

# GILBERTO GARCIA

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## EDUCATION

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### Wesleyan University

B.A. Astronomy & B.A. Physics, GPA: 3.41/4.00

May 2020

Middletown, CT

## WORK EXPERIENCE

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### Research Assistant

Wesleyan University Department of Astronomy

May 2018 - Present

Middletown, CT

- Work with Dr. Edward C. Moran on constructing a catalog of long-term, variable X-ray sources to understand the nature of accretion rates for supermassive black holes at the center of galaxies.
- Created a pipeline to query data from the Chandra X-ray Observatory and apply matching algorithms to find a source's counterpart in other X-ray catalogs. The pipeline applies statistical methods to create light curves using data spanning 4 decades.
- Presented a poster of our work at *Wesleyan's Summer Research Symposium* (June 2018, June 2019), at the *National McNair Conference* at UCLA (July 2019), *Keck Northeast Astronomy (KNAC)* at Vassar (October 2019), and at the *American Astronomical Society's 235th Meeting* in Honolulu, HI (January 2020). Gave a talk at *KNAC* at Middlebury (October 2018).

### Teacher Apprentice

Wesleyan University Department of Astronomy

Sept. 2019 - May 2020

Middletown, CT

- Enhance pedagogical methods by serving as an additional resource for 40 students in introductory Astronomy courses (Wesleyan's ASTR105 and ASTR111) by holding weekly homework help sessions, telescope operating for mandatory class observing nights, and individual tutoring upon request as well as teach class when the professor is unavailable.
- Practice student assessment skills by creating homework rubrics while also grading student homeworks and exams.

## PROJECTS

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### X-ray Variability in Active Galactic Nuclei

[github.com/ggarcia01/undergrad\\_astro\\_research](https://github.com/ggarcia01/undergrad_astro_research)

May 2018-Present

- Constructed a pipeline using custom Python code that analyzes the sources observed through the Einstein Observatory, the Roentgen Satellite, and the Chandra Observatory and finds variability in their X-ray flux.
- Incorporated the pandas, astropy, and matplotlib libraries for data filtering and graphing.
- This work resulted in a thesis which was awarded high honors.

### Molecular Dynamics Simulation in 2-D

[https://github.com/ggarcia01/wes\\_scripts/tree/master/PHYS340/340\\_final](https://github.com/ggarcia01/wes_scripts/tree/master/PHYS340/340_final)

Jan. 2019 - May 2019

- Simulated the motion of particles under a gravitational potential well, which has general applications for celestial systems or molecules.
- Incorporated Runge-Kutta analysis to integrate the motion of particles.

### Smaller Works

[https://github.com/ggarcia01/wes\\_scripts](https://github.com/ggarcia01/wes_scripts)

Sept. 2018 - May 2020

- Worked on various smaller projects that which include simulating the interior of a star, calculating the matter density of the universe using data from the Sloan Digital Sky Survey, and identifying the age of star clusters using Gaia data.

- These works incorporate different techniques such as Simpson integration, solving differential equations using Euler and Runge-Kutta methods, and querying databases using SQL.

## LEADERSHIP

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### Coordinator

Cross Street Tutoring

Sept. 2016 - May 2020

Middletown, CT

- Connect low-income students (K-12) from various Middletown public schools with educational resources, including supplies and tutors, through a daily after school program. Plan events geared towards igniting the Middletown students' interest in STEM and higher education by bringing in speakers and creating science lesson plans.
- Recruit and train groups of Wesleyan tutors on pedagogical methods to more effectively assist Middletown students with classwork and homework while also creating a safe and comfortable work environment.

### Co-Founder

Wesleyan Astronomy Club

Sept. 2018 - May 2020

Middletown, CT

- Created as a space to for Wesleyan students to get involved with the astronomy department at an enthusiast's level. Lead biweekly meetings on current and classic topics pertaining to astronomy geared towards people with minimal astronomy and physics knowledge while occasionally opening Wesleyan's telescopes to allow students to observe.

### Public Outreach Volunteer

Wesleyan University Department of Astronomy

Jan. 2018 - May 2020

Middletown, CT

- Engage with the Wesleyan student body and Middletown community by hosting presentations and observing sessions as part of Kids' Night and Space Night, public outreach programs at Wesleyan's Van Vleck Observatory. Kids' Night involves a short demonstration followed by activities and observing for younger children while Space Night involves a presentation delivered at a high-school/college level followed by an observing session.

## TECHNICAL SKILLS

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### Operating Systems

Mac OS, Microsoft Windows

### Languages

Python (astropy, pandas, numpy, scipy), C, HTML, CSS, SQL,  $\text{\LaTeX}$

### Software

IRAF, SAOImage DS9, Mathematica, Microsoft Excel, Google Drive