Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

A Deep Neural Network-Based Approach for the Force Predictions of Particulate Multiphase Flows[1] MAJID ALLAHYARI, W. C. MOORE, BHARGAV SRIRAM SIDDANI, S. BALACHANDAR, University of Florida — The hydrodynamics forces within random distributions of fixed monodisperse spherical particles are predicted using deep neural network-based technique. The test data are obtained from particle resolved-direct numerical simulations. The fully resolved simulations are based on direct forcing immersed boundary method. The methodology is examined for wide ranges of Reynolds number and mean volume fraction. A data augmentation strategy is implemented to achieve 3D rotation-invariant trained network and to improve the accuracy of the predictions. To evaluate the performance of the model, direct force predictions are compared with the corresponding fully resolved solutions.

Majid Allahyari
University of Florida

Date submitted: 03 Aug 2020

Electronic form version 1.4