AN ANALYSIS ON THE CORRELATES OF NUCLEAR PROLIFERATION AND NUCLEAR ENERGY

Abstract: The study of various indicators of nuclear proliferation actions by states can identify the associated level of risk. This study expands upon previous proliferation risk work by investigating the number of ENR facilities a state has based on various historical indicators. These indicators include: (a) GDP Per Capita, (b) Nuclear Electricity Production, (c) Possession of Nuclear Weapons, (d) Superpower Alliance, (e) Technical Capabilities, (f) number of Rival ENR facilities, and (g) number of ENR facilities held by a trading partner. ENR facilities are a vital part of the nuclear fuel cycle, regardless of intent be it civilian electricity production or weapons production. The number of ENR facilities is important to measure, as this provides information regarding a state's urgency and reasoning for a weapons program.

Data from A Spatial Model of Nuclear Technology Diffusion by Dr. Fuhrmann and Dr. Tkach is utilized to develop a predictive model, resulting in a states estimated advanced nuclear capabilities. This dataset includes state data from 1945-2010, for 56 countries who had at least one operational research reactor. From the aforementioned indicators, both the number of Rival ENR facilities and number of ENR facilities held by a trading partner accounted for spatial clustering of nuclear weapons programs. Spatial clustering provided the opportunity to capture the dynamic nature of proliferation.

Committee Chair: Dr. Sunil Chirayath, Department of Nuclear Engineering

Meyappan Subbaiah

Meyappan Subbaiah earned his Bachelor’s of Science in nuclear engineering at Texas A&M University in 2014. Promptly after receiving his bachelor’s degree, he began pursuing his master’s degree under Dr. Chirayath. His thesis work focuses on assessing potential proliferation threats and the level of proliferation risk. Meyappan interned at Pacific Northwest National Laboratory in Richland, Washington during his time with the Nuclear Security Science and Policy Institute.