

Zachary Hartman

Curriculum Vitae

EDUCATION

B.S. in Physics and Astronomy

Ohio State University

2010-2015

PhD. in Astronomy

Georgia State University

2015-

Expected Graduation - May 2021. Thesis committee: Dr. Sébastien Lépine, Dr. Gerard van Belle, Dr. Todd Henry, Dr. Douglas Gies, Dr. Xiaochun He

HONORS AND AWARDS

- Lowell Predoctoral Fellow
- 2018 AAS Chambliss Award
- Ohio State University Undergraduate Research Scholarship
- Ohio State University Department of Astronomy SURP participant
- Ohio State University Valentino Physics Scholar
- Ohio State University Maximus Scholarship

RESEARCH EXPERIENCE

Predoctoral Fellow

Lowell Observatory

2018-present

Advisor: Dr. Gerard van Belle

QWSSI Speckle Instrument Development: I am assisting in the development of a new speckle camera at Lowell Observatory. This camera will provide simultaneous observations in four visible wavelengths and two infra-red wavelengths. Besides helping with the construction of the instrument itself, I am developing the reduction code for the camera. This code is being written in Python and combines the current speckle reduction code that is used at Gemini N-S and WIYN with a multi-frame blind deconvolution code from Dr. Douglas Hope and Dr. Stuart Jefferies.

Graduate Researcher

Georgia State University

2015-present

Advisor: Dr. Sébastien Lépine

Statistical analysis of stellar catalogs looking for wide binaries: Taking the high proper motion stars in Gaia DR2, I have written a code which conducts a Bayesian Analysis to determine the probability that pairs of stars are binaries. 99,203 wide binary candidates with probabilities of being gravitationally bound systems > 95% have been identified with this method. Followup observations are being conducted on pairs with separations larger than 10,000 AU to search for clues on their origin. These observations include

speckle observations taken at various observatories and looking for eclipsing binaries in TESS, K2 and Kepler observations.

Research Assistant

2012-2015

Ohio State University

Advisor: Dr. Donald Terndrup

Searching for the low mass companions in sdB+dM: I conducted an analysis on light curves and spectroscopic observations of sdB+dM binary systems. The light curve analysis was used to determine and refine ephemeris for three sdB+dM systems. The spectroscopic observations were taken using KOSMOS on the 4m Mayall telescope at Kitt Peak. The goal of these spectroscopic observations was to determine if we could see any light from the low mass companion to the sdB. However, we were unable to detect any light from the companion.

Undergraduate Researcher

Summer 2012

Ohio State University

Advisor: Dr. Carsten Rott

The Precision IceCube Next Generation Upgrade (PINGU): I ran simulations detailing the effectiveness of PINGU on the IceCube neutrino detection array and outputted the results using ROOT. It was found that PINGU will increase the sensitivity of IceCube detector by an order of magnitude.

PUBLICATIONS AND PRESENTATIONS

- *The SUPERWIDE Catalog: A Catalog of 99,203 Wide Binaries Found in Gaia and Supplemented by the SUPERBLINK High Proper Motion Catalog*, **Hartman, Z.**, Lépine, S., 2020, ApJS
- *HST/FGS Trigonometric Parallaxes to M-dwarf Eclipsing Binaries* by van Belle, G.; Schaefer, G.; von Braun, K., Nelan, E., **Hartman, Zachary**, Boyajian, T., Lopez-Morales, M., Ciardi, D., 2020, PASP
- *K dwarf triples and quadruples in the SUPERWIDE catalog of 90,000 nearby wide binaries* by **Hartman, Zachary**, Lépine, S., 2020, CoSka
- *The Tale of the Lobster: Over-luminous Stars in Wide Binaries and a Search for Higher Order Multiples*, **Hartman, Z.**, Lépine, S., Clark, C., Medan, I., van Belle, G., AAS 2020
- *The SUPERWIDE Catalog of Wide Binaries and an Initial Look at the Higher Order Multiplicity of K and M dwarf Wide Binaries*, **Hartman, Z.**, , Lepine, S., Clark, C., AAS 2019
- *The SUPERWIDE Catalog of Wide Binaries*, **Hartman, Z.**, Lépine, S., 2018 Cool Stars Conference proceedings
- *On the Occurrence of Wide Binaries in the Local Disk and Halo Populations*, **Hartman, Z.**, Lépine, S., AAS 2018
- *An All-Sky Search for Wide Binaries in the SUPERBLINK Proper Motion Catalog*, **Hartman, Z.**, Lépine, S., AAS 2017
- *Optical and Infrared Photometry of Low-Mass Stars in Eclipsing Binaries*, **Hartman, Z.**, Terndrup, D., AAS 2015

OBSERVING EXPERIENCE

- 4 nights using QWSSI on Lowell Discovery Telescope
- 13 nights using DSSI on Lowell Discovery Telescope (LDT)
- 6 nights using DSSI on Gemini South
- 13 nights using Zorro on Gemini South
- 6 nights using 'Alopeke on Gemini North
- 3 nights using HYDRA spectrograph on WIYN 3.5 m
- 1/2 night using Deveny spectrograph on LDT
- 1/2 night using IGRINS spectrograph on LDT

CONFERENCES ATTENDED

- American Astronomical Society Conference participant (2015, 2017, 2018, 2019, 2020)
- 2019 Universe of Binaries Conference
- 2018 Cool Stars 20 Conference

TEACHING EXPERIENCE

Graduate Lab Coordinator <i>Georgia State University</i>	2017-2018
Teaching Assistant <i>Georgia State University</i>	2015-2018
Student Instructional Assistant <i>Ohio State University Department of Physics</i>	2014-2015
Student Instructional Assistant <i>Ohio State University Department of Astronomy</i>	2014
Student Instructional Assistant <i>Ohio State University Department of Physics</i>	2011-2012

SKILLS

<i>Languages</i>	English (Native)
<i>Software</i>	L ^A T _E X, PYTHON, C++,MATHEMATICA ,IDL