SCS Keynote Speaker

TITLE:

A Changing Technology Landscape With Value Drivers for Modeling & Simulation

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ABSTRACT: Miniaturization in electronics has liberated design of complex functionality from the impeding form factor of a physical implementation. The size and power constraints of an integrated circuit allow embedding complex functionality in devices such as smartphones, televisions, and watches as well as machines such as washers, automobiles, and humanoid robots. With computational power exploding, these systems are rapidly evolving to span all phases of decision making, which Colonel John Boyd identified as a cycle of (i) observe, (ii) orient, (iii) decide, and (iv) act (the OODA loop). Over the past decades, the automation of observation followed by determining an action based on perception and a given control strategy has been the province of automatic control. More recently, automation of orientation (e.g., by means of deep learning) has enabled strategies that interpret a given situation and adapt to it. Additionally, automation of decision allows reasoning about a given situation and is at the core of autonomy. Beyond individual systems becoming more adept at all phases of the OODA loop, exploiting ensembles of systems has opened up otherwise unattainable areas of the design space. Ensembles of automatic control have brought about distributed control, adaptive ensembles support cooperation, and ensembles of autonomous systems are becoming collaborative. This presentation will give an overview of the changing landscape along the various axes and highlight some emerging value drivers to advance the use of Modeling & Simulation in the engineering of such emerging systems.

SHORT BIO: 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. He also holds an Adjunct Professor position at the School of Computer Science of McGill University. Prior to this, 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 95 awarded patents.