MWSCAS 2020 KEYNOTE PRESENTERS

MONDAY 10th AUGUST

Model-Based Design for AI in IoT enabled Intelligent Systems

Pieter Mosterman

Pieter J. Mosterman is Chief Research Scientist and Director of the MathWorks Advanced Research & Technology Office in Natick, Massachusetts, where he works on computational methodologies and technologies. Between 2009 and 2017, he held an Adjunct Professor position at the School of Computer Science of McGill University. Prior to joining MathWorks, he was a research associate at the German Aerospace Center (DLR) in Oberpfaffenhofen. He earned his PhD in Electrical and Computer Engineering from Vanderbilt University in Nashville, Tennessee, and his M.Sc. in Electrical Engineering from the University of Twente, the Netherlands. His primary research interests are in Computer Automated Multiparadigm Modeling (CAMPaM) with principal applications in design automation, training systems, and fault detection, isolation, and reconfiguration. Dr. Mosterman designed the Electronics Laboratory Simulator that was nominated for The Computerworld Smithsonian Award by Microsoft Corporation in 1994. In 2003, he was awarded the IMechE Donald Julius Groen Prize for his paper on the hybrid bond graph modeling and simulation environment HyBrSim. In 2009, he received the Distinguished Service Award of *The Society for Modeling and Simulation International* (SCS) for his services as editor in chief of *SIMULATION: Transactions of SCS*. Dr. Mosterman was guest editor for special issues on CAMPaM of *SIMULATION*, *IEEE Transactions on Control Systems Technology*, and *ACM Transactions on Modeling and Computer Simulation*. He has chaired over 30 scientific events, served on more than 100 international program committees, published over 100 peer reviewed papers, and is the inventor on over 100 awarded patents.

Abstract

In the current technology landscape, data serves as a convergence point of concurrent trends. Ubiquitous sensors are generating ever larger amounts of data, pervasively connected 5G networks are making this data available at rapidly increasing speeds and size, proliferation of compute platforms enables computational applications beyond control flow oriented Harvard architectures, and sophisticated Artificial Intelligence and other algorithms are uniquely creating value from these reams of data and data intensive compute resources. These trends challenge the status quo in systems development and applications and create opportunity to predict, control, and optimize processes in new ways. How can Model-Based Design tools and workflows enable engineers to conceive, optimize, and implement these complex systems?

TUEDAY 11th AUGUST

System Integration: A new frontier in the world of semiconductors

Gene Frantz

Gene Frantz: Is a Professor in the Practice at Rice University and a founder of Octavo Systems, a company focused on heterogeneous integration using System in Package (SiP) technology. Prior to joining Rice University and Octavo Systems Gene spent his career as a systems engineer at Texas instruments where he retired in 2013 as its Principal Fellow. He also advises startup various companies as they take on new applications of semiconductor technology.

Frantz is a member of the NAE, a Fellow of the IEEE, holds 50 patents in the area of memories, speech, consumer products, DSP and SiP technology. He has written more than 100 Papers and articles and has presented at Universities and conferences worldwide.

Frantz received his BSE from University of Central Florida in 1971, his MSEE from Southern Methodist in 1977 and his MBA from Texas Tech University in 1982. Upon graduation with his BSE, he joined the US Army in 1972 where he was assigned to the Army Communications Command. After his time in the Army he began his career at Texas Instruments Calculator Division as a Product Engineer.

Abstract

The semiconductor industry has had an amazing run lasting more the five decades. But, as in many times past, we seem to be near the end of the driving function that has fed the success. That driving function being Moore's Law. But there is a new frontier of integration on the horizon that will certainly put us back or keep us on the road of integration. Perhaps the best description of this new frontier is we are "moving from integration on silicon to integration with silicon". Another way to view this new frontier is we are moving from "homogeneous integration to heterogeneous integration". In this talk I will look at where we have been and, where we are now in the world of integration. Then I will attempt to define this new frontier and finally provide a glimpse of two areas of integration I am involved in that are on the horizon.

WEDNESDAY 12th AUGUST

Towards Secure, Safe, and Resilient Learning-Enabled IoT

Yasser Shoukry

Yasser Shoukry is an Assistant Professor in the Department of Electrical Engineering and Computer Science at the University of California, Irvine where he leads the Resilient Cyber-Physical Systems Lab. Before joining UCI, he spent two years as an assistant professor at the University of Maryland, College Park. He received his Ph.D. in Electrical Engineering from the University of California, Los Angeles in 2015. Between September 2015 and July 2017, Yasser was a joint postdoctoral researcher at UC Berkeley, UCLA, and UPenn. His current research focuses on the design and implementation of resilient, AI-enabled, cyber-physical systems and IoT. His work in this domain was recognized by the NSF CAREER Award, the Best Demo Award from the International Conference on Information Processing in Sensor Networks (IPSN) in 2017, the Best Paper Award from the International Conference on Cyber-Physical Systems (ICCPS) in 2016, and the Distinguished Dissertation Award from UCLA EE department in 2016. In 2015, he led the UCLA/Caltech/CMU team to win the NSF Early Career Investigators (NSF-ECI) research challenge. His team represented the NSF- ECI in the NIST Global Cities Technology Challenge, an initiative designed to advance the deployment of Internet of Things (IoT) technologies within a smart city. He is also the recipient of the 2019 George Corcoran Memorial Award from the University of Maryland for his contributions to teaching and educational leadership in the field of CPS and IoT.

Abstract

From simple logical constructs to complex deep neural network models, Artificial Intelligence (AI)-agents are increasingly controlling physical/mechanical systems. Self-driving cars, drones, and smart cities are just examples of such systems to name a few. However, regardless of the explosion in the use of AI within a multitude of cyber-physical systems (CPS) and Internet-of-Things (IoT) domains, the safety, and reliability of these AI-enabled CPS and IoT is still an understudied problem. In this talk, I will discuss our work on applying ideas formal verification techniques to provide formal verification of the security, safety, and resilience of learning-enabled CPS and IoT.