Brooke Russell Curriculum Vitae

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EDUCATION

Ph. D., Physics, Yale University, 2020

Dissertation title: An electron neutrino appearance search in MicroBooNE with 5×10^{19} POT

Advisor: Bonnie Fleming

M. Phil., Physics, Yale University, 2016

M. S., Physics, Yale University, 2016

A. B., Physics, Princeton University, 2011

Senior thesis: An internal liquid argon purification system for liquid argon dark matter detectors

Advisor: Frank Calaprice

EMPLOYMENT

The Neil and Jane Pappalardo Special Fellow in Physics, Massachusetts Institute of Technology, 2024-Owen Chamberlain Postdoctoral Fellow, Lawrence Berkeley National Laboratory, 2020-2023 Graduate Research Assistant, Yale University, 2013-2019

Part have because Proposite Assistant Print for Heisensites 2011-2012

Post-baccalaureate Research Assistant, Princeton University, 2011-2013

Undergraduate Research Assistant, University of North Carolina Chapel Hill, 2009, 2010

HONORS

Pappalardo Fellowship in Physics, Massachusetts Institute of Technology, 2024-

For Women in Science Fellowship, L'Oreal USA & American Association for the Advancement of Science, 2021

Gertrude Scharff-Goldhaber Prize, Brookhaven National Laboratory, 2019

Owen Chamberlain Postdoctoral Fellowship, Lawrence Berkeley National Laboratory, 2020-2023

Troesh Prize Postdoctoral Fellowship (declined), California Institute of Technology, 2019

Dean's Emerging Scholars Research Award, Yale University, 2016

Office of Science Graduate Student Research Award, US Department of Energy, 2016

Leigh Page Prize, Yale University Physics Department, 2013

Co-captain, Princeton University Women's Varsity Track & Field, 2011

NAACP Academic Scholarship, Santa Maria-Lompoc NAACP Chapter, 2007-2011

PUBLICATIONS

INSPIRE reports a h-index of 40 for citeable work and 35 for published work.

Manuscripts in Review

- 8. A. Abed Abud et al. (DUNE Collaboration), Supernova Pointing Capabilities of DUNE, arXiv:2407.10339 [hep-ex]. In review at Physical Review D
- 7. F.P. An et al. (Daya Bay Collaboration), Measurement of Electron Antineutrino Oscillation Amplitude and Frequency via Neutron Capture on Hydrogen at Daya Bay, arXiv:2406.01007 [hep-ex]. In review at Physical Review Letters
- F.P. An et al. (Daya Bay Collaboration), Search for a sub-eV sterile neutrino using Daya Bay's full dataset, arXiv:2404.01687 [hep-ex]. In review at Physical Review Letters
- 5. A. Abed Abud et al. (DUNE Collaboration), Performance of a modular ton-scale pixel-readout liquid argon time projection chamber, arXiv:2403.03212v1 [physics.ins-det]. In review at Instruments
- 4. F.P. An et al. (Daya Bay Collaboration), First measurement of the yield of ⁸He isotopes produced in liquid scintillator by cosmic-ray muons at Daya Bay, arXiv:2402.05383 [nucl-ex]. In review at Physical Review Letters

- 3. A. Abed Abud et al. (DUNE Collaboration), Doping liquid argon with xenon in ProtoDUNE Single-Phase: effects on scintillation light, arXiv:2402.01568 [physics.ins-det]. In review at JINST
- 2. F.P. An et al. (Daya Bay Collaboration), Charged-current non-standard neutrino interactions at Daya Bay, arXiv:2401.02901 [hep-ph]. Submitted to JHEP
- 1. J. Asaadi, D.A. Dwyer, B. Russell, Novel Liquid Argon Time-Projection Chamber Readouts. In review at Annual Review of Nuclear and Particle Science.

Refereed Journal Articles

- 41. F.P. An et al. (Daya Bay Collaboration), Improved Measurement of the Evolution of the Reactor Antineutrino Flux and Spectrum at Daya Bay, Phys. Rev. Lett. 130 (2023) 211801.
- 40. F.P. An et al. (Daya Bay Collaboration), Precision Measurement of Reactor Antineutrino Oscillation at Kilometer-Scale Baselines by Daya Bay, Phys. Rev. Lett. 130 (2023) 161802.
- 39. A. Abed Abud et al. (DUNE Collaboration), Impact of cross-section uncertainties on supernova neutrino spectral parameter fitting in the Deep Underground Neutrino Experiment, Phys. Rev. **D107** (2023) 112012.
- 38. A. Abed Abud et al. (DUNE Collaboration), Highly-parallelized simulation of pixelated LArTPC on a GPU, JINST 18 (2023) P04034.
- 37. A. Abed Abud et al. (DUNE Collaboration), Identification and reconstruction of low-energy electrons in the ProtoDUNE-SP detector, Phys. Rev. **D107** (2023) 092012.
- 36. A. Abed Abud et al. (DUNE Collaboration), Reconstruction of interactions in the ProtoDUNE-SP detector with Pandora, Eur. Phys. J. C83 (2023) 618.
- 35. P. Abratenko et al. (MicroBooNE Collaboration), Search for an Excess of Electron Neutrino Interactions in MicroBooNE Using Multiple Final-State Topologies, Phys. Rev. Lett. 128 (2022) 241801.
- 34. P. Abratenko et al. (MicroBooNE Collaboration), Search for an anomalous excess of inclusive charged-current ν_e interactions in the MicroBooNE experiment using Wire-Cell reconstruction, Phys. Rev. **D105** (2022) 112005.
- 33. A. Abed Abud et al. (DUNE Collaboration), Separation of track- and shower-like energy deposits in ProtoDUNE-SP using a convolutional neural network, Eur. Phys. J. C82 (2022) 903.
- 32. A. Abed Abud et al. (DUNE Collaboration), Scintillation light detection in the 6-m drift-length ProtoDUNE Dual Phase liquid argon TPC, Eur. Phys. J. C82 (2022) 618.
- 31. A. Abed Abud et al. (DUNE Collaboration), Low exposure long-baseline neutrino oscillation sensitivity of the DUNE experiment, Phys. Rev. **D105** (2022) 072006.
- 30. A. Abed Abud et al. (DUNE Collaboration), Design, construction and operation of the ProtoDUNE-SP Liquid Argon TPC, JINST 17 (2022) P01005.
- 29. A. Abed Abud et al. (DUNE Collaboration), Deep Underground Neutrino Experiment (DUNE) Near Detector Conceptual Design Report, Instruments 5 (2021) 31.
- 28. P. Abratenko et al. (MicroBooNE Collaboration), Cosmic Ray Background Rejection with Wire-Cell LArTPC Event Reconstruction in the MicroBooNE Detector, Phys. Rev. Applied 15 (2021) 064071.
- 27. A. Abed Abud et al. (DUNE Collaboration), Searching for solar KDAR with DUNE, JCAP 10 (2021) 065.
- 26. P. Abratenko et al. (MicroBooNE Collaboration), Measurement of the flux-averaged inclusive charged-current electron neutrino and antineutrino cross section on argon using the NuMI beam and the MicroBooNE detector, Phys. Rev. D104 (2021) 052002.
- 25. P. Abratenko et al. (MicroBooNE Collaboration), Measurement of the atmospheric muon rate with the MicroBooNE Liquid Argon TPC, JINST 16 (2021) P04004.
- 24. P. Abratenko et al. (MicroBooNE Collaboration), Measurement of the differential cross sections for ν_μ-Ar charged-current interactions with protons and no pions in the final state with the MicroBooNE detector, Phys. Rev. D102 (2020) 112013.
- P. Abratenko et al. (MicroBooNE Collaboration), The continuous readout stream of the MicroBooNE liquid argon time projection chamber for detection of supernova burst neutrinos, JINST 16 (2021) P02008.

- 22. B. Abi et al. (DUNE Collaboration), Prospects for beyond the Standard Model physics searches at the Deep Underground Neutrino Experiment, Eur. Phys. J. 81 (2021) 322.
- 21. B. Abi et al. (DUNE Collaboration), Supernova neutrino burst detection with the Deep Underground Neutrino Experiment, Eur. Phys. J. C81 (2021) 423.
- 20. P. Abratenko et al. (MicroBooNE Collaboration), Convolutional neural network for multiple particle identification in the MicroBooNE liquid argon time projection chamber, Phys. Rev. **D103** (2021) 092003.
- 19. P. Abratenko et al. (MicroBooNE Collaboration), Semantic segmentation with a sparse convolutional neural network for event reconstruction in MicroBooNE, Phys. Rev. **D103** (2021) 052012.
- A. Ashkenazi et al. (MicroBooNE Collaboration), Neutrino event selection in the MicroBooNE liquid argon time projection chamber using Wire-Cell 3D imaging, clustering, and charge-light matching, JINST 16 (2021) P06043.
- 17. P. Abratenko et al. (MicroBooNE Collaboration), Cosmic Ray Background Rejection with Wire-Cell LArTPC Event Reconstruction in the MicroBooNE Detector, Phys. Rev. Applied 15 (2021) 064071.
- 16. P. Abratenko et al. (MicroBooNE Collaboration), Vertex-finding and reconstruction of contained two-track neutrino events in the MicroBooNE detector, JINST 16 (2021) P02017.
- 15. P. Abratenko et al. (MicroBooNE Collaboration), Measurement of space charge effects in the MicroBooNE LArTPC using cosmic muons, JINST 15 (2020) P12037.
- 14. B. Abi et al. (DUNE Collaboration), First results on ProtoDUNE-SP liquid argon time projection chamber performance from a beam test at the CERN Neutrino Platform, JINST 15 (2020) P12004.
- 13. B. Abi et al. (DUNE Collaboration), Neutrino interaction classification with a convolutional neural network DUNE far detector, Phys. Rev. **D102** (2020) 092003.
- 12. B. Abi et al. (DUNE Collaboration), Long-baseline neutrino oscillation physics potential of the DUNE experiment, Eur. Phys. J. C80 (2020) 978.
- 11. P. Abratenko et al. (MicroBooNE Collaboration), First Measurement of Differential Charged Current Quasielasticlike ν_{μ} -Argon Scattering Cross Sections with the MicroBooNE Detector, Phys. Rev. Lett. 125 (2020) 201803.
- 10. B. Abi et al. (DUNE Collaboration), Deep Underground Neutrino Experiment (DUNE), Far Detector Technical Design Report, Volume III. DUNE far detector technical coordination, JINST 15 (2020) T08009.
- 9. B. Abi et al. (DUNE Collaboration), Deep Underground Neutrino Experiment (DUNE), Far Detector Technical Design Report, Volume I. Introduction to DUNE, JINST 15 (2020) T08008.
- 8. P. Abratenko et al. (DUNE Collaboration), Search for heavy neutral leptons decaying into muon-pion pairs in the MicroBooNE detector, Phys. Rev. **D101** (2020) 052001.
- 7. C. Adams et al. (MicroBooNE Collaboration), Reconstruction and measurement of $\mathcal{O}(100)$ MeV energy electromagnetic activity from $\pi^0 \to \gamma \gamma$ decays in the MicroBooNE LArTPC, JINST 15 (2020) P02007.
- C. Adams et al. (MicroBooNE Collaboration), A method to determine the electric field of liquid argon time projection chambers using a UV laser system and its application in MicroBooNE, JINST 15 (2020) P07010.
- 5. C. Adams et al. (MicroBooNE Collaboration), Calibration of the charge and energy loss per unit length of the MicroBooNE liquid argon time projection chamber using muons and protons, JINST 15 (2020) P03022.
- P. Abratenko et al. (MicroBooNE Collaboration), First Measurement of Inclusive Muon Neutrino Charged Current Differential Cross Sections on Argon at E_ν 0.8 GeV with the MicroBooNE Detector, Phys. Rev. Lett. 123 (2019) 131801.
- C. Adams et al. (MicroBooNE Collaboration), Design and construction of the MicroBooNE Cosmic Ray Tagger system, JINST 14 (2019) P04004.
- R. Acciari et al., Convolutional neural networks applied to neutrino events in a liquid argon time projection chamber, JINST 12 (2017) P03011.
- 1. X. Pi et al., Bmper Inhibits Endothelial Expression of Inflammatory Adhesion Molecules and Protects Against Atherosclerosis, Arteriosclerosis, Thrombosis, and Vascular Biology 32 (2012) 2214.

White Papers

- 5. L. Alvarez-Ruso et al., Neutrino Scattering Measurements on Hydrogen and Deuterium: A Snowmass White Paper, arXiv:2203.11298v2 [hep-ex].
- 4. L. Alberez-Ruso et al., Bubble chamber Detectors with Light Nuclear Targets: A Snowmass 2021 White Paper, arXiv:2203.11319v1 [physics.ins-det].
- 3. A. Abed Abud et al. (DUNE Collaboratoin), A Gaseous Argon-Based Neutrino Detector to Enhance the Physics Capabilities of DUNE, arXiv:2203.06281v1 [hep-ex].
- 2. A. Abed Abud et al. (DUNE Collaboration), Snowmass Neutrino Frontier: DUNE Physics Summary, arXiv:2203.06100v1 [hep-ex].
- 1. D. Caratelli et al., Low-Energy Physics in Neutrino LArTPCs, arXiv:2203.00740v1 [physics.ins-det].

Conference Proceedings

B. Russell, The 2×2 Demonstrator — A demonstrator for the DUNE ND-LAr Near Detector based on the ArgonCube Design, PoS TAUP2023 (2024) 221.

Other

- 9. A. Abed Abud et al. (DUNE Collaboration), The DUNE Far Detector Vertical Drift Technology, Technical Design Report, arXiv:2312.03130 [hep-ex].
- 8. A. Abed Abud et al. (DUNE Collaboration), DUNE Offline Computing Conceptual Design Report, arXiv:2210.15665 [physics.data-an].
- 7. B. Abi et al. (DUNE Collaboration), Experiment Simulation Configurations Approximating DUNE TDR, arXiv:2103.04797 [hep-ex].
- B. Abi et al. (DUNE Collaboration), Deep Underground Neutrino Experiment (DUNE), Far Detector Technical Design Report, Volume IV: Far Detector Single-phase Technology, arXiv:2002.03010 [physics.ins-det].
- 5. B. Abi et al. (DUNE Collaboration), Deep Underground Neutrino Experiment (DUNE), Far Detector Technical Design Report, Volume II: DUNE Physics, arXiv:2002.03005 [hep-ex].
- 4. R. Acciari et al. (DUNE Collaboration), Long-Baseline Neutrino Facility (LBNF) and Deep Underground Neutrino Experiment (DUNE) Conceptual Design Report Volume 4: The DUNE Detectrs at LBNF, arXiv:1601.02984 [physics.ins-det].
- 3. R. Acciari et al. (DUNE Collaboration), Long-Baseline Neutrino Facility (LBNF) and Deep Underground Neutrino Experiment (DUNE) Conceptual Design Report Volume 1: The LBNF and DUNE Projects, arXiv:1601.05471 [physics.ins-det].
- 2. R. Acciari et al. (DUNE Collaboration), Long-Baseline Neutrino Facility (LBNF) and Deep Underground Neutrino Experiment (DUNE) Conceptual Design Report Volume 2: The Physics Program for DUNE at LBNF, arXiv:1512.06148 [physics.ins-det].
- 1. R. Acciari et al. (ICARUS-WA104, LAr1-ND, and MicroBooNE Collaborations), A Proposal for a Three Detector Short-Baseline Neutrino Oscillation Program in the Fermilab Booster Neutrino Beam, arXiv:1503.01520 [physics.ins-det].

ORAL PRESENTATIONS

Colloquia

Physics Department Colloquium, University of Texas at Arlington, (scheduled) November 2024

Physics Department Colloquium, Wellesley College, May 2022

Physics and Astronomy Department Colloquium, Dartmouth University, April 2022

Physics Department Colloquium, University of California Berkeley, March 2022

Nuclear and Particle Physics Colloquium, Massachusetts Institute of Technology, February 2022

Physics Department Colloquium, Syracuse University, March 2021

Seminars

Chemistry and Physics Seminar, Southeastern Louisiana University, (scheduled) November 2024 High Energy Physics Seminar, California Institute of Technology, October 2023

Neutrino Seminar, Fermi National Accelerator Laboratory, May 2022

High Energy Experiment Seminar, Boston University, February 2022

P3 Seminar, Los Alamos National Laboratory, June 2021

Chemistry and Physics Seminar, Southeastern Louisiana University, March 2021

Laboratory for Nuclear Science Lunchtime Seminar, Massachusetts Institute of Technology, February 2021

Scharff-Goldhaber Prize Seminar, Brookhaven National Laboratory, July 2019

Particle & Nuclear Astrophysics Dicke Candidate Seminar, Princeton University, January 2019

Research Progress Meeting, Lawrence Berkeley National Laboratory, December 2018

High Energy Physics Seminar, Northwestern University, November 2018

Particle Physics Seminar, Brookhaven National Laboratory, April 2018

Conferences

TAUP (parallel), Vienna, Austria, August 2023

CPAD (parallel), Stony Brook, New York, December 2022

Snowmass Community Summer Study (parallel, invited), Seattle, Washington, July 2022

Ann Nelson Memorial Fest (plenary, invited), Seattle, Washington, July 2022

Neutrino (poster), Online, June 2022

APS April Meeting (parallel), Online, April 2021

CPAD (plenary), Online, March 2021

NNN (plenary), Vancouver, Canada, November 2018

Neutrino (poster), Heidelberg, Germany, June 2018

DPF (poster), Batavia, Illinois, July 2017

New Perspectives (plenary), Batavia, Illinois, June 2015

CIPANP (parallel), Vail, Colorado, May 2015

Workshops

The Second Wire-Cell Reconstruction Summit, Upton, New York, April 2024

Rising Stars in Physics Workshop, Palo Alto, California, April 2019

Workshop on Calibration and Reconstruction for LArTPCs, Batavia, Illinois, December 2018

PHYSICS OUTREACH

Invited Speaker

Berkowitz Elementary, Chelsea, Massachusetts, May 2024

NAACP Juneteenth Celebration (keynote), Lompoc, California, June 2022

Self e-STEM Camp, Oakland, California, February 2022

Acorn Woodland Elementary, Oakland, California, February 2021

LBNL QuarkNet, Online, July 2020/2021

Cesar E. Chavez Multicultural Academic Center, Chicago, Illinois, May 2016

Santa Maria-Lompoc NAACP Chapter Meeting, Santa Maria, California, July 2011

Volunteer

Class volunteer, Adopt-A-Physicist, Online, 2021

Event volunteer, Berkeley Lab Director's Apprenticeship Program, June 2020

Event volunteer, Yale Physics Girls Science Investigations, 2016

Event volunteer, Yale Physics Olympics, October 2014/2016

Other

Guest contributor, Physics World, October 2020

Guest contributor, Physics Today, October 2020