Megan Masterson

PhD Candidate
MIT Department of Physics, Astrophysics Division

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Education

2020– **PhD in Physics**, Massachusetts Institute of Technology.
Thesis: *Toward a Multi-Wavelength Picture of Nuclear Transients*
Supervisor: Professor Erin Kara

2019–2020 **MASt in Astrophysics**, Churchill College, University of Cambridge.
Thesis: *Extended Fe Kα Emission in Nearby AGN Revealed by Multi-Order Chandra HETG Data*
Supervisor: Professor Chris Reynolds

2015–2019 **BS in Astronomy, BS in Mathematics & Physics**, Case Western Reserve University.
Graduated summa cum laude

Awards & Scholarships

2023 **Graduate Student Poster Award**, HEAD Meeting of the AAS.

2020–2021 **Kavli Graduate Fellowship**, MIT Kavli Institute for Astrophysics and Space Research.

2019–2020 **Gates Cambridge Scholarship**, MASt in Astrophysics, University of Cambridge.

2019 **Chambliss Astronomy Achievement Student Award**, 233rd AAS Meeting.

2019 **Jason J. Nassau Prize**, to an outstanding senior student in astronomy, Department of Astronomy, Case Western Reserve University.

2019 **Patricia B. Kilpatrick Award**, to the four-year varsity athlete with the highest GPA, Case Western Reserve University.

2018 **Richard F. Sigal Award**, for demonstrating excellence in their studies and intending to pursue a career in physics, Department of Physics, Case Western Reserve University.

Publications & Astronomer's Telegrams

ORCID: 0000-0003-4127-0739

5 first author publications, 7 co-author publications, 1 ATel

First-Author Publications:

[5] **Masterson, M.**, De, K., Panagiotou, C., Kara, E., et al. 2023, *A New Population of Mid-Infrared-Selected Tidal Disruption Events: Implications for Tidal Disruption Event Rates and Host Galaxy Properties*, ApJ, 961, 211. doi:10.3847/1538-4357/ad18bb
– Highlighted by MIT News, the Boston Globe, Newsweek

[4] **Masterson, M.**, Kara, E., Pasham, D., et al. 2023, *Unusual Hard X-ray Flares Caught in NICER Monitoring of the Binary SMBH Candidate AT2019cuk/Tick Tock/SDSS J1430*, ApJL, 945, L34. doi:10.3847/2041-8213/acbea9
– Highlighted as a NICER Science Nugget

[3] **Masterson, M.**, McDonald, M., et al. 2023, *Evidence for AGN-Regulated Cooling in Clusters at $z \sim 1.4$: A Multi-Wavelength View of SPT-CL J0607-4448*, ApJ, 944, 164. doi:10.3847/1538-4357/acae9e

[2] **Masterson, M.** & Reynolds, C.S. 2022, *Probing the Extent of Fe Kα Emission in Nearby AGN Using Multi-Order Analysis of Chandra High Energy Transmission Grating Data*, ApJ, 936, 66. doi:10.3847/1538-4357/ac83ae

[1] **Masterson, M.**, Kara, E., et al. 2022, *Evolution of a Relativistic Outflow and the X-ray Corona in the Extreme Changing-Look AGN 1ES 1927+654*, ApJ, 934, 35. doi:10.3847/1538-4357/ac76c0

Co-Author Publications:

[7] Wang, Y. et al. (including **Masterson, M.**) 2023, *Rapid dimming followed by a state transition: a study of the highly variable nuclear transient AT 2019avd over 1000+ days*, accepted in ApJ, arXiv:2312.13543

[6] Kammoun, E., Lohfink, A. M., **Masterson, M.** et al. 2024, *The High Energy X-ray Probe (HEX-P): Probing the physics of the X-ray corona in active galactic nuclei*, FrASS, 10, 1308056. doi:10.3389/fspas.2023.1308056

[5] Brightman, M. et al. (including **Masterson, M.**) 2024, *The High Energy X-ray Probe (HEX-P): Sensitive broadband X-ray observations of transient phenomena in the 2030s*, FrASS, 10, 1292656. doi:10.3389/fspas.2023.1292656

[4] Panagiotou, C., De, K., **Masterson, M.** et al. 2023, *A Luminous Dust-Obscured Tidal Disruption Event Candidate in a Star Forming Galaxy at 42 Mpc*, ApJL, 948, L5. doi:10.3847/2041-8213/acc02f – Highlighted in an MIT News Story

[3] Kara, E. et al. (including **Masterson, M.**) 2023, *UV/Optical disk reverberation lags despite a faint X-ray corona in the AGN Mrk 335*, ApJ, 947, 62. doi:10.3847/1538-4357/acbcd3

[2] Xu, Y. et al. (including **Masterson, M.**) 2022, *Ejection-Accretion Connection in NLS1 AGN 1H 1934-063, MNRAS, 513, 1910*, MNRAS, 513, 1910, doi:10.1093/mnras/stac1058

[1] Chakraborty, J., Kara, E., **Masterson, M.**, et al. 2021, *Possible X-ray Quasi-Periodic Eruptions in a Tidal Disruption Event Candidate, ApJL, 921, L40*, ApJL, 921, L40, doi:10.3847/2041-8213/ac313b

ATels:

[1] Pasham, D., et al. (including **M. Masterson**) 2022, *AT2019cuk/SDSSJ1430/ZTF18aarippg: High-cadence NICER and NuSTAR X-ray observations of the potential supermassive black hole binary with imminent merger (the tick-tock source)*, ATel#15225

Accepted Observing Proposals & Observing Experience

Accepted Observing Proposals (as PI in bold)

2023 **XMM-Newton (AO23)**, *5×30 ks*, Late-Time X-ray Emission in Mid-Infrared-Selected TDEs.

2023 JWST (AO2), *19 hours*, A Population of Hidden Tidal Disruptions in the Local Universe: Revealing the Energetics of the Most Luminous Infrared Transients with JWST.

2022 **NICER (AO5)**, *52 ks (NICER), 26 ks (Swift), $43k*, 1ES 1927+654: Constraining the Post-Outburst State of an Extreme Nuclear Transient.

2021 **XMM-Newton (AO21)**, *70 ks (XMM-Newton & NuSTAR), $54.4k*, 1ES 1927+654: Constraining the Late Stages of an Extreme Nuclear Transient.

NICER ToO Observations, *Total of 19 ks over 4 observations*.

Swift ToO Observations, *Total of 41 ks over 14 observations*.

Ground-Based Observing Experience

2023-2024 **Magellan Clay/LDSS3**, 5 nights.

2024 **IRTF/SpeX**, 2 nights.

2023 **Magellan Baade/FIRE**, 1 night.

2023 **Magellan Baade/MagE**, 1 night.

2022-2024 **1m class telescopes**, $>$ 10 nights.

Presentations

Sept. 2024 **Invited Talk**, *Tidal Disruption Events and Nuclear Transients: Entering the Data-Rich Era*.

Apr. 2024 **Invited Talk**, *21st Meeting of the High Energy Astrophysics Division of the AAS*.

Oct. 2023 **Invited Review Talk**, *BABAM! (Boston Area Black hole Accretion Meeting!)*.

May 2023 **Invited Talk**, *AAS HEAD Frontiers Seminar*.

Mar. 2023 **Poster**, *20th Meeting of the High Energy Astrophysics Division of the AAS*.
Awarded Graduate Student Poster Award

Feb. 2023 **Invited Talk**, *Astro Seminar*, Tufts University, Department of Physics & Astronomy.

Feb. 2023 **Invited Talk**, *CfA Seminar*, Center for Astrophysics | Harvard & Smithsonian.

Dec. 2022 **Invited Talk**, *Extreme Astrophysics Seminar*, University of Michigan, Department of Astronomy.

July 2022 **Contributed Talk**, *BLack holes Across Space and Time (BLAST) Workshop 2022*.

July 2022 **Contributed Talk**, *COSPAR 2022, 44th Scientific Assembly*.

June 2022 **Contributed Talk**, *XMM-Newton Workshop: Black Hole Accretion Under the X-ray Microscope*.

Mar. 2022 **Contributed Talk**, *19th Meeting of the High Energy Astrophysics Division of the AAS*.

Jan. 2022 **Contributed Talk**, *239th Meeting of the American Astronomical Society (Canceled due to COVID)*.

Jan. 2019 **Poster**, *233rd Meeting of the AAS*.
Awarded Chambliss Student Prize

Research Supervision

2024 **Taissia Karasova**, MIT Undergraduate Research Student.

2022–2023 **Kylee Carden**, MIT Undergraduate Research Student *(co-supervised with Erin Kara)*.
Now PhD student at Ohio State

2021–2022 **Isabella Guilherme**, MIT MSRP Undergraduate Student *(co-supervised with Erin Kara)*.
Now PhD student at Caltech

Professional Service

Collaborations & Working Groups

2021– **Member**, NICER Observatory Science Working Group.

2023– **Member**, HEX-P Coronal Physics Working Group.

Peer Review

Referee, Astrophysical Journal.

Teaching

Jan. 2024 **TA for Astronomy Field Camp**, *senior undergraduate course at MIT*.
Assisted with observations for three weeks at Teide Observatory in Tenerife, Spain

Jan. 2023 **TA for Astronomy Field Camp**, *senior undergraduate course at MIT*.
Assisted with observations for three weeks at Teide Observatory in Tenerife, Spain

Fall 2022 **TA for Observational Techniques in Optical Astronomy**, *senior undergraduate course at MIT*.
Supervised weekly observing at Wallace Astrophysical Observatory, assisted with data reduction and analysis, and gave a specialty lecture on X-ray astronomy and accretion physics.
Student Evaluation Score: 6.8/7

2021 **Teacher for MIT Educational Studies Program**.
Designed and taught two classes on black holes, designed for middle school and high school students

Advocacy & Outreach

2023– **Graduate Student Writer**, Astrobites.
Read my latest articles here

2023– **Event Organizer**, Boston Astronomy on Tap.

2021– **MIT Sidewalk Astrogazers Member**, MIT Kavli Institute.
Co-Lead of organization during 2023

2022– **Grads Advising Grad Admissions Committee Member**, MIT Physics Graduate Student Council.

2021–2024 **Mentor**, MIT Physics Graduate Application Assistance Program.

2021–2024 **Mentor**, MIT Graduate & Undergraduate Womxn in Physics.

Jan. 2023 **Mentor**, MIT Physics Directed Reading Program.

2021–2022 **Advocacy Board Member**, MIT Physics Graduate Student Council.

2019–2020 **Logistics Officer**, Cambridge University Girls in STEM.

2017, 2019 **Public Outreach Volunteer**, Astrophysics Research Lab at the NC Museum of Natural Sciences.
Ran solar observing sessions, developed new cart programs, and supervised local high school student