

# Stefan Arseneau

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<b>PRINCIPAL INTERESTS</b>	Observational cosmology, stellar physics, data science, and bayesian statistics	
<b>ACADEMIC BACKGROUND</b>	<i>B.S. Johns Hopkins University, Baltimore, MD</i>	<i>2020-2024</i>
	Majors: Physics, Mathematics; Minor: Earth & Planetary Science <ul style="list-style-type: none"><li>• Focus areas: observational astronomy, stellar evolution, geophysics</li></ul>	
<b>AWARDS &amp; OBSERVATORY ALLOCATIONS</b>	<i>Johns Hopkins University</i> <ul style="list-style-type: none"><li>• Provost's Undergraduate Research Award (\$6,000 award)</li><li>• Dean's List (4/6 semesters)</li></ul> <i>Gemini Observatory (GMOS, 2.3 Hours)</i> <ul style="list-style-type: none"><li>• "Probing the Mass-Radius Relation of White Dwarfs With Wide Binaries"</li></ul>	
<b>EMPLOYMENT HISTORY</b>	<i>Undergraduate Researcher</i>	2022 - Present
	Zakamska Group, Johns Hopkins University, Baltimore, MD Mentors: Nadia Zakamska (JHU), Vedant Chandra (Harvard CfA) <ul style="list-style-type: none"><li>• Used gravitational redshifts of white dwarf stars in wide binaries with main sequence stars observed by <i>Gaia</i> and the Sloan Digital Sky Survey to constrain the mass-radius relation of white dwarfs.</li><li>• Assisted in developing <a href="#">corv</a>, a software package for measuring the radial velocities of white dwarfs. This code will be used to generate white dwarf radial velocities in the upcoming fifth generation of the Sloan Digital Sky Survey.</li></ul>	
	<i>Undergraduate Researcher</i>	2020 - 2022
	CLASS Telescope, Johns Hopkins University, Baltimore, MD Mentors: Tobias Marriage (JHU), Tom Essinger-Hileman (NASA Goddard) <ul style="list-style-type: none"><li>• Carried out experiments to determine the efficiency and utility of polyamid aerogel as a filtering material in cosmic microwave background telescopes with Tom Essinger-Hileman (NASA Goddard). This involved working with cryogenics and lab techniques as well as CAD and machining work.</li><li>• Performed analyses of signal biases induced by azimuthal telescope motion working in time and frequency domains applying masks and using k-means deep learning algorithms to minimize bias.</li></ul>	
	<i>Research Intern</i>	2018
	Hypersonic Airbreathing Propulsion Branch, NASA Langley Research Center Mentor: Robert Baurle <ul style="list-style-type: none"><li>• Developed validation tests for VULCAN-CFD, a computational fluid dynamics solver used for developing hypersonic SCRAMjet engines.</li></ul>	
<b>TEACHING &amp; MENTORSHIP</b>	<i>Learning Assistant: AS.171.108 General Physics II</i>	2022

## PUBLICATIONS

4. **Arseneau, S.**; Chandra, V.; Hwang, H.; Zakamska, N.L.; Pallathadka, G.A.; Crumpler, N.R.; Hermes, J.J.; El-Badry, K.; Rix, H.; Stassun, K.G.; Gänsicke, B.T.; Brownstein, J.R.; Morrison, S. 2023. Measuring the Mass-Radius Relation of White Dwarfs Using Wide Binaries. *Under Review in the Astrophysical Journal*. <https://arxiv.org/abs/2310.19866>
3. Pallathadka, G.A.; Chandra, V.; Zakamska, N.L.; Hwang, H.; Zentai, Y.; Hermes, J.J.; El-Badry, K.; Gänsicke, B.T.; Morrison, S.; Crumpler, N.R.; **Arseneau, S.** 2023. Discovery of A Proto-White Dwarf With A Massive Unseen Companion. *Under Review in the Astrophysical Journal*. <https://doi.org/10.48550/arXiv.2310.16313>
2. Barlis, A.; **Arseneau, S.**; Bennett, C.L.; Essinger-Hileman, T.; Guo, H.; Helson, K.R.; Marriage, T.; Quijada, M.A.; Tokarz, A.E.; Vivod, S.L.; and Wollack, E.J., 2022. Characterization of aerogel scattering filters for astronomical telescopes. Proc. SPIE 12190, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy XI, 121902I (31 August 2022). <https://doi.org/10.1117/12.2627341>.
1. Helson, K.R.; **Arseneau, S.**; Barlis, A.; Bennett, C.L.; Essinger-Hileman, T.M.; Guo, H.; Marriage, T.; Quijada, M.A.; Tokarz, A.E.; Vivod, S.L.; and Wollack, E.J., 2022. Novel infrared-blocking aerogel scattering filters and their applications in astrophysical and planetary science. Proc. SPIE 12190, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy XI, 121901P (31 August 2022). <https://doi.org/10.1117/12.2630165>.

## PRESENTATIONS

3. JHU Society of Physics Students Chapter Presentation, 2023. Measuring the Mass-Radius Relation of White Dwarfs Using Wide Binaries.
2. JHU DREAMS Undergraduate Research Conference, 2023. Measuring the Mass-Radius Relation of White Dwarfs Using Wide Binaries.
1. NASA Langley Research Center Summer Intern Presentation, 2018. CFD Simulation With VULCAN-CFD.

## RELEVANT

### COURSEWORK

#### *Astronomy*

Planetary Interiors, Physics & Chemistry of Aerosols, Astrophysical Plasmas, General Relativity, Tectonics Seminar, Earth & Planetary Fluids

#### *Mathematics*

Real Analysis I & II, Introduction to Topology, Abstract Algebra, Complex Analysis, Introduction to Probability

## INDUSTRY

### EXPERIENCE

#### *Physics Consultant*

2023 - Present

Baltimore Orioles, Baltimore, MD

- Computationally modeled ball-bat interaction physics using stress-strain relations, deformation mechanics, and elastic vibrational modes.

#### *Junior Data Scientist*

2021

ThruGreen, LLC, Fairfax, Virginia

- Used machine learning techniques with Amazon AWS to optimize traffic flow.

## SKILLS

Python, C, SQL, Data Analysis using Jupyter  
English (Fluent), Mandarin (Beginner), Spanish (Beginner)