Trevor Z. Dorn-Wallenstein

Curriculum Vitae

Observatories of the Carnegie Institution for Science
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Employment

Carnegie Fellow — September 2022 - Present
Observatories of the Carnegie Institution for Science, Pasadena, CA

Postdoctoral Experience

Postdoctoral Scholar — September 2021 - September 2022
University of Washington, Seattle, WA

Education

Ph.D. in Astronomy — August, 2021
Thesis: "Small Samples No More: Probing the Evolution of Massive Stars
University of Washington, Seattle, WA

M.S. in Astronomy — 2016
University of Washington, Seattle, WA

B.S. in Physics — 2015
B.S. in Astronomy
Thesis: Characterizing the X-Ray Source Population of the Whirlpool Galaxy
Wesleyan University, Middletown, CT

Honors & Awards

Astronomy Department Graduate Research Prize (UW) — 2020
Schmidt Science Fellowship Nominee (UW) — 2020
Selected Attendee: Pulsations Along Stellar Evolution VIII (La Plata, Argentina) — 2019
International Travel Grant Recipient (International Astronomical Union) — 2016
High Honors (Wesleyan University) — 2015
Littell Prize (Wesleyan University Astronomy Dept.) — 2015
Presenter, Committee on Undergraduate Research REU Symposium — 2014

Research Experience

Postdoctoral Fellow (Carnegie) — 2022 – Present
Supervisors: Dr. Tony Piro

Postdoctoral Scholar (U. Washington) — 2021 – 2022
Supervisors: Prof. Emily M. Levesque, Prof. J. Davenport

Graduate Research Assistant (U. Washington) — 2015 – Present
Supervisors: Prof. Emily M. Levesque (Ph.D. Thesis Advisor),
Prof. J. Davenport, Prof. J. Dalcanton
(Published: Dorn-Wallenstein et al. 2017, 2018, 2019, 2020a, 2020b, 2021)

Undergraduate Researcher (Wesleyan University) — 2013 – 2015
Supervisor: Prof. Roy Kilgard (B.A. Honors Thesis Advisor)
Published: Dorn-Wallenstein (2015)

REU Student Researcher (Colgate University) — 2014
Supervisor: Prof. Jeff Bary (Keck Northeast Astronomy Consortium)

	24" Telescope Operator (Van Vleck Observatory) Supervisor: Prof. Seth Redfield (Wesleyan University)	2014 – 2015

Speaking Experience

Invited Panelist, Observations, Transport in Stellar Interiors (KITP), **video**	2021
Invited Talk, TESS Science Conference II, **video**	2021
Invited Talk, Thorne-Żytkow Object Meeting-in-a-Meeting, AAS 238	2021
Invited Talk, AAVSO Webinar	2021
Invited Talk, ARC Star Talk, University of Victoria **video**	2021
Astronomy at Home **video**	2021
Invited Talk, "Lunch Talk" Seminar, Carnegie Observatories	2021
Contributed Talk, DELVE Virtual Conference	2021
Contributed Talk, MOBSTER-1 Virtual Conference **video**	2020
Breakout wavelet tutorial, online.tess.science Virtual Sprint **video**	2020
Contributed Talk, STScI Spring Symposium	2019
Astronomy on Tap Seattle **video**	2019
Contributed Talk, Northwest x Southwest Meeting (University of British Columbia)	2018
Astronomy on Tap Seattle **video**	2017
Contributed Splinter Talk, IAU Symposium 329 (Auckland, NZ)	2016

Successful Observing Proposals

Las Campanas Observatory, Magellan telescopes (8 nights) Echelle spectroscopy with MIKE on various projects. P-I: **T. Dorn-Wallenstein**	2022 – Present
TESS, Cycles 2-4 (targets awarded) P-I: **T. Dorn-Wallenstein**	2019 – 2021
APO 3.5-m (>30 half nights) Optical imaging, long-slit spectroscopy, echelle spectroscopy on various projects. P-I: **T. Dorn-Wallenstein**	2015 – Present
Gemini, GMOS-S "Multi-Wavelength Monitoring of the Young HMXB SN 2010da," P-I: E. Levesque	2017A
Gemini Fast Turnaround, GMOS-N "A Candidate Red Supergiant High-Mass X-ray Binary in M31," P-I: E. Levesque	2016A
ESO, VLT/XSHOOTER "SMC 8324: A New Thorne-Zytkow Object Candidate in the Small Magellanic Cloud," P-I: E. Levesque	2016A

Technical Skills

Developer on open-source software packages: JazzHands, arcesetc, aesop, ingot
Data reduction, analysis, and visualization with Python, SQL/ADQL, IDL, IRAF, ciao/Xspec
Proposing, planning, and carrying out optical spectroscopic and photometric observations
Survey & time-domain data retrieval and analysis; machine learning methods (regression & classification)

Service & Outreach

Diversity, Equity, & Inclusion Committee Member (Carnegie Observatories)	2022 – 2023
Journal Referee (MNRAS, AAS Journals)	2019 - 2023
Graduate Student Representative to Faculty (UW)	2018 – 2020
Astronomy on Tap SEA Organizer	2016 – 2020
APO–UW Time Allocation Committee	2017 – 2019
Prospective Graduate Student Visit Coordinator (UW)	2017, 2018
Planetarium Presenter (UW)	2016, 2017

Teaching & Mentoring

RESEARCH MENTORSHIP 2017 – 2023

· Mentored multiple undergraduate students through the Pre-MAP program at UW and the CASSI program at Carnegie, leading to multiple student publications. · Completed the Advancing Inclusive Mentoring Program. This research mentor training program provides 12+ hours of content and discussion about positive and inclusive mentoring practices.

TEACHING ASSISTANT (UW) 2015-2017

· Designed and led lab/quiz sections for introductory college astronomy courses.

Refereed Publications ($h = 10$)

1st Author Publications

10. A Spectroscopic Hunt for Post-Red Supergiants in the Large Magellanic Cloud II: Turbulent Line Broadening in the Spectra of LMC Yellow Supergiants
T.Z. Dorn-Wallenstein, K.M. Chen†, S.C. Wu., J.A. Goldberg, A.J.G. O'Grady, & A.T. Mann. ApJ in Press (2025)
9. Physical Properties of 5,000 Cool LMC Supergiants with Gaia XP Spectra: A Detailed Portrait of the Upper HR Diagram Hints at Missing Supernova Progenitors
T.Z. Dorn-Wallenstein, K.F. Neugent, & E.M. Levesque. ApJ, 959(2):102 (2023)
8. The Properties of Fast Yellow Pulsating Supergiants: FYPS Point the Way to Missing Red Supergiants
T.Z. Dorn-Wallenstein, E.M. Levesque, J.R.A. Davenport, K.F. Neugent, B.M. Morris, & K.A. Bostroem. ApJ, 940(1):27 (2022)
7. Photometric Classifications of Evolved Massive Stars: Preparing for the Era of *Webb* and *Roman* with Machine Learning
T.Z. Dorn-Wallenstein, J.R.A. Davenport, D. Huppenkothen, & E.M. Levesque. ApJ, 913(1):32 (2021)
6. Short Term Variability of Evolved Massive Stars with TESS II: A New Class of Cool, Pulsating Supergiants
T.Z. Dorn-Wallenstein, E.M. Levesque, K.F. Neugent, J.R.A. Davenport, B.M. Morris, & K. Gootkin†. ApJ, 902(1):24 (2020) Press: Physics World, Astrobites
5. A Comparison of Rotating and Binary Stellar Evolution Models: Effects on Massive Star Populations
T.Z. Dorn-Wallenstein & E.M. Levesque. ApJ, 896(2):164 (2020)
4. Short Term Variability of Evolved Massive Stars with TESS
T.Z. Dorn-Wallenstein, E.M. Levesque, & J.R.A. Davenport. ApJ, 878(1):155 (2019)
3. Stellar Population Diagnostics of the Massive Star Binary Fraction
T.Z. Dorn-Wallenstein & E.M. Levesque. ApJ, 867(2):125 (2018)
2. A Mote in Andromeda's Disk: A Misidentified Periodic AGN behind M31
T.Z. Dorn-Wallenstein, E.M. Levesque, & J.J. Ruan. ApJ, 850(1):86 (2017)
1. Characterizing the X-Ray Source Population of the Whirlpool Galaxy
T.Z. Dorn-Wallenstein. Wesleyan University Press (2015)

Co–Author Publications

11. Automated Spectroscopic Wavelength Calibration using Dynamic Time Warping
J.R.A Davenport, F. Chabour Barra, K.A. Bostroem, S. Tuttle, J. Torres, J. Birky, A. Tzanidakis, K. Kadlec, Y. Wang, S.L. Hawley, **T.Z. Dorn-Wallenstein**, *et al.* AAS Journals (2025, submitted)
Code development, assisted with development of the manuscript.
10. Kalkayotl 2.0: Bayesian phase-space modelling of star-forming regions, stellar associations, and open clusters
J. Olivares, H. Bouy, **T.Z. Dorn-Wallenstein**, & A. Berihuete. A&A, 693(A):12 (2025)
Code development, assisted with analysis work and development of the manuscript.
9. A Spectroscopic Hunt for Post-Red Supergiants in the Large Magellanic Cloud I: Preliminary Results
K.M. Chen† & **T.Z. Dorn-Wallenstein**. RNASS, 8(3):75 (2024)
Mentored first author, oversaw the analysis work and development of the manuscript.
8. Photometric Classification of Evolved Massive Stars: Spectroscopic Verification and Validation
I.F. Ghosh-Coutinho†, **T.Z. Dorn-Wallenstein**, *et al.* RNAAS, 7(11):253 (2023)
Mentored first author, oversaw the analysis work and development of the manuscript.

7. Photometric detection of internal gravity waves in upper main-sequence stars. III. Comparison of Gaussian processes and amplitude spectrum fitting
D.M. Bowman & **T.Z. Dorn-Wallenstein**. A&A, 668(A):134 (2022).
Developed and tested GP fitting methodology, computed simulated light curves in hare & hound tests, contributed to manuscript.

6. Testing Evolutionary Models with Red Supergiant and Wolf-Rayet Populations
P. Massey, K.F. Neugent, **T.Z. Dorn-Wallenstein**, *et al.* ApJ, 922(2):177 (2021).
Computed model grids, ran variable star-formation history simulations, contributed to manuscript.

5. 13 years of P Cygni Spectropolarimetry: Investigating Mass Loss through Hα, Periodicity, and Ellipticity
K. Gootkin†, **T.Z. Dorn-Wallenstein**, *et al.* ApJ, 900(2):162 (2020)
Mentored first author, oversaw the analysis work and development of the manuscript.

4. Photometric Metallicities for Low-Mass Stars with Gaia and WISE
J.R.A. Davenport & **T.Z. Dorn-Wallenstein**. RNAAS, 3(1):3, (2019)
Ran queries and cross-matches to assemble the sample, aided in manuscript preparation.

3. arcesetc: ARC Echelle Spectrograph Exposure Time Calculator
B.M. Morris, **T.Z. Dorn-Wallenstein**, *et al.* JOSS, 4, 34 (2019)
Aided in software development and the creation of documentation.

2. aesop: ARC Echelle Spectroscopic Observation Pipeline
B.M. Morris & **T.Z. Dorn-Wallenstein**. JOSS, 3, 28 (2018)
Aided in software development and the creation of documentation.

1. No Strong Geometric Beaming in the Ultraluminous Neutron Star Binary NGC 300 ULX-1 (SN 2010da) from Swift and Gemini
B. Binder, E.M. Levesque, & **T.Z. Dorn-Wallenstein**. ApJ, 863(2):141 (2018)
Reduced optical spectroscopic observations, contributed to manuscript preparation.

Recent Conference Proceedings TO DO: 2022, 2023, 2024

Talk: New Phenomena in Evolved Supergiants Revealed by TESS
T.Z. Dorn-Wallenstein, E.M. Levesque, K.F. Neugent, J.R.A. Davenport, B.M. Morris, & K. Gootkin†.
TESS Science Conference II Virtual Conference, 2021

Talk: Photometric Identification of Red Supergiants Beyond the Local Group Using Machine Learning
T.Z. Dorn-Wallenstein, J.R.A. Davenport, D. Huppenkothen, & E.M. Levesque.
AAS 238, 2021 (Virtual)

Talk: New Phenomena in Evolved Supergiants Revealed by TESS
T.Z. Dorn-Wallenstein, E.M. Levesque, K.F. Neugent, J.R.A. Davenport, B.M. Morris, & K. Gootkin†.
DELVE: Death-throes of EvoLved stars, a Virtual Encounter, 2021

Lightning Talk: A New Class of Pulsating Yellow Supergiants
T.Z. Dorn-Wallenstein, E.M. Levesque, K.F. Neugent, J.R.A. Davenport, B.M. Morris, & K. Gootkin†.
MOBSTER-1 Virtual Conference, 2020

Poster: Measuring the Massive Star Binary Fraction with Stellar Population Diagnostics
T.Z. Dorn-Wallenstein, & E.M. Levesque.
AAS 233, 2019 (Seattle, WA)

†: Supervised student

Poster: 13 Years of Spectropolarimetry of P Cygni
K. Gootkin†, J. Lomax, **T.Z. Dorn-Wallenstein**, & E.M. Levesque.
AAS 233, 2019 (Seattle, WA)