Sóley Hyman

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| University of Arizona | Tucson, AZ |
|---|---------------|
| | expected 2026 |
| Thesis: "Probing the role of chaos in galaxy evolution" | |
| ◊ Advisor: Dr. Kate Daniel | |
| M.S. Astronomy and Astrophysics | May 2023 |
| ◇ Thesis: "Post-Newtonian Astrometric and Spectroscopic Models of Orbits around Black ◇ Advisors: Drs. Dimitrios Psaltis and Feryal Özel | Holes" |
| Harvard College | Cambridge, MA |
| A.B. Astrophysics and Physics, Minor in Music | May 2019 |
| ♦ <i>Thesis:</i> "A multiwavelength follow-up study of the enigmatic 3C 220.3 lensed system" | |
| ◊ Advisor: Dr. Belinda Wilkes | |
| ◊ Magna Cum Laude with Highest Honors | |

Selected Honors and Awards

| University of Arizona Theoretical Astrophysics Program Student Travel Grant | 2023,2024 |
|---|-----------|
| National Science Foundation Graduate Fellowship Research Program, Honorable Mention | 2022 |
| Andrew Carnie University Fellows Program Professional Development Award | 2022 |
| Andrew Carnie University Fellow | 2020-21 |
| Leo Goldberg Prize for Outstanding Senior Astronomy Thesis | 2019 |
| Harvard College Scholar | 2016-17 |

STATISTICS _____

| ◊ 8 publications (including articles under review) | ◊ 2 published software packages |
|--|--|
| ◊ 6 peer reviewed articles (5 lead author) | \diamond 10+ nights of approved telescope time |
| $\diamond~15$ presentations, 5 invited talks | ◊ co-organizer of 8 workshops |

Published Code

PECCARY

Package for identifying regular, complex, and stochastic behavior in timeseries

LightSound Computer Interface

Graphical user interface (GUI) for logging and plotting LightSound data

PUBLICATIONS

Summary: 6 articles published in or submitted to peer-reviewed journals, including 5 first author publications. From ADS on June 6, 2025 (ADS listings of papers and proceedings). Articles under review at a peer-reviewed journal are denoted with a *. Non peer-reviewed articles are marked with a †.

8. S.Ó. Hyman, K.J. Daniel, D.A. Schaffner, *PECCARY: A novel approach for characterizing orbital complexity, stochasticity, and regularity*, 2025, accepted to *ApJ* (in press), arXiv: 2407.11970

- 7. **S.Ó. Hyman**, S.P. Willner, B.J. Wilkes, *Redshifts of Objects near 3C 220.3*, **2025**, *PASP*, 137, 064103, DOI: 10.1088/1538-3873/adc2d3
- 6. **S.Ó. Hyman**, B.J. Wilkes, S.P. Willner, et al., *A Multiwavelength Portrait of the 3C 220.3 Lensed System*, **2024**, *ApJ*, 974, 171H, DOI: 10.3847/1538-4357/ad68f7
- 5. **S. Hyman**, W. González-Espada, A. Bieryla, W. Díaz-Merced, *Sounds in Sunlight*, **2023**, *ScTea*, 90g, 46H, DOI: 10.1080/00368555.2023.12315969
- 4. S.Ó. Hyman, D. Psaltis, & F. Özel, Analytic Post-Newtonian Astrometric and Spectroscopic Models of Orbits around Black Holes, 2023, ApJ, 952, 35H, DOI: 10.3847/1538-4357/accb52
- M. Azadi et al. (S. Hyman as author 13 of 15), Disentangling the AGN and Star formation Contributions to the Radio-X-Ray Emission of Radio-loud Quasars at 1 < z < 2, 2023, ApJ, 945, 145A, DOI: 10.3847/1538-4357/acbe9c
- 2. † A. Bieryla & S.Ó. Hyman, LightSound: Accessibility and Awareness for Upcoming Solar Eclipses, 2022, RMxAC, 54, 107B, DOI: 10.22201/ia.14052059p.2022.54.24
- 1. † A. Bieryla et al. (S. Hyman as author 4 of 7), LightSound: The Sound of An Eclipse, 2020, CAPJ, 28, 38B

PRESENTATIONS AND TALKS __

Invited and Contributed

| Lowell Observatory Colloquium (invited) Patterns in chaos: a new framework for interpreting dynamics | May 2025 |
|---|---------------|
| New Computational Methods in Milky Way Dynamics and Structure Identifying regular, complex, and stochastic behavior in orbits | July 2024 |
| CCA Galaxy Dynamics Group PECCARY:Distinguishing chaos, noise, and (quasi-)periodicity in orbits | March 2024 |
| Columbia University Galaxies Group PECCARY:Distinguishing chaos, noise, and (quasi-)periodicity in orbits | March 2024 |
| 54 th DDA Meeting An analytic post-Newtonian method for detecting general relativistic effects in the S stars | May 2023 |
| Indiana University Friday Lunch Seminar (invited) 3C 220.3: A multiwavelength smorgasbord | December 2021 |
| SciAccess 2021 (invited) <i>LightSound: Accessibility for the 2023 and 2024 Solar Eclipses</i> | November 2021 |
| 235 th AAS Meeting A multiwavelength follow-up study of the enigmatic 3C 220.3 lensed system | January 2020 |
| 234 th AAS Meeting, Solar Eclipse Planning Workshop (invited) <i>LightSound: Experiencing a Solar Eclipse through Sonification</i> | June 2019 |
| 234 th AAS Meeting Orchestar: Teaching the Color/Temperature Relation through Sound | June 2019 |
| 29 th New England Regional Quasars and AGN Meeting A multiwavelength follow-up study of the enigmatic 3C 220.3 lensed system | May 2019 |
| 233 rd AAS Meeting LightSound: A Sonification Device for Eclipses | January 2019 |

| Public | |
|--|---------------|
| Space Drafts Making Sense of Chaos: From Earth to Space | November 2024 |
| Simons Presents: Totality <i>Invited Panelist</i> | March 2024 |
| Space Drafts Ears to the Skies! The Past, Present, and Future of Sound in Astronomy | October 2022 |

WORKSHOPS AND PROPOSALS

Workshops

n ...

| A Universe of Sound: Astrophysical Data Sonification Workshop, Cambridge, MA (co-organizer) Participate in a LightSound Solar Eclipse Workshop | October 2024 |
|---|-------------------------------|
| University of Arizona, Tucson, AZ (co-organizer) LightSound x TIMESTEP: An introduction to soldering with the LightSound Project | April 2024 |
| University of Texas at Austin, Austin, TX (co-organizer) LightSound Make-a-thon for the 2024 solar eclipse | January 2024 |
| Harvard University, Cambridge, MA (co-organizer) LightSound Make-a-thon for the 2023 and 2024 solar eclipses | July 2023 |
| University of Texas at Austin, Austin, TX (co-organizer) LightSound Make-a-thon for the 2023 and 2024 solar eclipses | June 2023 |
| University of Arizona, Tucson, AZ (co-organizer) LightSound Make-a-thon for the 2023 and 2024 solar eclipses | April 2023 |
| AAS Solar Eclipse Planning Workshop, Rochester, NY (co-organizer) LightSound: A Sonification Tool for Solar Eclipses and Inclusive Classrooms | October 2022 |
| AAS Meeting #235, Honolulu, HI (co-organizer) LightSound: Learn to Build a Sonification Tool to Make Your Classes and Outreach Events Mo | January 2020 Dre Inclusive |

Approved Telescope Proposals

- S. Hyman, N. Schragal, & H. Foote. 2024, Kuiper 61" Cycle 2025A Program S-162, "61 inch Eyepiece Observing for Grad Students" (2 nights)
- S. Hyman, N. Schragal, & H. Foote. 2024, Kuiper 61" Cycle 2024B Program S-186, "61 inch Eyepiece Observing for Grad Students" (3 nights)
- S. Hyman, N. Schragal, & H. Foote. 2023, Kuiper 61" Cycle 2023B Program S-187, "61 inch Eyepiece Observing for Grad Students" (3 nights)
- H. Krantz & **S. Hyman**. 2022, Bigelow 61" Cycle 2023A Program S-160, "61 inch Eyepiece Observing for Grad Students" (2 nights)
- B.J. Wilkes, **S.O. Hyman**, S.P. Willner, et al. 2020, MMT Cycle 2021A Program SAO-7-21a, "Is the radio galaxy 3C220.3 a dual active galaxy?" **(1.5 hours)**
- **S.O. Hyman**, B.J. Wilkes, J. Kuraszkiewicz, et al. 2019, MMT Cycle 2020A Program SAO-8-20a, "3C 220.3: a strong dual AGN candidate lensing a high-z sub-mm galaxy" **(4 hours)**

PROFESSIONAL SERVICE

Steward Observatory Cosmology Faculty Position Hiring, graduate representativeSpring 2024Steward Observatory Stars Faculty Position Hiring, graduate representativeSpring 2023Steward Observatory Graduate Admissions, graduate advisor2022-2023Steward Observatory Bok 90" Telescope, service observer (1 night)November 2022Submillimeter Array Service Observing, queue observer assistant (5 nights)February 2020FLWO 1.5 m Tillinghast Telescope FAST Queue Observing, queue observer (4 nights)January 2020

TEACHING EXPERIENCE

University of Arizona, Steward Observatory

ASTR 300A Teaching Assistant, Professor: Dr. Kate Daniel

Teaching assistant for 30-person astronomy majors class on galactic dynamics, responsible for presenting several lectures, developing homework solution guides and rubrics, running office hours, and grading weekly homeworks.

University of Arizona, Steward Observatory

ASTR 203 Teaching Assistant, Professor: Dr. Thomas Fleming

Teaching assistant for 140-person general education class on stars, responsible for presenting several lectures, running office hours, working planetarium where class is held, and grading essays for the class.

COMMUNITY ENGAGEMENT AND VOLUNTEER WORK _____

Organizations and Programs

| Summer 2018 to present viduals |
|--------------------------------------|
| August 2022 to present speaker |
| June 2022 to present |
| 2023 to present annually dance |
| |
| April 4, 2024 |
| March 29, 2024 |
| March 20, 2024 |
| January 30, 2024 |
| • |

Fall 2023

Spring 2023

S.Ó. Hyman – CV

Visually impaired people can now listen to an eclipse. Here's how.

The Harvard Gazette Astronomy Lab sees the light — and wants everyone else to, too

SOFTWARE EXPERIENCE __

Programming languages: Python, Arduino Data Analysis Software: CIAO, DS9, IRAF, ROOT Other Software: LATEX, Adobe Premiere Pro

LANGUAGES _____

National Geographic

English (native proficiency) French (limited working proficiency)

Research Experience

University of Arizona, Steward Observatory

Graduate Research Assistant, Supervisor: Dr. Kathryne Daniel

Using the Permutation Entropy and Statistical Complexity Analysis (PESCy) method with different gravitational potentials to differentiate between chaotic orbital behavior and numerical noise in simulations

University of Arizona, Steward Observatory

Graduate Research Assistant, Supervisor: Drs. Dimitrios Psaltis and Feryal Özel Developing a novel, analytic, astrometric and spectroscopic model for the relativistic orbits of the cluster of stars near Sgr A* to explore the observability of various relativistic effects, test potential modifications of general relativity, and investigate the influence of extended mass distributions on extreme stellar orbits

- Published paper ("Analytic Post-Newtonian Astrometric and Spectroscopic Models of Orbits around Black Holes")
- Presented research results at 54th Annual Meeting of the Division on Dynamical Astronomy (upcoming)

Center for Astrophysics — Harvard & Smithsonian

Astrophysicist, Supervisor: Dr. Belinda Wilkes

Extending previous multiwavelength analysis of the 3C 220.3 galaxy system (a radio galaxy with a gravitationally lensed submillimeter galaxy) to include characterization of the magnetic fields and diffuse X-ray emission of the radio galaxy, reconstruction of the lensed galaxy, investigation of the dark matter fractions of the radio galaxy and a potential companion galaxy ("Source B")

- ◇ PI on MMT/Binospec proposal for spectra of potential companion galaxy (SAO-8-20a, accepted)
- Presented talk on 3C 220.3 analysis at the American Astronomical Society (AAS) 235 Winter Meeting (January 2020)

Harvard College, Department of Astronomy Undergraduate Research Assistant to Dr. Belinda Wilkes

Performing X-ray and optical wavelength analysis of the 3C 220.3 galaxy system to reconstruct the lensed galaxy and investigate the mass distribution and kinematics of the radio galaxy

- Resulted in senior thesis ("A multiwavelength follow-up study of the enigmatic 3C 220.3 lensed system") for A.B. in Astrophysics and Physics (April 2019)
- ♦ Awarded Leo Goldberg Prize for outstanding senior astronomy thesis (May 2019)

Jan 26, 2024

August 2019

January 2023 to present

October 2020 to December 2022

September 2019 to August 2020

September 2018 to May 2019

S.Ó. Hyman – CV

Harvard College, Department of Astronomy Research Collaborator with Allyson Bieryla

Developing Arduino-based devices to convert light/color to sound for the blind and visually impaired communities around the world

- Received funding from the International Astronomical Union (IAU) to construct 20 light-conversion devices (LightSound) to distribute to BVI students in Chile and Argentina for the solar eclipses in July 2019 and December 2020
- ◇ Generated extensive media coverage in international press (Reuters, AP, etc.) during the July 2019 eclipse
- ◇ Resulted in exhibition demonstration at the IAU General Assembly (August 2018), poster presentation at the AAS 233 Winter Meeting (January 2019), both oral talk and poster at the AAS 234 Summer Meeting (June 2019), and workshop at the AAS 235 Winter Meeting (January 2020)

Harvard College, Department of Astronomy

Student Leader for Harvard Observing Project (HOP)

Leading observing sessions (along with several other Astronomy graduate students) at the Clay Telescope (Harvard University Science Center) for Harvard students and affiliates interested in astronomy

Harvard College, Department of Physics

Undergraduate Research Assistant to Dr. Roxanne Guénette

Developed an algorithm for Fermilab's MicroBooNE detector that will select sections of the data that correspond to specific particle interactions caused by neutrinos

Washington University in St. Louis

Research Assistant to Dr. James Buckley

Worked on the research and design for the Advance Particle-astrophysics Telescope (APT), a space-based gamma ray telescope that will help with the dark matter search while also providing an all-sky field of view for recording gamma ray bursts

- Summer 2016: took spectroscopy measurements of various types of optical fibers to determine most effective type, wrote Python codes to analyze data, organized new lab space, and salvaged electronics from old laser
- ♦ Summer 2017: simulated various optical fiber orientations and geometries with a Python package, took measurements of APT

Summer 2018 to May 2019

January 2018 to August 2019

Summer 2016 and 2017

updated June 6, 2025

Summer 2018 to present