

# Rahul Jayaraman

Massachusetts Institute of Technology  
37-664k, 70 Vassar Street  
Cambridge, MA, 02139  
*Updated: October 1, 2024*

E-mail: [rjayaram@mit.edu](mailto:rjayaram@mit.edu)  
ORCID: 0000-0002-7778-3117  
Phone: +1 (408) 666-6323  
Website: [rj627.github.io](https://rj627.github.io)

---

## Education

Massachusetts Institute of Technology, Cambridge, MA	Aug 2019 - May 2025 (Expected)
PhD Candidate in Physics (GPA: 5.0/5.0)	
Thesis Advisor: Dr. George Ricker	
Brown University, Providence, RI	Sep 2015 - May 2019
Sc.B. Physics (Honors) & A.B. Comp. Sci., <i>magna cum laude</i> (GPA: 3.94/4.0)	

---

## Publication Summary ([ADS library](#))

5 **first-author peer-reviewed papers**, 20+ co-author papers (major and minor contributions)

- **Research Topics:** Transient detection and characterization; Optical signatures of gamma-ray bursts; Tidal asteroseismology of heat-driven pulsators

Author or co-author of 5 GCN Circulars, 2 conference proceedings, and 2 Research Notes

*A full listing of publications can be found at the end of the document*

---

## Selected Proposals and Observing Experience

### *As PI*

Magellan 6.5-m (IMACS): Identifying the Host Galaxy of GRB 230903A (0.5 nights)	2024A
TESS DDT Proposal 73: Observations of Tri-Axial Pulsators	Jul 2024
LCO 2-m (FLOYDS): Follow-up for Transients Detected with TESS (1 night)	2022B
TESS DDT Proposal 60: Tidally Tilted Pulsators in Cycle 4	Apr 2022
TESS DDT Proposal 39: TIC 5724661, a Unique sdB Binary	Jul 2021
TESS G05108: Using TESS to Study Tidally Tilted Pulsators	Aug 2022
TESS G04168: Complex Modulations in Rapidly Rotating M Dwarfs	Apr 2021

### *As co-I*

TESS G07128: Tidally Tilted Pulsators—the Next Level	Sep 2024
TESS G06123: Exploiting The Scientific Potential Of Tidally Tilted Pulsators	Aug 2023

---

## Presentations

Small-format and Seminar

- Observer Lunch, Northwestern/CIERA, Nov 2024 (*upcoming*)
- Astronomy Tea Talk, Caltech, Oct 2024 (*upcoming*)
- **(Invited)** Astrophysics Lunch, Cornell, Sep 2024
- **(Invited)** Transient Science @ Space Telescope Group Meeting, STScI, Apr 2024
- **(Invited)** Gamma-ray Burst Lunch, NASA/Goddard, Apr 2024
- **(Invited)**, virtual) ULTRASAT Gamma-ray Burst Working Group, Dec 2023
- **(Invited)** Harvard ITC Luncheon Seminar, Oct 2023
- The Transient Universe Workshop (Corsica), Jun 2023
- **(Invited Guest Lecture)**, PSYC 201, UMass Boston, Apr 2023
- TESS Science Update Meeting, virtual, Nov 2020

## Conferences

- **Talk:** Optical Emission from Gamma-ray Bursts in TESS, *Rise-Time* (Aug ‘24, West Lafayette, IN)
- **Talk:** TESS as a Multi-Messenger Observatory, *TESS Science Conference 3* (Jul ‘24, Boston, MA)
- **Talk:** Characterizing Gamma-ray Bursts with TESS, *TESS Science Conf. 3* (Jul ‘24, Boston, MA)
- **Talk:** Studying Gamma-ray Bursts and Gravitational-wave events with TESS, *Transients Down Under* (Jan ‘24, Melbourne, Australia).
- **Talk:** Studying Gamma-ray Bursts with TESS, AAS 243 Meeting (Jan ‘24, New Orleans, LA).
- **Talk:** Tidally Tilted Pulsations: A Novel Window into Asteroseismic Inference. TASC6/KASC13 Workshop (Jul ‘22, Leuven, Belgium).
- **Talk:** Tidally Tilted Pulsations in HD 265435, AAS 240 (Jun ‘22, Pasadena, CA).
- **Poster:** BU CMi: The Tighest-Known Flat Quadruple System, TSC II (Aug ‘21, virtual).
- **Talk:** TESS: The Transient (Extragalactic) Survey Satellite, AAS 237 (Jan ‘21, virtual).
- **Talk:** Transient Detection in FFIs Using ML, AAS 237 Special Session (Jan ‘21, virtual).
- **Poster:** Using TESS Full-Frame Images to Detect Transients, AAS 235 (Jan ‘20, Honolulu, HI).
- **Poster:** The Phase Curve of WASP-79b. Rhode Island Space Grant Meeting (Apr ‘19, Bristol, RI).
- **Poster:** Identification of Exoplanetary Targets for JWST, ERES IV (Jun ‘18, State College, PA).

---

## Awards, Grants, and Fellowships

MIT Physics Department, Graduate Service Award	Jun 2021
NSF Graduate Research Fellowship Program, Honorable Mention	Mar 2021
Rhode Island Space Grant, Academic Year Scholarship	May 2018
Rhode Island Space Grant, Summer Fellowship ( <i>declined</i> )	Mar 2017
Karen T. Romer Undergraduate Teaching & Research Award, Summer ( <i>declined</i> )	Mar 2017
National Merit Scholarship	Mar 2015

---

## Selected Outreach and Service

**Proposal Referee**, Canada-France-Hawaii Telescope

**Referee**, *Astronomy & Astrophysics*

**LOC Member**, TESS Science Conferences 2–3

<b>physREFS Peer Counselor</b> , MIT Physics Department	Jan 2020 - present
<b>Academic Mentor</b> (8.012 - Mechanics; 8.03 - Waves), MIT Physics Department	Sep 2020 - Dec 2023
<b>Bargaining Committee Member</b> , MIT Graduate Student Union	Jul 2022 - Sep 2023
<b>Graduate Representative</b> , MIT Physics Graduate Admissions Committee	Aug 2020 - Jul 2022
<b>Graduate Representative</b> , MIT Physics Values/DEI Working Group	Sep 2020 - Jun 2022
<b>President</b> , MIT Physics Graduate Student Council	Jul 2021 - Jun 2022
<b>Diversity, Equity, and Inclusion Fellow</b> , MIT Graduate Student Council	Jan 2021 - Dec 2021
<b>Small Group Mentor</b> , Warrior-Scholar Project	Jul 2021
<b>Webmaster</b> , <u>MIT Graduate Student Council</u>	Sep 2019 - Sep 2021
<b>Graduate Representative</b> , MIT Kavli Institute Anti-Racism/DEI Task Force	Jun 2020 - Aug 2020
<b>Volunteer Director &amp; Astronomy Contest Lead</b> , Brown Science Olympiad	Sep 2017 - Mar 2019
<b>In-class Tutor</b> , Providence Public Schools	Sep 2015 - May 2017

---

## Mentoring Experience

Michelle Xiang, MIT '26 (MIT UROP; co-supervised with Jeroen Audenaert)	May 2023 - present
Valencia Zhang (Andover Academy; co-supervised with Prof. Saul Rappaport)	Mar 2023 - present
Mohammad Abdullah, MIT '24 (MIT UROP; co-supervised with Prof. Michael Fausnaugh)	Jun 2021 - Jan 2022

---

## Teaching Experience

<b>Teaching Assistant</b> , MIT 8.284: Modern Astrophysics	Sep 2024 - Dec 2024
<b>Academic Mentor</b> , MIT 8.012: Classical Mechanics	Sep 2023 - Dec 2023
	Sep 2020 - Dec 2020
<b>Academic Mentor</b> , MIT 8.03: Waves and Oscillations	Feb 2021 - Jun 2021
<b>Physics Group Tutoring Coordinator</b> , Brown Dean of the College Office	Sep 2017 - May 2019
<b>Undergraduate TA</b> , Brown Department of Computer Science	Aug 2016 - Dec 2016

---

## Other Professional Experience

<b>Astrophysics Mission Design School</b> , JPL (Pasadena, CA)	Jan 2023 - Apr 2023
<b>Director of Web Development</b> , <u>Brown Daily Herald</u>	Mar 2018 - Sep 2019

<b>Software Engineering Intern</b> , TripAdvisor (Needham, MA)	Jun 2018 - Aug 2018
<b>Full-Stack Web Developer Intern</b> , Adobe (San Francisco, CA)	May 2017 - Aug 2017
<b>Application Development Intern</b> , ServiceNow (Santa Clara, CA)	May 2016 - Aug 2016

---

## Press

Research Updates from TESS, **MIT News Office** ([link](#))

Feb 10, 2021

---

## Full List of Publications ([ADS library](#))

### *As first author*

1. Rahul Jayaraman, Saul Rappaport, Brian Powell, Gerald Handler, Mark Omohundro, Robert Gagliano, Veselin Kostov, Jim Fuller, Donald Kurtz, Valencia Zhang, and George Ricker. TIC 435850195: The Second Tri-Axial, Tidally Tilted Pulsator. *arXiv e-prints*, page arXiv:2409.03815, September 2024
2. **Rahul Jayaraman**, Michael Fausnaugh, George R. Ricker, and Roland Vanderspek. Gamma-Ray Bursts Observed by the Transiting Exoplanet Survey Satellite: Prompt Optical Counterparts and Afterglows of Swift-XRT Localized GRBs. *arXiv e-prints (2308:05148)*, August 2023 (accepted ApJ)
3. **Rahul Jayaraman**, Saul A. Rappaport, Lorne Nelson, Donald W. Kurtz, George Dufresne, Gerald Handler, Abdel Senhadji, David W. Latham, George Zhou, Allyson Bieryla, and George R. Ricker. TIC 5724661: A Long-period Binary with a Pulsating sdB Star and  $\delta$  Scuti Variable. *The Astrophysical Journal*, 936(2):123, September 2022
4. **Rahul Jayaraman**, Gerald Handler, Saul A. Rappaport, Jim Fuller, Donald W. Kurtz, Stéphane Charpinet, and George R. Ricker. Tidally Tilted Pulsations in HD 265435, a Subdwarf B Star with a Close White Dwarf Companion. *The Astrophysical Journal Letters*, 928(2):L14, April 2022
5. **Rahul Jayaraman**, Svetlana Hubrig, Daniel L. Holdsworth, Markus Schöller, Silva Järvinen, Donald W. Kurtz, Robert Gagliano, and George R. Ricker. Could the Magnetic Star HD 135348 Possess a Rigidly Rotating Magnetosphere? *The Astrophysical Journal Letters*, 924(1):L10, January 2022

### *As major contributing author*

1. Jim Fuller, Saul Rappaport, **Rahul Jayaraman**, Gerald Handler, and Donald Kurtz. Tidally Distorted Stars are Tri-axial Pulsators. (*submitted to the Astrophysical Journal*)
2. F. Kahraman Aliçavuş, G. Handler, S. Chowdhury, E. Niemczura, **R. Jayaraman**, P. De Cat, D. Ozuvar, and F. Aliçavuş. On the Existence of “Maia variables”. *arXiv e-prints*, page arXiv:2404.16988, April 2024 (*accepted to Publications of the Astronomical Society of Australia*)
3. Valencia Zhang, Saul Rappaport, **Rahul Jayaraman**, Donald W. Kurtz, Gerald Handler, James Fuller, and Tamas Borkovits. TIC 184 743 498: the first tri-axial stellar pulsator. *Monthly Notices of the Royal Astronomical Society*, 528(2):3378–3391, February 2024
4. Veselin B. Kostov, Brian P. Powell, Saul A. Rappaport, Tamás Borkovits, Robert Gagliano, Thomas L. Jacobs, **Rahul Jayaraman**, Martti H. Kristiansen, et al. 101 eclipsing quadruple star candidates discovered in TESS full frame images. *Monthly Notices of the Royal Astronomical Society*, 527(2):3995–4017, January 2024

5. Luke G. Bouma, **Rahul Jayaraman**, Saul Rappaport, Luisa M. Rebull, Lynne A. Hillenbrand, Joshua N. Winn, et al. Transient Corotating Clumps around Adolescent Low-mass Stars from Four Years of TESS. *The Astronomical Journal*, 167(1):38, January 2024
6. Theodor Pribulla, Tamás Borkovits, **Rahul Jayaraman**, Saul Rappaport, Tibor Mitnyan, Petr Zasche, et al. BU Canis Minoris - the most compact known flat doubly eclipsing quadruple system. *Monthly Notices of the Royal Astronomical Society*, 524(3):4220–4238, September 2023
7. Silva P. Järvinen, Svetlana Hubrig, **Rahul Jayaraman**, Aleksandar Cikota, and Markus Schöller. The magnetic, spectroscopic, and photometric variability of the Wolf-Rayet star WR 55. *Monthly Notices of the Royal Astronomical Society*, 524(1):L21–L25, September 2023
8. Donald W. Kurtz, **Rahul Jayaraman**, Paulina Sowicka, Gerald Handler, Hideyuki Saio, Jonathan Labadie-Bartz, and Umin Lee. HD 42477: coupled r modes, g modes, and a p mode in an A0Vnne star. *Monthly Notices of the Royal Astronomical Society*, 521(3):4765–4774, May 2023
9. Geoffrey Mo, **Rahul Jayaraman**, Michael Fausnaugh, Erik Katsavounidis, George R. Ricker, and Roland Vanderspek. Searching for Gravitational-wave Counterparts Using the Transiting Exoplanet Survey Satellite. *The Astrophysical Journal Letters*, 948(1):L3, May 2023
10. P. Zasche, T. Borkovits, **R. Jayaraman**, S. A. Rappaport, M. Brož, D. Vokrouhlický, I. B. Bíró, T. Hegedüs, Z. T. Kiss, R. Uhlař, et al. V994 Herculis: a unique triply eclipsing sextuple star system. *Monthly Notices of the Royal Astronomical Society*, 520(2):3127–3142, April 2023
11. S. P. Järvinen, S. Hubrig, **R. Jayaraman**, I. Ilyin, and M. Schöller. Magnetic field measurements of sharp-lined Ap stars. *Monthly Notices of the Royal Astronomical Society*, 516(2):2629–2640, October 2022
12. Brian P. Powell, Saul A. Rappaport, Tamás Borkovits, Veselin B. Kostov, Guillermo Torres, **Rahul Jayaraman**, David W. Latham, et al. TIC 114936199: A Quadruple Star System with a 12 Day Outer-orbit Eclipse. *The Astrophysical Journal*, 938(2):133, October 2022

*As minor contributing author or as part of a collaboration*

1. S. Hubrig, M. Schöller, S. P. Järvinen, A. Cikota, M. Abdul-Masih, A. Escorza, and **R. Jayaraman**. Detection of extragalactic magnetic massive stars. *Astronomy & Astrophysics*, 686:L4, June 2024
2. S. A. Rappaport, T. Borkovits, T. Mitnyan, R. Gagliano, N. Eisner, T. Jacobs, A. Tokovinin, B. Powell, V. Kostov, M. Omohundro, M. H. Kristiansen, **R. Jayaraman**, et al. Seven new triply eclipsing triple star systems. *Astronomy & Astrophysics*, 686:A27, June 2024
3. D. L. Holdsworth, M. S. Cunha, M. Lares-Martiz, D. W. Kurtz, V. Antoci, S. Barceló Forteza, P. De Cat, A. Derekas, C. Kayhan, D. Ozuyar, et al. (including **R. Jayaraman**) TESS Cycle 2 observations of roAp stars with 2-min cadence data. *Monthly Notices of the Royal Astronomical Society*, 527(4):9548–9580, February 2024
4. Daniel A. Perley, Anna Y. Q. Ho, Michael Fausnaugh, Gavin P. Lamb, Mansi M. Kasliwal, Tomas Ahumada, Shreya Anand, Igor Andreoni, Eric Bellm, et al. (including **Rahul Jayaraman**) AT2019pim: A Luminous Orphan Afterglow from a Moderately Relativistic Outflow. *arXiv e-prints*, January 2024
5. M. M. Fausnaugh, P. J. Vally, M. A. Tucker, C. S. Kochanek, B. J. Shappee, K. Z. Stanek, George R. Ricker, Roland Vanderspek, Manan Agarwal, Tansu Daylan, **Rahul Jayaraman**, Rebekah Hounsell, and Daniel Muthukrishna. Four Years of Type Ia Supernovae Observed by TESS: Early-time Light-curve Shapes and Constraints on Companion Interaction Models. *The Astrophysical Journal*, 956(2):108, October 2023

6. S. Hubrig, S. P. Järvinen, I. Ilyin, M. Schöller, and **R. Jayaraman**. Are magnetic fields universal in O-type multiple systems? *Monthly Notices of the Royal Astronomical Society*, 521(4):6228–6246, June 2023
7. J. Greiner, C. Maitra, F. Haberl, R. Willer, J. M. Burgess, N. Langer, J. Bodensteiner, D. A. H. Buckley, I. M. Monageng, A. Udalski, H. Ritter, K. Werner, P. Maggi, **R. Jayaraman**, and R. Vanderspek. A helium-burning white dwarf binary as a supersoft X-ray source. *Nature*, 615(7953):605–609, March 2023
8. Colin Littlefield, D. W. Hoard, Peter Garnavich, Paula Szkody, Paul A. Mason, Simone Scaringi, Krystian Ilkiewicz, Mark R. Kennedy, Saul A. Rappaport, and **Rahul Jayaraman**. Kepler K2 and TESS Observations of Two Magnetic Cataclysmic Variables: The New Asynchronous Polar SDSS J084617.11+245344.1 and Paloma. *The Astronomical Journal*, 165(2):43, February 2023
9. Maximilian N. Günther, David A. Berardo, Elsa Ducrot, Catriona A. Murray, Keivan G. Stassun, Katalin Olah, L. G. Bouma, Saul Rappaport, Joshua N. Winn, Adina D. Feinstein, Elisabeth C. Matthews, et al. (including **Rahul Jayaraman**) Complex Modulation of Rapidly Rotating Young M Dwarfs: Adding Pieces to the Puzzle. *The Astronomical Journal*, 163(4):144, April 2022
10. Natalia M. Guerrero, S. Seager, Chelsea X. Huang, Andrew Vanderburg, Aylin Garcia Soto, Ismael Mireles, Katharine Hesse, William Fong, Ana Glidden, Avi Shporer, David W. Latham, Karen A. Collins, et al. (including **Rahul Jayaraman**) The TESS Objects of Interest Catalog from the TESS Prime Mission. *The Astrophysical Journal Supplement Series*, 254(2):39, June 2021
11. Brian P. Powell, Veselin B. Kostov, Saul A. Rappaport, Tamás Borkovits, Petr Zasche, Andrei Tokovinin, Ethan Kruse, David W. Latham, Benjamin T. Montet, Eric L. N. Jensen, **Rahul Jayaraman**, Karen A. Collins, et al. TIC 168789840: A Sextuply Eclipsing Sextuple Star System. *The Astronomical Journal*, 161(4):162, April 2021
12. Kristin S. Sotzen, Kevin B. Stevenson, David K. Sing, Brian M. Kilpatrick, Hannah R. Wakeford, Joseph C. Filippazzo, Nikole K. Lewis, et al. (including **Rahul Jayaraman**) Transmission Spectroscopy of WASP-79b from 0.6 to 5.0  $\mu\text{m}$ . *The Astronomical Journal*, 159(1):5, January 2020

*Non peer-reviewed publications and conference proceedings*

1. G. Mo, **R. Jayaraman**, D. Frostig, M. Fausnaugh, E. Katsavounidis, and G. Ricker. Multi-messenger astrophysics in the gravitational-wave era. In *XVIII International Conference on Topics in Astroparticle and Underground Physics*, page 105, January 2024
2. Michael M. Fausnaugh, **Rahul Jayaraman**, Roland Vanderspek, George R. Ricker, Christopher J. Burke, Knicole D. Colón, et al. Observations of GRB 230307A by TESS. *Research Notes of the American Astronomical Society*, 7(3):56, March 2023
3. Gerald Handler, **Rahul Jayaraman**, Donald W. Kurtz, Jim Fuller, and Saul A. Rappaport. Tidally Tilted Pulsators. In *Polish Astronomical Society Meeting*, volume 12, pages 183–186, October 2022
4. **Rahul Jayaraman**, Donald W. Kurtz, Gerald Handler, Saul Rappaport, and George Ricker. Two New roAp Stars Discovered with TESS. *Research Notes of the American Astronomical Society*, 5(11):268, November 2021

---

## Miscellany

**Professional Affiliations:** American Astronomical Society

**Programming Skills:** Python, Java, C, JavaScript, HTML/CSS, Mathematica, IDL, R, Scala

**Spoken Languages:** English, Spanish, Tamil, Hindi (limited proficiency)