



# CHALLENGE #1

## ASU-BLOCK-01

### Blockchain and Smart Contracts for Self-Adaptive Cyber Risk Management via Machine to Machine Economy

Meet the expectations of this US Node through the technology challenge described below



## GOALS

The challenge is to advance cybersecurity of large scale blockchain-enabled Internet of Things (IoT) systems via a novel organization of Machine to Machine (M2M) economy. Blockchain is a decentralized and distributed ledger. The IoT is a system of interconnected computing devices on which the emergence of 5G technology has an accelerating effect. The M2M economy is a collection of machines acting as economic agents that autonomously interact through sequences of transactions. Blockchain technology enables the registry of these transactions whose logic is articulated and coded in the form of smart contracts. These technologies have transformational potential and hold the promise of an unprecedented economic growth, but they come with many vulnerabilities. This research contributes to the progress of science, advancement of prosperity and welfare, and securing the national defence through a new mechanism to enable security/cost efficient interactions on M2M platforms. The novel idea is to design market incentives, such that services between machines are bought and sold based not only on their cost but also on cyber riskiness of the devices providing those services.

## DETAILS

Define the model/framework for decentralized systems that are self-adapting to cyber risk and facilitate security/cost efficient interactions on platforms based on blockchain and IoT. The challenges are lack of: (a) real-time market design and self-optimization mechanisms; (b) scalable approaches for real-time attack identification across programs and high-level logics; (c) methods to assess M2M specific attack impact.

## SKILLS REQUIRED

Mandatory is strong knowledge in private and public blockchain protocol design and performance evaluation, digital twins, and digital threads. Additional skills that would be appreciated are mathematical finance and AI/ML (CNN, TLSM).