

# MASON V. TEA

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## PROFILE

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My name is Mason Tea, and I'm a senior astronomy & physics major at Wesleyan University. I've been involved in research in the Wesleyan astronomy department since my second week here, and I'm drawing on that accumulated experience as I approach my senior thesis this spring. Broadly speaking, I'm interested in gravity, both in theory and observation. In particular, I look forward to pursuing opportunities dealing with both astrophysical and theoretical black hole physics, multi-messenger / gravitational wave astronomy, and the role compact objects can play in constraining a theory of quantum gravity. I am also particularly enthusiastic about outreach and education in astrophysics; I feel that teaching is one of my strong suits, and I enjoy it immensely.

## EDUCATION

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**Wesleyan University**

2017-2021

B.A. Astronomy & B.A. Physics

Overall GPA: 86.3/100.0 (3.13/4.0)

## RESEARCH

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**Classification of X-ray binaries in the local universe**

Spring 2020 - Present

*Wesleyan University, Department of Astronomy*

*Advisor: Dr. Roy E. Kilgard*

- My current research is focused on determining suitable spectral models for a select sample of ultra-luminous X-ray binaries in the local universe, with the following goals: (a) determine X-ray spectral state, which is related to accretion rate, (b) use timing analysis to search for source variability, (c) perform optical follow-up of transient source outbursts with Van Vleck Observatory's new 24" research telescope. This work will culminate in my honors thesis this spring.

**Simulating the Solar Gravitational Lens**

Fall 2017 - Fall 2019

*Wesleyan University, Department of Astronomy*

*Advisor: Dr. Seth Redfield*

- For the first three years of my undergraduate career, I worked on image deconvolution techniques for the Solar Gravitational Lens (SGL), a theoretical space telescope which will utilize the gravity of the Sun to image the surface of distant exoplanets. This work culminated in a relativistic raytracer which simulated the data that the SGL might collect, the first step in generating a training set for a machine learning algorithm to be used for deconvolution.

## TEACHING

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**Course assistant for *Introduction to Astrophysics***

Fall 2020

*Wesleyan University, Department of Astronomy*

*Professor: Dr. Meredith Hughes*

- Due to the pandemic, this course is taking place online, and in-class time is primarily used for discussion- and collaboration-based activities. Alongside the other teaching assistants, I'm responsible for facilitating these discussions and being available to answer questions. Additionally, I conduct weekly TA sessions and anticipate leading social-distanced observational activities with the observatory's many telescopes.

**Teaching assistant for *The Universe***

Fall 2019

*Wesleyan University, Department of Astronomy**Professor: Dr. William Herbst*

- I was responsible for conducting weekly homework help sessions for students, leading laboratory exercises in class, and grading labs & weekly homework for 50 students.

**OUTREACH & ACTIVITIES**

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**Student Director of Van Vleck Observatory**

Summer 2019 - Present

*Wesleyan University, Department of Astronomy*

- As student director, I'm responsible for maintaining the facilities for the observatory's 24" research telescope, scheduling and selecting targets to be observed by students, and training new students on the telescope. I've made a point of being able to operate all the telescopes in the observatory and being present & available for any events that may need an extra hand, as well as being involved in the installation of VVO's new 24" PlaneWave research telescope. More information can be found on [my website](#).

**Wesleyan Astronomy Club**

August 2018 - Present

*Wesleyan University, Department of Astronomy**Co-Founder*

- WesAstro was created as an opportunity for those outside of the astronomy major at Wesleyan to get involved with astronomy. We held bi-weekly meetings during which a presentation on a topic in astronomy was given by some combination of myself and my co-founders, Ben C.O. Martinez (B.A. 2021) and Gil Garcia (B.A. 2020).

**Astroparticle & Cosmology Journal Club**

Spring/Fall 2019, Fall 2020 - Present

*Wesleyan University, Department of Astronomy**Co-Founder*

- The Astroparticle & Cosmology Journal Club was founded as a way for myself and my co-founders, Ben C.O. Martinez (B.A. '21) and Nikki Pallat (B.A. '21), to get some exposure emerging topics in these fields. We've since extended the group to students in the astronomy & physics departments. Meetings occur weekly, which involve discussion of a recent paper selected by a group member the week previous.

**STEM Diversity Journal Club**

Summer 2020 - Present

*Wesleyan University, Department of Astronomy**Member*

- The astronomy department at Wesleyan, in light of the events surrounding the murder of George Floyd at the hands of racist police, has chosen to reinstitute the DJC, an initiative started by Dr. Kevin Flaherty as a postdoc here at Wes. The DJC is comprised of both students and faculty and meets bi-weekly to discuss an article related to diversity in astronomy, STEM or in general, with the goal of reflecting on the department's own shortcomings and organizing to improve.

**Telescope Operator**

Fall 2017 - Present

*Wesleyan University, Department of Astronomy***Kids' Nights & Public Nights @ VVO**

Fall 2019 - Present

*Wesleyan University, Department of Astronomy**Volunteer***SKILLS**

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**Teaching****Data science****Programming**

Python, C, Mathematica, SQL, HTML, CSS

**Tools & frameworks**L<sup>A</sup>T<sub>E</sub>X, Unix (terminal), Git

## PRESENTATIONS

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- Bright Meals for Light Eaters: Analysis and Characterization of Ultraluminous Accreting X-Ray Binaries in the Local Universe** July 26, 2020  
*Wesleyan University* *Poster*
- If You Give the Sun a Telescope: Imaging Alien Earths with the Solar Gravitational Lens** October 5, 2019  
*Keck Northeast Astronomy Consortium Undergraduate Research Symposium* *Talk*
- If You Give the Sun a Telescope: Imaging Alien Earths with the Solar Gravitational Lens** July 25, 2019  
*Wesleyan University* *Poster*

## HONORS & AWARDS

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- Connecticut Space Grant Consortium Undergraduate Scholarship** Fall 2019
- CIS Summer Research Fellow** Summer 2020  
*Wesleyan University, Department of Astronomy* *Advisor: Dr. Roy E. Kilgard*
- CIS Summer Research Fellow** Summer 2019  
*Wesleyan University, Department of Astronomy* *Advisor: Dr. Seth Redfield*

## REFERENCES

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- Seth Redfield, PhD**  
Associate Professor of Astronomy  
Wesleyan University, Department of Astronomy  
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- Roy E. Kilgard, PhD**  
Associate Professor of the Practice in Astronomy  
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- A. Meredith Hughes, PhD**  
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