chintzoglou, J. Duncan, B. Fritz, B. Maruca, R. McGranaghan, X. Meng, R. Perea, K. Rankin, E. Robertson, L. Lowes, A. Nash, A.Romero-Wolf, Team-X. Sun Sailing Polar Orbiting Telescope (SunSPOT): A Solar Polar Imaging Mission Design. (2022). *Advances in Space Research* 70, no. 2: 510–22. DOI:10.1016/j.asr.2022.04.060. Citations: 0

## Presentations

\*presenting author

### INVITED TALKS

March 2022. *Investigating the thunderstorm contribution to the Earth's Global Electric Circuit: comparison of simultaneous stratospheric electrical measurements and global lightning data*. Invited talk: Laboratory for Atmospheric and Space Physics (LASP) Friends of Magnetospheres seminar, University of Colorado Boulder, Boulder, CO.

### CONTRIBUTED PRESENTATIONS

- Anderson, T. S.;** Holzworth, R. H.; McCarthy, M. P.; Brundell, J. B. 2022. Investigating Spatial Scales of Particle Precipitation Signatures in the Mesosphere-Lower Thermosphere with a VLF Lightning Detection Network. Oral presentation: Fall Meeting of the American Geophysical Union, Chicago, IL.
- Anderson, T. S.;** McCarthy, M. P.; Holzworth, R. H.; Thomas, J. N.; Solorzano, N. N.; Higgins, E.; Griffith, B.; MacDicken, C.; Anderson, C. 2021. Quantifying the Thunderstorm Contribution to Earth's Global Electric Circuit: Simultaneous Multi-Point Measurements of the Fair-Weather Return Current by Instrumented Stratospheric Balloon Payloads. Oral presentation: Fall Meeting of the American Geophysical Union, New Orleans, LA.
- Chintzoglou, G.\*; **Anderson, T.;** Akhavan-Tafti, M.; Chartier, A.; Duncan, J. M.; Farrish, A.; Fritz, B. A.; Kjellstrand, C. B.; Maruca, B.; McGranaghan, R. M.; Meng, X.; Newheart, A.; Perea, R. S.; Probst, A.; Rankin, K.; Robertson, E.; Thaller, S.; Young, S. A. Q.; Lowes, L. L. 2020. A Mission Concept for a Solar Observatory in a Highly-Inclined Heliocentric Orbit-Demystifying the Magnetic Nature and Activity of our Star. Poster: Fall Meeting of the American Geophysical Union, virtual.
- Anderson, T. S.;** McCarthy, M. P.; Thomas, J. N.; Solorzano, N. N.; Holzworth, R. H.; Anderson, C.; MacDicken, C. 2018. Quantifying the Thunderstorm Contribution to Earth's Global Electric Circuit. Oral presentation: Fall Meeting of the American Geophysical Union, San Francisco, CA.
- Anderson, T. S.;** Holzworth, R. H.; McCarthy, M. P.; Brundell, J. B. 2019. Initial steps for a system to monitor space weather effects on the lower ionosphere using global lightning as a probe signal. Poster: AGU Chapman on Challenges Related to Space Weather Forecasting Including Extremes, Pasadena, CA.
- Anderson, T. S.;** Holzworth, R. H.; Brundell, J. B. 2017. Sferic propagation perturbations caused by energetic particle events as seen in global lightning data. Poster: Fall Meeting of the American Geophysical Union, New Orleans, LA.

## Teaching Experience

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- Spring 2023 **ESS 102: Space and Space Travel**, Teaching Assistant. Taught lab sections in elementary physics and scientific writing related to planetary science exploration missions.
- Spring 2015-2019, **ESS 205: Access to Space**, Teaching Assistant. Taught lab sections in physics and electrical engineering concepts and guided development of student sounding balloon payloads; 2022 assisted in launch of these payloads, and led the recovery team.

## Outreach, DEI & Professional Development

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### SERVICE AND OUTREACH

- 2018-2022 **Department committee service**, Preliminary Exam Committee (2018, 2019, 2022); Awards Committee (2019)
- 2021-2023 **AGU Space Physics and Aeronomy Nomination Task Force**, Committee Member
- Spring 2021 **NASA Heliophysics Supporting Research review panel**, Executive Secretary

### DIVERSITY, EQUITY AND INCLUSION (DEI)

Participated in the UW ESS graduate student and postdoc pod for **Unlearning Racism in the Geosciences** (URGE). This program was designed to bring together scientists at institutions across the US to identify issues related to DEI in their departments, and draft actionable policy to address those issues. In my pod, I was part of group that drafted a new department complaints-handling policy, and created accountability tools for tracking the implementation of URGE deliverables on the department website. See [urgeosscience.org](http://urgeosscience.org) for more information.

### DEVELOPMENT

**NASA-JPL Heliophysics Mission Design School (HMDS)**. HMDS is a 10-week course for early-career scientists about the formulation and proposal of NASA Heliophysics missions, with an emphasis establishing science traceability; that is, demonstrating how agency goals lead to science objectives, which drive mission requirements. The school culminated in an intensive week working with the JPL Team X on mission and spacecraft design, and ended with a proposal to a NASA review board. Our mission, the Sun-Sailing Polar Orbiting Telescope (SunSPOT), was presented at the 2020 AGU Fall Meeting, and a mission design paper was published in 2021.

## PEER REVIEW

Natural Hazards (2022)

## PROFESSIONAL MEMBERSHIPS

American Geophysical Union