

## Curriculum Vitae

**Alexa Beyer**

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### Education

**Masters in Astronomy**

**Expected Graduation: May 2026**

**PhD in Astronomy**

**Expected Graduation: May 2030**

University of Florida (UF) | Gainesville, FL

Youngstown State University (YSU) | Youngstown, OH

**Bachelor of Science in Astronomy and Physics (05/2024)**

**Minor:** Mathematics

### Research Experience and Publications

- **Georgia State University REU**

Summer 2023

- Advisor: Dr. Russel J. White

- First Author paper submitted for review (January 2024) to the Astronomical Journal

My research project is to empirically define the Kraft Break, previously last done in 1967. Taking local high mass stars from the Gaia Data Release 3 and comparing the stars to other surveys to reduce the sample size. Using python code to mathematically represent the break when higher mass F stars either increase their rotation speed to continue rapidly rotating or slow down.

- **Michigan State University REU**

Summer 2022

- Advisors: Dr. Jay Strader, Dr. Ryan Urquhart, Dr. Laura Chomiuk

My research project was on a new eclipsing X-Ray binary, given the goal to identify the binary period. I downloaded publicly available data from the Chandra archive to analyze. I reduced x-ray and optical data using the software tool ciao to create light curves and three-color images. Additionally, I spent time familiarizing myself with python, specifically Jupyter Notebooks to plot light curves and spectral energy distributions.

- **Honors Contract Research**

Spring 2023

- Using 'unsharp-masking' techniques to the small images in order to remove the smooth light distributions, and to look for any remaining 'fine-structure', which are low-level features such as disks, shells, or tails that are hidden by the bulk of the galaxy light. Compare the input and output images to look for any hints of substructure which could be caused by interactions or collisions between dwarf galaxies.

- **Observation at Apache Point Observatory**

July 2023

- Earned observation certification.

- **Creating color images from the Hubble Space Telescope working with FITS Liberator**

Fall 2022

- Advisor: Dr. Patrick Durrell

### Coding and Computer Experience

- **Python**

- Jupyter Notebooks

- CIAO

- DS9

- **TOPCAT**

- **FITS Liberator**

- **C++**

- **Linux/Unix**

## **Public Speaking Experience**

- Beyer, A. (May 4<sup>th</sup> 2024) STEM College Graduation Commencement Speaker.
- Beyer, A. (2024), The Kraft Break Sharply Divides Low Mass and Intermediate Mass Stars, Poster Session at *The American Astronomical Society (AAS) Winter Conference*, New Orleans, LA.
- Beyer, A. (2024), It's All About Mass; The Formation and Evolution of Stars, Talk given at *Astronomy on Tap*, Youngstown, OH.
- Beyer, A. (2023), The Kraft Break Sharply Divides Low Mass and Intermediate Mass Stars, Talk given at *The American Physics Society (APS) Eastern Great Lakes Section (EGLS) Conference*, Cleveland, OH.
- Beyer, A. (2023), The Kraft Break Sharply Divides Low Mass and Intermediate Mass Stars, *Georgia State University Undergrad Colloquium*, Atlanta, GA.
- Beyer, A. (2022), Discovery of a New Eclipsing X-Ray Binary, *Michigan State University REU poster presentation*, East Lansing, MI.
- Beyer, A. (2022), Discovery of a New Eclipsing X-Ray Binary, *Physics and Astronomy Research Experience for Drew Scholars Conference*, East Lansing, MI.
- Beyer, A. (2022), Discovery of a New Eclipsing X-Ray Binary, *Summer Research Presentation at Youngstown State University*, Youngstown, OH.

## **Popular Media**

- STEM Student Spotlight January 2024
  - "Stellar Journey: A glimpse into an Astronomy and Physics student's pursuits"  
<https://ysu.edu/news/stellar-journey-glimpse-astronomy-and-physics-student-s-pursuits>
- Mental Match Up Podcast March 2024
  - Episode 121, titled "Alexa Beyer". Discussion on the battles with being a student athlete in a difficult major and dealing with long term injuries.  
<https://www.morgansmessage.org/podcast-episodes/episode-121-alexa-beyer>

## **Community Engagement**

- Astronomy on Tap (Gainesville) 2024 – Current
  - Host and announcer for all Gainesville AOT events.
  - Planned, coordinated, and presented at Youngstown's first ever Astronomy on Tap event.

## **College Athletic Experience**

**NCAA Division 1 Women's Lacrosse Team | YSU** Fall 2020-Present

- Commit well over 30 hours every week to practice, strength training, film study, travel and games while managing a full course load.
- Develop strong communication, teamwork skills and work ethic to meet personal and team goals.
- Communicate with coaches, trainers, athletic and academic advisors, and compliance to meet all standards of requirements for YSU athletics.
- Serve as a representative of YSU lacrosse and the athletic program through service and volunteerism.

## **Job Experience**

**Math Tutor | YSU Math Assistance Center** August 2021 - Present

- Customized tutoring and teaching methods to meet the needs of each individual student to help them succeed.
- Tutored in all college mathematics courses from algebra, calculus, differential equations, and linear algebra.

**Assistant | TCP Photography** September 2019 – August 2020

- Operated and set up expensive photography equipment to create innovative lighting effects and camera angles.

**Event Planner Intern | Michigan State Hillel** May 2015 – August 2021

- Trained customer service, marketing and sales teams for events.
- Propose effective layouts, marketing ideas and sales teams throughout a 500 person all day event.
- Maintained close communication with clients to mitigate service issues.

**Custodian | Michigan State Hillel** March 2019 - March 2020

- Maintained accountability for building keys, master keys, and access cards.
- Maintained cleanliness of sanctuary, offices, meeting rooms, kitchen, restrooms and gathering halls.

#### **Grill Cook | Bob Evans Farms**

February 2018 - September 2019

- Operated fryers and grills according to instructions to maintain safety and food quality.
- Conducted daily inspections and maintained food sanitation and kitchen equipment safety reports.

#### **Lacrosse Coach | M3 Elite Lacrosse Program**

Summer 2021

- Coached an elite youth girls summer team.
- Organized, planned, and implemented practices, travel, recruiting seminars, individual skill work for over 100 girls.
- Provided a safe, productive, and informational team environment while promoting hard work, good sportsmanship, responsibility, and discipline.

### **Research Areas of Interest**

My main areas of research interest are, but not exclusively, compact objects such as black holes and super novae, stars, stellar formation, and stellar evolution. I have completed work with X-Ray binaries, working with light curves and binary periods. Additionally, I have done extensive research within stellar evolution and rotation of main sequence F stars that lie along the Kraft Break. With every new area of astrophysics I have spent time within of research, I have enjoyed.

### **Scholarships and Awards**

- Presidents List Spring 2021, Fall 2023, Fall 2023
- Dean's List Fall 2020 – Fall 2023
- American Physical Society ECLS Conference  
Undergraduate Outstanding Contributed Talk Award October 2023
  - Awarded \$100
- Frank M. Clark Physics Award March 2023
  - "This award is given to outstanding achievement in the study of physics."
- Honors College Academic Scholarship Fall 2020 – Fall 2023
- Nominated for Goldwater Scholarship December 2022
- Trailblazer Scholarship Fall 2020 – Fall 2023
  - Awarded to a first-generation college student.
- Capital Area Athletic Conference Competitive Cheer Scholarship January 2020
  - Awarded to a cheerleader who shows excellent academic achievements and athletic leadership in their programs.

### **Clubs and Involvements**

- President of YSU Society of Physics Students 2023-2024
  - Planned and coordinated society bi-monthly meetings.
  - Organized an Astro Coffee hour for weekly presentations of recent published paper to improve students paper reading skills and to talk about recent findings within physics and astronomy.
  - Planning a community outreach event to improve scientific communication to the public by presenting varying areas of research within physics and astronomy and answering questions.
- YSU Sokolov Honors College 2020-Present
- YSU Women's Lacrosse 2020-Present
- Girl Scout of America 2012-Present

### **Volunteerism**

- Girl Scout of America 2012-Present
  - Achieved a Bronze and Silver award for volunteerism.
- Over 150 cumulative volunteer hours throughout college
- Pen pal with three local elementary school students August 2023- Present
- iPenPal, helping students in Vietnam improve English August 2021 - Present

- Lacrosse Instructor for local schools in Northeast Ohio

October 2021

**Related Course List:**

- Quantum Mechanics 1 & 2 – Shankar, *Principles of Quantum Mechanics*
- Observational Astronomy 1 & 2 – Chromey, *To Measure the Sky*
- Astrophysics 1 – Owacki, *Fundamentals of Astrophysics*
  - Astrophysics 2 next semester
- Classical Mechanics
- Moons and Planets
- Thermodynamics and Statistical Mechanics
- Introduction to Astronomy
- Modern Physics
- Electromagnetic Field Theory – Griffiths, *Introductions to Electrodynamics*
  - EMFT 2 next semester