

Zachary Weaver

PhD Candidate



Institute for Astrophysical
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Interests

Active Galactic Nuclei — High-Energy Astrophysics — Extragalactic Astronomy
Theoretical Astrophysics — Machine Learning — Big Data
Science Outreach — Online Education

Education

2017-	PhD Candidate	Boston University Department of Astronomy
2017-2019	M.A. in Astronomy	Boston University
2013-2017	B.A. in Physics and Astronomy Magna Cum Laude with High Honors Senior Thesis: The Dramatic 2016 Optical and Gamma-ray Outburst of the Blazar 3C454.3	Colgate University

Peer-Reviewed Publications

1. Parsec-Scale Kinematics of Gamma-Ray Blazars at 43 GHz within the VLBA-BU-BLAZAR Program II
Weaver, Z.R., Jorstad, S.G., Marscher, A.P., et al.
In Prep.
2. Multi-Wavelength Variability of BL Lacertae Measured with High Time Resolution
Weaver, Z.R., Williamson, K.E., Jorstad, S.G., et al.
Accepted to ApJ (In Press) — ArXiv 2007.07999
3. Multiwavelength Behavior of the Blazar 3C279: Decade-Long Study from γ -Ray to Radio
Larionov, V., Jorstad, S.G., . . . , Weaver, Z.R., et al.
MNRAS 492, 3829 — ArXiv 2001.06512
4. The June 2016 Optical and Gamma-Ray Outburst and Optical Micro-Variability of the Blazar 3C454.3
Weaver, Z.R., Balonek, T.J., Jorstad, S.G., et al.
ApJ, 875, 15 — ArXiv 1903.40587

Select Abstracts and Posters

1. Kinematics of Parsec-Scale Jets of Gamma-Ray Blazars at 43 GHz within the VLBA-BU-BLAZAR Program: 2013-2018
Weaver, Z.R., Jorstad, S.G., Marscher, A.P., et al.
B.A.A.S. #235, 305.06, 2020
2. Short-Term Variability of BL Lacerate at Different Photon Energies
Williamson, K.E., Jorstad, S.G., . . . , & Weaver, Z.R.
B.A.A.S. #235, 305.10, 2020
3. Identifying Blazar Variability with Machine Learning
Weaver, Z.R., Jorstad, S.G., Marscher, A.P., & Balonek, T.J.
Presented at the XXX IAC Winter School on "Big Data Analysis in Astronomy", Universidad de La Laguna, Tenerife, Spain, 11/2018
4. The June 2016 Multi-Frequency Outburst and Optical Micro-Variability of the Blazar 3C454.3
Weaver, Z.R., Jorstad, S.G., Marscher, A.P., et al.
Presented at the 8th International Fermi Symposium, 10/2018
6. The Dramatic June 2016 Optical Outburst and Micro-Variability of the Blazar 3C 454.3
Weaver, Z., & Balonek, T. J.
B.A.A.S. #229, 250.33, 2017

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Presentations

- August 2019 Understanding Blazars Through Multiwavelength Variability
Kavli Institute for Particle Astrophysics and Cosmology, Stanford University - Oral Presentation
- May 2018 27th Annual New England Regional Quasar and AGN Meeting
Leitner Observatory, Yale University - Oral Presentation
- Dec. 2016 Colgate University Department of Physics and Astronomy Senior Thesis Presentations - Oral Presentation
- Nov. 2016 Undergraduate Research Day
Syracuse University Department of Physics - Oral Presentation
- Oct. 2016 Keck Northeast Astronomy Consortium Symposium on Undergraduate Research - Poster Presentation
- Jun. 2016 Undergraduate ALFALFA Training Meeting at the National Radio Observatory, Green Bank, West Virginia - Poster Presentation
- Oct. 2015 Keck Northeast Astronomy Consortium Symposium on Undergraduate Research - Oral Presentation
- Nov. 2014 Keck Northeast Astronomy Consortium Symposium on Undergraduate Research - Oral Presentation

Research Projects

- 2019- WEBT, TESS, NuSTAR, and Swift Observations of BL Lac
Boston University
- 2017- Kinematics of Parsec-scale Jets of Gamma-Ray Blazars at 43 GHz within the VLBA-BU-BLAZAR Program
Boston University
- 2018 XXX IAC Winter School of Astrophysics on "Big Data Analysis in Astronomy"
Universidad de La Lagune, Tenerife, Spain
- 2016-2018 The Dramatic June 2016 Outburst of the Blazar 3C454.3
Colgate University
- 2014-2017 Optical Monitoring of Select Active Galactic Nuclei and Variable Stars
Colgate University
- 2016 ALFALFA Radio Undergraduate Training Program
NRAO Green Bank, West Virginia
- 2015 Using Exponential Curves to Characterize the 2014-2015 Outburst of the Blazar 3C454.3
Colgate University

Observing Experience

- 35 Nights 1.8-m Perkins Telescope Lowell Observatory/Boston University
Use of the telescope with the PRISM instrument for photometric and polarimetric monitoring of *Fermi Space Telescope* Gamma-Ray Blazars.
- ~200 Nights 16-inch Telescope Colgate University Foggy Bottom Observatory
Several years spent monitoring active galactic nuclei and variable stars.

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Astronomer's Telegrams

1. Detection of optical activity in the BL Lac Object OT 081 (PKS 1749+096)
Balonek, T. J., Stahlin, R. W., . . . , Weaver, Z., *et al.*
The Astronomer's Telegram, No. 9259, 2016
2. A Dramatic Optical Flare and Micro-variability in the Blazar 3C 454.3
Balonek, T. J., Boni, S. J., . . . , Weaver, Z., *et al.*
The Astronomer's Telegram, No. 9178, 2016

Skills and Techniques

Coding

Python — MATLAB — IDL — HTML — CSS — LaTeX

Techniques

Photometry — *Fermi Large Area Telescope* Analysis — Differential Radio Mapping
Astrophotography — Computer Building — Machine Learning

Teaching Experience

Spring 2019	Astr. 109: Cosmology Boston University	TA
Spring 2018	Astr. 109: Cosmology Boston University	TA
Fall 2017	Astr. 107: Life Beyond Earth Boston University	TA
Spring 2017	Astr. 102: Stars, Galaxies, & the Universe Colgate University	TA
Fall 2016	Astr. 210: Intermediate Astronomy Colgate University	TA
Fall 2016	Phys. 111: Fundamental Physics I Colgate University	Private Tutor
2016-2014	Astr. 101: Solar System Astronomy Colgate University	TA
Fall 2015	Emerging Global Challenges Colgate University	Co-Taught, Online Course
Spring 2015	Advent of the Atomic Bomb Colgate University	TA, Online Course

Awards

2017	Alumnae Leadership Scholarship
2016	Sigma Pi Sigma Physics Honor Society
2015 - 2017	Ronald J. Taylor '67 Endowed Scholarship
2015, 2016	Class of 1957 Endowed Scholarship
2014	Phi Eta Sigma First-Year Honor Society
2013	Colgate University Benton Scholar
2013-2016	Colgate University Dean's List

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Public Outreach

- 2020 Massachusetts Science & Engineering Fair Judge MSEF
Judge for Astronomy/Physics related entries to the 2020 Massachusetts High School Science and Engineering Fair.
- 2017 - Boston University Public Open Nights Coit Observatory
Ran weekly open nights for the public to use 8-inch telescopes and observe seasonal objects.
- 2013-2017 Foggy Bottom Observatory Open Nights Colgate University
Operated the telescopes and interfaced with the public during open house events at the Colgate University Foggy Bottom Observatory during a variety of events, such as Reunion Weekend nights, Astronomy classes, local group visits, and lunar eclipse events.
- 2013-2017 Science Outreach Coordinator Ho Tung Visualization Lab, Colgate University
Student coordinator of the Ho Tung Visualization Lab (planetarium) at Colgate University. Gave "Sky Talk" guest lectures on objects of interest in the night sky using Digistar 5 program. Also ran science outreach events with local schools and groups on a variety of topics, including topics as diverse as volcanos, weather, comets and asteroids, and deep space objects.