1145-62-2608 **James Kerce*** (clayton.kerce@gtri.gatech.edu), 400 10th St. NW, CRB 259, Atlanta, GA 30332. *Machine Learning for Data Assimilation in Dynamic Physical Processes.* Preliminary report.

The process of combining a time series of (possibly disparate) errored measurements with a state estimate of a dynamical system is commonly referred to as data assimilation, the goal being to produce a new state estimate that is statistically optimal with respect to both the statistics of the prior state the measurement. This methodology is routinely employed in approximation for forecasting the states of the troposphere, ocean, and ionosphere. A typical compromise is to preform measurement assimilation on a coarse grained model and then map the updated state to a higher resolution grid for forecasting. This process introduces dynamical artifacts, the removal of which is often carried out either through dissipation or spectral filtering. Motivated by recent progress in applying convolutional artificial neural network (CNN) architectures to the time update in both the inviscid Euler Equation [1] and seismic wave equation [2], we examine the use of CNNs in solving for physical consistency between thermodynamic states in dynamic fluid models using machine learning (ML) techniques. These approaches have resulted in a significant reduction in runtime while maintaining short time error performance that allows for their use in feedback control and measurement assimilation schemes. (Received September 25, 2018)