




Eliza Hahn Neights

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Personal Statement

I am a Physics PhD student at George Washington University studying gamma-ray bursts (GRBs) at NASA Goddard Space Flight Center. I make predictions for next-generation GRB science that will be done with the upcoming space telescope *COSI*, write the spectral and polarization analysis software for *COSI*, and am the Early Career Co-Lead for the *COSI* GRB science team. I also study GRBs observed by *Fermi*-GBM, for which I serve as a burst advocate.

Education

- 2021-2027 **George Washington University** Ph.D in Physics (*in progress*)
Advisors: Dr. Sylvain Guiriec & Dr. Carolyn Kierans
Thesis: Studying Gamma-Ray Bursts with *COSI* and *Fermi*-GBM Analysis of a Record Ultra-long Gamma-Ray Burst
- 2021-2024 **George Washington University** M.Phil in Physics
M.S. in Physics
- 2017-2021 **Pennsylvania State University** B.S. in Astronomy & Astrophysics
B.S. in Physics
Minor in Mathematics

Leadership Roles

- 2026-present **Early Career Co-Lead for *COSI* GRB Science Team**
First Early Career Co-Lead for a *COSI* science team and only student member of the *COSI* Central Science Team. Manage the >50 person group and organize monthly meetings.
- 2024-present **Burst Advocate for *Fermi*-GBM**
Volunteer for 6-8 burst advocate shifts per month for *Fermi* Gamma-ray Burst Monitor. Analyze triggered observations, ensure good data quality, and send alerts to scientific community.
- 2022-present **Spectral and Polarization Analysis Software Development for *COSI***
Lead development of publicly available spectral and polarization analysis software used by scientific community to analyze *COSI* data.  github.com/cositools/cosipy
- 2023-2026 **Technical Lead for *COSI* GRB Science Team**
Planned and led monthly meetings. Managed GRB team tasks, including development of *COSI* transient analysis pipelines. Led creation of simulated *COSI* transient observations used to develop analysis software, develop and test onboard trigger algorithm and classification algorithm, and make GRB science predictions. Developed software to simulate realistic population-level *COSI* observations of transients.  github.com/cositools/grb-simulations

Awards & Scholarships

- 2025 **Gus W. Weiss Prize (Honorable Mention)**
Award celebrating graduate student research contributions and dedication to George Washington University Physics department and larger physics community.
- 2022-2025 **John Mather Nobel Scholar**
Travel allowances awarded by John and Jane Mather Foundation for Science and the Arts towards cost of presenting research at conferences.



Awards & Scholarships (continued)

- 2017-2021 **Braddock Scholarship**
Four-year academic merit scholarship awarded by Penn State Eberly College of Science.
- 2019-2021 **M. Dean and Jean L. Underwood Scholarship in Physics**
Academic merit scholarship awarded by Penn State Eberly College of Science.
- 2019-2020 **Eberly College of Science Undergraduate Research Award**
Funding from Office of Science Engagement in Penn State Eberly College of Science to do undergraduate astrophysics research with Dr. Doug Cowen.
- 2017-2020 **Dean's List**
Maintained GPA above 3.5.
- 2018 **NASA Pennsylvania Space Grant**
Women in Science and Engineering Research scholarship to do undergraduate astrophysics research with Dr. Miguel Mostafá.


Publications


In addition to the publications below, I have led 12 GCN circulars and 1 Astronomer's Telegram.


E. Neights et al. 2026 was featured as a in *Nature Astronomy* Research Highlight in Feb 2026.


 Orcid: 0009-0005-0762-4507,  SciX


Refereed


E. Neights, E. Burns, C. L. Fryer, *et al.*, “GRB 250702B: discovery of a gamma-ray burst from a black hole falling into a star,” *MNRAS*, Jan. 2026.  DOI: 10.1093/mnras/staf2019.

N. Parmiggiani, A. Bulgarelli, G. Panebianco, *et al.*, “COSI Short Gamma-Ray Burst Localization Using BGO Shield Data,” *ApJ*, Feb. 2026.  DOI: 10.3847/1538-4357/ae25fc.


A. Rizzo, N. Parmiggiani, A. Bulgarelli, *et al.*, “Comparing Classical and Quantum Deep Learning Techniques for Anomaly Detection of Short-Duration Gamma-Ray Signals,” *Astronomy and Computing*, Jul. 2026.  DOI: 10.1016/j.ascom.2026.101090.


A. C. Trigg, E. Burns, M. Negro, *et al.*, “From Rare Events to a Population: Discovering Overlooked Extragalactic Magnetar Giant Flare Candidates in Archival Fermi Gamma-ray Burst Monitor Data,” *arXiv e-prints*, Oct. 2025.  DOI: 10.48550/arXiv.2510.23367.

H. Yoneda, T. Siegert, I. Martinez-Castellanos, *et al.*, “Enhancing Compton telescope imaging with maximum a posteriori estimation: A modified Richardson–Lucy algorithm for the Compton Spectrometer and Imager,” *A&A*, May 2025.  DOI: 10.1051/0004-6361/202453528.

H. C. Gulick, **E. Neights**, S. Al Nussirat, *et al.*, “Across the soft gamma-ray regime: utilizing simultaneous detections in the Compton Spectrometer and Imager (COSI) and the Background and Transient Observer (BTO) to understand astrophysical transients,” in *Space Telescopes and Instrumentation 2024: Ultraviolet to Gamma Ray*, Aug. 2024.  DOI: 10.1117/12.3020606.

Non-Refereed

N. Parmiggiani, A. Bulgarelli, G. Panebianco, *et al.*, “Localization and Confidence Region Estimation of Short GRBs with the COSI BGO Shield Using a HEALPix-Based Deep Learning Approach,” *arXiv e-prints*, Apr. 2026.  DOI: 10.48550/arXiv.2604.15119.

E. Burns, J. Andrews, R. Szabo, *et al.*, “The Heavy Element Enrichment History of the Universe from Neutron Star Mergers with Habitable Worlds Observatory,” *arXiv e-prints*, Jul. 2025.  DOI: 10.48550/arXiv.2507.09778.

E. Burns, C. L. Fryer, I. Agullo, *et al.*, “Multidisciplinary Science in the Multimessenger Era,” *arXiv e-prints*, Feb. 2025.  DOI: 10.48550/arXiv.2502.03577.

H. Yoneda, T. Siegert, I. Martinez-Castellanos, *et al.*, “Imaging MeV Gamma-ray Lines with Advanced Image Reconstruction Framework for COSI,” in *39th International Cosmic Ray Conference*, Dec. 2025. [URL: https://pos.sissa.it/501/891/pdf](https://pos.sissa.it/501/891/pdf).

J. Tomsick, S. Boggs, A. Zoglauer, *et al.*, “The Compton Spectrometer and Imager,” in *38th International Cosmic Ray Conference*, Sep. 2024. [DOI: 10.22323/1.444.0745](https://doi.org/10.22323/1.444.0745).

I. Martinez-Castellanos, S. Gallego, C.-Y. Huang, *et al.*, “The cosipy library: COSI’s high-level analysis software,” *arXiv e-prints*, Aug. 2023. [DOI: 10.48550/arXiv.2308.11436](https://doi.org/10.48550/arXiv.2308.11436).

T. Akindede, T. Anderson, E. Anderssen, *et al.*, “A Call to Arms Control: Synergies between Nonproliferation Applications of Neutrino Detectors and Large-Scale Fundamental Neutrino Physics Experiments,” *arXiv e-prints*, Feb. 2022. [DOI: 10.48550/arXiv.2203.00042](https://doi.org/10.48550/arXiv.2203.00042).

T. Grégoire, H. Ayala Solares, S. Coutu, *et al.*, “Model independent search for transient multimessenger events with AMON using outlier detection methods,” in *37th International Cosmic Ray Conference*, Mar. 2022, p. 934. [DOI: 10.22323/1.395.0934](https://doi.org/10.22323/1.395.0934).

Presentations

Invited Talks

- Mar 2026 **Discovery of a Gamma-Ray Burst from a Black Hole Falling into a Star** American Physical Society Global Physics Summit (*Denver, CO*)
- Oct 2025 **COSI GRB Group Update** COSI Collaboration Meeting (*St. Louis, MO*)
- Oct 2024 **COSI’s Spectral Analysis Software** COSI Collaboration Meeting (*Berkeley, CA*)
- Oct 2024 **GRB Polarization with COSI** COSI Collaboration Meeting (*Berkeley, CA*)
- Apr 2024 **The COSI GRB Science Goals** “Exploring the MeV Gamma-ray Sky: The Past, Present, and Future” Special Session at the High Energy Astrophysics Division Meeting (*Horseshoe Bay, TX*)
- Jul 2024 **GRB Polarization with COSI** GRB Forum (*Athens, Greece*)

Contributed Talks

- May 2026 **Studying GRBs with COSI** Seminar at Flatiron Institute’s Center for Computational Astrophysics (*New York, NY*)
Gamma-Ray Burst from a Black Hole Falling into a Star Theoretical High Energy Astrophysics Seminar at Columbia University (*New York, NY*)
- Oct 2025 **GRB Localizations and Polarimetry with COSI** “Exploring the MeV Gamma-ray Sky with COSI” Special Session at the High Energy Astrophysics Division Meeting (*St. Louis, MO*)
- Jan 2025 **Gamma-Ray Burst Polarization with COSI** American Astronomical Society Meeting (*National Harbor, MD*)
- Aug 2024 **Studying GRBs Using COSI’s Polarization Measurements** AstroCon DC (*Washington, DC*)
- Jun 2024 **Studying GRBs Using COSI** Fermi Summer School (*Lewes, DE*)
- May 2024 **GRB Science Using COSI** Seminar at Oregon State University (*Corvallis, OR*)
- Apr 2024 **Studying Gamma-Ray Bursts Using COSI** High Energy Astrophysics Division Meeting (*Horseshoe Bay, TX*)
- Aug 2023 **Using COSI to Study GRBs** DMV Consortium Graduate Student Astrophysics Conference (*Washington, DC*)
- Aug 2022 **Scientific Pipeline Development for COSI** NASA Goddard Space Flight Center Astrophysics Summer Intern Symposium (*Virtual*)






Presentations (continued)

Sep 2020 **Archival Coincidence Analysis for IceCube Cascade Events & GRBs** IceCube Collaboration Meeting (*Virtual*)

Posters

- Oct 2025 **Gamma-Ray Observations of GRB 250702B: Gamma-Ray Burst from a Black Hole Falling into a Star** High Energy Astrophysics Division Meeting (*St. Louis, MO*)
- Mar 2023 **Introduction to COSI Data Analysis** High Energy Astrophysics Division Meeting (*Waikoloa, HI*)
- May 2020 **Photomultiplier Tube Pressure Testing for WATCHMAN** Pennsylvania State University Undergraduate Exhibition (*State College, PA*)
- Nov 2018 **The Study of Binary Neutron Star Mergers from Simulations** Pennsylvania State University Undergraduate Research Symposium (*State College, PA*)

Selected Press

- 2026 **BBC Sky at Night**
 skyatnightmagazine.com/news/grb-250702b-study-interview
- 2025 **National Geographic**
 nationalgeographic.com/science/article/gamma-ray-burst-black-hole-eats-star
- NASA**
 science.nasa.gov/science-research/black-hole-eats-star
- Sky and Telescope**
 skyandtelescope.org/astronomy-news/black-hole-eats-through-star-explodes-it-from-within
- GW Today**
 gwtoday.gwu.edu/black-hole-eats-star-student-charts-record-blast

Teaching

- 2022 **Teaching Assistant for Classical Mechanics**
Assisted with lesson delivery, graded, held weekly office hours, and led one independent lecture for an undergraduate electricity and magnetism class of 38 students.
- 2021 **Teaching Assistant for Electricity & Magnetism**
Assisted with lesson delivery, graded, and held weekly office hours for an undergraduate electricity and magnetism class of 25 students.

Outreach & Professional Development

- 2025 **Attendee of Summer School in Statistics for Astronomers**
- 2024 **Attendee of Fermi Summer School**
Volunteer for Astronomy Festival on the National Mall
- 2023-2024 **Member of COSI Collaborations Connections Team** Addressed issues of diversity, equity, inclusion, and accessibility in *COSI* collaboration.
- 2020 **Volunteer for Penn State AstroFest**
- 2019-2021 **Safety Liaison for Penn State Social Dance Club**
Wrote safety and inclusivity policies for club addressed concerns of club members, and handled cases of misconduct.

Outreach & Professional Development (continued)

2018 **Presenter at Penn State AstroFest**

Collaborations

COSI

Early Career Co-Lead for GRB science team, leading creation of transient observation simulations, making GRB science predictions, and developing spectral and polarization analysis software.

Fermi-GBM

Burst advocate and led analysis of record-duration GRB 250702B.