1158-41-302 **Christian Bueno*** (christianbueno@ucsb.edu) and **Alan G. Hylton** (alan.g.hylton@nasa.gov). *Permutation-Invariant Neural Networks.* Preliminary report.

Point clouds form an important data type in machine learning that inherently lack order. This makes them tricky inputs for traditional neural networks. As a result, interest in permutation-invariant and permutation-equivariant neural networks has grown and led to recent innovations in neural network design. Approaches for dealing with group actions in neural networks can range from using weight sharing with pooling, group averaging and using invariant polynomials. In this talk we explore some of these models, their theoretical capabilities, and their limitations when it comes to representing or approximating functions of interest. Along the way we will generalize the classical universal approximation theorem to general compact Hausdorff spaces, apply them to spaces of point clouds, and show that two popular permutation-invariant models have different representational power. (Received March 03, 2020)