

# Rebecca Rapp

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## EDUCATION

**M.S. / Ph.D. in Physics** (May 2019 / Anticipated 2022)

Carnegie Mellon University, Pittsburgh, PA 15213

- ≈ Field: Experimental nuclear/particle physics, neutrino physics
- ≈ Thesis (*in progress*): Characterizing neutrino and neutron fluxes at the Spallation Neutron Source
- ≈ Advisor: Diana Parno
- ≈ Thesis Committee: Curtis Meyer, Diana Parno, Riccardo Penco, Brian Quinn
- ≈ Highlighted Courses: Introductory Mathematical Physics, Quantum Mechanics I & II, Statistical Mechanics, Classical Electrodynamics I & II, Particle Physics I & II, Quantum Field Theory, Introductory Astrophysics

**B.A., Physics & Mathematics** (May 2017)

Washington & Jefferson College, Washington, PA 15301

- ≈ Advisors: Michael McCracken (Physics), Faun Doherty (Math)
- ≈ Honors: *Summa Cum Laude*, ΦBK, George Winchester Prize (Physics), Clyde Sheperd Atchison Prize (Math)

## GRADUATE RESEARCH ACTIVITIES

- ≈ Studying CEvNS at the Spallation Neutron Source (SNS) as a member of COHERENT (August 2017 - present)
  - Maintainer for a Geant4 simulation predicting the neutrino production at the SNS
    - Advising Aria Salyapongse in her validations against pion production data (May 2020 - present)
    - Advised Shuaixiang Zhang in his simulation of the SNS Second Target Station (Summer 2019)
  - Ongoing work with the MARS neutron monitoring subsystem (simulation and data analysis)
    - Advising Duy Hoang in his construction of a detailed Cf252 fission source (May 2020 - present)
  - Contributing to design and commissioning studies for a D<sub>2</sub>O detector to normalize neutrino flux
  - Serving as Data Coordinator for the collaboration (June 2020 - present)
- ≈ Worked with Brian Quinn to characterize photomultiplier tubes for parity-violation experiments and achieved nonlinearity on the order of 0.2% under CRex operating conditions (August - December 2018)

## GRANTS AWARDED

- ≈ DOE Office of Science Graduate Student Research Award (Solicitation Cycle 2020-1)
  - Project title: Investigating neutrino and neutron fluxes at the Spallation Neutron Source
  - Collaborating DOE Scientist: Jason Newby, Oak Ridge National Laboratory

## TECHNICAL SKILLS

- ≈ Programming:
  - Languages/Tools: python, Mathematica, LabVIEW, Arduino, C++, Geant4, ROOT, RooFit, coda
  - Techniques: large-scale data analysis, data visualization and fitting, Monte Carlo simulation, basic instrument interfacing, data acquisition
- ≈ Electronics: basic circuit construction, photomultiplier tube alterations, high voltage, data acquisition
- ≈ Other: basic glassblowing, basic shop experience

## PUBLICATIONS

- ~ [First constraint on coherent elastic neutrino-nucleus scattering in argon](#)  
COHERENT collaboration, Phys. Rev. D. **100**. 115020 – 9 December 2019.
- ~ [Sensitivity of the COHERENT Experiment to Accelerator-Produced Dark Matter](#)  
COHERENT collaboration, Phys. Rev. D. **102**. 052007 – 29 September 2020.

## PREPRINTS

- ~ [First Detection of Coherent Elastic Neutrino-Nucleus Scattering on Argon](#)  
COHERENT collaboration, 2020 preprint, arXiv: 2003.10630v1 [nucl-ex]
- ~ [COHERENT 2018 at the Spallation Neutron Source](#)  
COHERENT collaboration, 2018 white paper. arXiv:1803.09183v2 [physics.ins-det]

## CONFERENCE PROCEEDINGS

- ~ [COHERENT Plans for D<sub>2</sub>O at the Spallation Neutron Source](#)  
American Physical Society Division of Particles & Fields Meeting 2019. arXiv: 1910.00630 [physics.ins-det]

## RECENT PRESENTATIONS

- ~ Invited: [Impact of a NA61/SHINE Low-E Beamline on the COHERENT experiment](#)  
NA61/SHINE at Low Energy, Zoomland (9 December 2020)
- ~ Contributed: [ORNL Neutrino Flux Simulations: FTS and STS](#)  
Magnificent CEvNS Workshop 2020, Zoomland (17 November 2020)
- ~ Contributed: Investigating the background neutron flux for COHERENT with MARS  
American Physical Society Division of Nuclear Physics Annual Meeting, Zoomland (1 November 2020)
- ~ Poster: [Studying neutron backgrounds for COHERENT with MARS](#)  
XXIX International Conference on Neutrino Physics and Astrophysics, Zoomland (22 June 2020)
- ~ Invited: [ORNL Neutrino Flux Simulations: FTS and STS](#)  
Magnificent CEvNS Workshop 2019, Chapel Hill, NC (11 November 2019)
- ~ Contributed: [COHERENT Plans for D<sub>2</sub>O at the Spallation Neutron Source](#)  
American Physical Society Division of Particles & Fields Meeting, Boston, MA (1 August 2019)
- ~ Invited: [Spallation Neutron Source Neutrino Flux](#)  
Workshop on Fundamental Physics at the Second Target Station, Oak Ridge, TN (27 July 2019)
- ~ Contributed: [Pion production at the Spallation Neutron Source](#)  
The 15<sup>th</sup> International Conference on Meson-Nucleon Interactions and the Structure of the Nucleon, Pittsburgh, PA (4 June 2019)
- ~ Poster: [Neutrino Flux Simulations at the ORNL Spallation Neutron Source](#)  
XXVIII International Conference on Neutrino Physics and Astrophysics, Heidelberg, Germany (6 June 2018)

## TEACHING EXPERIENCE

- ~ Teaching Assistant for 33-142: Physics II for Engineering and Physics Students      August - December 2020  
*Department of Physics, Carnegie Mellon University*      Supervisor: Hael Collins
- ~ Teaching Assistant for 33-121: Physics I for Science Students      August 2017 - May 2019  
*Department of Physics, Carnegie Mellon University*      Supervisors: Stephen Garoff, Manfred Paulini
- ~ Math and Physics Tutor      August 2014 - May 2017  
*Peer-Assisted Learning, Washington & Jefferson College*      Supervisor: Doree Baumgart

## PROFESSIONAL DEVELOPMENT

- ≈ Junior Member Representative to the COHERENT Collaboration Board (January 2020 - January 2021)
  - Ex-officio member of COHERENT's Diversity & Inclusion Action Committee (July 2020 - January 2021)
- ≈ American Physical Society's Conferences for Undergraduate Women in Physics
  - Contributed to the national application review and will chair sessions at virtual CUWiP 2021
  - [Served in leadership roles during the organization of PghCUWiP in 2020](#)
    - Drafted initial proposal to APS to host a CUWiP site in Pittsburgh
    - Member of the national organizing committee, chaired local admissions and logistics committees
    - Led coordination of volunteers, served as primary point of contact for all participants
    - Panelist for *Work/Life Balance: Personal Interests*, chaired student research talk session
  - Assisted with networking events as a graduate student in 2019 (TCNJ)
  - Attended as an undergraduate in 2016 (ODU/JLab) and 2017 (Princeton)
- ≈ [Constructive Interference: Women and Minorities in Physics](#) (August 2017 - present)

## REFERENCES

Assistant Prof. Diana Parno  
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 COHERENT Collaborator  
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