Brendan M. O'Connor

PhD Student · The George Washington University

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Education

The George Washington University — *Washington, DC*

PhD Physics – GPA: 4.0 — *August 2017 - present*

- Advisor: Dr. Chryssa Kouveliotou; Co-Advisors: Eleonora Troja and Brad Cenko
- Thesis: The Transient Universe: Compact Objects Near and Far
- Graduation planned for Spring 2023

The George Washington University — *Washington, DC*

MPhil Physics – GPA: 4.0 — *August 2017 - July 2020*

The George Washington University — *Washington, DC*

MS Physics – GPA: 4.0 — *August 2017 - February 2020*

Union College — *Schenectady, NY*

BS Physics – GPA: 3.8 (*summa cum laude*) — *August 2013 - June 2017*

- Minor in Astrophysics
- Thesis: Colliding Wind Binaries with Orbital Motion: Line Wind Formulation
- Thesis advisor: Francis Wilkin

Research Interests

- Gamma-ray Bursts and their host galaxies and environments
- Gravitational waves and multi-messenger astrophysics
- Neutron star mergers and kilonovae
- Fast Radio Bursts and their host galaxies and environments
- Galactic X-ray transients: Magnetars, Cataclysmic Variables, High-mass X-ray Binaries
- Surveys and serendipitous optical or high-energy transients

My analysis has focused on the following telescopes and observatories:

- **X-rays:** *Swift*/XRT, *NICER*, *NuSTAR*, *Chandra*, *XMM-Newton*
- **Optical/infrared:** *Hubble Space Telescope*, *Swift*/UVOT, Gemini, Keck, Lowell Discovery Telescope

Professional Experience

2019 - now	**Faculty Assistant** , Department of Astronomy, University of Maryland, College Park Advisor: Eleonora Troja
2019 - now	**Research Assistant** , NASA Goddard Space Flight Center (GSFC) Astrophysics Science Division (ASD) Advisors: Eleonora Troja and Brad Cenko
2018 - now	**Graduate Research Assistant**, Department of Physics, The George Washington University Advisor: Chryssa Kouveliotou
2016 - 2017	**Undergraduate Thesis Researcher**, Department of Physics and Astronomy, Union College Advisor: Francis Wilkin
2014	**Undergraduate Summer Researcher**, Department of Astronomy, University of Massachusetts Amherst Advisor: Mark Heyer

Publications

As of June 25, 2022: I have completed 4 first-author, 3 second-author, and 2 third-author publications. I have authored or co-authored a total of 19 publications which have a total of 237 citations. My h-index is 9. In addition to these refereed publications I have led 16 GCN Circulars and Astronomer's Telegrams.

First Author

1. **O'Connor, B.**, Troja, E., Dichiara, S., Beniamini, P., et al. 2022. *A deep survey of short GRB host galaxies over $z \sim 0 - 2$: implications for offsets, redshifts, and environments*. MNRAS, In press.

2. **O'Connor, B.**, Göğüş, E., Huppenkothen, D., Kouveliotou, C., et al. 2021. *Identification of an X-Ray Pulsar in the BeXRB System IGR J18219−1347*. ApJ, 927, 139

3. **O'Connor, B.**, Troja, E., Dichiara, S., Chase, E. A., et al. 2021. *A tale of two mergers: constraints on kilonova detection in two short GRBs at $z \sim 0.5$*. MNRAS, 502, 1279

4. **O'Connor, B.**, Beniamini, P., & Kouveliotou, C. 2020. *Constraints on the circumburst environments of short gamma-ray bursts*. MNRAS, 495, 4782

Co-author

5. Chase, E. A., **O'Connor, B.**, Fryer, C. L., Troja, E., et al., 2022. *Kilonova Detectability with Wide-field Instruments*. ApJ, 927, 163.

6. Troja, E., **O'Connor, B.**, Ryan, G., Piro, L., et al., 2022. *Accurate flux calibration of GW170817: is the X-ray counterpart on the rise?*. MNRAS, 510, 1902.

7. Bruni, G., **O'Connor, B.**, Matsumoto, T., Troja, E., et al., 2021. *Late-time radio observations of the short GRB 200522A: constraints on the magnetar model*. MNRAS, 505, L41.

8. Troja, E., Fryer, C. L., **O'Connor, B.**, Ryan, G., et al., 2022. *A long gamma-ray burst from a stellar merger in the nearby Universe*. Submitted.

9. Dichiara, S., Troja, E., **O'Connor, B.**, Marshall, F. E., et al., 2020. *Short gamma-ray bursts within 200 Mpc*. MNRAS, 492, 5011.

10. Piro, L., Bruni, G., Troja, E., **O'Connor, B.**, et al., 2021. *The fast radio burst FRB 20201124A in a star-forming region: Constraints to the progenitor and multiwavelength counterparts*. A&A, 656, L15.

11. Dichiara, S., Troja, E., Beniamini, P., **O'Connor, B.**, et al., 2021. *Evidence of Extended Emission in GRB 181123B and Other High-redshift Short GRBs*. ApJL, 911, L28.

12. Becerra, R. L., Troja, E., Watson, A., **O'Connor, B.**, et al., 2022. *Deciphering the unusual stellar progenitor of GRB 210704A*. In preparation.

13. Ricci, R., Troja, E., Bruni, G., Matsumoto, T., Piro, L., **O'Connor, B.**, et al., 2021. *Searching for the radio remnants of short-duration gamma-ray bursts*. MNRAS, 500, 1708.

14. Enoto, T., Ng, M., Hu, C.-P., Güver, T., Jaisawal G. K., **O'Connor, B.**, et al., 2021. *A Month of Monitoring the New Magnetar Swift J1555.2−5402 during an X-Ray Outburst*. ApJL, 920, L4.

15. Troja, E., van Eerten, H., Zhang, B., Ryan, G., Piro, L., Ricci, R., **O'Connor, B.**, et al., 2020. *A thousand days after the merger: Continued X-ray emission from GW170817*. MNRAS, 498, 5643.

16. Dichiara S., Troja E., Lipunov V., Ricci R., et al., 2022. *The early afterglow of GRB 190829A*. MNRAS, 512, 2337.

17. Dichiara, S., Becerra, R. L., Chase, E. A., Troja, E., et al., 2021. *Constraints on the Electromagnetic Counterpart of the Neutron-star-Black-hole Merger GW200115*. ApJL, 923, L32.

18. Gorgone, N. M., Woudt, P. A., Buckley, D., Mukai, K., et al., 2021. *Swift/XRT Deep Galactic Plane Survey Discovery of a New Intermediate Polar Cataclysmic Variable, Swift J183920.1−045350*. ApJ, 923, 243.

19. Champion, D., Cognard, I., Cruces, M., Desvignes, G., et al., 2020. *High-cadence observations and variable spin behaviour of magnetar Swift J1818.0-1607 after its outburst*. MNRAS, 498, 6044.

Awards, Fellowships, & Grants

Awards

2021 **Berman Award for Excellence in Experimental Physics**, The George Washington University

Fellowships

2016 **Davenport Research Fellowship**, Union College
2013 **Presidential Scholarship**, Union College

Academic Honor Societies

2017 **Phi Beta Kappa**, Union College
2017 **Sigma Xi**, Union College
2016 **Sigma Pi Sigma**, Union College
2016 **The Order of Omega**, Union College

Grants

2022 ***Chandra* Cycle 23 Award (PI: B. O'Connor)**, Smithsonian Astrophysical Observatory (SAO) *$ 66,792*

Accepted Proposals

As of June 25, 2022: I am PI of 8 accepted telescope proposals. I acted as the observer (and Co-I) for another 15 accepted proposals. I was involved in an additional 30 accepted proposals as Co-I (totaling 45 proposals as Co-I).

These proposals have been awarded time on the following telescopes and observatories:
Swift, *Fermi*, *NICER*, *NuSTAR*, *Chandra*, *Hubble Space Telescope*, Lowell Discovery Telescope, Gemini, Keck, ATCA, VLA, uGMRT, e-MERLIN, EVN

As PI:

1. **Gemini-North 2022B**, Identifying the fingerprints of r-process heavy metals in a short GRB – Awarded 9.5 hr of Rapid ToO *GN-2022B-Q-130*
2. **Gemini-South 2022B**, Identifying the fingerprints of r-process heavy metals in a short GRB – Awarded 9.5 hr of Rapid ToO *GS-2022B-Q-134*
3. **Gemini-South 2022B**, Off-axis afterglows from compact binary mergers – Awarded 8.5 hr of Rapid ToO *GS-2022B-Q-232*
4. **Lowell Discovery Telescope 2022B (Co-PI)**, Classically Scheduled Imaging and Spectroscopy of Transients and Their Host Galaxies – Awarded 5 full nights
5. **Gemini-South 2022A**, Identifying the fingerprints of r-process heavy metals in a short GRB – Awarded 9.5 hr of Rapid ToO *GS-2022A-Q-141*
6. **Lowell Discovery Telescope 2022A**, Gamma-ray bursts and their host environments – Awarded 4 half-nights
7. ***Chandra* Cycle 23 Award**, The collimation and energetics of short GRBs: searching for jet-breaks with *Chandra* – Awarded 80 ks (2 ToOs) *$ 66,792*
8. **Gemini-South Director's Discretionary Time**, Probing the unusual long GRB 211227A with Gemini – Awarded 2.1 hr of Rapid ToO *DT-2021B-019*
9. ***Swift* Target of Opportunity Requests**, Successfully requested 21 *Swift* ToOs of Galactic X-ray sources identified through the *Swift* Deep Galactic Plane Survey

As Co-I and Observer:

1. **Lowell Discovery Telescope 2022B (PI: S. B. Cenko)**, Target of Opportunity Transient Follow-Up with LDT
2. **Lowell Discovery Telescope 2022B (PI: I. Andreoni)**, ToO Observations of Gravitational Wave Counterparts in the Fourth LIGO-Virgo-KAGRA Observing Run
3. **Lowell Discovery Telescope 2022A (PI: A. Gottlieb)**, LDT observations of Fast Radio Bursts: counterparts and environment
4. **Lowell Discovery Telescope 2022A (PI: Cenko)**, Target of Opportunity Gamma-Ray Burst Follow-Up with LDT

5. ***NICER* Cycle 4 (PI: C. Kouveliotou)**, *NICER* ToO observations of *Swift*/XRT Deep Galactic Plane Survey (DGPS) sources
6. ***Chandra* Cycle 23 (PI: C. Kouveliotou)**, *Chandra* ToO observations of Phase II *Swift* Deep Galactic Plane Survey (DGPS) sources
7. **Lowell Discovery Telescope 2021B (PI: Cenko)**, Target of Opportunity Gamma-Ray Burst Follow-Up with LDT
8. **Lowell Discovery Telescope 2021B (PI: S. Dichiara)**, Gamma-ray bursts and their host environments
9. **Lowell Discovery Telescope 2021B (PI: E. Troja)**, LDT observations of Fast Radio Bursts: counterparts and environment
10. ***Chandra* Director's Discretionary Time (PI: E. Troja)**, A luminous kilonova or a faint supernova? The curious case of GRB210704A
11. ***Chandra* Director's Discretionary Time (PI: L. Piro)**, Unraveling the nature of the persistent radio source associated to FRB201124A with *Chandra*
12. **Lowell Discovery Telescope 2021A (PI: S. Dichiara)**, Gamma-ray bursts and their host environments
13. **Lowell Discovery Telescope 2021A (PI: E. Troja)**, LDT observations of Fast Radio Bursts: counterparts and environment
14. ***NICER* Cycle 3 (PI: C. Kouveliotou)**, *NICER* ToO observations of *Swift*/XRT Deep Galactic Plane Survey (DGPS) sources
15. ***NuSTAR* Director's Discretionary Time (PI: C. Kouveliotou)**, *Swift* Galactic Plane Survey Key Project – Utilized 9 *NuSTAR* DDTs of Galactic X-ray sources identified through the *Swift* Deep Galactic Plane Survey. The Survey was a *NuSTAR* Legacy Survey Program until 2019.

Additional Co-I Proposals:

1. **HST Cycle 30 (PI: E. Troja)**, Mapping the diversity of kilonovae through rapid Hubble observations of a short gamma-ray burst — *GO-17175*
2. **HST Cycle 29 (PI: E. Troja)**, Identifying the fingerprints of r-process heavy metals in a short GRB — *GO-16846*
3. **HST Cycle 25 (PI: E. Troja)**, Identify the signature of neutron star mergers through rapid Hubble observations of a short GRB — *GO-15089*
4. **Gemini-North 2022B (PI: M. Im)**, Long-term Monitoring in Optical/NIR of Gravitational-wave Sources — *GN-2022B-Q-117*
5. **Gemini-South 2022B (PI: M. Im)**, Long-term Monitoring in Optical/NIR of Gravitational-wave Sources — *GS-2022B-Q-120*
6. **Gemini-North 2022B (PI: M. Im)**, Optical/NIR Follow-up Observation of Gravitational-Wave Sources — *GN-2022B-Q-118*
7. **Gemini-South 2022B (PI: M. Im)**, Optical/NIR Follow-up Observation of Gravitational-Wave Sources — *GS-2022B-Q-119*
8. **Gemini-South 2021A (PI: E. Troja)**, Mapping the diversity of neutron star mergers with rapid Gemini observations of short gamma-ray bursts — *GS-2021A-Q-102*
9. **Gemini-North 2021A (PI: E. Troja)**, Mapping the diversity of neutron star mergers with rapid Gemini observations of short gamma-ray bursts — *GN-2021A-Q-103*
10. **Gemini-North 2020B (PI: E. Troja)**, Mapping the diversity of neutron star mergers with rapid Gemini observations of short gamma-ray bursts — *GN-2020B-Q-102*
11. **Gemini-South 2020B (PI: E. Troja)**, Mapping the diversity of neutron star mergers with rapid Gemini observations of short gamma-ray bursts — *GS-2020B-Q-101*
12. **Keck 2022B (PI: S. B. Cenko)**, ToO Spectroscopy of GW Counterparts

13. **Fermi Cycle 14 (PI: C. Kouveliotou)**, Magnetar Observations with the Fermi/Gamma Ray Burst Monitor
14. **Chandra Cycle 23 (PI: E. Troja)**, Beyond the GRB jet: searching for the remnant of a neutron star merger
15. **Chandra Cycle 23 (PI: E. Troja)**, Identifying the fingerprints of r-process heavy metals in a short GRB
16. **Chandra Cycle 23 (PI: S. Dichiara)**, Chandra Sub-arcsecond Localization of Swift Short GRBs
17. **Chandra Cycle 22 (PI: E. Troja)**, The Collimation and Energetics of Short GRBs: Searching for Jet-breaks with Chandra
18. **Swift Cycle 18 (PI: S. Dichiara)**, Searching High and Low for Elusive Short GRBs
19. **EVN E21 (PI: G. Bruni)**, Characterising the progenitors of fast radio bursts with the EVN *EB094*
20. **EVN DDT (PI: F. Panessa)**, Disclosing the nature of the persistent radio source associated to FRB20201124A
21. **e-MERLIN Cycle 13 (PI: G. Bruni)**, Characterising the progenitors of fast radio bursts with e-MERLIN
22. **e-MERLIN DDT (PI: G. Bruni)**, Disclosing the nature of the persistent radio source associated to FRB 20201124A with e-MERLIN
23. **ATCA 2022 (PI: R. Ricci)**, Characterizing the spectral behaviour of the Persistent Radio Emission of a Fast Radio Burst
24. **GMRT Cycle 42 (PI: G. Bruni)**, Spectral characterization of the persistent radio emission in fast radio bursts
25. **GMRT DDT (PI: G. Bruni)**, Characterising starburst activity in the host of the repeating FRB 20201124A
26. **VLA 2022B (PI: E. Troja)**, The collimation and energetics of short gamma-ray bursts
27. **VLA 2022B (PI: S. Chastain)**, Electromagnetic counterparts of gravitational wave events
28. **VLA 2021B (PI: E. Troja)**, The collimation and energetics of short gamma-ray bursts
29. **VLA 2021B (PI: E. Troja)**, Beyond the GRB jet: searching for the remnant of a neutron star merger
30. **VLA 2021A (PI E. Troja)**, Beyond the GRB jet: searching for the remnant of a neutron star merger

Presentations

Invited Talks

May 2022. *Shedding light on hostless short GRBs with large aperture telescopes*. Invited talk (45m) at Transient Astronomy Meeting (TAM). University of Maryland, College Park. Presented virtually.

April 2022. *Shedding light on hostless short GRBs with large aperture telescopes*. Invited talk (45m) at Astronomy Group Meeting. The George Washington University. Washington, DC.

March 2022. *Shedding light on hostless short GRBs with large aperture telescopes*. Invited talk (45m) at High Energy Astrophysics (HEAP) seminar. Universidad Nacional Autónoma de México. Presented virtually.

Contributed Presentations

March 2022. *A search for hostless short GRBs with large aperture telescopes*. Poster presentation at High Energy Astrophysics Division (HEAD 19) Meeting. Pittsburgh, PA.

December 2021. *Shedding light on hostless short GRBs with large aperture telescopes*. Contributed talk (20m) at IAU Symposium 363. Presented virtually.

June 2021. *Constraints on kilonova emission in two short GRBs at $z \sim 0.5$*. Contributed talk (15m) at Marcel Grossman 16th Meeting. Presented virtually.

June 2021. *Constraints on kilonova emission in two short GRBs at $z \sim 0.5$.* Contributed talk (15m) at European Astronomical Society (EAS) Annual Meeting. Presented virtually.

March 2021. *Constraints on kilonova emission in two short GRBs at $z \sim 0.5$.* Contributed talk at 2021 Square Kilometer Array (SKA) Science Conference. Presented virtually.

January 2021. *Constraints on kilonova emission in two short GRBs at $z \sim 0.5$.* Contributed talk (5m) at the virtual 237th meeting of the American Astronomical Society (AAS). Presented virtually.

October 2020. *The merger environments of short gamma-ray bursts*. Contributed talk (15m) at Chandra Frontiers in Time Domain Astrophysics. Presented virtually.

April 2019. *Revealing Trending YouTube Videos and their Relation to Power Laws*. Poster presentation at The George Washington University Research Days (second prize in the area of Studies in Business, Politics, and Society). Washington, DC.

May 2017. *Binary Stellar Wind Collisions with Orbital Motion*. Poster presentation at Annual Union College Steinmetz Symposium. Schenectady, NY.

April 2017. *Colliding Wind Binaries with Orbital Motion: Line Wind Formulation*. Poster presentation at National Conference on Undergraduate Research (NCUR). Memphis, TN.

October 2016. *Colliding Wind Binaries with Orbital Motion: 2D Line Wind Formulation in the Corotating Frame*. Poster presentation at Astronomical Society of New York (ASNY) Monference. Albany, NY.

Teaching Experience

2019	**Secondary Instructor**, The George Washington University
2017-2019	**Graduate Teaching Assistant**, The George Washington University

Mentoring Experience

2022	**Supervised the research of a first-year graduate student**, Seth Gagnon, The George Washington University
2021	**Supervised the research of a first-year graduate student**, Alex van Kooten, The George Washington University

Outreach & Professional Development

Service and Outreach

2018 & 2019	**Astronomy Festival on the National Mall**, Volunteer	*Washington, DC*
2016-2017	**Union College Student Affairs Council**, Student Representative	*Schectady, NY*
2016-2017	**Union College Student Conduct Committee**, Committee Member	*Schectady, NY*
2016 & 2017	**Dudley Observatory at Museum of Innovation and Science**, Volunteer at Astronomy Days	*Schectady, NY*
2015-2016	**Union College Men's Club Soccer**, Treasurer	*Schectady, NY*
2015 & 2016	**Special Olympics New York Annual 5k rUndead Event Service**, Volunteer	*Schectady, NY*
2014, 2015, & 2016	**John Calvin Toll Day of Community Service**, Volunteer	*Schectady, NY*
2015	**Town of Niskayuna Recreational Soccer**, Volunteer Coach	*Niskayuna, NY*
2014	**Food Bank of Western Massachusetts**, Volunteer	*Hatfield, MA*

Peer Review

2022 - now	**Journal referee**, The Astrophysical Journal (ApJ)

Professional Memberships

2022 - now ***STROBE-X* Science Working Group**, Member
2020 - now ***Swift* Deep Galactic Plane Survey (SGPS)**, Observation Lead
2020 - now **The *Gamow Explorer* Science Team**, Member
2020 - now **MeerKAT Galactic Plane Survey**, Member

Weekly Colloquia

2022 - now **GWU Astronomy Data Analysis Seminars**, Organizer/Presenter
2022 - now **UMD Transient Astronomy Meetings**, Member/Presenter
2019 - now **NASA GSFC GRB Lunch**, Member/Presenter
2018 - now **GWU Astronomy Group Meetings**, Member/Presenter