ZACHARY BALDWIN

||
Pittsburgh, Pa, USA

EDUCATION & PROFESSIONAL EXPERIENCE

Carnegie Mellon Univeristy, Pittsburgh Pa *June 2019 - July 2025 (expected)*
Ph.D. in Nuclear & Particle Physics

The College of William & Mary, Williamsburg Va *August 2015 - May 2019*
B.S. Honors Physics & Mathematics

The Univeristy of Glasgow, Glasgow Scotland *May 2018 - August 2018*
Visiting Student Researcher

RESEARCH PROJECTS

Carnegie Mellon University - GlueX experiment *(2019 - Present) Advisor: Curtis Meyer*
- My area of research is searching for the existence of exotic hybrid mesons, particularly on the $\pi^0\eta$ and $\pi^0\eta'$ systems. The interest in these two systems is due to the strong possibility of the presence of exotic J^{PC} (quantum) numbers in their final states. By comparing both systems, the role of flavor symmetry should be illuminated as to allow for a better understanding of meson production mechanisms.
- During this project, a full partial wave analysis will be implemented.

The College of William & Mary - GlueX experiment *(2016 - 2019) Advisor: Justin Stevens*
- This research studies the reaction $\gamma p \rightarrow \pi^0\gamma$ alongside an exploratory study of the Compton scattering process $\gamma p \rightarrow \gamma p$. The reason for this analysis is to aid in the understanding of production mechanisms in high-energy photoproduction. The results from this research will provide a stepping stone to ultimately measure the Σ beam asymmetry for large angle Compton scattering.
- During this analysis, a fix to the GlueX calorimeter clustering algorithm was implemented in order to view the separation of small decay angles of $\pi^0 \rightarrow \gamma\gamma$.

The University of Glasgow - MAMI experiment *(2018) Advisor: Ken Livingston*
- This project's main goal was to develop a compact pair polarimeter and spectrometer for use in hadron physics experiments at photon beam facilities. Challenging techniques are employed to observe the degree and angle of polarization from electron and positron separation, along with other polarization observables.
- During this project, a brand new approach using machine learning and neural networks was developed to try and gather the problematic degree of polarization.

SCHOLARSHIPS, FELLOWSHIPS, & HONORS

Honors

The Open Science Grid User School *July 2022*
-Taught how to utilize high-throughput computing systems using the national-scale OSG to run large-scale computing resources. – ***Madison, Wisconsin***

The International High Process Computing School on Challenges in Computational Sciences *June 2022*
- According to details about the school, "The summer school will familiarize the best students in computational sciences with major state-of-the-art aspects of HPC and Big Data Analytics for a variety of scientific disciplines, catalyze the formation of networks, provide advanced mentoring, facilitate international exchange and open up further career options." – ***Athens, Greece***

Scholarships & Fellowships

The William & Mary Honors Fellowship *April 2018 - May 2019*
- The William & Mary Honors Fellowship supports students conducting research for department Honors projects. This fellowship is offered to roughly 70 students in the graduating class each year. Once approved for the fellowship, students must gain donors to help support their research project.

Howard Hughes Medical Institute Summer Research Fellowship *March 2017 - August 2017*
- This fellowship provides the opportunity for students to work full-time on campus with a faculty member in mentored research in any STEM field. In addition to sponsoring full-time summer research opportunities, the fellowship also hosts workshops on various topics relevant to STEM fields.

Howard Hughes Medical Institute Summer STEM Course Scholarship *March 2016 - August 2016*
- For this scholarship, students receive a stipend that covers the cost of the course as well as any associated fees including summer registration fees. The students also receive free on-campus housing.

The Wren Scholarship *August 2015 - May 2019*
- The Wren Scholarship provides extraordinary opportunities to academically distinguished undergraduates at William & Mary. This scholarship was first offered to the class of 2015
- Each year, roughly twenty students are selected from the incoming freshman class that will major in STEM fields. The scholarship offers personal faculty supervision, collaborative research opportunities, and financial support. During the summer before the beginning of the first academic year, the new Wren Scholars come to the College and take a one credit course in order to help the scholar settle in for the start of their college journey.

PUBLICATIONS

GlueX Collaboration

Search for photoproduction of axion-like particles at GlueX ||
Physical Review D (Vol. 105, Iss. 5)

Measurement of Spin Density Matrix Elements in $\Lambda(1520)$ *Photoproduction at 8.2* GeV *to 8.8* GeV ||
Physical Review C (Vol. 105, Iss. 3)

Measurement of beam asymmetry for $\pi^-\Delta^{++}$ *photoproduction on the proton at* $E_\gamma = 8.5GeV$ ||
Physical Review C (Vol. 103, Iss. 2)

AWARDS

Division of Nuclear Physics Travel Grant *(Unclaimed due to COVID-19)* *February 20, 2020*
- Based on the quality of work and references, a stipend of $400 was awarded to cover travel costs.

CONFERENCES

Presented

APS Division of Nuclear Physics – Boston, Massachusetts *(Virtual)* *October 25, 2021*

Topical Group on Hadronic Physics – Sacramento, California *(Virtual)* *April 13, 2021*

APS Division of Nuclear Physics – New Orleans, Louisiana *(Virtual)* *October 25, 2020*

American Physics Society – Washington, D.C. *(Virtual)* *April 18, 2020*

APS Division of Nuclear Physics Fall Joint Meeting – Island of Hawai'i *October 26, 2018*

Zone 4 SPS Meeting – University of Maryland *April 22, 2018*

American Physics Society – Columbus, Ohio *April 16, 2018*

ADMINISTRATIVE EXPERIENCE

AI Super-Resolution Simulations: From Climate Science to Cosmology *February 23-25, 2022*
- Helped organize conference meeting.

OUTREACH

Pittsburgh Regional Science and Engineering Fair *March 23, 2022*
- Presented concepts and research on nuclear and particle physics to high school teachers.