



**conference on systems engineering research**

Recent Trends and Advances in Model-Based Systems Engineering

18th Annual Conference on Systems Engineering Research  
October 08 - 10, 2020

## Technical Program: Thursday, October 08, 2020

Pacific Time (PT)	Tutorials
8:00 - 17:00	Enterprise Modeling using UAF (Mr. Barry Papke, Dassault Systèmes – NoMagic)
8:00 -10:00	Preparing MBSE for Industry 4.0 & IOT– Part 1 (Dr. Dov Dori, Technion - Israel Institute of Technology)
	Parallel Agile - Part 1 (Mr. Doug Rosenberg, University of Southern California)
10:00-10:30	Break
10:30-12:00	Preparing MBSE for Industry 4.0 & IOT– Part 1 (Dr. Dov Dori, Technion - Israel Institute of Technology)
	Parallel Agile – Part 2 (Mr. Doug Rosenberg, University of Southern California)
12:00-13:00	Break
13:00-15:00	MBSE Overview – Part 1 (Dr. Mark L McKelvin Jr., University of Southern California)
	Data Analytics- Part 1 (Dr. Courtney Paulson, Southern Utah University)
15:00-15:30	Break
15:30-17:00	MBSE Overview – Part 2 (Dr. Mark L McKelvin Jr., University of Southern California)
	Data Analytics– Part 2 (Dr. Courtney Paulson, Southern Utah University)



## Technical Program: Friday, October 09, 2020

Pacific Time (PT)	Opening Remarks and Welcome: Dr. Azad M. Madni, Conference General Co-Chair			
8:00-10:00	Keynote Presentations <ul style="list-style-type: none"> <li>• General (Ret.) Ellen M. Pawlikowski, Judge Widney Professor at USC</li> <li>• Mr. Scott Miller, Executive Chief Engineer, Automated Driving, &amp; Executive Director, AV/EV Integration, GM</li> </ul>			
10:00-10:15	Break			
	Ontology-enabled SE Cecilia Haskins, John Poladian, and Shatad Purohit	MBSE Process Advances Daniel DeLaurentis and Isabeta Rountree	Modeling and Simulation in Systems Architecting Cihan Dagli and Matthew Cotter	Advances in Systems Science Javier Calvo-Amodio, David Rousseau and Phyllis Marbach
10:15-10:45	An Ontology for System Reconfiguration: Integrated Modular Avionics IMA Case Study Lara Qasim, Andreas Makoto Hein, Sorin Olaru, Marija Jankovic and Jean-Luc Garnier	Implementing a MOSA Decision Support Tool in a Model-Based Environment Michael Dai, Cesare Guariniello and Daniel DeLaurentis		A Systems Science Basis for Compositionality Reasoning Swaminathan Natarajan, Anand Kumar and Subhrojyoti Roy Chaudhuri
10:45-11:15	Reducing Design Rework using Set-based Design in a Model Centric Environment Shawn Dullen, Dinesh Verma and Mark Blackburn	Change Management Processes in MBSE Isabeta Rountree, Victor Lopez and L. Dale Thomas	A survey of super-resolution techniques for a potential CubeSat imagery system architecture William Symolon and Cihan Dagli	Towards the Design of Artificial Swarms Using Network Motifs Khoinguyen Trinh and Zhenghui Sha
11:15-11:45	Knowledge Representation and Reasoning in the Context of Systems Engineering Hanumanthrao Kannan	A Literature Review of the Integration of Test Activities into the Development Process Aksel Elkjaer and Geir Ringen	Automated Detection of Architecture Patterns in MBSE Models Matthew Cotter, Michael Hadjimichael, Aleksandra Markina-Khusid and Brian York	
11:45-13:00	Break			

## Technical Program: Friday, October 09, 2020

Pacific Time (PT)		Enterprise Architecture Applications Raymond Vetter and Bryan Mesmer	MBSE Languages Alejandro Salado and Ryan Colletti	MBSE Economics James P Alstad and James Dalton
13:00-13:30	Panel - Smart Manufacturing: Recent Trends and Success Stories (Chair: Prof. S. K. Gupta, Director, Center for Advanced Manufacturing, USC, Panelists: Mr. Gerald Deren, Siemens Digital Industries Software, Mr. Greg Colvin, Honeywell- Aerospace and Mr. Kelly Dodds, Raytheon Space and Airborne Systems)	Enterprise Architecting Applied to Small Unmanned Aircraft System Integration into Low Altitude Urban Airspace Raymond Vetter and Donna Rhodes	The Need for Semantic Extension of SysML to Model the Problem Space Paul Wach and Alejandro Salado	COSYSMO 3.0's Improvements in Estimating and Methodology James P Alstad
13:30-14:00		Application and modelling of systems engineering methods to deployed enterprise content management systems Stephan Bren	Variant modeling for multi-perspective, multi-fidelity systems simulation Ryan Colletti, Ahsan Qamar, Sandro Nuesch, William Bailey and Christiaan Paredis	Integrating the Constructive Systems Engineering Cost Model with the System Modeling Language James Dalton
14:00-14:30		Identification of Elements and Element Relationships for Organizational Architectures for Systems Engineers Garima Bhatia and Bryan Mesmer	Executable Systems Modeling Language (ESysML): Motivations and Overview of Language Structure Matthew Amissah and Holly Handley	Towards Making the Business Case for MBSE Shatad Purohit and Azad Madni
14:30-15:00		Towards an Enterprise Architecture for a Digital Systems Engineering Ecosystem Yaniv Mordecai, Olivier L. de Weck and Edward F. Crawley	Quantitative System Reliability and Availability Analysis Using SysML Jaron Chen, Michael Hailwood and Myron Hecht	
15:00-15:30	Break			

## Technical Program: Friday, October 09, 2020

Pacific Time (PT)	Probabilistic Modeling and Analytics Michael Sievers and Parisa Pouya	Digital Engineering and MBSE Paul Grogan and Shatad Purohit	Ontology-enabled SE Edwin Ordukhanian and Leonard Petnga	MBSE for Automotive Systems Joseph D'Ambrosio and Kaliappa Ravindran
15:30-16:00	Data analytics of a honeypot system based on a Markov decision process model Lidong Wang, Randy Jones and Terri Falls	Towards a Reference Architecture for Digital and Model-based Engineering Information Systems Hayden Daly and Paul Grogan	Ontology-driven Knowledge Modeling and Reasoning for Multidomain System Architecting and Configuration Leonard Petnga	Optimal Management & Configuration Methods for Automobile Cruise Control Systems Arun Adiththan, Kaliappa Ravindran and S Ramesh
16:00-16:30	Probabilistic System Modeling for Complex Systems Operating in Uncertain Environments Parisa Pouya and Azad Madni	Digital Engineering Ecosystem for Future Nuclear Power Plants: Innovation of Ontologies, Tools, and Data Exchange Christopher Ritter, Jeren Browning, Lee Nelson, Tammie Borders, John Bumgardner and Mitchell Kerman	Ontological Modeling of Time and Time-Based Reasoning for Systems of Systems Surya Vamsi Varma Sagi and Leonard Petnga	Model-driven safety of autonomous vehicles Nicholas Annable, Alison Bayzat, Zinovy Diskin, Mark Lawford, Richard Paige and Alan Wassying
16:30-17:00	Dynamic Causal Hidden Markov Model Risk Assessment Michael Sievers and Azad Madni	Introducing digital doppelgängers for health care policy analysis Jennifer Legaspi and Shamsnaz Virani Bhada	Minimum Viable Model to Demonstrate Value Proposition of Ontologies for Model Based Systems Engineering Azad Madni	Model-aided Inference of Control Structures in Networked Systems: A Security Perspective Kaliappa Ravindran, Arun Adiththan, Michael Iannelli and Mohammad Rabby
17:00-17:30	Identification of Adverse Operational Conditions in Sociotechnical Systems: A Data Analytics Approach Taylan Topcu, Konstantinos Triantis and Bart Roets	Employing Digital Twins within MBSE: Preliminary Results and Findings Shatad Purohit and Azad Madni	Ontology-Enabled Hardware-Software Testbed for Engineering Adaptive Systems Edwin Ordukhanian and Azad M. Madni	A Model-Based Engineering Approach for Development of ADAS Features Joseph D'Ambrosio, Arun Adiththan, Prakash Peranandam, Ramesh S. and Grant Soremekun

## Technical Program: Saturday, October 10, 2020

Pacific Time (PT)	Opening Remarks: Dr. Barry Boehm, Conference General Co-Chair			
8:00-10:00	Keynote Presentations Lt. Gen. (Ret.) Larry James, Deputy Director, Jet Propulsion Lab Prof. Garrett Reisman, Astronautical Engineering, University of Southern California			
10:00 – 10.15	Break			
		Defense Applications of MBSE Martin Span, John Poladian and Shatad Purohit	MBSE Applications Bernard Zeigler, Emily Wall and Phyllis Marbach	Advances in MBSE Alejandro Salado and Edwin Ordukhian
10:15 – 10.45	Panel - Exploring Digitization of Human Bias (Moderator: Ms. Rosalind Lewis, Aerospace Corporation Panelists: Dr. Cecilia Haskins, NTNU, Dr. Donna Rhodes, MIT, Dr. Mark L. McKelvin, Jr., The Aerospace Corporation, Dr. Shamsnaz Bhada, WPI, Dr. Tom McDermott, Stevens Institute)	Executable Modeling of a CubeSat Based Space Situational Awareness System Mostafa Lutfi and Ricardo Valerdi	A Bio-inspired Framework for Analyzing and Predicting the Trade-off between System of Systems Attributes Abheek Chatterjee, Richard Malak and Astrid Layton	Interpretation Discrepancies of SysML State Machine: An Initial Investigation Ben Cratsley, Siwani Regmi, Paul Wach and Alejandro Salado
10:45 - 11.15		A Systems Modeling Illustration of the Military Academy Doolie Cadet System Martin Span and Nathan Oh	Model-Based Systems-of Systems Healthcare: Coordinating the Coordinators Bernard Zeigler	Functional Decomposition: Evaluating Systems Engineering Techniques Cal M. Cluff and Dinesh Verma
11:15 – 11.45		A plan for model curation at the US Army Armaments Center Christina Jauregui and Mary Bone	Comparing weighting strategies for SME-based manufacturability assessment scoring Emily Wall, Christina Rinaudo and Richard Salter	Assurance case property checking with MMINT-A and OCL Nick Fung, Sahar Kokaly, Alessio Di Sandro and Marsha Checkik
11:45-12:15	Model-based Representation of Historical Cases for Dynamic Analysis Marilee Wheaton	Project managers and systems engineers, “Can two walk together, unless they agree?” Recent research findings on development projects Sigal Kordova, Eyal Kats and Moti Frank	A framework for using the MAKE methodology and tool for objective manufacturability decision analysis Sara Fuller, Tonya McCall, Terril Falls, Christina Rinaudo, Randy Buchanan and Emily wall	Fuzzy Multicriteria Optimization for System Engineer’s Design of Myoelectric Prostheses Kenneth Garner and Kamran Iqbal
12:15-12:45	Break			

## Technical Program: Saturday, October 10, 2020

Pacific Time (PT)	MBSE in Aerospace Cecilia Haskins and Alejandro Trujillo	Model-Based Decision Support Bryan O'Halloran, John Kosempel and Phyllis Marbach	Beyond MBSE Bryan Mesmer and Parisa Pouya	Digital Engineering and MBSE Neil Siegel and Shatad Purohit
12:45 -13:15	Model-Based Systems Engineering for CubeSat FMECA Evelyn Honoré-Livermore and Cecilia Haskins	Collaborative Management of Research Projects in SysML Benjamin Kruse, Thomas Hagedorn, Mary Bone and Mark Blackburn	Models in Systems Engineering: From Engineering Artifacts to Source of Competitive Advantage Azad M. Madni	A Review of Set-Based Design Research Opportunities Nicholas Shallcross, Gregory Parnell, Edward Pohl and Eric Specking
13:15-13:45	Model-Based Systems Engineering for Design of Unmanned Aircraft Traffic Management Systems Martin Lindsey, Samantha Rawlins and Leonard Petnga	Supporting the Application of Dynamic Risk Analysis to Real-World Situations using Systems Engineering: A focus on the Norwegian Power Grid Management Michael Pacevicius, Cecilia Haskins and Nicola Paltrinieri	Transdisciplinary Systems Engineering Approaches Michael Watson, Bryan Mesmer, Dorothy Mckinney and Azad Madni	Investigating Model Credibility within a Model Curation Context Donna Rhodes
13:45-14:15	Exploration of MBSE Methods for Inheritance and Design Reuse in Space Missions Alejandro Trujillo and Azad Madni	Toward A Reliability Approach Decision Support Tool For Early System Design: Physics Of Failure Vs. Historical Failure Data John Kosempel, Bryan O'Halloran and Douglas L. Van Bossuyt	An Approach to Improve Hurricane Disaster Logistics Using System Dynamics and Information Systems Jeanne-Marie Lawrance, Niamat Ullah Ibne Hossain, Chirstina Rinaudo, Randy Buchanan and Raed Jaradat	Digital Modernization for Systems Engineering Jorge Buenfil, Arnold Ross and Benjamin Abruzzo
14:15-14:30	Break			
14:30-16:30	Executive Leadership Panel (Moderator: Ms. Marilee Wheaton, The Aerospace Corporation, Panelist: Dr. Robert Minnichelli, The Aerospace Corporation, Dr. Joseph D'Ambrosio, General Motors, Mr. Marcus Nance, The Boeing Company, Ms. Padma Sundaram, General Motors, and Mr. Scott Lucero, DoD)			
	Closing Remarks: Dr. Azad M. Madni, Conference General Co-Chair			