Tobin Wainer

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Education

Doctorate of Philosophy in Astronomy — Pending 2027
University of Washington, Seattle, Washington

Masters of Science in Astronomy — Pending 2024
University of Washington, Seattle, Washington

Honors Bachelor of Science in Physics with Astronomy Emphasis — May 2021
University of Utah, Salt Lake City, Utah

- Unweighted GPA: 3.90/4.0 (3.84/4.0 Physics GPA)
- Honors Thesis; "Star Clusters in the Triangulum Galaxy: Star Cluster Catalog and Mass Function Fitting"
- Undergraduate Research Scholar Designation

Honors and Awards

Honorable Mentions in the Graduate Research Fellowship Program — 2024

University of Utah Most Outstanding Teaching Assistant Award — 2022

Honorable Mentions in the Graduate Research Fellowship Program — 2022

Honorable Mentions in the Chambliss Achievement Student Award competition for undergraduates at the 237th AAS conference — 2021

University of Utah Outstanding Undergraduate Research Award in Astronomy and Astrophysics — 2021

University of Utah representative for Research on Capitol Hill; presenting research to state legislators — 2021

Made Dean's List each eligible semester of enrollment — F17, S18, F19, F20

Research Experience for Undergraduates at Northwestern University — 2020

Summer Undergraduate Research Program at the University of Utah — 2019

One-year Peer Advisor Scholarship for dedication to student learning and excellence

	in teaching	$2000, 2019
	Four-year Sterling Scholar Scholarship for Speech and Debate	$20,000, 2017-2020
	Two-year Regents Scholarship	$6000, 2017-2019

Grants	Co-I: JWST Proposal. Cycle 3, ID. #5145	$Pending Budget Approval
	Co-I: Astrophysics Data Analysis Program (ADAP)	$262,000, 2024-2025 5.5 Months
	Undergraduate Research Opportunity Program Grant	$1200, 2020

Project Lead Publications

Wainer, T., [3 Authors], 2023, "ELK: A python package for correcting, analyzing, and diagnosing TESS integrated light curves", *The Journal of Open Source Software 2023 JOSS, 8(90), 05605*

Wainer, T., [9 Authors], 2023, "Catalog of Integrated-light Star Cluster Light Curves in TESS", *The Astronomical Journal, 2023AJ, 166, 106W*

Wainer, T., [12 Authors], 2022, "The Panchromatic Hubble Andromeda Treasury: Triangulum Extended Region (PHATTER). III. The Mass Function of Young Star Clusters in M33", *The Astrophysical Journal, 2022ApJ, 928, 15W*

Johnson, L.C., **Wainer, T.**, [11 Authors], 2022, "The Panchromatic Hubble Andromeda Treasury: Triangulum Extended Region (PHATTER). IV. M33 Star Cluster Catalog", *The Astrophysical Journal 2022ApJ, 938, 81J*

Contribution Publications

Peltonen, J., [...] **Wainer, T.**, 2024, "JWST reveals star formation across a spiral arm in M33", *Monthly Notices of the Royal Astronomical Society, 527, I4*

Peltonen, J., [...] **Wainer, T.**, 2023, "Clusters, Clouds, and Correlations: Relating Young Clusters to Giant Molecular Clouds in M33 and M31", *Monthly Notices of the Royal Astronomical Society, 522, I4*

Gibson, B., [...] **Wainer, T.**, 2023, "The Chemodynamics of the Stellar Populations in M31 from APOGEE Integrated Light Spectroscopy" *The Astrophysical Journal 2023ApJ, 952, 23G*

Research Experiences

Searching for Stellar Cycles using Flares in TESS data August 2023 - Present
University of Washington
Mentored by **Dr. James Davenport**

- Search TESS light curves for stellar flares and characterize observed flares using `stella`
- Compute Flare energies and rates and statistically model the probability of flare rate variations.

High Mass Initial Mass Function for M33 Star Clusters January 2023 - Present
University of Washington
Mentored by **Dr. Ben Williams**

- Compute the stellar mass function for M33 star clusters.
- Use Bayesian statistics to measure the galactic wide initial mass function.
- Use a Gaussian mixture model to model potential IMF dependencies on cluster properties.

Stellar variability in star cluster light curves May 2021 - Present
University of Utah
Mentored by **Dr. Gail Zasowski**

- Download and reduce TESS data to create reliable ensemble light curves of Milky Way star clusters
- Developed open source pipeline "elk" to derive and analyze variability statistics from light curve data
  - `https://github.com/tobin-wainer/elk`

Star cluster mass function for M33 June 2020 - October 2021
Northwestern University
Mentored by **Dr. Cliff Johnson**

- Participated in the Research Experience for Undergraduates at Northwestern University during summer 2020
  - Worked with HTML to construct a research website
  - Completed tutorials in Python, LaTex, Git and Github
  - Completed workshops in scientific writing and presenting science research
- Conducted simulation-based analysis to predict and model potential mass function biases caused by mass uncertainties
- Applied code to perform maximum-likelihood color magnitude diagram analysis to derive constraints on cluster properties.
- Wrote code to perform hierarchical Bayesian statistical analysis and Marcov Chain Monte Carlo probabilistic modeling
  - `https://github.com/tobin-wainer/mass_function_fitting`
- Performed literature reviews and performed analysis on previously published data using new modeling techniques

Star Cluster catalog for M33 January 2019 - September 2021
University of Utah
Mentored by **Dr. Anil Seth**

- Participated in the Summer Undergraduate Research Program during the Summer of 2019
- Wrote Python code to conduct statistical analysis of citizen science classification data that contributed to cluster catalog creation
- Created and implemented new methodology to analyze and model catalog completeness
- Created image products and web pages to review star cluster candidates
- Compiled research information to compare findings to previous results in the literature

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Presentations and Conference Contributions

243rd Meeting of the AAS Contributing Talk — January 2024
New Orleans, Louisiana

8th TESS Asteroseismic Science Consortium, Contributing Talk — July 2023
Honolulu, Hawaii

240th Meeting of the AAS Poster 201.01 (Link to Abstract) — June 2022
Pasadena, California

Undergraduate Research Symposium — April 2021
University of Utah, Salt Lake City, Utah

237 Meeting of the AAS- Poster 150.07 (Link to Abstract) — January 2021
Virtual

Research Experience for Undergraduate Symposium — August 2020
Northwestern University and Adler Planetarium, Chicago, Illinois

235 Meeting of the AAS-Poster 306.02 (Link to Abstract) — January 2020
Honolulu, Hawaii

2019 Physics Congress — November 2019
Providence, Rhode Island

Summer Research Symposium — August 2019
University of Utah, Salt Lake City, Utah

Teaching Experience

Teaching Assistant — September 2022 - Current
University of Washington
Classes:

- *Astronomy 101a, 101b; Introduction to Astronomy In person and Online*
  - Lead 3 weekly sections of 30 students each
  - Make weekly recap lecture videos

Teaching Assistant August 2018 - May 2022
University of Utah
Classes:

- *Astronomy 1010, 4090; The Universe, Stellar Astrophysics*
  - Helped facilitate weekly 5-person teaching staff meeting to plan for the next week
  - Facilitated 20-person group sessions and provided one-on-one support
  - Collaborate with professor to design class structure
- *Physics 2210, 2020; Physics I for Scientists and Engineers, General Physics II*
  - Collaborated with teachers and program directors to meet academic needs of students
  - Graded student assignments and exams
- *LEAP 1010, 1020; Pre-Law I, Pre-Law II, Role of Law in Society*
  - Led class when professors were attending conferences

Service

Senator in the University of Washington Graduate and Professional Student Senate September 2023 - Present

- Serve the broader University student population on issues like affordability and student wellness.

Apache Point Observatory Telescope Allocation Committee May 2023 - Present

- University of Washington graduate student representative for allocating telescope time of the 3.5 meter APO.
- Tasks include reading proposals and collaborating with faculty members of the TAC, to equitably allocate time.

University of Washington Astronomy Planetarium Technical Assistant September 2023 - Present

- Point person for technological issues with the planetarium.
- Perform routine service to Planetarium software.

Society of Physics Students Communications Director May 2019 - May 2021
University of Utah Chapter

- Raised over $7500 to send 12 undergraduates to the quadrennial SPS conference in Rhode Island
- Orchestrated monthly outreach events for local high school and middle school students

- Coordinated lab tours to help undergraduates discover research opportunities

Undergraduate Student Advisory Committee Associate Chair August 2019 - May 2021
University of Utah Department of Physics and Astronomy

- Worked with a six-person committee to generate a report providing a recommendation about a professor's Retention, Promotion, or Tenure
- Conducted interviews with professors, graduate students, and undergraduates to gather information
- Coordinate with the committee chair to facilitate meetings

Other Experience and Activities

Research on Capitol Hill February 2021
Salt Lake City Capital Building

- Selected as 1 of 15 undergraduates to represent the University of Utah
- Presented research to state legislators

Pro Bono Law Clinic Volunteer August 2019 - December 2019
Salt Lake City Pro Bono Law Clinic

- Worked alongside law students and practicing attorneys to provide clients with legal advice
- Conducted client interviews and consulted with attorneys
- Helped direct clients through necessary paperwork

Resident Advisor August 2018 - May 2019
University of Utah

- Assisted 30 residents with transitioning into a new living environment
- Facilitated floor meetings to discuss concerns, review complaints and convey policy changes
- Enforced policies and safety standards through building rounds
- Provided emotional support and counseling to residents coping with loss
- Provided swift and knowledgeable emergency support in line with campus crisis protocols

Hobbies

- Backpacking
- Mountaineering
- Skiing
- Sports fanatic

Skills

- Programming Languages: Python, HTML
- Astronomy Software: DS9, Astropy, MATCH, SLUG
- Data Analysis: integrated spectroscopy, using large survey data (HST), HST image processing
- Technical skills: Stellar population synthesis modeling
- Statistical Techniques: Bayesian Modelling, Regression, Bootstrap sampling
- Other software: LATEX, Github

Professional Memberships

American Astronomical Society (AAS)
American Physics Society (APS)
Society Of Physics Students (SPS)