AUGUSTANA UNIVERSITY

May 4, 2019

To the DUNE:
Co-spokespersons
Edward Blucher and Stefan Soldner-Rembold,
Institutional Board Chair
Robert Wilson,
and the full Institutional Board.

This is a letter of application for Augustana University in Sioux Falls, South Dakota, to participate in the DUNE experiment. In this letter we provide our intent to join the work on preparing for this ground-breaking experiment. Augustana is a primarily undergraduate institution with no graduate programs in the sciences. The physics department has four full time faculty and typically has about 50 undergraduate physics majors. The three tenured members of the department all have external research funding and this has allowed us to have 95% of our undergraduates perform research before they graduate. About 40-50% of physics graduates go one to graduate or professional school, and around a third go to a partner school to finish out an engineering degree.

Andrew (Drew) Alton, Associate Professor, would be the only named member joining, but we expect that about one or two undergraduates per summer will spend 10 weeks working on DUNE projects. A reasonable fraction of students would end up working multiple summers. Augustana physics students are very strong students, in the past ten years, three have received Goldwater Honorable mentions, two have received Goldwater Scholarships, and a student has received the APS LeRoy Apker award. Over the past 14 years at Augustana University, Drew has collaborated on the D0 experiment at Fermilab, the CUBED project at SURF, and the DarkSide experiment at LNGS.

Drew completed his PhD on the NuTeV experiment at Fermilab. His thesis focused on neutrino beam line modeling, identification of muons of the wrong charge and measurement of the charm content of the nucleon. In addition, he contributed by constructing and maintaining drift chambers for calibration. Through a post-doc on D0 his service focused on commissioning and operation of the Central Fiber Tracker (CFT) and the Central Preshower (CPS) detectors. This continued with software development for reconstruction and calibration of the CPS. Further research on D0 was focused on photon reconstruction and di-boson measurements, including limits on anomalous tri-boson coupling measuremtns and searches for particle decay to Z and gamma. His research on DarkSide has focused on simulation development, data analysis, and preliminary testing of silicon photo-multipliers. The most intense work has been data analysis where he and students have worked on energy reconstruction and data quality.

In the short term our interest and plans for DUNE would focus on data analysis of Proto-DUNE. With previous experience identifying hot and dead channels in the CFT/CPS at D0. this seems like an ideal place to begin understanding the prototype detector, the work can begin as early as June. From there we could move on to data analysis tasks. And, as time goes on, we would appreciate the opportunity to participate in

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on-site construction and commissioning as a quasi-local collaborating institution. As far as physics goals, I am most interested in supernova neutrino detection and in SM neutrino interactions. As far as what resources I can bring, I expect that I can contribute about half my research time toward DUNE. I have funding that will support a student full time this summer and I expect that funding will continue with future students. Other funding specific to DUNE will be sought and I would expect that many or most summers we'd have two or more students spend their summer on DUNE activities. I currently have funding through NSF and the South Dakota Space Grant Consortium.

If you need any more information, please contact me at (605)274-4924.

Sincerely,

Andrew Alton

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