Abstract Submitted
for the DNP17 Meeting of
The American Physical Society

Taming Many-Parameter BSM Models with Bayesian Neural Networks M.P. KUCHERA, A. KARBO, Davidson College, H.B. PROSPER, Florida State University, A. SANCHEZ, Carnegie Mellon University, J.Z. TAYLOR, Davidson College — The search for physics Beyond the Standard Model (BSM) is a major focus of large-scale high energy physics experiments. One method is to look for specific deviations from the Standard Model that are predicted by BSM models. In cases where the model has a large number of free parameters, standard search methods become intractable due to computation time. This talk presents results using Bayesian Neural Networks, a supervised machine learning method, to enable the study of higher-dimensional models. The popular phenomenological Minimal Supersymmetric Standard Model was studied as an example of the feasibility and usefulness of this method. Graphics Processing Units (GPUs) are used to expedite the calculations. Cross-section predictions for 13 TeV proton collisions will be presented. My participation in the Conference Experience for Undergraduates (CEU) in 2004-2006 exposed me to the national and global significance of cutting-edge research. At the 2005 CEU, I presented work from the previous summer's SULI internship at Lawrence Berkeley Laboratory, where I learned to program while working on the Majorana Project. That work inspired me to follow a similar research path, which led me to my current work on computational methods applied to BSM physics.

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Date submitted: 29 Jun 2017 Electronic form version 1.4