Michael M. Fausnaugh

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Research Expertise

Time Domain Astronomy, Supermassive Black Holes, Astrophysical Transients

Current Position

Reseach Scientist, **Massachusetts Institute of Technology,** Cambridge, MA — 2017–present

Responsibilities:

- Data Analysis and Quality Assurance for NASA's TESS mission
- Mission and Observation Planning for TESS
- Original Research Programs

Education

Ph.D., Astronomy, The Ohio State University; Advisor: Prof. Bradley Peterson — 2017
M.S., Astronomy, The Ohio State University — 2014
B.A., History of Math and Science, Philosophy, St. John's College, Santa Fe, NM — 2011

Professional Experience

Five **first author** papers accepted (147 citations).
68 **papers** total, 15 minor publications.
Data Release Notes for NASA's TESS mission, **lead author**. — 2018–present
Referee for *Nature*, leading astrophysics journals (*Nature Astronomy*, *ApJ*, *MNRAS*, *Astronomy & Astrophysics*, *PASP*), and general journal *Frontiers*. — 2016–present
Chair and Organizer for the special session "TESS and Transient Science" at AAS 235. — Jan 2020
Co-Chair of LOC for the New England Regional Quasar and AGN Meeting — May 2019
Mentor for 2 graduate students and 3 undergraduates. — 2017–present

Honors and Awards

NASA Silver Achievement Award for the TESS Mission — Sept 2019
OSU Hayes Research Forum, 2nd place Oral Presentation — March 2017
OSU Markowitz Award for Excellence in Observational Astronomy — 2016–2017
OSU Graduate School Presidential Fellow — 2016–2017
St. John's College Award for Sustained Academic Excellence — May 2011
St. John's College ARIEL Internship — May 2011

Presentations

Invited Talks

1. AAS 235 Special Session "TESS and Transient Science." Honolulu, HI. — Jan 2020
2. "One Year for TESS: Early Findings and the Future Ahead." Northrop Grumman Innovation Systems, Sterling, VA. — April 2019
3. CCAP Summer Seminar, The Ohio State University. Columbus, OH. — June 2016
4. Galaxy and Cosmology Seminar. Harvard-Smithsonian Center for Astrophysics. Cambridge, MA. — Nov 2016

TESS Contributed Research

5. TESS Science Conference. MIT. Cambridge, MA. Aug 2019
6. Meeting of the American Astronomical Society #233. Seattle, WA. Jan 2019
7. TESS Science Meeting. MIT. Cambridge, MA. Oct. 2018

AGN Contributed Research

8. NERQUAM 2019. MIT. Cambridge, MA. May 2019
9. AGN STORM Research Meeting. Atlanta, GA. Aug 2017
10. Hayes Research Forum. The Ohio State University. Columbus, OH. March 2017
11. AGN Research Group Meeting. Space Telescope and Science Institute. Baltimore, MD. Feb 2017
12. MIT Kavli Institute Research Lunch. Cambridge, MA. Jan 2017
13. Meeting of the American Astronomical Society #229. Grapevine, TX. Jan 2017
14. AGN STORM Workshop. Reykjavik, Iceland. July 2016
15. Great Lakes Quasar Symposium, Western University. London, Ontario. May 2016
16. Narayan Research Group, Harvard-Smithsonian Center for Astrophysics. Cambridge, MA. April 2016
17. Quasar Research Group Meeting, Harvard-Smithsonian Center for Astrophysics. Cambridge, MA. April 2016
18. AGN Research Group Meeting. Space Telescope and Science Institute. Baltimore, MD. March 2016
19. AGN STORM Workshop. Columbus, OH. July 2015
20. Meeting of the American Astronomical Society #225. Seattle, WA. Jan 2015
21. AGN Research Retreat. University of St. Andrews. St. Andrews, Scotland. Jan 2015
22. Catolica Workshop. The Ohio State University. Columbus, OH. May 2014
23. Spitz Summer Institute, planetarium workshop/training. Spitz Inc. Chadds Ford, PA. July 2013

Mentoring and Teaching

Mentor for MIT Graduate Students: 2019–present

Guided dissertations, outlined and managed research projects.

- Akshata Krishnamurthy (2019), Rahul Jayaraman (2019–present)

Supervisor through MIT Undergraduate Research Opportunity Program: 2017–present

Designed and managed research/programming projects, introduced students to best research practices.

- Nadia Dimitrova (2017), Ally Hong (2018–present), Jason Yang (2019–present)

Graduate Teaching Associate, The Ohio State University: 2012–2013

Graded exams, designed and lead review sessions.

- Astro 2291, Intro to Astronomy and Planets (calculus-based, Autumn 2012)
- Astro 1161, Intro to Astronomy and the Solar System (Spring 2013)

Head Laboratory Assistant, St. John's College: 2010–2011

Supervised and demonstrated classroom practica, developed and documented pedagogical experiments.

Laboratory Assistant, St. John's College: 2009–2010

Supervised and demonstrated classroom practica.

Observing Experience

Space-based

Transiting Exoplanet Survey Satellite

Monthly mission planning (2018–present):

- Selected 20,000 targets for transiting planet search
- Select 1,900 guide stars
- Quality checks, diagnostics, engineering validation
- Assess and report guiding performance and pointing stability

Ground-based

Total:	119 nights	(81 queue, 38 classical)
Large Binocular Telescope:	54 nights	2013-2016
MDM 2.4m Hiltner:	24 nights	2012-2015
MDM 1.3m McGraw:	18 nights	2013-2014
CTIO SMARTS 1.3m:	16 nights	2015
VERITAS (γ-ray observatory):	7 nights	2011

Selected Outreach

Upper Arlington Library Summer Astronomy Series — June 2014, 2015, 2016

Presented 2-4 planetarium shows per month. — 2013-2016

OSU Planetarium: Wrote the following shows: — 2013–2015

- *OSU Planetarium Grand Reopening, The Sky Tonight.*
- *Journey through the Solar System.*
- *The Autumn Sky: Hidden Treasures.*

Hosted a high school student for 1 day — May 2014

Blendon Middle School Career Day — May 2013

4-H Science Saturday — April 2013

Bailey Elementary Astronomy mini-course — March 2013

Wickliffe Elementary Space Day — Jan 2013

Publications

First Author

1. "Continuum Reverberation Mapping of the Accretion Disk in Two Seyfert 1 Galaxies"
M. M. Fausnaugh et al. (71 authors), *Astrophysical Journal*, 854:107 (2018).

2. "Reverberation Mapping of Optical Emission Lines in Five Active Galaxies"
M. M. Fausnaugh et al. (71 authors), *Astrophysical Journal*, 840:97 (2017).

3. "A New Approach to the Internal Calibration of Reverberation Mapping Spectra"
M. M. Fausnaugh (single author), *Publications of the Astronomical Society of the Pacific*, 129:972 (2017). Includes first video abstract ever published by PASP.

4. “Space Telescope and Optical Reverberation Mapping Project. III. Optical Continuum Emission and Broad-Band Time Delays in NGC 5548”
M. M. Fausnaugh et al. (99 authors), *Astrophysical Journal*, 821:56 (2016).

5. “The Cepheid distance to the maser-host galaxy NGC 4258: studying systematics with the Large Binocular Telescope”
M. M. Fausnaugh, C. S. Kochanek, J. R. Gerke, L. M. Macri, A. G. Riess, K. Z. Stanek, *Monthly Notices of the Royal Astronomical Society*, 450:3597 (2015).

Major Contributing Author

6. “Space Telescope and Optical Reverberation Mapping Project. V. Optical Spectroscopic Campaign and Emission-Line Analysis for NGC 5548”, L. Pei, **M. M. Fausnaugh**, and 152 others, *Astrophysical Journal*, 837:131 (2017).

7. “Swift Monitoring of NGC 4151: Evidence for a Second X-ray/UV Reprocessing”, R. Edelson, J. Gelbord, E. Cackett, C. Done, **M. M. Fausnaugh**, and 37 others *Astrophysical Journal*, 840:41 (2017).

8. “Spitzer Space Telescope Measurements of Dust Reverberation Lags in the Seyfert 1 Galaxy NGC 6418”, B. Vazquez, P. Galianni, M. Richmond, A. Robinson, D. J. Axon, K. Horne, T. Almeyda, **M. M. Fausnaugh**, and 18 others, *Astrophysical Journal*, 801:127 (2015).

Contributing Author

9. “Space Telescope and Optical Reverberation Mapping Project. VII. Understanding the Ultraviolet Anomaly in NGC 5548 with X-Ray Spectroscopy”, Mathur, S. et al. (150 authors, including **M. M. Fausnaugh**) *Astrophysical Journal*, 846:55 (2017).

10. “Space Telescope and Optical Reverberation Mapping Project. VI. Reverberating Disk Models for NGC 5548”, D. Starkey, K. Horne, **M. M. Fausnaugh**, and 96 others, *Astrophysical Journal*, 835:65 (2017).

11. “Space Telescope and Optical Reverberation Mapping Project. IV. Anomalous behavior of the broad ultraviolet emission lines in NGC 5548”, M. R. Goad et al. (102 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 824:11 (2016).

12. “Space Telescope and Optical Reverberation Mapping Project. II. Swift and HST Reverberation Mapping of the Accretion Disk of NGC 5548”, R. Edelson et al. (50 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 806:129 (2015).

13. “Space Telescope and Optical Reverberation Mapping Project. I. Ultraviolet Observations of the Seyfert 1 Galaxy NGC 5548 with the Cosmic Origins Spectrograph on Hubble Space Telescope”, G. De Rosa et al. (50 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 806:128 (2015).

14. “Swift/UVOT Grism Monitoring of NGC 5548 in 2013: An Attempt at MgII Reverberation Mapping”, E. M. Cackett, K. Gültekin, M. C. Bentz, **M. M. Fausnaugh**, B. M. Peterson, J. Troyer, M. Vestergaard, *Astrophysical Journal*, 810:86 (2015).

15. “XMM-Newton Observations of the Peculiar Cataclysmic Variable Lanning 386: X-ray evidence for a Magnetic Primary”, M. R. Kennedy, P. Callanan, P. M. Garnavich, **M. M. Fausnaugh**, J. C. Zinn, *Monthly Notices of the Royal Astronomical Society*, 466:2202 (2017).

16. “Ground-based Parallax Confirmed by Spitzer: Binary Microlensing Event MOA-2015-BLG-020”, T. Wang, et al. (87 authors, including **M. M. Fausnaugh**, *Astrophysical Journal*, 845:129(2017).

17. “OGLE-2015-BLG-1482L: The First Isolated Low-mass Microlens in the Galactic Bulge”, S. J. Chung (42 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 838:154 (2017).

18. “Toward a Galactic Distribution of Planets. I. Methodology & Planet Sensitivities of the 2015 High-Cadence Spitzer Microlens Sample”, W. Zhu et al. (28 authors, including **M. M. Fausnaugh**), submitted to *Astrophysical Journal* 2017 January 18.

19. “OGLE-2015-BLG-0196: Ground-based Gravitational Microlens Parallax Confirmed by Space-based Observation”, C. Han et al. (26 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 834:82 (2017).

20. “First simultaneous microlensing observations by two space telescopes: Spitzer & Swift reveal a brown dwarf in event OGLE-2016-BLG-1319”, Y. Shvartzvald et al. (94 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 831:183 (2016).

21. “OGLE-2015-BLG-0479LA,B: Binary Gravitational Microlens Characterized by Simultaneous Ground-based and Space-based Observations”, C. Han et al. (63 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 828:53 (2016).

22. “The Spitzer Microlensing Program as a Probe for Globular Cluster Planets: Analysis of OGLE-2015-BLG-0448”, P. Radoslaw et al. (92 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 823:63 (2016).

23. “Spitzer Observations of OGLE-2015-BLG-1212 Reveal a New Path to Breaking Strong Microlens Degeneracies”, V. Bozza et al. (92 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 820:79 (2016).

24. “Spitzer Microlens Measurement of a Massive Remnant in a Well-Separated Binary”, Y. Shvartzvald et al. (66 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 814:111 (2015).

25. “Spitzer IRAC Photometry for Time Series in Crowded Fields”, S. Calchi Novati et al. (25 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 814:92 (2015).

26. “The Typecasting of Active Galactic Nuclei: Mrk 590 no Longer Fits the Role”, K. D. Denney et al. (12 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 796:134 (2014).

27. “SN 2012au: A Golden Link between Superluminous Supernovae and Their Lower-luminosity Counterparts”, D. Milisavlejic et al. (29 authors, including **M. M. Fausnaugh**), *Astrophysical Journal*, 770:L38 (2013).

Minor Publications

28–34. Seven *Astronomer’s Telegrams* with the ASAS-SN research group (#5102, #5110, #6143, #6158, #8352, #8356, #9146, unrefereed, 2013–2016).

35. “TESS Data Processing and Quick-look Pipeline”, **M. M. Fausnaugh**; Xu Huang; Ana Glidden; Natalia Guerrero; TESS Science Office, Meeting of the American Astronomical Society #231 (2018).

36. “Reverberation Mapping of AGN Accretion Disks”, **M. M. Fausnaugh**, Meeting of the American Astronomical Society #229 (2017).

37. “AGN Space Telescope and Optical Reverberation Mapping Project II. Ultraviolet and Optical Continuum Analysis”, **M. M. Fausnaugh**, Meeting of the American Astronomical Society #225 (2015).