1145-I1-2841 **Marisa J Hughes*** (marisa.hughes@jhuapl.edu) and **Elizabeth P Reilly**. *Saving the World with Modeling Integration.* Preliminary report.

When will we run out of power, water, or food? How will population growth and climate change impact these interconnected systems? How do you quantify the impact of a new technology or policy?

To answer these questions, we must consider multiple domains simultaneously such as population, power, water, food, economy, transportation, etc. Experts are generating more and more models and data for each of these domains, but how do we link these products together? In particular, can it be done flexibly enough to easily accommodate new models and data?

We discuss the challenges of this problem and present preliminary results derived from our approach: a modular modeling framework called SIMoN (System Integration using Multiscale Networks). SIMoN combines mathematical and software tools to address the issue of data/models arriving at multiple levels of granularity, particularly in geography and time. These levels of granularity are captured by posets which must be navigated carefully. SIMoN leverages these posets to facilitate the communication of coupled models between timesteps. A real-world application will be shown including interacting low fidelity population, power, and water models for the United States. (Received September 25, 2018)