

Michael A. Reefer

MIT Department of Physics
77 Massachusetts Avenue
Cambridge, MA 02139-4307

Cell Phone: +1 (540) 848-4434
E-mail: mreefer@mit.edu
Website: www.mit.edu/~mreefer/

GitHub: [Michael-Reefer](#)
LinkedIn: [Michael Reefer](#)

EDUCATION	Ph.D., Physics Massachusetts Institute of Technology, Cambridge, MA <i>Advisor: Michael McDonald</i>	2022 – Present
	B.S., Physics Concentration in Astrophysics With Honors, <i>Summa cum laude</i> George Mason University, Fairfax, VA	2018 – 2022 GPA: 4.00
RESEARCH EXPERIENCE	Graduate Research Fellow Massachusetts Institute of Technology <ul style="list-style-type: none">Modeling mid-infrared integral field unit spectroscopy for galaxies and galaxy clusters Undergraduate Research Assistant George Mason University <ul style="list-style-type: none">Analyzing and modeling photometric transits and spectroscopic radial velocity data to validate exoplanets and model for characteristics, i.e. planet mass, radius, and orbital period.Using Python coding for data analysis of integrated field unit spectroscopy and complete hardware automation of the GMU campus telescope.Analyzing galaxy spectra to search for active galactic nuclei via coronal line emission.	Aug. 2022 – Present Cambridge, MA Sept. 2019 – July 2022 Fairfax, VA
TEACHING EXPERIENCE	Learning Assistant George Mason University <ul style="list-style-type: none">Introductory electricity & magnetism courseAttended classes and answered students' questions, helping them with problemsHeld personal office hours to work through examplesCreated a presentation to summarize the lessons learned from participating in this position.	June 2020 – May 2020 Fairfax, VA
HONORS & AWARDS	NSF Graduate Research Fellowship \$34,000 stipend & \$12,000 educational allowance per year for 3 years. Competitive national research fellowship for prospective graduate students across all science & math disciplines that requires a detailed 3-year research proposal plan. Dean's Award for Excellence in Academics and Research \$1,250 award. GMU College of Science award for excellence in academics and/or research. Outstanding Undergraduate Research Award GMU Physics & Astronomy department recognition of exceptional undergraduate research. Outstanding Graduating Senior Award GMU Physics & Astronomy department recognition of an exceptional graduating senior. Outstanding Learning Assistant Award \$150 award. Recognition of outstanding leadership as a learning assistant. Osher Lifelong Learning Institute Scholarship \$500 award. Recognition of academic excellence for GMU students. George Mason University Distinction Scholarship \$2,000 per year. Merit based scholarship for academically distinguished GMU students. Dean's List Cumulative GPA above 3.5 at GMU.	2022 – 2027 2022 2022 2022 2021 2020 2018 – 2022 2018 – 2022

First & Second Author

6. **Reefe M.**, Alfaro O., Foster S. et al. 2022: "Asynchronous object-oriented approach to the automation of the 0.8-meter George Mason University campus telescope in Python," *JATIS*, **8**, 027002
5. **Reefe M.**, Luque R., Gaidos E. et al. 2022: "A Close-in Puffy Neptune with Hidden Friends: The Enigma of TOI 620," *AJ*, **163**, 269
4. **Reefe M.**, Satyapal S., Sexton R.O. et al. 2022: "CLASS: Coronal Line Activity Spectroscopic Survey," *ApJ*, **936**, 140
3. **Reefe M.**, Satyapal S., Sexton R.O. et al. 2022: "Nuclear Activity in the Low Metallicity Dwarf Galaxy SDSS J0944-0038: A Glimpse into the Primordial Universe," *arXiv e-prints*, arXiv:2211.13179
2. **Reefe M.**, Sexton R.O., Doan S.M. et al. 2022: "CLASS Survey Description: Coronal Line Needles in the SDSS Haystack," *arXiv e-prints*, arXiv:2211.11882
1. Cale B.L., **Reefe M.**, Plavchan P. et al. 2021: "Diving Beneath the Sea of Stellar Activity: Chromatic Radial Velocities of the Young AU Mic Planetary System," *AJ*, **162**, 295

Coauthor

11. El Mufti M., Plavchan P.P., Isaacson H. et al. 2023: "TOI 560: Two Transiting Planets Orbiting a K Dwarf Validated with iSHELL, PFS, and HIRES RVs," *AJ*, **165**, 10
10. Pfeifle R.W., Satyapal S., Ricci C. et al. 2023: "NuSTAR Observes Two Bulgeless Galaxies: No Hard X-Ray AGN Detected in NGC 4178 or J0851+3926," *ApJ*, **943**, 109
9. Wittrock J.M., Plavchan P., Cale B.L. et al. 2023: "Validating AU Microscopii d with Transit Timing Variations," *arXiv e-prints*, arXiv:2302.04922
8. Gilbert E.A., Barclay T., Quintana E.V. et al. 2022: "Flares, Rotation, and Planets of the AU Mic System from TESS Observations," *AJ*, **163**, 147
7. Rodriguez J.E., Quinn S.N., Vanderburg A. et al. 2022: "Another Shipment of Six Short-Period Giant Planets from TESS," *arXiv e-prints*, arXiv:2205.05709
6. Wittrock J.M., Dreizler S., **Reefe M.** et al. 2022: "Transit Timing Variations for AU Microscopii b and c," *AJ*, **164**, 27
5. Yee S.W., Winn J.N., Hartman J.D. et al. 2022: "The TESS Grand Unified Hot Jupiter Survey. II. Twenty New Giant Planets," *arXiv e-prints*, arXiv:2210.15473
4. Fukui A., Korth J., Livingston J.H. et al. 2021: "TOI-1749: an M dwarf with a Trio of Planets including a Near-resonant Pair," *AJ*, **162**, 167
3. Osborn A., Armstrong D.J., Cale B. et al. 2021: "TOI-431/HIP 26013: a super-Earth and a sub-Neptune transiting a bright, early K dwarf, with a third RV planet," *MNRAS*, **507**, 2782
2. Teske J., Wang S.X., Wolfgang A. et al. 2021: "The Magellan-TESS Survey. I. Survey Description and Midsurvey Results," *ApJS*, **256**, 33
1. Dreizler S., Crossfield I.J.M., Kossakowski D. et al. 2020: "The CARMENES search for exoplanets around M dwarfs. LP 714-47 b (TOI 442.01): populating the Neptune desert," *A&A*, **644**, A127

240th Meeting of the American Astronomical Society
iPoster

12–17 June 2022
Pasadena, CA

CLASS: Coronal Line Activity in the Sloan Digital Sky Survey [ADS]

TESS Science Conference II

2–6 Aug. 2021
Virtual

Poster

A Flexible Python Observatory Automation Framework for the George Mason University Campus Telescope [zenodo]

Poster (Coauthor)

Methods of Data Analysis on TESS Observations [zenodo]

Poster (Coauthor)

Transit Timing Variations for AU Microscopii b & c [zenodo]

GMU College of Science Undergraduate Research Colloquium

22 Apr. 2021

Poster

Virtual

Automation of TESS Follow-up Observations with the GMU Campus Telescope

237th Meeting of the American Astronomical Society

11–15 Jan. 2021

iPoster

Virtual

An Asynchronous Object-Oriented Approach to Automation of the 0.8-meter
George Mason University Campus Telescope in Python [ADS]

PROPOSALS

Contributor

Gemini Observatory: MAROON-X Instrument, 24+ nights requested

2021B

Keck Observatory: HIRES Instrument, 5 nights requested

2021B

NASA IRTF: iSHELL Instrument, 50 nights requested

2021B

Gemini Observatory: MAROON-X Instrument, 24+ nights requested

2022A

**COMMUNITY
OUTREACH**

Graduation Speaker

May 2022

GMU College of Science

Fairfax, VA

Chosen to be the student speaker for the College of Science's Spring 2022 graduation event.

Undergraduate Representative

Jan. 2022

GMU Hiring Committee, for an Astronomy Professor

Fairfax, VA

Attended a mock lecture and research colloquium presented by each candidate, as well as interviews, and provided feedback to the faculty hiring committee from the undergraduate student perspective.

President

July 2021 – Aug. 2022

Spectrum

Fairfax, VA

Planning talks, discussions, fundraisers, and other events, as well as managing website and budgetary concerns and working with the College of Science Faculty to improve diversity at GMU for student-led group [Spectrum](#), which promotes the enhancement of under-represented groups in STEM.

Peer Mentor

Dec. 2020 – Aug. 2022

Spectrum

Fairfax, VA

Providing academic and personal tutoring for students in physics and astronomy at GMU through [Spectrum](#).

**SCIENCE
OUTREACH**

Graduate Student Panelist

Aug. 2022

Aspiring Scientists' Summer Internship Program (ASSIP)

Fairfax, VA

Served on a panel of graduate students for a Career Day event hosted by GMU's ASSIP program, answering high school students' questions about a career in academia.

NSF GRFP Cohort Workshop Panelist

July 2022

GMU Office of Fellowships

Fairfax, VA

Served on a panel of NSF GRFP recipients and reviewers to answer students' questions about the application and review process.

Competition Judge

Oct. 2020

MathCounts

Fairfax, VA

Scored math exams based on the answer key for middle school students participating in the competition.

Research Mentor

Summer 2020, 2021

Aspiring Scientists' Summer Internship Program (ASSIP)

Fairfax, VA

Taught high school interns about the academic research done in our group, and tutored them on how to perform it themselves to synthesize a presentable project by the end of the summer.

COMPUTER SKILLS

Python: Over 3 years of experience working with data analysis, simulations, modeling, and a full-scale automation project of the GMU telescope observations. Packages: Numpy, Numba, Scipy, Astropy, Pandas, Matplotlib, Plotly, Emcee, PyAstronomy, Corner.
MATLAB & Mathematica: 2 years of experience with numerical computations for classes.
Bash / Shell: 2 years of experience in unix terminal environments
Git: Basic source code management with Git and GitHub
Astronomy Programs: AstroImageJ, DS9
Document Creation: \LaTeX , Vim, Microsoft Office

REFERENCES

Shobita Satyapal: George Mason University, Professor, Research advisor.
Peter P. Plavchan: George Mason University, Associate Professor, Research advisor.
Joseph C. Weingartner: George Mason University, Associate Professor, Academic advisor.