

Information Science and Technology Seminar Speaker Series



Dr. Bruce McMillin
Missouri University of Science and Technology

Information Flow Properties for Security in Cyber-Physical Systems

Wednesday, April 30, 2014

NOTE TIME CHANGE - 2:00 - 3:00 PM

TA-3, Bldg. 1690, Room 102 (CNLS Conference Room)

Abstract: A Cyber-Physical System (CPS) is an engineered physical system with a significant cyber component and consists of many interacting distributed cyber and physical components. CPSs are deployed in critical applications such as advanced power electronics in a green electric power system, vehicles in an automated highway system, and consumer components of a smart house in which correct operation is paramount. Unintended or misunderstood interactions among the components of a CPS cause unpredictable behavior leading to serious errors. While each component may independently function correctly, their composition may yield incorrectness due to Interference. Interference that violates correctness or security is well understood in the purely software (cyber) domain. In the CPS domain, interference is much less understood. Security and confidentiality problems are particularly vexing. Recent attacks, such as Stuxnet show how Formal security properties can be violated through physical interference with the cyber components.

This talk presents an interpretation of formal information flow properties and interference within the context of a cyber-physical system using examples from the electric smart grid and poses the deep scientific question: how to make such systems secure and correct?

Biography: Dr. Bruce McMillin is currently a Professor of Computer Science, director of the center for information assurance and a senior research investigator in the Intelligent Systems Center at the Missouri University of Science and Technology. He leads and participates in interdisciplinary teams in formal methods for fault tolerance and security in distributed embedded systems with an eye towards critical infrastructure protection. His current work focuses on protection for advanced power grid control. The United States NSF, AFOSR, DOE, and several Missouri Industries have supported McMillin's research. His research interests include fault tolerance, security, parallel algorithms, software engineering, and distributed systems theory. Dr. McMillin has authored over 80 refereed papers in international conferences and journals. He is the current steering committee chair of COMPSAC 2014. He is leading the distributed grid intelligence project of the Future Renewables Engineering Research Center, and advanced smart grid architecture. He is a senior member of the IEEE and member of the IEEE P2030.4 on Smart Grid, IFIP WG 11.0 on Critical Infrastructure Protection, and past member and contributor to the NIST SGIP IR 7628 on security and privacy in the smart grid. He currently serves in the IEEE Computer Society's Technical and Conference Activities (T&C) Executive Committee.

For more information contact the technical host Alex Kent, alex@lanl.gov, 505-216-6191.