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The International Association for the Engineering  
Modeling, Analysis and Simulation Community

**CONFERENCE PROGRAM & AGENDA**

# Engineering Analysis & Simulation in the Automotive Industry

## Creating the Next Generation Vehicle

November 14th, 2019 | Troy, MI

[nafems.org/americas](http://nafems.org/americas)

**Keynote** from General Motors on "*Generative Design in the Future of Next Generation Vehicle Development*" and Ford Motor Company on "*Leveraging Systems Thinking, MBSE and Simulation in the Design and Analysis of Highly Distributed Autonomous Vehicle Systems*"

**Four Tracks** with presentations from industry, software providers, researchers, and academia

**Four Panel Discussions** on "*Democratization in the Automotive Industry*," "*Learning Simulation in the Academic Environment: Inside and Outside the Classroom*," "*Generative Design for Future Vehicle Development*," and "*Systems Thinking for the Design of Complex Products*."



### Contact Information

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The automotive engineering community is now confronting the largest technology transformation since its inception. This includes the electrification of powertrains for more efficient consumption and cleaner emissions, the reinvention of the battery with fast wireless charging capabilities and finally the advent of a fully autonomous vehicle. Compounding to these technology changes, the automotive companies design verification process is moving away from a major reliance on physical testing to almost a full virtual simulation product verification process.

Hence, the challenges to the automotive engineers are enormous and require a significant increase in the upfront use of numerical simulation capabilities, methods and processes such they're able to efficiently design, manufacture and deliver these very innovative technologies to the market in greater speeds than ever before.

Topics presented and discussed at this conference will address various questions, such as:

- What CAE techniques are being used to drive various powertrain electrification design alternatives (i.e., HEVs, PHEVs, EBVs)
- How can I democratize engineering analysis & simulation through automation, embedded intelligence and smart processes?
- How do I overcome technical challenges to enable faster & smoother transition from physical to virtual Design Validation testing?
- What are the latest simulation solutions/techniques applied to deliver current and future sustainability requirements (e.g., light weighting, alternative-propulsion, fuel economy, ultra-low emissions)?
- What are some pragmatic simulation case studies applicable to the design & development of level-4 & level-5 autonomous vehicles?
- What steps should I take when exploring the widening technology landscape (i.e., application of AI, generative-design, etc.)?
- How can I better leverage systems modeling & simulation to improve the safety, reliability, NVH and functional performance of next-generation vehicles?

## Conference Overview

NAFEMS and participating speakers will cover these topics, and more, at, "Engineering Analysis & Simulation in the Automotive Industry: Creating the Next Generation Vehicle." Located at the MEC in Troy, MI, attendees from the major automotive manufacturers and suppliers will gather at this annual event, in a pre-competitive manner, to exchange ideas, identify best practices, and drive the near-future direction of technology.

This event aims to deliver information and insights on critical topic areas in a manner that maximizes the "take-away" value for attendees. An event agenda and concept championed by several leading figures in the automotive industry will provide the opportunity to learn about the latest technologies and practices, which attendees can later share and apply within their own organizations.

## Sponsors

*We would like to extend a special thanks to the sponsors of the 2019 NAFEMS Americas Conference on "Engineering Analysis & Simulation in the Automotive Industry: Creating the Next Generation Vehicle." Please be sure to visit and speak with each of our sponsors during the conference to see and hear about the latest advancements in their technologies.*



**Plenary Session: Auditorium**

- 8:30 **Welcome & Introduction**  
A. Wood, Americas Regional Manager, NAFEMS
- Generative Design in the Future of Next Generation Vehicle Development**  
S. Xu, General Motors Technical Center
- Leveraging Systems Thinking, MBSE and Simulation in the Design and Analysis of Highly Distributed Autonomous Vehicle Systems**  
C. Davey, Ford Motor Company

10:00 Break in Foyer

Auditorium	Room 101	Room 102	Room 106
<b>COMPUTER-AIDED OPTIMIZATION</b> Chair: E. Nutwell, SIMCenter	<b>SPDM &amp; COMPUTING</b> Chair: J. Walsh, ASSESS	<b>MBE &amp; SYSTEMS MODELING</b> Chair: F. Popielas, SMS_ThinkTank	<b>MFG PROCESS SIMULATION</b> Chair: C. Mozumder, General Motors
<b>Generative Design When it Matters Most!</b> P. Yadav, SciArt Software, Inc.	<b>A Massive Simulation Approach to Verify and Validate AV Systems</b> T. Gioutsos, Siemens PLM Software	<b>Accurate 1D Model of a Fuel System Pressure Relief Valve Under Special Operating Conditions</b> B. Stroia, Stanadyne LLC	<b>Discussions on Design for Die Casting Manufacturing Process in Up-front Automotive Part Engineering</b> J. Huang, Ryobi Die Casting, USA
<b>Democratization through Automation, Embedded Intelligence and Smart Processes</b> S. Bhogle, Detroit Engineered Products	<b>Automated Model Build Process through an SPDM System</b> M. Lamping, Siemens PLM Software	<b>Simulation Solution for xEV Development</b> W. Linares, AVL - Advanced Simulation Technologies	<b>Accurate Heat Transfer Simulation of Rough Wall Cooling Channels with Complex Geometries</b> M. Hoffmeyer, Southwest Research Inst.
<b>Multi-Material Topology Optimization for Automotive Applications</b> R. Hoglund, Altair Engineering, Inc.	<b>Democratization and Knowledge Mgmt Using Core Tenets of SPDM</b> N. Kasarekar, ESTECO North America, Inc.	<b>Validation and Verification Simulation Block-Set for Automated Vehicles</b> P. Tulpule, The Ohio State University	<b>Machining Process Design Using Numerical Methods for Powertrain Components</b> N. Saini, Third Wave Systems
<b>Structural Optimization Methods with Commonality Constraints</b> P. Adduri, Vanderplaats Research & Development	<b>The Effect of HDR InfiniBand on Automotive Simulations</b> Y. Qin, HPC-AI Advisory Council	<b>Systems Thinking Enabled by Effective Enterprise SPDM for Reduction of Physical Testing</b> M. Panthaki, ARAS Corporation	<b>The Status of Manufacturing Process Simulation and NAFEMS – MANWG</b> J. Huang, Ryobi Die Casting, USA

12:10 Lunch in Dining Room

PANEL DISCUSSION 1	PANEL DISCUSSION 2	PANEL DISCUSSION 3	PANEL DISCUSSION 4
<b>Systems Thinking for the Design of Complex Products</b> M. Felice, Ford Motor Co.	<b>Democratization in the Automotive Industry</b> F. Popielas, SMS_ThinkTank	<b>Generative Design for Future Vehicle Development</b> S. Xu, General Motors Technical Center	<b>Learning Simulation in the Academic Environment</b> S. Midlam-Mohler, SIMCenter

2:15 Break in Foyer

<b>COMPUTER-AIDED OPTIMIZATION</b> Chair: M. Felice, Ford Motor Company	<b>AUTONOMOUS</b> Chair: K. Zouani, Ford Motor Company	<b>NVH</b> Chair: M. Ladzinski, NAFEMS	<b>INNOVATIVE APPLICATIONS</b> Chair: J. Huang, Ryobi Die Casting, USA
<b>Blended Optimization Procedure for Lightweighting of Big Sheet Metal Stru.</b> M. Kayupov, Dassault Systemes SIMULIA Corp.	<b>How to Leverage Applied AI &amp; Deep Learning in Manufacturing and Simulation</b> B. Turner, MAYA Heat Transfer Tech.	<b>System Simulation to Optimize Powertrain NVH</b> G. Festag, Ford Motor Company	<b>Virtual Simulation Verification Process of Parking Pawl Mechanism Based on Multibody Simulations</b> N. Roy, American Axle Manufacturing
<b>Optimization Techniques to Design Efficient Automotive Components</b> O. Joshi, Vanderplaats Research & Development	<b>Efficient V&amp;V of ADAS Algorithms Using Simulation and Design Exploration Techniques</b> K. Krishnan, MSC Software	<b>Simulating Clutch Nonlinearity Effectively to Improve Transmission NVH Prediction</b> W. Nie, Ford Motor Company	<b>A Computational Approach to Design An Optimal Urea Mixer in a Diesel Exhaust System</b> S. Mishra, Ford Motor Company
<b>Overcoming Technical Challenges to Transition from Physical to Virtual Design Validation Testing</b> L. Dahiya, Detroit Engineered Products	<b>Engineering Challenges for Modelling 77GHz Antenna Arrays for Autonomous Vehicles and ADAS Applications</b> L. Salman, ANSYS Canada Ltd.	<b>Analysis and Optimization of an Automotive Cradle Using Single FEM with Multiple Attributes</b> P. Hiremath, Altair Engineering, Inc.	<b>Fatigue Simulation of Welds Using the Total-Life Method</b> J. Mentley, HBM Prensicia nCode
<b>Multi-objective Topology Optimization Methods for Vehicle Design Concepts</b> D. Detwiler, Honda R&D Americas, Inc.	<b>Simulation Based Study of Pedestrian Detectability on Roads with High Radar Cross Section Infrastructure</b> U. Chipengo, ANSYS, Inc.	<b>Accurate Modeling of Motors with Contact Interference for Effective Electric Drive NVH Analysis</b> W. Nie, Ford Motor Company	

- 4:30 **PANEL DISCUSSION: Auditorium**  
- **Recap of Four Breakout Panel Discussions:** 1) Generative Design for Future Vehicle Development, 2) Democratization in the Automotive Industry, 3) Systems Thinking for the Design of Complex Products, 4) Learning Simulation in the Academic Environment  
- **Brief Open Discussion**  
**CLOSING:** M. Felice, Ford Motor Company

5:50 **Networking Reception in Foyer**

