Unintelligent Design for asynchronous exascale Systems

Intelligent Design (ID): A central authority with complete knowledge and full control designs a system according to a well defined specification. Software Developers pretend they do ID since they view a computer as a finite state machine with a well defined state at any point in time. Asynchrony, however, fundamentally changes the game. Without global synchronization, memory, ALUs, I/O, network traffic and every feature of the system are in ill-defined states at any given time. ID with its perfect knowledge of the system, cannot deal with this situation. Instead, we need to embrace Unintelligent Design (UD). We need to stop pretending that we have full knowledge and control over a computer. Global state is uncertain, so programs become a sea of locally interacting tasks with behavior as an emergent property of the system.   In this talk we will discuss asynchrony and its role in exascale computing. We will then explore mechanisms to support programming based on unintelligent designs.