Prof. Jerome P. Lynch University of Michigan, USA

Dr. Jerome Lynch is an Associate Professor of Civil and Environmental Engineering at the University of Michigan; he is also holds a courtesy faculty appointment with the Department of Electrical Engineering and Computer Science. Dr. Lynch completed his graduate studies at Stanford University where he received his PhD in Civil and Environmental Engineering in 2002, MS in Civil and Environmental Engineering in 1998, and MS in Electrical Engineering in 2003. Prior to attending Stanford, Dr. Lynch received his BE in Civil and Environmental Engineering from the Cooper Union in New York City. His current research interests are in the areas of wireless structural monitoring, feedback control systems, and sustainable built environments. Dr. Lynch is credited with early field deployments of wireless sensors in full-scale operational bridge structures world-wide. In addition, Dr. Lynch has assumed leadership roles in the international structural health monitoring community having served as the Chair of the ASCE EMI Structural Health Monitoring and Control Committee, Co-Chair of the SPIE Smart Structure Conference, Editor of *Earthquakes and Structures*, and Associate Editor of *ASCE's Journal of Engineering Mechanics*. More recently, Dr. Lynch has served as Founder and Vice President of Civionics LLC, a spin-out company from the University of Michigan. Dr. Lynch was awarded the 2009 Presidential Early Career Award for Scientists and Engineers (PECASE) by the White House in recognition of his contributions to the structural health monitoring field.

Keynote abstract:

Partitioned Computing of a Markov Parameter System Identification Method in a Heterogeneous Wireless Sensor Network Comprised of iMotes and Narada

The efficient extraction of information from wireless sensor networks (WSN) can be carried out using algorithms embedded in the network itself. These embedded programs allow the network to harness the computational resources of the individual wireless sensor nodes to create a distributed computing network. To execute more sophisticated data processing algorithms, it is often desirable to add additional computational resources to the existing network. However, additional computing resources come at the cost of increased energy consumption. This can be problematic as wireless sensor networks are often limited to the energy that can be scavenged from the surrounding environment or from battery packs coupled with the nodes. Thus, it is desirable to create a network that can provide additional computing power while minimizing the increase in energy consumption. To this end, a heterogeneous wireless sensor network consisting of wireless units optimized for low power sensing interspersed with units optimized for low power computing can create a more computationally efficient network than is currently available when working with a homogeneous network. As a proof of this concept, a hybrid WSN was created consisting of the Narada wireless sensing units (WSU) to provide low power sensing node and iMote2 units serving as efficient computational engines. In order to demonstrate the efficiency of such a configuration, a network was created to extract modal parameters based on Markov parameters. The resulting network was then tested in the lab.