

# John “Jack” P. McGuire

jackmcg7@live.com | jmcguire5@student.gsu.edu

## EDUCATION

Georgia State University, Atlanta, GA

- **Bachelor of Science in Physics**  
Institutional GPA: 3.82
- **Associate of Science in Physics**  
Institutional GPA: 3.80

*Expected May 2026*

Overall GPA: 3.73

*May 2024*

Overall GPA: 3.70

*Honors:* High Honors, Global Scholar, Perimeter STAR Award in Physics, President’s List

## SKILLS & INTERESTS

**Technical:** Python (NumPy, Matplotlib, AstroPy, EinsteinToolkit), Arduino, geant4, LabVIEW, TopCAT, LATEX **OS:** MacOS, Windows, Linux **Professional Interests:** Space Exploration, Astrophysics Research, Science Communication, Product Design **Professional Affiliations:** Sigma Pi Sigma, Society for Physics Students

## RESEARCH EXPERIENCE

**GSU USRP – Rhagavan Fellowship (Mentor: Dr. Russel White)**

*Summer 2025*

- Compiled first unified catalogue of known barium dwarfs using Gaia DR3 & SIMBAD sources.
- Investigated Ba. Dwarf formation mechanisms via orbital separations and stellar parameters.
- Applied CHARA reduction pipeline to obtain stellar diameters from interferometric data.
- Modeled limb-darkened disks using `mpfit.limbdark.disk.analytic` for the GJ 166 trinary system. Recorded errors,  $x(\text{squared})$ , and variable or fixed scales in order to weed out systematic errors from instrumental and statistical error.
- Talk will be Presented at the Undergraduate Research Symposium August 7th, 2025. "Where Are the K & M Barium Dwarfs? Potential Answers in the 40 Eri System"
- Paper will be Submitted to Astronomical Society of the Pacific August 8th, 2025. "Missing M-Class Barium Dwarfs; Insights from 40 Eri C"

**Binary System Monitoring at Hard Labor Creek Observatory**

*Spring 2025*

- Observed binary system (757 Montana) for three nights on the 24" Miller telescope at HLCO. Conducted photometric data reduction using IRAF and IDL and operated remote telescopes.
- Contributed to data collection and analysis for the peer-reviewed publication:

*Bentz, Misty C., ..., McGuire, J.P., et al. (2025). "Broad-band Monitoring of 797 Montana." *Minor Planet Bulletin*, pp. 207–208.*

Broad-band monitoring of asteroid 797 Montana was conducted over four nights in February 2025. The first three nights used a Johnson V filter; the fourth was unfiltered. A best-fit rotation period of  $4.545 \pm 0.001$  hours and amplitude of  $\Delta V = 0.50 \pm 0.03$  mag were found—consistent with previous results but with slightly higher variability than most studies have reported.

**Cosmic Ray Detector Assembly – Global Muon Detector Network (Mentor: Dr. Xiochun He)**

**Upcoming: Study of Cosmic Ray Flux and Tidal Cycles**

*Planned Fall 2025*

- Will perform statistical analysis of global muon detector data to correlate tidal cycles (high, low, spring, neap) with muon flux on Earth’s surface.
- Contributed to construction and integration of cosmic ray detectors using aluminum framing and Raspberry Pi systems to support global monitoring network as an undergraduate research assistant.

## PROFESSIONAL EXPERIENCE

### **Vertigo Pinball, LLC** – Startup Consultant and Manager

*Dec 2020 – Present*

- Researched the 'barcade' market and designed an experience for people of all walks of life to enjoy the pinball and craft beer scene. Created P&L projections, selected machine lineup, and helped build out the physical layout.
- Led the creation of the Georgia Pinball Museum initiative; curated interactive exhibits for hundreds of guests daily, during the summers of 2023 and 2024.
- Led the creation of Blue Ridge Gourmet Popcorn: overseeing popping, developing new specialty flavors, oversee production and packaging. 2024 through Present.

### **British Swim School** – Swim Instructor & Substitute

*Spring 2022 – Winter 2023*

- Taught private and group swim lessons for all ages, infants to elderly, focusing on safety and technique. Worked with client to train towards goals of their choosing and provided 'push goals' as well as motivation to achieve them.
- Returned in Winter 2024 as a replacement to support staff during shortages.

### **Huntcliff Club** – Assistant Head Swim Coach

*Summer 2016 – Summer 2021*

- Introduced swimmers 4-18 to competitive swimming skills, bolstered competitive spirit, and promoted strong work ethic among the team.
- Utilized TeamUnify to create most effective lineups for each swim meet.

### **Camp-Run-A-Mutt:**

*Spring 2020-Spring 2022*

- Worked to care for 5-25 dogs at a time at a daily/overnight cage-less dog boarding facility.
- Maintained constant communication with staff in order to ensure the safety of each pet and to ensure a seamless return of the pet to the parent upon pick-up.

## LEADERSHIP & ACTIVITIES

### **Eagle Scout, BSA Troop 463**

*Aug 2020 – Present*

Earned through years of dedication in earning merit badges, benefiting the community through various service projects. Earned an Induction into the Order of the Arrow. For my Eagle Scout project, I planned and executed a redesign of the landscaping at the entrance of Mount Vernon Presbyterian Church with hundreds of bundles of grass and three Japanese Maple Trees.

### **G.S.U. Perimeter SPACE Club** – Secretary

*Fall 2022 – Spring 2024*

Coordinated outreach events to elementary schools around metro-Atlanta, shared the excitement of science with children with physics simulations and VR demos of missions onboard the International Space Station; recorded club and staff meetings and communicated with the club details surrounding the events.

### **Rotary International Club** – Secretary of Service

*2017 – 2020*

Managed weekly meeting agenda to keep meetings efficient, on topic, and productive. Planned and led multiple service projects including planting trees at Big Trees Forest Preserve, cleaning up after shelter animals at PAWs Atlanta, and a monthly workshop for writing letters to veterans thanking them for their service. Maintained strategic partnerships with external sources to create opportunities to provide service in Atlanta area.

### **International Thespian Society** – Secretary, Capstone Director

*2018 – 2020*

Inducted as a member for active participation in a significant number of productions and dedication to the theater program. Led the Senior Capstone Project, overseeing all aspects of the senior show production, including scriptwriting, costume design, and programming lighting and sound cue routines. Managed a diverse team to ensure a seamless production, demonstrating leadership, collaboration, and creative problem-solving.

### **Varsity Swim Team Captain, Mount Vernon**

*2017 – 2020*

Voted team captain for junior & senior seasons due to work ethic, integrity, and success in pool and classroom. Led team to school's first two state championships during junior and senior year seasons (2018-2019, 2019- 2020).