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## Deep Learning on HPC at NERSC

We present recent work in deep learning for particle physics and cosmology at NERSC, the US Dept. of Energy mission HPC centre. We will describe activity in new methods and applications; distributed training across HPC resources; and plans for accelerated hardware for deep learning in NERSC-9 (Perlmutter) and beyond. Some of the HEP methods and applications showcased include conditional Generative Adversarial Networks on large full-detector HEP images and high-resolution dark-matter cosmology simulations; bayesian inference via probabilistic programming for LHC analyses; alternative representations of HEP data for NN training (such as GraphNNs); and architecture search approaches. We also describe computational developments and infrastructure for training these models at large scale on NERSC supercomputers through productive interfaces.

**Authors:** BHIMJI, Wahid (Lawrence Berkeley National Lab. (US)); FARRELL, Steven Andrew (Lawrence Berkeley National Lab. (US)); Dr MUSTAFA, Mustafa (Lawrence Berkeley National Laboratory)

**Presenter:** BHIMJI, Wahid (Lawrence Berkeley National Lab. (US))

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