

# Ben Cassese

Ph.D. Candidate, Department of Astronomy, Columbia University

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## EDUCATION

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<b>Ph.D. (in progress)</b> Astronomy, Columbia University	2021-
<b>M.Phil.</b> Astronomy, Columbia University	2024
<b>M.A.</b> , Astronomy, Columbia University	2023
<b>B.S.</b> Planetary Science and History, California Institute of Technology	2016-2020

## PUBLICATIONS ([VIEW ALL RECORDS ON ADS](#), [INCL. SELECT SCICOMM](#))

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### As First Author:

4. [submitted] **Cassese, B.**, and 8 others, “Quantifying the Contamination of TESS Ecliptic-Plane Light Curves by Minor Planets” *AJ*
3. [submitted] **Cassese, B.**, Rice, M., & Lu, T. “A High-Precision, Differentiable Code for Solar System Ephemerides” *PSJ*
2. **Cassese, B.**, Vega, J., Lu, T., Rice, M., Poddar, A., & Kipping, K. (2024) “[squishyplanet: modeling transits of non-spherical exoplanets in JAX](#)”, *JOSS*, 9(100), 6972
1. **Cassese, B.** & Kipping, D. (2022) “[Kepler-1708 b-i is likely undetectable with HST](#)”, *MNRAS*, 516, 3, 3701–3708

### As Co-Author:

4. [submitted] Yahalom, D. and 11 others, incl. **Cassese, B.** (2024) “[The democratic detrender: Ensemble-Based Removal of the Nuisance Signal in Stellar Time-Series Photometry](#)”, *AAS Journals*
3. Lu, T., Li, G., **Cassese, B.** & Lin, D.N.C. (2024) “[The Dynamical History of HIP-41378 f - Oblique Exorings Masquerading as a Puffy Planet](#)”, *ApJ*, 980, 39
2. Hunt, J. and 6 others, incl. **Cassese, B.** (2023) “[Radial phase spirals in the Solar neighbourhood](#)”, *MNRAS*, 527, 4, 11393–11403
1. Trumbo, S., Davis, M.R., **Cassese, B.** & Brown, M.E. (2022) “[Spectroscopic mapping of Io’s surface with HST/STIS: SO<sub>2</sub> frost, sulfur allotropes, and large-scale compositional patterns](#)”, *Planet. Sci. J.* **3** 272

## TELESCOPE TIME

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### As PI:

James Webb Space Telescope:

- Cassese, B.** & 11 others Cycle 3 GO. ID: 6491. “[Revealing the Oblateness and Satellite System of an Extrasolar Jupiter Analog](#)”, 71.62 hours

Subaru 8.2m Telescope:

**Cassese, B.** & Rice, M. 2024a, “Follow up of TESS TNO Candidates”, 1 night, HSC. Time granted via NSF/NOIRLab’s share of Gemini Observatory time → Gemini Observatory’s time sharing agreement w/ Subaru Telescope

Víctor M. Blanco 4m Telescope:

**Cassese, B.** & Rice, M. 2024a, “Follow up of TESS TNO Candidates”, 3 nights, DECam. Time granted via NSF/NOIRLab’s 2024a call for proposal

MDM Hiltner 2.4m Telescope:

**Cassese, B.** & Yahalomi, D. 2023a, “Follow up of a Candidate TNO Detection from TESS”, 5 nights, OSMOS imager

**Cassese, B.** 2022b, “Attempted Recovery of a Distant Trans-Neptunian Object”, 5 nights, OSMOS imager (shortened to 2 following the 2022 Contreras wildfire)

As Co-I:

James Webb Space Telescope:

(archival program) Kipping, D. **Cassese, B.**, Batygin, K. Cycle 4 GO. ID: JWST-AR-09042. “For the Love of Exoplanets: Characterization of the Internal Structure of Hot-Jupiters”.

Changeat, Q.. & 11 others, incl. **Cassese, B.** Cycle 3 GO. ID: 5531. [“Contextualizing our solar-system: Atmospheric characterization of the Jupiter-analogue Kepler-167e”](#), 39.26 hours. Selected, but observations not taken due to observatory conflicts

Palomar Observatory Palomar 200-inch Hale Telescope:

Rice, M., & **Cassese, B.**. 2024b, “Examining the Edges of the Solar System”, 4 nights, WaSP imager

Rice, M., & **Cassese, B.**. 2023b, “Examining the Edges of the Solar System”, 5 nights, WaSP imager

MDM McGraw-Hill 1.3m Telescope:

Yahalomi, D., **Cassese, B.**, Sayeed, M., & Hattori, S. 2023a, “Photometric Confirmation and Ephemeris Refinement of TESS Planet Candidates”, 5 nights

Yahalomi, D., **Cassese, B.**, Sayeed, M., & Hattori, S. 2022b, “Photometric Confirmation and Ephemeris Refinement of TESS Planet Candidates”, 5 nights (cancelled following the 2022 Contreras wildfire)

## CONFERENCE TALKS

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**Cassese, B.** & Rice, M. (2024), [“Initial results of a TESS outer solar system survey”](#), TESS Science Conference III, Cambridge, MA

**Cassese, B.** & Kipping, D. (2022), [“Detectability of Galilean Moon Analogs with JWST”](#), Exoplanets IV, Las Vegas, NV, 105.01

**Cassese, B.** & Stevenson, D. (2018) [“Feasibility of in-situ water production during fast-accreting super-earth formation”](#), 50th AAS DPS Meeting, Knoxville, TN, 101.01

## TEACHING

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As Instructor:

ASTR 1904: Astronomy Lab I, Columbia

Fall 2022

As Teaching Assistant:

ASTR 1610: Theories of the Universe, from Babylon to Big Bang, Columbia

Spring 2022

ASTR 1404: Stars, Galaxies, and Cosmology, Columbia

Fall 2021

Ge/Ay 103: Introduction to Planetary Science, Caltech (4.89/5 review)

Spring 2020

Ge 1: Earth and Environment, Caltech (4.9/5 review)

Spring 2018

Training:

## AWARDS AND FELLOWSHIPS

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AAS Media Fellowship, American Astronomical Society	2022-23
Fritz B. Burns Prize, Division of Geological and Planetary Sciences, Caltech	2019
Beckman Political Science Award, California Institute of Technology	2019
Perpall Speaking Competition Winner, California Institute of Technology	2019
Gee Family Poster Competition Winner, California Institute of Technology	2018
George W. Housner Student Discovery Fund, California Institute of Technology	2018
Perpall Speaking Competition Finalist, California Institute of Technology	2018

## COMPUTATION RESOURCES

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**Cassese, B.** (2025) [Simulating the solar system for automated asteroid detection](#), NSF Access Program PHY250025, Explore level (400k CPU-hours)

## PROFESSIONAL ENGAGEMENT

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Publications of the Astronomical Society of the Pacific	
Volunteer Reviewer	2025-
Journal of Open Source Software (JOSS)	
Volunteer Reviewer	2024-
American Astronomical Society	
AAS Media Fellow: Writer for <a href="#">AAS Nova</a>	2022-2024
<a href="#">Astrobites</a> Collaboration	
Co-Chair, Science Policy Committee	2022-2023
Member, Scheduling Committee	2022-2023
Author	2022-2024
National Academy of Sciences, Space Studies Board	
<a href="#">Lloyd V. Berkner Space Policy Intern</a> ( <i>Astro2020 Decadal Survey staff</i> )	2019
AAS Division of Planetary Science Federal Relations Subcommittee	
Undergraduate Member	2018-2020
Columbia University Astronomy Department	
High school outreach co-coordinator	2024
Admissions visit co-coordinator	2023

## OUTREACH AND MENTORING

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Mentor, Student Training in Astronomy Research program, Columbia Astronomy	2024-present
Mentor, grad/undergrad mentoring program, Columbia Astronomy	2021-present
Mentor, Independent Inquiry Project, Inspired Teaching Demonstration School	2021-2022
<i>Mentored an 8th grade project on exoplanets</i>	
Volunteer Tutor, <a href="#">RISE Program</a> , Caltech Y	2016-2019

## SOFTWARE

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### Lead Developer:

<a href="#">jorbit</a>	2024
<i>Solar system orbit fitting and propagation in JAX. Open source python package.</i>	
<a href="#">squishyplanet</a>	2024
<i>Transits and phase curves of non-spherical exoplanets in JAX. Open source python package.</i>	
<a href="#">astro-forecaster</a>	2021
<i>A vectorized and packaged up rewrite of <a href="#">forecaster</a> from <a href="#">Chen &amp; Kipping 2017</a>.</i>	

Open-source contributions (pull requests only, for issues see my [github](#)):

[SORA](#): PR for correctly resolving spacecraft locations (03/2025)  
[tesswcs](#): PR for correcting pointing info bug (03/2025)  
[tess-prf](#): PR for correcting bug when querying coordinates on detector edge (03/2025)  
[exotic-ld](#): Large PR, pre-compute grids of stellar models for faster runtime interpolation (08/2024)  
[democratic-detrender](#): Several PRs for online docs skeleton+content (06/2024)  
[nbi](#): Small PR for docs rendering (05/2024)

## OTHER PRESENTATIONS

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### At Home Institution:

Inter-department STEM Grad Talks, Graduate School of Arts and Sciences	Oct. 2022
Astrofest 2022, Columbia Astronomy Dept.	Sept. 2022
Columbia Astro “Friends of the Department” Evening, Columbia Astronomy Dept.	Jun. 2022
Small Council Donors Meeting, Cool Worlds Lab	Nov. 2021

### At Other Institutions: (\* = *invited*)

*Astronomy Seminar, Carnegie EPL	May 2025
*Planetary lunch (PLUNCH) & Stars Seminar, UC Santa Cruz	May 2025
NYC Exoplanets, Flatiron Institute Center for Computational Astrophysics	May 2024
*Yale Exoplanets & Stars Seminar, Yale University	Apr. 2023
GothamFest 2023, Flatiron Institute Center for Computational Astrophysics	Jan. 2023
GothamFest 2021, Flatiron Institute Center for Computational Astrophysics	Dec. 2021

## SCIENCE COMMUNICATION

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### With Sky and Telescope:

[The Webb Telescope Reveals a “Featherweight Giant” Planet](#) (online 12/2024, print April 2025)

### With AAS Nova:

[Cool It Down: Warm Jupiters Are Better Aligned Than Hot Jupiters](#) (10/2024)  
[Hunting for a Target on the Fly](#) (09/2024)  
[The Odds of the Unthinkable](#) (08/2024)  
[Plotting the Course, a Billion Miles Away](#) (08/2024)  
[The Featherweight Champion of Black Holes](#) (07/2024)  
[Hot Stars Spin Sideways](#) (07/2024)  
[Dimorphos, from Up Close and Far Away](#) (06/2024)  
[Modeling the Unknown: A New Tool for Radio Bursts](#) (05/2024)  
[Huge Survey vs. Tiny Space Junk](#) (05/2024)  
[Possibility of Detecting Clumsy Asteroids](#) (04/2024)

Cosmic Rays Near and Far (04/2024)  
 Making Computers Count Pulses (03/2024)  
 How to Slice a Star (03/2024)  
 Supernova Nickel and Neural Nets (03/2024)  
 Magnetic Last Moments (02/2024)  
 What Kind of World is LHS 1140 b? (02/2024)  
 The AAS Goes to LIGO (01/2024)  
 JWST: The World's Most Sophisticated Carbon Monoxide Detector (12/2023)  
 Patience Rewarded with a Planet (12/2023)  
 Two-for-One, Three Times: New Candidate Brown Dwarf Binaries (11/2023)  
 Enceladus, Previous Speedster (10/2023)  
 Metal Before It Was Cool: Super-Enrichment in the Early Universe (10/2023)  
 A Forge Without Iron (09/2023)  
 Lonely Neutrinos: IceCube's First Population Limits (09/2023)  
 Fast Radio Burst Roundup (08/2023)  
 [Carried by Sky & Telescope Online (08/2023)]  
 Spotting an Exoplanet in the Mid-Infrared (08/2023)  
 All Dust, No Ice: Comet 46P/Wirtanen (07/2023)  
 [Carried by Sky & Telescope Online (08/2023)]  
 When White Dwarf Is on the Menu (07/2023)  
 Baby Brown Dwarf Might be Growing: JWST Observations of TWA 27B (06/2023)  
 Triage with Random Forests: Machine Learning for Transient Classification (06/2023)  
 Serendipitous Supernovae (05/2023)  
 The First Y+Y Binary: Cool Brown Dwarfs Come in Pairs (04/2023)  
 Planning for Touchdown: New Maps of the Moon's South Pole (04/2023)  
 Different Pipelines, Different Atmospheres? (03/2023)  
 Deep Learning, Deep Images, Disk Galaxies (03/2023)  
 Bangs Without Flashes: Gravitational Waves and Elusive Neutrinos (03/2023)  
 A New Spider Joins a Deadly Club (02/2023)  
 Plunging Through the Plumes of Enceladus (02/2023)  
 The Corgi of Exoplanets: Methane Mystery on HAT-P-18b (01/2023)  
 [Carried by Sky & Telescope Online (01/2023)]  
 Dotting the i's, Crossing the t's: Follow-Up of an Exo-Venus (12/2022)  
 Four Stars, Many Eclipses (11/2022)  
 [Carried by Sky & Telescope Online (11/2022)]  
 A Supernova Hits a Cosmic Speed Bump (11/2022)  
 [Carried by Sky & Telescope Online (11/2022)]  
 Under Pressure: A New Technique for Measuring Gas Surface Density (11/2022)  
 New Life for Lunar Seismic Data (10/2022)  
 [Carried by Sky & Telescope Online (10/2022)]  
 Software Updates: The Latest from the Astropy Project (9/2022)  
 Beginnings of a Branch (9/2022)

With Astrobites:

Fish(er)ing for Planet Nine (02/2023)  
 [Carried by AAS Nova (08/2023)]  
 Biases from Bulging Planets (12/2022)  
 [Carried by AAS Nova (4/2023)]  
 Twirling in the Cold: The spins of Eris and Dysnomia (12/2022)  
 Asteroids in the Archives (10/2022)  
 A Conversation with Dr. Julie Davis, AAS Bahcall Fellow (7/2022)

(Re)discovering Gravity (6/2022)

Star light, lamp bright (5/2022)

[Carried by AAS Nova (6/2022)]

Teamwork Across Timezones: The Transit of TOI-2180 b (4/2022)

The bigger they are, the smaller their moons? (2/2022)

## MEDIA

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Scientists use space telescope to step up hunt for first ‘exomoon’ (The Times of London, 10/2024)

JWST will officially begin searching for exomoons around other planets (New Scientist, 03/2024)