Project Summary

\section{Project Summary}

\subsection{Overview}

Rephrase this

This topic will address the fundamental challenges in real-time prediction of weapon effects (such as a tradeoff between precision and speed). Currently weaponeers rely on engineering models for lethality. These are low-fidelity models calibrated to a subset of munitions and environments. The resulting uncertainty often requires overallocation of munitions, which reduces the warfighter’s capabilities against adversaries. High fidelity simulations can reduce uncertainty but are too computationally intensive and time consuming to be used by weaponeers. The proposed research will utilize recent advances in Machine Learning (ML) methods to rapidly provide surrogate data to weaponeers (based on offline training on high fidelity simulation data). Specifically, selected scholars will learn how to apply MeshGraphNets to learn and predict mesh-based finite element simulations. Also, the scholars will compare MeshGraphNets with other ML methods. The scholars will advance their ability to code and perform numerical analysis. This work will provide the scholars valuable experience with state-of-the-art code for ML and high-fidelity simulations.\\