

# Tim Mathew

## Curriculum Vitae

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### Education

- 2020– **University of Oregon, Ph.D. Physics.**  
High Energy Particle Experiment. Research assistant with the ATLAS collaboration.
- 2017–2019 **University of Washington, B.S. Physics.**  
*cum laude*, 3.82 GPA  
Comprehensive Physics major. Undergraduate research assistant at the Center for Experimental Nuclear Physics and Astrophysics (CENPA).
- 2015–2016 **Green River College, A.S. Physics.**  
*Highest Honors*, 3.99 GPA  
Treasurer of the Green River Chapter of the Society of Physics Students.

### Research Experience

- 2021– **University of Oregon, High Energy Experiment Group, Graduate Research Assistant.**  
Supervisor: Stephanie Majewski  
ATLAS Collaboration at CERN.
- Participating in the current optimization of topoclustering algorithms for future ATLAS hardware upgrades.
  - Contributed to the Dark Meson search and associated software framework.
  - Ran a statistical cost/benefit analysis of including the multi-lepton channel in the Dark Meson search.
  - Coded various software routines to analyze ATLAS event simulations and data, and mentored fellow students on implementation.
- 2018–2020 **University of Washington, CENPA, Undergraduate Research Assistant/Lab Technician.**  
Supervisor: Jason Detwiler  
MAJORANA DEMONSTRATOR (MJD) and Large Enriched Germanium Experiment for Neutrinoless  $\beta\beta$  Decay (LEGEND) Collaborations.
- Extensive work with germanium radiation detectors and associated systems.
  - Leading role in the R&D, construction, and data taking campaign of the Collimated Alphas Gammas and Electrons (CAGE) test stand, which will characterize germanium detector response to various collimated radiation sources on sensitive detector surfaces to improve background rejection and data analysis for LEGEND.
  - Participated in work on the MJ60 detector test stand. The MJ60 test stand utilizes gaseous krypton-83 to characterize surface events versus bulk events to help understand backgrounds in MJD.
  - Coded and implemented multiple routines in the prototype LEGEND data processing and analysis suite, `pygama`. Including auto-calibration and pulse shape discrimination (PSD) software for MJ60 and CAGE data.
  - Mentored other members of the collaboration in the use of germanium detectors and analysis software

COHERENT Collaboration. COHERENT will measure Coherent Elastic Neutrino-Nucleus Scattering using the Spallation Neutron Source at Oak Ridge National Laboratory (ORNL).

- Contributed to the NaI[Tl] scintillating radiation detector characterization campaign, including a study of the internal alpha rate of the detectors to understand backgrounds in the low energy region. NaI[Tl] detectors will be sent to ORNL for a ton-scale CEvNS search using sodium recoils.
- Wrote analysis software using Python and ROOT.
- Involved in writing the standard operating procedure for training new assistants.

## █ Awards and Honors

- 2019–           Sigma Pi Sigma member  
2017–2019     Dean’s List

## █ Technical Skills

Radiation detection, radioactive source handling, detector hardware and electronics, vacuum and cryogenic systems, DC motors, data analysis (Python, ROOT, Pandas, HDF5)

## █ Presentations

- [1]           *Initial Commissioning Results from the CAGE Scanner.*  
CENPA Monday Meeting.  
Seattle, Washington, 18 November, 2019.
- [2]           *An Internal Scanning Cryostat for High Purity Germanium Detectors.*  
Fall Meeting of the American Physical Society, Division of Nuclear Physics, 2019.
- [3]           *The CAGE Scanner.*  
Undergraduate Research Symposium 2019.  
Seattle, Washington, 17 May, 2019.

## █ Teaching and Mentorship Experience

- 2021–           **UO PAGES Mentor.** Mentor to undergraduate physics majors through the Physicists for Advancing Gender Equity in Science (PAGES) mentorship program. Meet with students monthly to round out their experience as a physics major and help them achieve their academic and research goals. Introduce students to faculty, and offer them a variety of resources to gain research experience. Advocate for students during times of difficulty and help them build confidence in their academic skills.
- 2020–           **UO Physics Department Teaching Assistant, various courses.** Graduate lab and teaching assistant for intro series physics courses and astronomy, and the lead TA for the upper division digital electronics lab. Guided students through physics labs and led tutorial sessions to solidify student understanding of the material. Assessed students through graded assignments. Accessible office hours were a priority to help students achieve their learning goals.

- 2019–2020 **Pacific Learning Academy Instructor, High School Physics and Chemistry.** Science teacher at a private high school in the Seattle area during gap year. Taught a mixture of traditional and active learning lectures using data driven education techniques. Created and implimented science labs that empowered students to master lecture material. Helped refine the physics curriculum to prepare students for modern college science classes. Assessed students through a mixture of homework, tests, presentations, and independent research.
- Spring 2018 **UW Physics Lab Teaching Assistant, Calculus-based Introductory Physics: Waves and Optics.** Undergraduate lab assistant for 3 sessions of Physics 123. Guided lab groups through a mixture of traditional and modern experiments designed to reinforce concepts taught in lectures. Engaged students in open discussions to motivate active learning and provoke interest in physics.
- 2016–2017 **Green River College Tutor, Physics 121-123** Lead tutor for first-year physics courses. Taught students one-on-one and led group sessions to enrich understanding of fundamental concepts and improve problem-solving skills on homework and tests.

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## Publications

- [1] *Commissioning CAGE: An internal-source scanning cryostat for HPGe detectors.*  
CENPA Annual Report 2020.

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