Shane O'Brien

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Education:

University of California, Irvine (UCI) **(Sep. 2020 – June 2024)**

Bachelor of Science in Physics with Honors, specialization in Astrophysics

- **Awards:** Outstanding Graduating Senior Research Award ($500), Dean's Honor List (5 Quarters), Resonance Fellow Recognition

Technical Skills:

- **Coding Languages:** Python (Advanced), R (Beginner), SQL (Intermediate), LaTeX (Advanced), HTML/CSS (Intermediate), C/C++ (Beginner)
- **Data Analysis Tools:** Jupyter Notebook, RStudio
- **Scientific Libraries & Tools:** NumPy, pandas, SciPy, matplotlib, PyMC3, ROOT, MadGraph
- **Version Control:** Git/GitHub for version control and collaboration on coding projects
- **Operating Systems & Computing:** Proficient in Unix/Linux, macOS, and Windows; experienced with Linux terminal commands and high-performance computing clusters
- **Other Software:** MS Office, Google Suite, Wolfram Mathematica

Experience:

SCY High School (San Diego, CA) **(Sep. 2024 – Present)**

AP Physics C Instructor

- Instructing AP Physics C, a calculus-based, college-level physics course, at a small private high school part-time
- Planning and delivering three lectures weekly on key physics topics, incorporating problem-solving techniques and real-world applications

Robertson Astronomy Research Group (Irvine, CA) **(Sep. 2023 – Present)**

Undergraduate Researcher in Astronomy

- Investigating exoplanet candidates TOI-5916 and TOI-6158 through joint modeling of transit and radial velocity data from TESS, HPF, and ground-based observatories
- Using the *exoplanet* and *PyMC3* frameworks to build Bayesian models and run MCMC sampling to constrain system parameters and explore formation scenarios for giant planets around M-dwarf stars
- Co-authoring a manuscript for *The Astrophysical Journal (ApJ)* on the systems' orbital and physical properties and their implications for planet formation around M-dwarf stars

Whiteson Particle Physics Research Group (Irvine, CA) **(May 2023 – August 2024)**

Undergraduate Researcher in Particle Physics

- Utilized Python programming, the ROOT framework, and the particle collision simulation program MadGraph to analyze simulated collider data to help improve theoretical understanding of processes
- Lived in Geneva, Switzerland for a month working with the UCI ATLAS collaboration at CERN studying the decay modes of the theoretical heavy top quark partner particle T, in hopes of better understanding more about top quarks themselves
- Attended CERN Summer Student lectures where physicists from around the world would come and speak about their work and its relation to experiments at CERN

UCI Physics Department (Irvine, CA) **(Sep. 2022 – June 2024)**

Peer Undergraduate Mentor

- Mentored a "Resonance Group" of new physics students, serving as a peer mentor to new physics majors
- Answered student questions about physics courses at UCI, and helped new students adjust to studying physics at UCI
- Presented my own research to the class of new physics students in order to show them what undergrad research is like and to answer questions about how to get involved in undergraduate research

References:

- Prof. Paul Robertson, paul.robertson@uci.edu - Dept. of Physics & Astronomy, UC Irvine
- Prof. Daniel Whiteson, daniel@uci.edu - Dept. of Physics & Astronomy, UC Irvine