

FORHAD HOSSAIN

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Overview

Visiting Researcher at Fermi National Accelerator Laboratory, working on Experiments E906/SeaQuest and E1039/SpinQuest. Responsibilities include data analysis, software development, and hardware maintenance. Former officer at Fermilab Student and Postdoc Association, advocating for young physicists.

Research Experience

• **Leading the trigger-detector effort for the SpinQuest Experiment at Fermilab** (May 2018 - Present) Advisor: Dr. Stephan Pate, Dr. Vassili Papavassiliou, New Mexico State University, Las Cruces, NM

- Performed data analysis, hardware installation, and systems testing for trigger hodoscopes.
- Developed software to optimize high-voltage PMTs.
- Set up triggers using NIM electronics.

• **Analyzing SeaQuest Experimental Data** (Feb 2022 - Present) Advisor: Dr. Stephen Pate, New Mexico State University, NM

- Extracted angular distributions of proton-induced Drell-Yan dimuons at SeaQuest/E906, Fermilab.
- Used Bayesian Iterative Unfolding to address bin migration and acceptance effects.
- Used Geant4-based simulations for closure tests.
- Applied the ‘Gradient Boosted Reweigher’ and ‘neural resampler’ for Monte Carlo calibration.

Education

Ph.D. in Physics , New Mexico State University, Las Cruces, NM, USA Supervisor: Dr. Stephen Pate	2016 - Ongoing
M.Sc. in Physics , New Mexico State University, Las Cruces, NM, USA GPA: 3.64/4.0 , Supervisor: Dr. Stephen Pate	May 2021
M.Sc. in Physics , Jagannath University, Dhaka, Bangladesh Grade: 3.74 out of 4.00	2012 - 2014
B.Sc. in Physics , Jagannath University, Dhaka, Bangladesh Grade: 3.75 out of 4.00	2006 - 2012

Collaborations

- [SpinQuest](#)
- [SeaQuest](#)

Professional Memberships

- [American Physical Society \(APS\)](#)

Technical Skills

- **Software and Programming Language:** bash, C++, Python, ROOT.
- **Operating system:** Windows, Linux, Mac
- **Version Control System:** GitHub, CVS
- **Special Courses and certifications:** 1) [U.S. Particle Accelerator School \(USPAS\)](#) 2) [DANCE/CoDaS computational and data science software training](#) 3) [The 2023 National Nuclear Physics Summer School \(NNPSS\)](#)

Journal Publications

- 1) Stephen Pate et al. Estimation of Combinatoric Background in SeaQuest using an Event-Mixing Method. 2023, [arXiv:2302.04152](#)
 - 2) Andrew Chen, et al. Probing nucleon's spin structures with polarized Drell-Yan in the Fermilab SpinQuest experiment. 2019, [arXiv:1901.09994](#)
- Lists of SeaQuest and SpinQuest Collaboration Papers and Conference talks in my Google Scholar profile:
<https://scholar.google.com/citations?user=K0ygUhMAAAAJ&hl=en>.

Presentations

- 1) [2023 Fall Meeting of APS DNP and JPS](#) : Angular Distribution of Dimuons from Drell-Yan Production in p+Fe Interactions at 120 GeV Beam Energy
- 2) [New Perspectives, 26-27 June 27 2023, Fermi National Accelerator Laboratory, Illinois, Chicago, USA](#): Iterative Unfolding of the Angular Distribution of Drell-Yan Production in p+Fe Interactions at 120 GeV Beam Energy
- 3) [Fall 2022 Meeting of the APS Division of Nuclear Physics, October 27-30 2022](#): Measurement of the Angular Distribution of Drell-Yan Production in p+Fe Interactions at 120 GeV Beam Energy
- 4) [New Perspectives, 16-19 August 2021, Fermi National Accelerator Laboratory, Illinois, Chicago, USA](#): Measurement of the Angular Distribution of Drell-Yan Production in p+Fe Interactions at 120 GeV Beam Energy
- 5) [New Perspective 2020\(2.0\), August 24-25, 2020](#): Systematic Study of Spectrometer-Induced Azimuthal Asymmetries for SpinQuest
- 6) [2020 Fall Meeting of the APS Division of Nuclear Physics, October 29-November 1, 2020](#): Systematic Study of Potential False Azimuthal Asymmetries in SpinQuest
- 7) [Summer 2019 USPAS Session](#): 350 MHz Single Spoke Resonator design and optimization for $\beta = 0.45$
- 8) [52nd Fermilab Users Organization Annual Meeting, Batavia, IL, USA](#): Commissioning Trigger for the SpinQuest/E1039 Experiment (**Poster**).

Job Experience

Graduate Research Assistant

May 2018 - Present

New Mexico State University, Las Cruces, NM

- Conducted simulation tasks and developed the analysis framework for my thesis project.
- Served as an expert on the trigger detector system in the [SpinQuest Experiment](#).

Graduate Teaching Assistant

Aug 2016 - May 2018

New Mexico State University, Las Cruces, NM

- Instructed introductory physics laboratory classes and provided tutoring as a Graduate Teaching Assistant.
- Played a role in networking and system administration.

Leadership Roles

- Judge at the Southwestern New Mexico Regional Science and Engineering Fair March 2017
- FSPA Officer at the Fermilab Student and Postdoc Association (FSPA) Oct 2021 - Oct 2022
- Managed the schedule for the Users' Executive Committee visits to Congress in Washington, D.C. March 2021

Honors and awards

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| 2022-2023 | \$4000 Merit-based Enhancement Fellowships. |
| 2021-2022 | \$1600 Scholarship for outstanding work as Ph.D. student. |
| 2021-2022 | \$2962 IA HEERF PHYS LEADS 2025. |
| 2020-2021 | \$1600 Scholarship for outstanding work as Ph.D. student. |

Media Appearance

- [NMSU continues research on particle physics with renewed DOE grant](#) July 09, 2022
- [NMSU physics department awarded \\$1.26 million DOE grant](#) June 23, 2018

■ References

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