**Keynote 2: “Distributed Algorithms for Estimation and Inference in Discrete Event Systems: Implications to Diagnosability and Opacity”**

*Prof. Christoforos Hadjicostis*

*University of Cyprus, Cyprus*

**Abstract:** Discrete event systems (DES) are event-driven systems whose state evolutions are determined by occurrences of asynchronous events. Examples include a variety of systems from domains as diverse as transportation, automated manufacturing, process control, communication and networking, security protocols, and others. This talk discusses the recursive algorithms for state estimation and event inference in DES, which are key tasks for proper monitoring and control of such systems, as well as the verification of properties of interest, such as diagnosability and opacity. The verification of such properties becomes even more challenging in emerging distributed settings where there may exist multiple interacting systems and multiple monitors, with diverse (and possibly unreliable) observation and communication capabilities. The talk discusses recent progress on distributed state estimation and event inference in emerging interconnected DES, as well as efficient ways for verifying properties of interest, such as diagnosability (i.e., the ability to detect within finite time the occurrence/type of a fault) and opacity (i.e., the guarantee that outsiders will never be able to infer that the system lies within a certain secret/critical states).

**Biography**

**Christoforos Hadjicostis** is Professor of Electrical and Computer Engineering at the University of Cyprus. He received S.B. degrees in Electrical Engineering, Computer Science and Engineering, and Mathematics, the M.Eng. degree in Electrical Engineering and Computer Science, and the Ph.D. degree in Electrical Engineering and Computer Science, all from the Massachusetts Institute of Technology, Cambridge, MA. From 1999 to 2007, he was Assistant and then Associate Professor with the Department of Electrical and Computer Engineering at the University of Illinois at Urbana-Champaign. Since 2007, he has been with the University of Cyprus, where he has served as Chair of the Department of Electrical and Computer Engineering and Dean of Engineering. His research focuses on fault diagnosis and tolerance in distributed dynamic systems; error control coding; monitoring, diagnosis and control of large-scale discrete event systems; and related applications in embedded systems, distributed robotics, anomaly detection and network security. His work has been funded via several competitive grants from the National Science Foundation (including an NSF Career Award), the Air Force Office of Scientific Research, the European Commission (including a Marie Curie International Reintegration Grant), Qatar Foundation, the Cyprus Research Promotion Foundation, and companies like Boeing, Motorola, and Lucent. Dr. Hadjicostis has served or is serving on the Editorial Board of IEEE Transactions on Automatic Control, IEEE Transactions on Automation Science and Engineering, IEEE Transactions on Circuits and Systems (Part I), IEEE Transactions on Control Systems Technology, and International Journal of Discrete Event Dynamic Systems.