

Michael A. Reefer

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Michael-Reefe
Michael Reefer
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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.	2022 – 2027
	MIT Whiteman Fellowship MIT Physics Department fellowship covering the full stipend and tuition for the first year of study, funded by the Patrons of Physics Fellows at MIT.	2022 – 2023
	Dean's Award for Excellence in Academics and Research \$1,250 award. GMU College of Science award for excellence in academics and/or research.	2022
	Outstanding Undergraduate Research Award GMU Physics & Astronomy department recognition of exceptional undergraduate research.	2022
	Outstanding Graduating Senior Award GMU Physics & Astronomy department recognition of an exceptional graduating senior.	2022
	Outstanding Learning Assistant Award \$150 award. Recognition of outstanding leadership as a learning assistant.	2021
	Osher Lifelong Learning Institute Scholarship \$500 award. Recognition of academic excellence for GMU students.	2020
	George Mason University Distinction Scholarship \$2,000 per year. Merit based scholarship for academically distinguished GMU students.	2018 – 2022
	Dean's List Cumulative GPA above 3.5 at GMU.	2018 – 2022

First & Second Author

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

Coauthor

11. M. El Mufti, P. P. Plavchan, H. Isaacson et al. incl. **M. Reefe**, “TOI 560: Two Transiting Planets Orbiting a K Dwarf Validated with iSHELL, PFS, and HIRES RVs.” *AJ* **165**, 10 (2023), [ADS].
10. R. W. Pfeifle, S. Satyapal, C. Ricci et al. incl. **M. Reefe**, “NuSTAR Observes Two Bulgeless Galaxies: No Hard X-Ray AGN Detected in NGC 4178 or J0851+3926.” *ApJ* **943**, 109 (2023), [ADS].
9. J. M. Wittrock, P. Plavchan, B. L. Cale et al. incl. **M. Reefe**, “Validating AU Microscopii d with Transit Timing Variations.” *arXiv e-prints* arXiv:2302.04922 (2023), [ADS].
8. E. A. Gilbert, T. Barclay, E. V. Quintana et al. incl. **M. Reefe**, “Flares, Rotation, and Planets of the AU Mic System from TESS Observations.” *AJ* **163**, 147 (2022), [ADS].
7. J. E. Rodriguez, S. N. Quinn, A. Vanderburg et al. incl. **M. Reefe**, “Another Shipment of Six Short-Period Giant Planets from TESS.” *arXiv e-prints* arXiv:2205.05709 (2022), [ADS].
6. J. M. Wittrock, S. Dreizler, **M. Reefe** et al., “Transit Timing Variations for AU Microscopii b and c.” *AJ* **164**, 27 (2022), [ADS].
5. S. W. Yee, J. N. Winn, J. D. Hartman et al. incl. **M. Reefe**, “The TESS Grand Unified Hot Jupiter Survey. II. Twenty New Giant Planets.” *arXiv e-prints* arXiv:2210.15473 (2022), [ADS].
4. A. Fukui, J. Korth, J. H. Livingston et al. incl. **M. Reefe**, “TOI-1749: an M dwarf with a Trio of Planets including a Near-resonant Pair.” *AJ* **162**, 167 (2021), [ADS].
3. A. Osborn, D. J. Armstrong, B. Cale et al. incl. **M. Reefe**, “TOI-431/HIP 26013: a super-Earth and a sub-Neptune transiting a bright, early K dwarf, with a third RV planet.” *MNRAS* **507**, 2782–2803 (2021), [ADS].
2. J. Teske, S. X. Wang, A. Wolfgang et al. incl. **M. Reefe**, “The Magellan-TESS Survey. I. Survey Description and Midsurvey Results.” *ApJS* **256**, 33 (2021), [ADS].
1. S. Dreizler, I. J. M. Crossfield, D. Kossakowski et al. incl. **M. Reefe**, “The CARMENES search for exoplanets around M dwarfs. LP 714-47 b (TOI 442.01): populating the Neptune desert.” *A&A* **644**, A127 (2020), [ADS].

CONFERENCES & PRESENTATIONS	4. 240th Meeting of the American Astronomical Society 12–17 June 2022
	<i>(iPoster)</i> <i>Pasadena, CA</i>
	CLASS: Coronal Line Activity in the Sloan Digital Sky Survey [ADS]
	3. TESS Science Conference II 2–6 Aug. 2021
<i>(Poster)</i> <i>Virtual</i>	
A Flexible Python Observatory Automation Framework for the George Mason University Campus Telescope [zenodo]	
2. GMU College of Science Undergraduate Research Colloquium 22 Apr. 2021	
<i>(Poster)</i> <i>Virtual</i>	
Automation of TESS Follow-up Observations with the GMU Campus Telescope	
1. 237th Meeting of the American Astronomical Society 11–15 Jan. 2021	
<i>(iPoster)</i> <i>Virtual</i>	
An Asynchronous Object-Oriented Approach to Automation of the 0.8-meter George Mason University Campus Telescope in Python [ADS]	
PROPOSALS	<p>Contributor</p> <p>Gemini Observatory: MAROON-X Instrument, 24+ nights requested 2021B</p> <p>Keck Observatory: HIRES Instrument, 5 nights requested 2021B</p> <p>NASA IRTF: iSHELL Instrument, 50 nights requested 2021B</p> <p>Gemini Observatory: MAROON-X Instrument, 24+ nights requested 2022A</p>
COMMUNITY OUTREACH	<p>College of Science Graduation Speaker May 2022</p> <p><i>GMU College of Science</i> <i>Fairfax, VA</i></p> <p>Chosen to be the student speaker for the College of Science’s Spring 2022 graduation event. [Recording].</p> <p>Undergraduate Representative Jan. 2022</p> <p><i>GMU Hiring Committee, for an Astronomy Professor</i> <i>Fairfax, VA</i></p> <p>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.</p> <p>President July 2021 – Aug. 2022</p> <p><i>Spectrum</i> <i>Fairfax, VA</i></p> <p>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.</p> <p>Peer Mentor Dec. 2020 – Aug. 2022</p> <p><i>Spectrum</i> <i>Fairfax, VA</i></p> <p>Providing academic and personal tutoring for students in physics and astronomy at GMU through Spectrum.</p>
SCIENCE OUTREACH	<p>Graduate Student Panelist Aug. 2022</p> <p><i>Aspiring Scientists’ Summer Internship Program (ASSIP)</i> <i>Fairfax, VA</i></p> <p>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.</p> <p>NSF GRFP Cohort Workshop Panelist July 2022</p> <p><i>GMU Office of Fellowships</i> <i>Fairfax, VA</i></p> <p>Served on a panel of NSF GRFP recipients and reviewers to answer students’ questions about the application and review process.</p> <p>Competition Judge Oct. 2020</p> <p><i>MathCounts</i> <i>Fairfax, VA</i></p> <p>Scored math exams based on the answer key for middle school students participating in the competition.</p>

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.