



nwc2021

NAFEMWORLD CONGRESS

25-29 OCTOBER | ONLINE

INCORPORATING **spdm** INTERNATIONAL CONFERENCE
Simulation Process & Data Management 
CAE in Automotive Development
State of the Art, Technology Changes, & Future Trends

Agenda



09.30

Training A1 An Introduction to VVUQ

Training: An Introduction to Simulation V&V
 J.F. Imbert (JFIConsult, FRA)

This short course introduces key simulation VVUQ concepts and methodologies aimed at building simulation credibility, and in line with current standards, including;

- Simulation process and role in decision-making
- Simulation management
- Verification: definition, code verification, solution verification
- Validation: definition, hierarchical validation, validation metrics
- Predictive Capability
- Uncertainty Quantification
- Standards and guides from ASME, NASA, NAFEMS...

Training B1 Introduction to SPDM

Training: An Introduction to SPDM and How to Get Started - part 1
 M. Norris (the SDMConsultancy, GBR)

This session provides an introduction to Simulation Process & Data Management, the technology and the

Training C1 Intro to Probabilistic Design

Training: Introduction to Probabilistic Analysis and Design
 D. Riha (Southwest Research Institute, USA)

This course is intended for engineers, scientists, and technical managers who are concerned with managing uncertainty and risk of structural, mechanical and other engineering systems, and desire to become familiar with the background and the use of state-of-the-art probabilistic methods. The four hour course will include the motivation, methods, and tools for probabilistic analysis and design. These methods are general and used to design for reliability and systematically account for variations and uncertainties in engineering systems. Probabilistic analysis and design approaches allow the analyst to quantify the reliability and identify the important variables in their design. These results provide decision makers additional information for decisions related to issues such as certification, fleet management, and condition based maintenance. The course will use examples relevant to aircraft airworthiness and sustainment such as determining the reliability for crack growth in a structural component for a specified design life. Selected design problems will be used to illustrate the technology.

Training D1 Developing MBD Models

Training: Developing MBD models of increasing realism
 Patrick Morelle (Consultant, BEL)

During this NAFEMS course, we'll discover how to build our first MBD models, and then how to increase realism, switching from rigid to flexible and then nonlinear flexible bodies, managing contact, tyres, gears in order to reach a realistic model capable to provide accurate load distribution along an entire MB system, but also focus on local stresses and strains and estimate fatigue life. Modern MBD software are now offering more and more capabilities dealing with multiphysics and nonlinear phenomena. A convergence between classical nonlinear FEA and classical MBDS can be observed leading to new enhanced capabilities for realistic system simulation. Example related to driving dynamics or windturbine simulation will be described so to illustrate those capabilities.

Coffee Break

11.30

Training B2 Get started with SPDM

Training: An Introduction to SPDM and How to Get Started - Part 2
 M. Norris (the SDMConsultancy, GBR)

- assumes basic knowledge of SPDM -
 This session is based on the NAFEMS publication "How to get started with SDM" and describes how to start a project to deploy SPDM in your organisation.

Training C2 UQ for Model V&V

Training: Uncertainty Quantification for Model Verification and Validation
 D. Riha (Southwest Research Institute, USA)

Uncertainty quantification (UQ) plays a critical role in establishing model prediction capability and credibility. Model verification and validation (V&V) frameworks have been developed for the fluid mechanics, solid mechanics, and integrated computational materials engineering (ICME) disciplines as well as organization specific guidance for NASA and the U.S. Department of Defense to address the need to confirm that model predictions are sufficiently accurate to support programmatic decisions. This tutorial will introduce concepts of model V&V and how uncertainty analysis is used to support the process with an emphasis on identifying uncertainties and methods to quantify their impact on model predictions. A realistic case study based on a model developed to predict the temperature dependent yield strength of nickel-based superalloys will be used to introduce concepts and demonstrate analysis strategies for identifying, quantifying, and reducing uncertainty in the model predictions.

Training D2 Intro to Solid Mechanics

Training: Understanding Solid Mechanics – A Pic-n-mix of Basic Courses
 G. Duffett (NAFEMS Iberia, ESP)

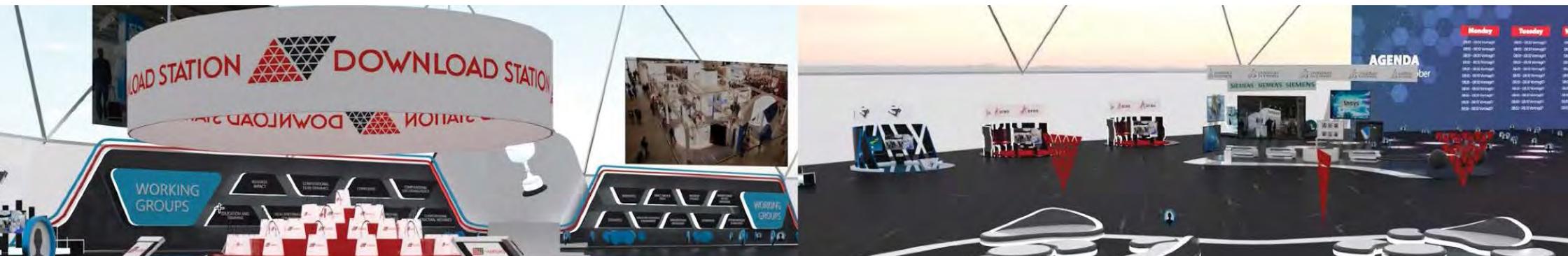
Training E2 Metals Material Modelling

Training: Metals Material Modelling (Plasticity, creep, welding)
 Adib Becker (NAFEMS Technical Fellow, GBR)

Finite Element software has been extensively used over many decades to simulate the behaviour of metallic engineering structures with impressive accuracy. However, when simulating metal applications involving highly non-linear features such as extensive plasticity, very high temperatures, welding and material damage, the analyst should keep in mind that there are limitations to the capabilities of the simulation software in modelling these problems.

This course is extracted from 3 NAFEMS eLearning short courses (6 hours each) on "Metals Material Modelling". FE simulations of some advanced non-linear metal behaviour involving plasticity, creep and welding are presented. Mathematical derivations will not be covered. The session will highlight the potential challenges faced by the FE analyst and the limitations of FE software.

Lunch Break



Day 1 - Monday 25th October - **Afternoon**

*all times are in Congress time - CEST (Berlin)

14.15

P3 Plenary Presentations – 1

14:15 Welcome & Introduction

14:45 Digital Transformation & Modernization at Ford
 C. Gray (Ford Motor Company, USA)

15:15 Sponsor Presentation: Embrace Complexity or Extinction, Digital Transformation in the Space Sector
 M. Visco (Analytical Graphics, Inc, USA)

15:30 Global Citizen: Reporting for Duty
 Y. Akinola (Innovate UK, GBR)

16:00 Sponsor Presentation: Bringing People, Data, and Tools Together - How Modeling & Simulation Transforms Product Development
 F. Jurecka (Dassault Systemes Deutschland GmbH, DEU)

Coffee Break 2

16.45

P4 Plenary Presentations – 2

16:45 Digital Transformation in the Modelling and Simulation World - The Airbus Vision
 M. Ferrogallini (Airbus Operations SAS, FRA)

17:15 Sponsor Presentation: Design & Engineering for Smart Manufacturing
 R. Assaker (Hexagon, BEL)

17:30 The Future of Virtual Vehicle Development from a Management Perspective
 C. Gümbel (Future Matters AG, DEU)

18:00 The Evolution of Modelling & Simulation in Healthcare: Medical Device Perspectives
 M. Palmer (Medtronic Inc., USA)

18.30

Get together in the exhibition



08.30

<p>A5 Automotive 1</p> <p>08:35 Future Virtualized Engineering – A Journey From Applied Research Perspective B. Fachbach (Virtual Vehicle Research GmbH, AUT)</p> <p>08:55 Virtual Automotive Powertrain Development P. Fietkau (Dr. Ing. h.c.f. Porsche AG, DEU)</p> <p>09:15 Simulation Governance – Building Simulation Capability I. Krajinović (Rimac Automobili d.o.o., HRV)</p> <p>09:35 CFD Simulation of a Vehicle Driving in Snow D. Bäder (Audi AG, DEU); A. Oliva, P. Kolar (AVL, DEU)</p>	<p>B5 System Level Simulation 1</p> <p>08:35 Thermofluiddynamic Pre-design of a Primary Surface Heat Exchanger Under the Influence of Heat Radiation Using 1D/3D Coupled Simulation Method T. Xie, T. Starick (BTU Cottbus-Senftenberg, DEU)</p> <p>08:55 Web-based Team-oriented Modelling, Simulation, Optimization and Evaluation of Modular Mechanical Systems W. Witteveen (FH OÖ Forschungs- und Entwicklungs GmbH, AUT); J. Schönböck (University of Applied Sciences Upper Austria, AUT)</p> <p>09:15 Approach to Support Frontloading in Product Development by Cross-Domain Simulation Models for the Prediction of System Performance Under Consideration of Relevant Thermal Effects F. Leitenberger (Karlsruher Institut für Technologie (IPEK), DEU); S. Knecht, S. Matthiesen, A. Albers, T. Gwosch (Karlsruhe Institute of Technology - Institute of Product Engineering, DEU)</p> <p>09:35 Balancing Interior Environmental Quality and HVAC Energy Efficiency using 1D and 3D Simulation T. Tumforde, S. Wischhusen (XRG Simulation GmbH, DEU); C. Luzzato, V. Nagarajan, V.-M. Lebrun, A. Colleoni, A. Mann (Dassault Systemes, DEU)</p>	<p>C5 HPC 1</p> <p>08:35 Mechanical FEA Simulations on a 2000 Core Cluster H. Guettler (MicroConsult Engineering GmbH, DEU); J. Beisheim (Ansys Inc., USA)</p> <p>08:55 New Performance Dimension for Extremely Large CFD Simulations: Reduce Computing Times and Increase Result Quality With the Right Workflow C. Woll (GNS Systems GmbH, DEU)</p> <p>09:15 Airplane Simulations on Heterogeneous Pre-Exascale Architectures R. Borrell, O. Lehmkuhl, D. Mira, G. Houzeaux (Barcelona Supercomputing Center, ESP); R. Taghavi (SIW, ESP); G. Oyarzun (Barcelona Supercomputing Center, CHL)</p> <p>09:35 Paving the Way for the Development to Exascale Multiphysics Simulations A. Dessoky (Hochleistungsrechenzentrum Stuttgart (HLRS), DEU); R. Schneider, HLRS, (DEU)</p>	<p>D5 Multibody Dynamics</p> <p>08:35 Virtual Testing for High Lift Systems: Flexibility in Multibody Simulations – An Alternative to the Modal Neutral File Approach T. Uimer (Airbus Operations, DEU)</p> <p>08:55 DEMMOW – Detailed Model of a Morphing Wing: Development of Separate Components Models M. Bruyneel, A. Mawet, (GDTEch, BEL); G. Carossa, E. Marinone (Leonardo Aircraft, ITA)</p> <p>09:15 Deployment of Software Tools for Simulation Based Design of Drill Hammers V. Keppler (CENIT AG, DEU)</p> <p>09:35 Contact Modelling in Multi Body Simulation for Seat Mechanisms M. Ben Tkaya, D. Guillaume, A. Page, L. Guerin, (Faurecia Caligny, FRA)</p>	<p>E5 Digital Twins 1</p> <p>08:35 Digital Twin Based Predictive Maintenance B. Kieß (Anhalt University of Applied Sciences, DEU); C. Schulz (Hochschule Anhalt, DEU)</p> <p>08:55 Real-time Digital Twins J. Lorenzi, C. Heinrich, D. Hartmann (Siemens Digital Industries Software, DEU)</p> <p>09:15 Simulation Based on Distributed Digital Twins - Today and Tomorrow D. Penner (EKS InTec GmbH, DEU); E. Bayrhammer (Fraunhofer IFF, DEU); H.C. Avgoustinos, Robin Thrift (EXPO21XX GmbH, DEU)</p>	<p>F5 Particle Methods 1</p> <p>08:35 Effect of Impact Angle for a Bird Strike Case E. Kayar (Turkish Aerospace Industries, TUR)</p> <p>08:55 Shape Optimization of Tire Tread Pattern to Minimize Water Splashing on Vehicle Body Using Particle Method CFD Simulation S. Tokura (Prometech Software, Inc., JPN)</p> <p>09:15 Large Bore Engine Lubrication System: Oil Flow and Pressure Analysis by Moving Particle Simulation L. Perinel, I. Gallici, A. Cherini (Wärtsilä Italia S.p.A, ITA); G. Parm (EnginSoft S.p.A, ITA)</p> <p>09:35 Multiple-level Adaptive Particle Refinement for SPH Method M. de Lefte (Siemens Digital Industries Software, FRA)</p>
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Coffee Break

10.35

<p>A6 Autonomous Driving 1</p> <p>10:40 Numerical Simulation for Supporting Validation and Certification of Automated Driving Features E. Landel (ELC, FRA); E. Arnoult (Renault, FRA)</p> <p>11:00 Simulation Credibility for Virtual Validation of Automated Vehicle Systems M. Benedikt (Virtual Vehicle Research GmbH, AUT)</p> <p>11:20 Scenario-based Validation of Automated Driver Assistance Systems using Reliability Analysis Methods Z. Kayatas, M. Rasch, P.T. Ubben (Mercedes-Benz AG, DEU); V. Bayer, S. Kunath, R. Niemeier (Dynardo GmbH, DEU)</p> <p>11:40 Integrative Simulation Architecture for Highly Automated Vehicles C. Franke, F. Fischer (Prostep AG, DEU)</p>	<p>B6 Buckling</p> <p>10:40 Developing FEA Standards for UK Submarine Design R. Craven, D. Graham (QinetiQ, GBR); D. Tanner, K. Hughes (MOD, GBR)</p> <p>11:00 Optimization of Structures Under Consideration of Buckling Conditions N. Wagner (INTES GmbH, DEU)</p> <p>11:20 The Relevance of Analytical Formulations Predicting Stiffener Tripping J. Reijmers, P. Nobel (Nevesbu, NLD)</p>	<p>C6 Cloud</p> <p>10:40 A Workflow for Combining Highly Scalable and Parallel Cloud CFD/FEA Simulations With Multi-Objective Optimisation Models N. Zhukov, A. Saratov (Datadvice, RUS); A. Dammer (SimScale GmbH, DEU)</p> <p>11:00 Migrating Engineering Simulations to the Cloud Use Case: How Freudenberg Embraces Cloud for Infrastructure Modernization W. Gentsch (TheUberCloud, DEU); C. Weis (Freudenberg Group, DEU); L. Miroslaw (Microsoft, DEU)</p> <p>11:20 Challenges and Potentials of Cloud-native Software Architectures Towards Industrial use in the Field of Computational Engineering J. Gutekunst, I. Simonsmeier (dive solutions GmbH, DEU)</p> <p>11:40 Enabling Fast, Multi-cloud HPC to SPDM Solution Integration R. Klein (Rescale Southern Europe, FRA); M. Nicolich (ARAS Corporation, USA)</p>	<p>D6 Materials 1</p> <p>10:40 Predictive Numerical Simulations in Different Loading Cases for Polymer Structures P. Mahajan, Y. Trolez, E. Maziers, G. Hibert (Total Energies, BEL); E. Laine, J.C Grandidier (ENSMA, FRA)</p> <p>11:00 Bridging the Gap Between Materials Selection and Simulation L. Mohee (Ansys UK, GBR); D. Mercier (Ansys, FRA)</p> <p>11:20 Integration and Processing of Material Property Data from Different Sources to Create Materials Cards U. Diekmann, P. Rostami (Matplus GmbH, DEU); R. Ufer, T. Marwitz (HS Mittweida, DEU)</p> <p>11:40 Prepare for the Future With a Digital Transformation for Your Engineering Materials Data C. Bream (Ansys, GBR)</p>	<p>E6 Digital Twins 2</p> <p>10:40 Using Digital Twins to Accelerate Product Development – Beginners Guide C. Stretton (Dyson Ltd, GBR)</p> <p>11:00 Determination of Digital Twin Maturity Levels Within Value Creation Networks S. Schulte, R. Stark (Technische Universität Berlin, DEU)</p> <p>11:20 The Executable Digital Twin: Leveraging Engineering Knowledge at Any Point in the Lifecycle H. Van der Auweraer, T. Tamarozzi (Siemens Digital Industries Software, BEL); I. McGann, D. Hartmann (Siemens Digital Industries Software, DEU)</p>	<p>F6 Particle Methods 2</p> <p>10:40 E-drives Spray Cooling Optimization by Moving Particle Simulation I. Deac, J. Wang (NIDEC PSA emotors SAS, FRA); M. Merelli (Enginsoft, ITA)</p> <p>11:00 Thermal Simulation of an Oil-Cooled E-Motor D. Percival (EnginSoft UK Ltd, GBR); M. Brada (Ricardo Shanghai Company, CHN)</p> <p>11:20 The Use of Mesh Free Methods in System CFD to Model Multi-Component Transient Duct and Pipe Flows D. Hunt (Siemens Digital Industries Software, GBR); R. Drury, Z. Pan, (Mentor a Siemens Company, GBR)</p> <p>11:40 Grid Free Simulations of Fluid Structure Interaction J. Kuhnert (Fraunhofer ITWM, DEU)</p>
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Lunch Break

08.30

G5 Process Simulation 1

08:35 Adaption of the Aluminium Electrolysis to Volatile Power Supply: Development of a Predictive Model to Investigate the Thermal Behavior of a Cell
 N. Janssen, H. Gesell, R. Gutt, U. Janoske (Bergische Universität Wuppertal, DEU)

08:55 Impinging Jet Flow and Heat Transfer for Industrial Drying Applications
 G. Klepp, G. Langer, Ali Chitsazan (OWL University of Applied Sciences and Arts, DEU)

09:15 Numerical and Experimental Study of Dual Scale Flow in RTM with Anisotropic Tow Saturation
 S. Facciotto, A. Pickett, P. Middendorf (Universität Stuttgart, DEU); P. Simacek, S.G. Advani (University of Delaware, USA)

09:35 Effect of Process Parameters on the Temperature Field During Electrofusion Welding of Glass/PE Thermoplastic Composite Pipes
 A. Al Obedan, R. Tomlinson (University of Sheffield GBR); A. Traidia (Saudi Aramco, SAU)

H5 The Failure Test

08:35 Defining Safe Operating Limits for the Inlet Tee of the Steam Reformer by Level 3 Fitness-for-service Assessment
 O. Kwon, E. Griffiths, H. Duncan (Quest Integrity Group, NZL); D. Osuna (Incitec Pivot Ltd., AUS)

08:55 A Contribution to the Analysis of Structural Failure of Sandwich Structures Under Localised Load
 S. Diana Zimmermann (Hochschule Mittweida, DEU); D. John (Westfälische Hochschule Zwickau, DEU)

09:15 New VDI Guideline "Strength Assessment of Plastic Components" - A Contribution to the Democratization of Structural Simulation
 W. Korte (PART Engineering GmbH, DEU)

J5 Composites 1

08:35 FE-Based Method for Stiffness-optimized Infill Patterns for Fused Filament Fabrication with Composite Materials
 M. König, A. Scheible, E. Vандoros, M. Lahres (Mercedes-Benz AG, DEU); P. Middendorf (University of Stuttgart, Institute of Aircraft Design, DEU)

08:55 A Method for Deriving a Substitution Finite Element Model of Fiber-reinforced Beaded Sheet Metals
 P. Haberkern, A. Albers (Karlsruher Institut für Technologie (IPEK), DEU); M. Ott, W. Volk (Technical University of Munich (TUM), DEU)

09:15 Virtual Testing of CFRP: From Unnotched Coupon to Compression After Impact Simulation
 A. Cheruet (Hexagon, LUX); P. Martiny (Hexagon, BEL)

09:35 Simulating a Lightweighting Steering Housing Made of Reinforced Plastic
 F. Pavia, F. Negria (Ansys Switzerland GmbH, CHE); F. Fiorini (Thyssenkrupp Presta AG, LIE)

K5 SDM 1

08:35 Bridging the Gap Between Product and Simulation Data Management. An Analysis of the Needs and Possibilities in Industrial Engineering
 P. Spelten (Fraunhofer SCAI, DEU)

08:55 And Yet! The Benefit and Efficiency Gain Through SPDM Can Be Quantified and the ROI is Quickly Achieved
 M. Krastel (em engineering methods AG, DEU)

09:15 Data Compression for Simulation results
 S. Müller, F. Natter, H. Talaat, C-A. Thole, T. Weinert (SIDACT GmbH, DEU)

09:35 User-Centric Traceability for Simulation-Informed Decisions
 M. Atak, S. Fricke, A. Filimon, L. Reichelt, E. Solana, H-M. Heinkel, M. Brunk, R. Koehler (Robert Bosch GmbH, DEU)

L5 Multiphysics 1

08:35 Enhanced Correlation for off Highway Vehicle Wheel Loads Using an Integrated Multiphysics Multibody Dynamics Simulation Model
 R. Udasi (John Deere India Pvt Ltd - Pune, IND); A. Shah (John Deere, USA)

08:55 Smart Automatic Configurator for Fast and Robust Fluid Structure Interaction Co-Simulations
 H. Arjmandi (Fraunhofer SCAI, DEU); D. C. Padmanabhan (Bonn-Rhein-Sieg University of Applied Sciences, DEU)

09:15 A Model Based Approach for a Multiphysics Optimization of an Airborne Radome
 A. Bhattacharya, M. Krause, Y. Shestakovskiy, T. Bernarding (Dassault Systèmes, DEU,); R. Valecha (Dassault Systèmes, IND); C. Karch (Airbus Defence and Space, DEU)

09:35 Coupled Simulation of Flow-induced Deformations of Filter Media
 R. Kirsch (Fraunhofer ITWM, DEU); S. Antonyuk, V. Puderbach, O. Lykhachova (TU Kaiserslautern, DEU)

Coffee Break

10.35

G6 Benchmarking

10:40 Standardised Benchmarks for Increasingly Complex Computational Frameworks
 N. Wilke (Pretoria University, ZAF)

11:00 Quantifying the Value of Modeling, Analysis and Simulation
 G. Thomas (Open IT Norge AS, NOR)

11:20 Ensuring Quality and Accuracy: How Do We Test Algorithms and Solvers?
 C. Hickey, R. Kannan (Arup, GBR)

J6 Composites - Failure

10:40 Finite Element Analysis Assisted Fatigue Life Estimation Method for Continuous Fiber Reinforced Plastics
 L. Kovacs, L. Takacs, T. Olajos (eCon Engineering Kft., HUN)

11:00 Analysis and Simulation Methodology for Strength Prediction of Open Hole Tension and 4-point Bending Plates Made of 2D Woven Fabrics
 M. Bruyneel, F. Streppe, A. Rajaneesh (GD&Tech, BEL); F. Ravallier, N. Preud'homme (SAFRAN Nacelles, FRA)

11:20 Inelastic Damage Attributes of Hyperelastic Fiber-reinforced Composites: Matrix-fiber Interface Debonding
 M. Mansouri, P. Fuchs (Polymer Competence Center Leoben GmbH, AUT)

11:40 Data Requirements for Detecting Collision Positions on Fiber Composite Plates Using Artificial Intelligence
 A. Raiche (Universität Stuttgart IFB, DEU); A. Damm (Bosch Sensortec GmbH, DEU); Prof. Dr. P. Middendorf (University of Stuttgart, Institute of Aircraft Design, DEU)

K6 SDM 2

10:40 The Virtual Lifecycle Manufacturing – Connecting the Real and the Virtual World for the Benefit of Industrial Products
 I. Hahn (Simufact Engineering GmbH - Part of Hexagon, DEU); S. Huhn (Forming Technologies, CAN)

11:00 SPDM Requirements to Manage the Simulations of Smart Products
 M. Schlenkrich (MSC Software GmbH, DEU)

11:20 The Impact of Business Process Modeling in the Context of SPDM Environment: A Human-in-the-loop Approach for Design Optimization and Business Decision Making
 M. Turchetto, A. Viola (Esteco SPA, ITA)

11:40 Next Generation Information System Architecture for Simulation-led Engineering of a Fusion Reactor
 M. Norris (the SDMCConsultancy, GBR)

L6 Multiphysics 2

10:40 Fluid Structure Interaction Study for the Performance Evaluation of a Newly Developed Voice Prosthesis Device
 S. Nair, S. Sujesh, GS Akhil, K.R. Mahesh (Sree Chitra Tirunal Institute for Medical Sciences & Technology, IND); B. Varghese (Regional Cancer Centre, IND)

11:00 Multi-Physics Dynamic Modelling of an Electric Vehicle from Road to Battery
 B. James, H. Tanner, H. Mahmoud (Romax Technology, GBR); C. Selvi (MSC Software, SWE)

11:20 Overview of Electro-static Discharge (ESD) Risk Assessment in Polymer Composite Pipes used in Gas Applications
 R. Lunn, T. London, M. Roy (TWI, GBR); A. Traidia, A. Shahran (Saudi Aramco, GBR)

11:40 Modelling and Numerical Analysis of Silos Under Discharge Using a Space-time Single-phase Level-set-method
 S. Reinstädler (CENT AG, DEU)

Lunch Break



13.15

P7 Plenary Presentations – 3

13:15 A Unified Approach on Teaching and Modelling 1D Dynamic Multiphysics Systems
G. Boiger (ZHAW School of Engineering, CHE)

13:45 Recommended Industry Practices to Promote and Support Airframe Structures Modeling & Simulation for Certification
T. Syberg (The Boeing Company, USA)

14:15 20 years of SPDM in Production, from Systems to Solutions
M. Norris (The SDMConsultancy, GBR)

Coffee Break

15.30

WS A8 Automotive Discussion 1

Automotive Panel Discussion 1

Join us for this expert discussion session covering the latest challenges for simulation in the automotive industry. Topics will include:

- Disruption in the Automotive industry
- How OEMs are meeting current challenges
- Autonomous Driving

Invited panelists:

M. Felice (virsolTech Engineering Consulting, USA) – Moderator
M. Wierse (Dr. Ing. h.c. F. Porsche, DEU)
B. Fachbach (Virtual Vehicle Research, AUT)
C. Gumbel(Future Matters, SUI)

Sponsor B8 Platinum Sponsor Hexagon 1

CAE simulation has been delivering time-to-market, reduced use of prototyping, compressed development cycles, right-first-time predictions and cost savings for the last half century. And the concept of multiphysics has been grappled with inside computer-aided engineering software for just as long with multiple co-simulation point physics couplings being particularly challenging. This presentation will highlight where Hexagon | MSC software is with its multiphysics approach and co-simulation solutions and how this drives smart manufacturing today covering topics as diverse as Cloud, AI/ML, Big Data and Data Management and the emergence of Autonomy and Democratization of Design & Engineering Simulation.

Sponsor C8 Platinum Sponsor Dassault 1

Join Dassault Systemes Simulia to learn how to save time and solve 3 engineering challenges in the automotive industry:

- Propulsion system noise & vibration mitigation to for quieter, more comfortable vehicles before the first prototypes are available.
 - Gear box lubrication to improve efficiency and ensure long component life.
 - Electric drive cooling & battery thermal management to enable innovation in body design and propulsion architecture while meeting requirement for performance, efficiency, and durability.
- Presented by Satheesh Kandasamay, Edward Tate, Young-Chang Cho (Dassault Systemes Simulia)

Sponsor D8 Platinum Sponsor Ansys 1

SPDM and MBSE Enable Digital Thread Throughout the Product Lifecycle

Products and systems are becoming increasingly complex, interconnected, and interdependent. To meet these challenges, there is a strong industry focus on implementing a model-based systems engineering approach in combination with multiphysics and SPDM techniques that enable a digital thread that can be shared, continuously improved and managed throughout the product lifecycle. Join us to learn how to speed time to market, reduce risk, manage complexity, enhance collaboration, and ensure safety with an open yet integrated solution that will propel you on your journey towards full digitalization.

Presented by Christian Schrader, Ansys

Sponsor E8 Silver Sponsor Aras / Prencia

15:35 – 16:15 Aras sponsor presentation
Introducing Systems Thinking in a Large Product Development Organization Through the Digital Thread
Malcolm Panthaki, Tim Keer (Aras), Ernesto Mottola (Toyota Motor Europe)

16:15 – 16:55 HBM/HBK Prencia sponsor presentation
Influence of the additive manufacturing process on CAE-based life estimations of a medical application
S. Vervoort (Senior Technical Software Expert – Prencia)

F8 Discrete Element Method

15:35 Packaging Line Virtual Testing
C. Shiao, A. Bhat, L. Zhao (Pepsi Co, USA)

15:55 CFD-DEM and DEM Modeling for Key Unit Operations of Process Industries and Their Integration Into Workflows and Simulation Platforms
C. Kloss, C. Goniva, A. Mayrhofer, A. Hager, R. Togni (DCS Computing, AUT)

16:15 Machine Learning for the Rapid Generation of a Discrete Element Model Database
S. Pantaleev (Altair Engineering, GBR)

16:35 A CFD Approach to Analysing Rock Armour Coastal Protection
A. Salmon (WSP, GBR)

Coffee Break

17.30

A9 Battery Simulation

17:35 Cell Venting Within a Simplified 18650 Li-ion Battery Pack
D. Grimmisen, M. Schneider (Cascate GmbH, DEU)

17:55 An Automated Battery Module Swelling Simulation Process of Pouch Cell for Battery Module Design Iteration Evaluation
Y. Zhang, S. Song, W. Jiang (Farasis Energy, USA); B. Liu, (ESI-China, CHN); P. Ding (ESI-NA, USA)

18:15 Simulating Battery Thermal Runaway Through Varying Fidelity
K. Ila (Siemens Digital Industries Software, USA); M. Muneki (Siemens Digital Industries, JPN)

18:35 Simulating Thermal Runaway of Batteries
N. Karajan, S. Sible (DYNAmore Corporation, USA)

WS B9 INCOSE-NAFEMS 1

Connecting Two Worlds through Leadership: NAFEMS-INCOSE Partnership

This collaboration between NAFEMS and INCOSE starts at the leadership level of both organisations and propagates to joint working group activities. During this session, a joint panel will outline some of the activities we are focusing on to prepare for the future.

Kerry Lunney (INCOSE President)
Garry Roedler (INCOSE Past-President)
Tom McDermott (INCOSE Strategic Integration)
Tim Morris (NAFEMS Chief Executive)
Ian Symington (NAFEMS Technical Officer)
Rod Dreisbach (NAFEMS/INCOSE SMS WG)

C9 HPC 2

17:35 Improving the Performance of Engineering Codes
F. Panichi, F. Hosseini (Numerical Algorithms Group Ltd, GBR)

17:55 The Effect of HDR InfiniBand and In-Network Computing on CAE Simulations
O. Maor (HPC-AI Advisory Council, USA)

18:15 GPU Developments of an Open Source CFD Software
S. Posey (NVIDIA, USA); M. Martineau (NVIDIA Ltd., GBR)

WS D9 Stochastics Challenge Problems

Discussion Session: Stochastics Challenge Problem Update
NAFEMS Stochastics Working Group

Review of previous stochastics challenge problems

E9 Digital Twins 3

17:35 Using True Digital Twins to Develop, Test, and Optimize Complex Systems
J. Jarrett (Kinetic Vision, USA)

17:55 Thermo-Mechanical Modelling, Test Correlation, and Physics/AI-based Model Order Reduction in Gas Turbine Applications
C. Blake, C. Semler (MAYA HTT, CAN)

18:15 On-Demand Auto-Generation of Predictive Digital Twins for Cyber-Physical Systems
S. Coy, G. Gershanok (TimeLike Systems, USA)

18:35 Cloud-Based Digital Twins of Overlay Metal Deposition for Responsive Control of Distortion
M. Asadi, M. Fernandez, M. Tanbakuei Kashani, M. Smith (Applus (SKC Engineering), CAN)

F9 V&V 1

17:35 On the Importance of Abstraction Validation for Fluid Flow Applications: Case Studies Demonstrating Difficulties in Ensuring All Relevant Physics are Considered for CFD Validation
S. Howell, P. Middha (Abercrombie Limited, GBR)

17:55 How FEA and Structural Verification According to Standards Helps EMO Terminal to Assure Safe Operations and Extend the Lifetime of the Lifting Equipment
O. Ishchuk (SDC Verifier, NDL)

18:15 Accuracy of Predicting Stress Risers for Several Ansys Element Types
C. Roche, R. Teja Dhanalakota (Western New England University, USA)

18:35 Applying Machine Learning to Detect Errant Behavior in Multiscale Physics-Based Models
A. Cox (Aerospace Systems Design Laboratory, USA); H. Johnston, D. Mavris (Georgia Institute of Technology, USA)

Coffee Break

15.30

G8 Control Systems	H8 Simulation Supporting Certification	J8 Multiscale - Composites	K8 SDM 3	L8 Multiphysics 3	M8 Automation
<p>15:35 Augmented Virtual Prototyping of an Ultra-high-strength Hot-stamped Steels Process. Real Time Parametric Response in Closed Loop as the Gateway for a Hybrid Twin M. Esparcia Arnedo, S. Masqué Barri, (ESI Spain, ESP); M. Lopez Lage, J. Castilla Moreno (GESTAMP Body-in-White R&D, ESP); F. Chinesta (ENSAM, FRA); J.L. Duval (ESI, FRA)</p> <p>15:55 Development of a Digital Twin for Control and Optimization of Potato Peelers S. Eichenlaub (Pepsi Co, USA)</p> <p>16:15 Analyzing the Impact of Different Drive Concepts on Machine Tool Dynamics Using Mechatronic System Simulation R. Binder (Fill Gesellschaft m.b.H., AUT); M. Wiesauer (Institut für Fertigungstechnik und Photonische Technologien TU Wien, AUT)</p>	<p>15:35 An Acoustic Evaluation of a Skid Steer Loader A. Rajagopal (Dassault Systemes, USA); V. Patel (The Charles Machine Works, Inc., USA); R. Mallyala, Dassault Systemes, USA)</p> <p>15:55 Accelerating Regulatory Compliance with 3D Model-Based Simulation J. Quincy (Dassault Systemes, FRA); M. Beyer, E. Grald (Dassault Systemes, USA)</p> <p>16:15 Virtual Testing for Authorization of Railway Vehicle Brake Systems O. Urspruch (Knorr-Bremse SFS GmbH, DEU); M. Krammer (Virtual Vehicle Research GmbH, AUT)</p> <p>16:35 Orifice Plates Sizing for Cases out of the Scope of ASME MFC-14M-2003 (low Re number and low β ratio) R. Konieczny (HPE 8 Sp. z o.o., POL)</p>	<p>15:35 Modelling of 3D-Woven Composites Performance to Support the Virtual Design Process V. Kotov (ESI, RUS); P.A. Khilov, A.V. Pakhomenkov, K.R. Pyatunin (PJSC UEC-Saturn, RUS); J. Bartošek, J. Pokorný (ESI MECAS, CZE); D. Huehn, S. Müller (ESI, DEU)</p> <p>15:55 From Nano Modeling to Macro Modeling in the Service of the Functionalization of Composites P. Dewailly (IPC, FRA)</p> <p>16:15 Semantic Documentation for Computer Aided Engineering A. Pakiman, J. Garcke, Fraunhofer SCAI, DEU)</p>	<p>15:35 Transforming the CAE Result Sharing Process for Automotive Powertrain Mounting Brackets with Automation and 3D Digital Reports J. Liu, R. Stec (Ford Motor Company, USA); P. Mandava, S. Brown (Visual Collaboration Technologies, Inc., USA)</p> <p>15:55 Practical Aspects of Integrating Simulation to the Digital Thread in a High-diversity Prototyping Environment at MIT Lincoln Laboratory J. Rey, D. Fitzgerald (MIT Lincoln, USA); M. Panthaki (Aras, USA)</p> <p>16:15 Semantic Documentation for Computer Aided Engineering A. Pakiman, J. Garcke, Fraunhofer SCAI, DEU)</p>	<p>15:35 Mesh Motion and Smart Adaptive Mesh Refinement Framework for High-fidelity Fluid-structure Interaction Simulations A. Patel, M. Mehrabadi, S. Pemberton, (Illinois Rocstar LLC, USA)</p> <p>15:55 Launching Light Weight Multipactor Free Consolidated RF Devices to Space L. Salman (Ansys Canada Ltd., CAN); S. Acharya, R. Chao (Ansys Inc, USA)</p> <p>16:15 3-D Microstructure Electrochemistry Simulations of Li-Ion Battery Cells with Parameterized Geometries to Assess Plating Risk S. Srinivasan, P. Rawat, R. Reynolds (Siemens Digital Industries Software, USA); X. Xu, T. Garrick, Y. Zeng (General Motors, USA)</p>	<p>15:35 Methodology for Automated Designing of Composite Structures in Suspension Systems T. Grünheid, R. Sturm, O. Deißer (DLR - Deutsches Zentrum für Luft- und Raumfahrt, DEU)</p> <p>15:55 Hundreds of Bolt Simulated With Just a Few Clicks C. Schlegel (7tech GmbH, AUT)</p> <p>16:15 Propeller Design at Pipistrel: A Direct Flight from Simulation to Production A. Mugnai (Esteco SPA, ITA); R. Lapuh, D. Erzen (Pipistrel, SVN)</p> <p>16:35 Democratization of Simulation Made Easy by "Low Code" Tools K. Peters (Crossover Solutions LLC, USA); A. Patil, S.T. Patil (Novus Nexus Pvt Ltd, IND); D. Evans (Novus Nexus, Inc., USA)</p>

Coffee Break

17.30

G9 Process Simulation 2	H9 Dynamics & Vibration 1	J9 Meshing	K9 Designer Orientated Simulation	L9 Multiphysics 4	M9 Joints & Connections
<p>17:35 Modeling of the Aluminium Electrolysis Process: Feeding and Dissolution of Alumina Particles H. Gesell, R. Gutt, N. Janssen, U. Janoske (Bergische Universität Wuppertal, DEU)</p> <p>17:55 Bottle Sanitization Modeling C. Shiau, L. Zhao, M. Ciciora, A. Huchthausen, Y. Lou, S. Qu (PepsiCo, USA)</p> <p>18:15 Predicting Solder Shape Evolution During Solder Reflow in Packaging Assembly Processes A. Sengupta, X. Pan, S. Medikonda, A. Srivastava, A. Shejwal, K. Morgan (Ansys Inc., USA)</p> <p>18:35 Investigation of Flow Field and Heat Transfer with an Array of Slot Jet Reattachment Nozzle Over Stationary and Moving Surfaces M. Farzad, C. Koh, S. Ramsay, L. Zhao (PepsiCo, USA); S. Tibos, PepsiCo, GBR)</p>	<p>17:35 Combined 3D Cyclic Symmetry and 2D Axisymmetric Simulation for Turbine Engine Systems M. Lamping (Siemens Digital Industries Software, USA); N. Kill (BEL); F. D'Ambrosio (BEL)</p> <p>17:55 Efficient Coupled Modal Vibro-acoustic Analysis for Structures With Heavy Fluids A. Sohn (MSC Software, USA); S. Palfreyman, M. Robinson (Hexagon MSC, USA)</p> <p>18:15 The Concept of Pseudo Damage When Using Acceleration Response Data N. Bishop (MSC Software, USA); P. Murthy (Hexagon, FRA)</p>	<p>17:35 Reliable Meshing of 10 000 Parts M. Lautsch (Lautsch Finite Elemente GmbH, DEU)</p> <p>17:55 Mesh Adaptation Based on Taylor Micro-scale for Aeroacoustics Simulation L. Delmas (MSC Software France - groupe Hexagon, FRA); A. Poulos, C. Legendre (Free Field Technologies, BEL)</p> <p>18:15 Autonomous Hexahedral Meshing Using Artificial Intelligence A. Patel (Illinois Rocstar LLC, USA); S. Pemberton (Illinois Rocstar LLC, USA); M. Safdari (Ansys USA); W. Quadros (Sandia National Laboratories, USA)</p> <p>18:35 Creating a 20-Node Hexahedral Element Model: An Innovative Solution to an Old Problem J. Pura, J. Leedom (MSC Software, USA); J. Kofoed (Northrop Grumman, USA)</p>	<p>17:35 Next Step in Simulation Driven Design at Argo Hytos and Oerlikon K. Kruse, L. Ziegler (CADFEM GmbH, DEU)</p> <p>17:55 Use of Templated and Democratized Simulation to Accelerate Design G. Westwater (Fisher Controls International LLC, USA); E. Xiao (Emerson Automation Solutions, CHN)</p> <p>18:15 A Step Towards Integrated Engineering: Fluid Topology Optimization With Embedded Reconstruction for CAD Designers J. Iseler (Dassault Systemes Deutschland GmbH, DEU); P. Pagliughi (Dassault Systemes, FRA)</p> <p>18:35 Digital Exploration Made Possible By High Performance Computing on GPUs D. Choudhury, A. Main, R. Borker, J. Maruszewski (Ansys Inc., USA)</p>	<p>17:35 Multiphysics Simulation of an Electromagnetic Launcher A. Bruettsch (Honeywell Federal Manufacturing & Technologies, USA)</p> <p>17:55 Magnetic Latches and Fixtures: A Unique Multiphysics Solution D. Sarkar, P. Larsen, P. Gottipati (Ansys, USA)</p> <p>18:15 Blood Flow Modeling in Human Aorta: A Fluid-Structure Interaction Analysis D. Patel, D. Panneerselvam (Dassault Systemes, USA); T. Spirka, K. Genc (Synopsys Inc., USA)</p> <p>18:35 Generic Co-simulation Engine for Coupling Individual Physics Solvers K. Samavedam (ANSYS Inc., USA)</p>	<p>17:35 Efficient Stress Linearization in FEA Continuum Models for Weld Fatigue Assessment N. Fried, W. Vonach (CAE Simulation & Solutions Maschinenbau Ingenieurdienstleistungen GmbH, AUT)</p> <p>17:55 Optimization of Development Process of Barge Modules Through Advanced Numerical Simulation H. Bastien (CREAFORM, CAN); B. Leclerc (Ocean, CAN)</p> <p>18:15 Thread Analysis for Downhole Applications; From Mechanics to Numerical Simulation S. Pirayeh Gar, A. Zhong (Halliburton Carrollton Technology Center, USA)</p> <p>18:35 Is Bolt Loosening Based on Advanced Pretension Functionality Predictable? M. Klein (INTES GmbH, DEU)</p>

08.30

A10 Autonomous Driving 2

08:35 Integration of Driving Physical Properties into the Development of a Virtual Test Field for Highly Automated Vehicle Systems
R. Degen, Margot Ruschitzka, H. Ott, F. Overath (Technische Hochschule Köln, DEU); M. Leijon (Uppsala University, SWE); C. Schyr (AVL Germany GmbH, DEU); F. Klein (HH Vision (hoersch und Hennrich Architekten GBR), DEU)

08:55 Parametric Optimization of a Human-developed Algorithm Outperforms Artificial Intelligence
I. Tolchinsky (Phoenix Integration, FRA)

09:15 Smart Cloud-based Co-Simulation for Autonomous Cars
M. Schlenkrich (MSC Software GmbH, DEU); T. Bhanage (VIRE Simulationstechnologie GmbH, DEU)

09:35 Managing Supplier / OEM Collaboration to Speed up Verification and Validation of ADAS
J. Eichler (Dassault Systèmes, CZE); T. Nguyen That, V-M. Lebrun (Dassault Systèmes, FRA)

B10 Impact Shock & Crash 1

08:35 Simulating Windborne Debris Actions on Laminated Glass Facades
J. Smith, D. Aggromito, J. Farley, J. Klimentko, L. Pascoe (Arup, AUS)

08:55 Simulation Methodology Investigations for the Assessment of Civil Aircraft Shieldings with Diverse Materials
Y. Toso (DLR - Deutsches Zentrum für Luft- und Raumfahrt, DEU)

09:15 Towards a Framework for Automatic Local Event Detection for Car Crash Simulations
D. Steffes-laj, M. Pathare (Fraunhofer SCAI, DEU); J. Garcke, (Fraunhofer SCAI and Universität Bonn, DEU)

09:35 Assessment of the robustness of vehicle restraint systems crash tests by numerical simulation and consequences on the regulation
C. Goubel, V. Lapoujade, C. Michel, J. Pourcelot (DynaS+, FRA)

C10 Multiphysics 5

08:35 Optimizing Gearbox Lubrication With a Fully Integrated PLM Process, Using GPU Based Lattice Boltzmann and Multi-physics Solvers
J. Ginés (Dassault Systèmes, ESP); P. Gabriel (Dassault Systèmes K.K., JPN)

08:55 Hood Fluttering Caused by Unsteady Aerodynamic Loads by On Route Vehicles' Interaction
A. Pérez Peña (ESI Spain, ESP); Á. Segura Santillana, J. Comas Font, T. Angulo de Diego, V. Cermeño Escobar (SEAT SA, ESP); R. Almenar (ESI, DEU)

09:15 Approaching Reality: CFD Simulations of Positive Displacement Compressors With More Details in Geometry and Physics
A. Spille, J. Hesse (CFX Berlin Software GmbH, DEU)

D10 Aerospace

08:35 Boosting Weight Saving for New Generation of Aircrafts: A New Framework for Composite Structures Connecting Design Tools (CAD), Sizing Tools (CAE/FE) and Manufacturing Process Simulations (CAM)
A. Chiappini (Stelia Aerospace Toulouse, FRA); M. Daubeu (ALTRAN, FRA)

08:55 An Automated Silhouette-based Segmentation and Semi-parametric Geometry Reconstruction of Quasi-axisymmetric Aero Engine Structures
B. Spieß, K. Häscher (BTU Cottbus-Senftenberg, DEU); M. Fanter (Rolls-Royce Deutschland Ltd. & Co KG, DEU)

09:15 Autonomous Urban Air Mobility: an Accurate Digital Twin of the Aircraft and its Environment
Y. Lemmens (Siemens Digital Industries Software, BEL)

09:35 Multidisciplinary Optimisation of Steered-fibre Composite Wings
O. Stodieck (Daptable Ltd, GBR)

E10 Computational Electromagnetics 1

08:35 Non-parametric Shape Optimization of an EV-drive Permanent Magnet Synchronous Machine
E. Lange, C.B.W. Pedersen, M. Hoffart (Dassault Systèmes, DEU); S. Reitzinger, Dassault Systèmes, AUT)

08:55 Electromagnetic Field Simulation of Moving Parts
T. Rüberg, L. Kielhorn, J. Zechner, (TailSit GmbH, AUT)

09:15 Private 5G Wireless Network Design in a Smart Factory Environment
M. Rüttschlin (Dassault Systèmes, DEU)

09:35 Impact of a Strong Electromagnetic Field on Rebars in a Reinforced Concrete Building: Design Guidelines and Safety Assessment
J. Wheeler (SIMTEC Solution France, FRA)

F10 Additive Manufacturing 1

08:35 An Update from the NAFEMS Metallic Additive Manufacturing Focus Team
S. Van Der Veen (Airbus CTO, FRA)

08:55 An Integrated Physics-based Digital Twin to Reveal Process-Structure-Properties Relations in Laser Powder-bed Fusion Additive Manufacturing
G. Vastola (Institute of High Performance Computing, SGP); J. Mikula, R. Laskowski, R. Ahuwalia, M. Wei, K. Bai, Y. Zeng, Y-W. Zhang (A*STAR Institute of High Performance Computing, SGP)

09:15 Experimental and Numerical Investigation of Metallic Powder Material Inside Additive Manufactured Particle Dampers
G. Hauenstein (SMS Concast AG, CHE); R. Baumann, C. Haack (Hochschule Luzern, CHE)

09:35 Predicting the Fatigue Life of Additively Manufactured Metal Components Using a Machine Learning Enhanced Durability Analysis
H. Erdelyi, N. Lammens, M. Hack, M. Schulz, S. Straesser (Siemens Digital Industries Software, BEL)

Coffee Break

10.35

A11 Electric Vehicles

10:40 A Continuous Workflow With System Simulation and Integrated Reduced Order Modeling to Support the Design and Validation of EV Battery Thermal Management System
B. Honel, B. Lecoindre (Siemens Digital Industries Software, FRA)

11:00 Approach on a Model Based Current Regulator Design for an Electric Drive Unit Using a Holistic System Design With Driver and Driving Cycle
H. Ott, M. Ruschitzka, R. Degen (Technische Hochschule Köln, DEU); M. Leijon (Uppsala University, DEU)

11:20 Electric Vehicle Simulation Platform: One Model to Rule Them All
R. Nicolas, L. Broglia (Siemens Digital Industries Software, FRA)

11:40 The Story Behind Building the World's Fastest Fully Electric Aircraft
S. Hafid (Ansys Europe Ltd., GBR)

B11 Integration of Analysis & Test 1

10:40 Statistical Simulation: Integrating Analysis, Test, and Reality Through Bayesian Inference
F. Günther (Knorr-Bremse SFS GmbH, DEU)

11:00 Towards Matching Simulation and Experiment
R. Heilrich (INTES GmbH, DEU)

11:20 A Novel Dynamic Material Characterisation Method
S. Sriraman, H. Goyder (Cranfield University, GBR); D. Brown, P. Ind (AWE, GBR)

11:40 A Digital Twin for Lightweight Thermoplastic Composite Part Production
M. Meyer, A. Delforouzi (Fraunhofer SCAI, DEU); R. Schlimper, M. John (Fraunhofer IMWS, DEU); T. Link (Fraunhofer ICT, DEU); D. Koster, U. Rabe (Fraunhofer IZFP, DEU); C. Krauß (KIT FAST, DEU)

C11 Multiphysics 6

10:40 A Numerical Framework for the Simulation of Stimuli-responsive Polymer Gels for the Application as Actuators
A. Attaran (IMO Holding GmbH, DEU); P. Gebhart, T. Wallmersperger (TU Dresden, Institute of Solid Mechanics, DEU)

11:00 Two-Way Coupled Thermal-Electric Simulation of a Packaged Laserdiode using Reduced Order Models
T. Moldaschl, G. Grosso (SAL Silicon Austria Labs GmbH, AUT); R. Fuger (CADFEM, AUT)

11:20 FSI Analysis of Flow Around an Elastic Plate Behind a Rigid Circular Cylinder - A Parametric Study
M. Cakir, W. Malalasekera (Loughborough University, GBR)

11:40 CFD and Radiation Model of a Highly Nonlinear Glass Forming Process
W. Hoffmann (SiCo Solutions, DEU); T. Bernard (Fraunhofer IOSB, DEU); R. Wulfert, Q. Ma (Heraeus Quartz North America LLC, USA)

E11 Autonomous Things 2

10:40 Co-simulation Framework for Virtual V&V of GNC Algorithms for Autonomous UAV
V. Dezobry, F. Cappuzzo, E. Carencotte (Siemens Digital Industries Software, FRA); S. Di Gennaro; D. Bianchi (Università degli Studi dell'Aquila, ITA)

11:00 Improvement of Lidar Detection and Tracking Algorithm Using and Development of a Multi-sensor Fusion Module
Hadj-Bachir, D. Gruyer (Université Gustave Eiffel, FRA); K. Fcheris Kevin, P. de Souza (ESI Group, FRA)

11:20 Simulation of ADAS Functions in Cutoff Situations
M. Kereszter, K. Pintér (Bay Zoltán Nonprofit Ltd. for Applied Research, HUN)

11:40 Surrogate Model Based Safety Performance Assessment of Integrated Vehicle Safety Systems
P. Wimmer, S. Kirschbichler, O. Zehbe (Virtual Vehicle Research GmbH, AUT); J. Hay, L. Schories (ZF Friedrichshafen Corporate Research and Development, DEU); J. Fehr (University of Stuttgart, DEU); E. Bayerschen, (ZF Friedrichshafen Passive Safety System

F11 Additive Manufacturing 2

10:40 Simulation of Metal Binder Jetting Sintering for Design and Manufacture of High Volume AM
K. Abburi Venkata, D. Paff (Simufact Engineering GmbH - Part of Hexagon, DEU)

11:00 Validation of Metal Additive Manufacturing Simulation Focusing on Printing Failures and Optimization
B. Dóczy (Knorr-Bremse Vasúti Jármű Rendszerek Hungária Kft., HUN); N. Keller (Additive Works, DEU)

11:20 Smart "Additive Manufacturing Using Metal Pilot Line"
O. Tabaste (MSC Software France - groupe Hexagon, FRA); E. Onillon (CSEM, CHE); S. Bigot (School of Engineering, Cardiff University, GBR)

Lunch Break

08.30

<p>G10 Optimisation 1</p> <p>08:35 Investigation on the Influence of Different Modeling of Multiple Surface Layers on a 3D Topology Optimization J. Holoch, R. Renz, S. Lenhardt, A. Albers (Karlsruher Institut für Technologie (IPEK), DEU)</p> <p>08:55 Automatic Processing and Cross Section Analysis of Topology Optimization Results C. Gomes Alves, Y. Barthe (German Aerospace Center / Deutsches Zentrum für Luft- und Raumfahrt e.V., DEU)</p> <p>09:15 Multidisciplinary Analysis and Optimisation of Space Infrastructure: an Industrial Perspective N. Sarda, J. Moulin, M. Huguenin, J. Olympio, R. Palao (AIRBUS Defence and Space Toulouse, FRA)</p> <p>09:35 Optimization of Water Cooled Condenser in Combo Washer Dryer Using Computational Fluid Dynamics Simulation K. Parashar, P. Gandhi (Whirlpool India, IND)</p>	<p>H10 Acoustics 1</p> <p>08:35 Study on the Aerodynamic Noise Source of the Concept Designed Air Taxi W. Jeon (MSC Software, KOR); K-K. Lee, J. Sim (CEDIC Co. Ltd., KOR); C. Lee, T-G. Lim (MSC Software, KOR)</p> <p>08:55 Experimental and Numerical Investigation of Aerodynamic Noise Generated By Subsonic Axial Fan Using Hybrid Approach S. Hangargekar (Trane Technologies, IND); S. Reddy (Trane Technologies, IND); G. Wang, J. S. Hausmann (Trane Technologies, USA)</p> <p>09:15 Using Data Science's Methods in Analyzing Frequency Filtering in Grids I. Podpruhnikov, A. Vershinin, V. Levin (Lomonosov Moscow State University, RU); K. Zingerman (Tver State University, RU)</p> <p>09:35 Optimizing Noise Performance in Cooktop Extractors for an Enhanced User Experience J. Laguna, F. Cuzzola (Dassault Systemes, DEU); A. Rafidarisoa (Dassault Systemes, FRA)</p>	<p>J10 Dynamics & Vibration 2</p> <p>08:35 Explicit Dynamic Analysis of Wafer Stage Cable Slab of EUV Lithography System O. Khodko (ASML Netherlands B.V., NLD)</p> <p>08:55 NVH Optimization of Refrigerator Tubings for Structure Borne Noise Reduction Through Numerical Simulations A. Jadhav, M. Kikale, A. Shedage, S. Paradhe (Whirlpool Corporation, IND); P. Kosowski (Whirlpool Corporation, POL)</p> <p>09:15 Why We Do 'System Modeling' for Geared Machine J. Seo (FunctionBay, Inc, KOR)</p> <p>09:35 Model Based Analysis of Overhead Crane and Inverted Pendulum S. Yoshida (Shonan R&D, Inc., JPN)</p>	<p>K10 SDM 4</p> <p>08:35 What Makes the Integration of an SDM Successful? The Journey and Experiences of an Automotive Supplier M. Tupy (Brose Fahrzeugteile GmbH & Co. KG, DEU)</p> <p>08:55 The Standard Based Digital Twin - Making the Foundation for Smarter Manufacturing and Creating Better Products M. Prado Motta, C. Abel, C. Pelaingre (Cirtes, FRA); R. Lanza, H. Galtung, M. Chauré (Iotne, NOR)</p> <p>09:15 Management of CAE Model Variants Within an SDM Environment S. Tzamtzis, I. Makropoulou (BETA CAE Systems SA, GRC)</p> <p>09:35 Mastering Incompatibility: Intelligent Integration of a Blackbox CAE Tool with a SPDM System A. Nicklaß, A. Benden (GNS Systems GmbH, DEU)</p>	<p>L10 Computational Fluid Dynamics 1</p> <p>08:35 Numerical and Experimental Investigation of Flow Through Water Filters Using Porous Media Approach R. Kadam, A. Awachat, P. Deshmukh, P. Gandhi (Whirlpool Corporation, IND)</p> <p>08:55 Discussion on the Development of 3D, Multiphase Solvers for Problems in Solid Rocket Propulsion N. Srivastava, T. Jayachandran (Indian Institute of Technology Madras, IND)</p> <p>09:15 Prediction of Clogging of Detergent in Dispenser Using Computational Fluid Dynamics Simulation A. Nagarajan, B. Shome, P. Dhanasegar, K. Parashar (Whirlpool, IND); Prof. S. S. Mujumdar, (Birla Institute of Technology & Science, Pilani, IND)</p> <p>09:35 The Analytical and Numerical Model to Predict Low Reynold's Number Pressure - Flow Characteristics of a Valve With Non-Linear Opening Boundaries A. Gopinathan, C. Muraleedharan, D.V. Vipin, L.J. Sukanya (Sree Chitra Tirunal Institute for Medical Sciences and Technology, Bio Medical Technology Wing, Trivandrum IND)</p>	<p>M10 Engineering Data Science 1</p> <p>08:35 Application of AI for Pre- and Postprocessing for Crash Simulations R. Sridhar, P. Kuber, K. Chetti, R. Reddy, N. Kulkarni, M. Mala (Mercedes-Benz Research and Development India Pvt. Ltd., IND)</p> <p>08:55 A Flexible and Efficient In-situ Data Analysis Framework for CFD Simulations C. Gscheidle, J. Garcke (Fraunhofer SCAI, DEU); J. Meng (Hochschule Bonn-Rhein-Sieg, DEU)</p> <p>09:15 Combining Machine Learning and Simulation for Structural Health Monitoring in Urban Air Mobility V. Savane (Dassault Systemes, IND); R. Fu (Dassault Systemes, USA)</p> <p>09:35 Data Science Meets CFD - How Engineering Can Benefit From Modern Data Science Methods and Techniques A. Walle (Astrid Walle CFDsolutions, DEU)</p>
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Coffee Break

10.35

<p>G11 Optimisation 2</p> <p>10:40 Recent Developments for Non-parametric Non-linear Sizing, Shape and Bead Optimization C. Pedersen, S. Mulumle (Dassault Systemes, DEU); C. B.W. Pedersen (Kingshuk Bose, USA); R. Fan (Yale University, USA)</p> <p>11:00 Game Theory Based Methodologies For Optimization of Interwoven Systems L. Battaglia, A. Clarich (Esteco SPA, ITA)</p> <p>11:20 Aerodynamic Efficiency Potentials of a Tricar Stern Derived From an Ordinary Car Based on Open Source CFD, Morphing - and Optimization Software P. Stang, S. Staus, K. Timmann (Ostfalia University of Applied Sciences, DEU)</p> <p>11:40 Combining Parametric and Non-Parametric Structural Optimization for Urban Air Mobility Conceptual Development T. Moecker (Dassault Systemes Deutschland GmbH, DEU); V. Savane (Dassault Systemes, IND); R. Keswani (Dassault Systemes, FRA); R. Fu (Dassault Systemes, USA)</p>	<p>H11 Covid / Nanoparticle Modelling</p> <p>10:40 Dynamic Modeling of Heat Transfer for Syndromic PCR Testing L. Drazek, J. Baer, D. Duba, P. Childs (bioMérieux, USA)</p> <p>11:00 Influence of the Positions of Air Purifiers on the Velocity Distribution in Rooms – Comparison of Different Simulation Methods U. Janoske, S. Burgmann (Bergische Universität Wuppertal, DEU)</p> <p>11:20 Simulation of the distribution of aerosols in public transport to determine the infection risk using Model Order Reduction S. Vilfayeau, M. Cameron (ESI, FRA); S. Spring (Tplus Engineering GmbH, FRA); R. Magg, R. Almenar (ESI, DEU); A. Rayudu, A.M.N. Rao (ESI, IND); F. Mendonca (ESI-OpenCFD, GBR); M. Reiserer (Universität Kassel, DEU)</p> <p>11:40 Using Computational Fluid Dynamics for the Design of In-Vitro Testing Methods for Inhalable Micro- and Nanoparticles C. Brodbeck (Fraunhofer SCAI, DEU); D. Ritter (Fraunhofer Institute for Toxicology and Experimental Medicine ITEM, DEU); C. Hoyer, F. Kiss (Technical University Berlin, DEU)</p>	<p>J11 Dynamics & Vibration 3</p> <p>10:40 Validating the Flexible Multi-Body Dynamic Model of 3 DOF Manipulator Against the Experimental Modal Analysis Measurements H. Yurt (VDL ETG Technology & Development BV, NLD)</p> <p>11:00 Modal Analysis of Planetary Gearsets J. Haslinger (MathConsult GmbH Kompetenzzentrum Ind. Math., AUT); G. Offner, M. Sopotuch, B. Zinkiewicz (AVL List GmbH, AUT)</p> <p>11:20 Fast Thermal Heat-Up Simulation of Hydrodynamic Lubricated Journal Bearings N. Lorenz (MathConsult GmbH Kompetenzzentrum Ind. Math., AUT); G. Offner (AVL List GmbH, AUT); D. Jaitner (AVL Deutschland GmbH, DEU)</p>	<p>K11 SDM 5</p> <p>11:00 Eliminating Errors During Model Build Process A. Fassis, M.Stampouli, S. Karastamatiadis (BETA CAE Systems SA, GRC)</p> <p>11:20 How to Supplement the Latest Generations of PLM Platforms with an Agnostic and Fine-grained Data Management System G. Neveu, P. Grimberg, X. Dugros (Digital Product Simulation, FRA)</p> <p>11:40 Automatic Outlier Detection for Crash Simulation Results D. Borsotto, L. Jansen, V. Krishnapp, S. Mertler, C-A. Thole (Sidac GmbH, DEU)</p>	<p>L11 Heat Transfer</p> <p>10:40 Predictive Model for Transient Thermal Analysis of Domestic Oven J. Chhatre (Whirlpool India, IND)</p> <p>11:00 Reduced Order Models for Thermal Management in Batteries T. Szpartaluk-Kozak, M. Kurzynka (QuickerSim Sp. z o.o., POL)</p> <p>11:20 Transfer of Heat Transfer Simulation Results to a Mixed Reality Platform for Industry 4.0 R. Stauch, M. Sonntag, C. Polak, D. Mayer, A. Saramet, M. Schnierle (Hochschule Esslingen, DEU)</p>
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Lunch Break

13.15

<p>A12 Automotive - Crash</p> <p>13:20 Simplification of FE-Crash-Models for Optimization of Vehicle Structures M. Schäffer (DLR - Deutsches Zentrum für Luft- und Raumfahrt, DEU); M. Totzke, R. Sturm (German Aerospace Center, DEU)</p> <p>13:40 Application of Physical and Mathematical Surrogate Models to Optimize the Crashworthiness of Vehicle Front Structures P. Luaidi (DLR - Deutsches Zentrum für Luft- und Raumfahrt, DEU); M. Schäffer, R. Sturm (German Aerospace Center (DLR), DEU)</p> <p>14:00 State of the Art of Damage and Fracture Modelling in Crashworthiness Simulation A. Haufe (Dynamore GmbH, DEU)</p> <p>14:20 A Reduced Order Model Optimization Method for Spot-weld Position and Vehicle Structure Crash Performance M. Couste (Renault Technocentre, FRA); Y. Tourbier (Groupe Renault, FRA)</p>	<p>Sponsor B12 Platinum Sponsor Hexagon 2</p> <p>The world is experiencing the biggest threat to its existence in the history of humanity on the planet. With a global population projected to hit 10 billion by 2050, depletion and exhaustion of natural resources, and observable climatic impacts on our habitats and way of life, global manufacturing is having to pivot towards both a digital transformation post the COVID-19 pandemic yet meet tighter legislative sustainability targets such as those for CO2 emissions. This presentation will show how a combination of CAE design & engineering simulations and sensor data can be at the forefront of delivering real green tech solutions for sustainability outcomes with several examples to illustrate the concept of 'design for sustainability'.</p>	<p>Sponsor C12 Platinum Sponsor Dassault 2</p> <p>Global competition, electrification, startup competition and other industry trends are increasing market complexity. Product development costs and speed matter more than ever. Learn how a unified environment can dramatically improve productivity using 4 examples:</p> <ul style="list-style-type: none"> - Body-in-white and aircraft fuselage structures - Electric Drive systems - Exhaust systems - Drug delivery devices, such as injectors. <p>Presented by Charles Luzzato, Nilesh Birajdar, Uday Komaragiri (Dassault Systemes Simulia)</p>	<p>Sponsor D12 Platinum Sponsor Ansys 2</p> <p>Enabling Application and Method Development</p> <p>Engineers and analysts are increasingly in need of flexible ways to leverage engineering simulation technology. Artificial intelligence and machine learning application can be used to create applications for design engineers, and to simplify the set-up and solve of repeated workflows. Come to this session to see how engineering software vendors are working on tools that allow engineers and method developers to accomplish these tasks.</p> <p>Presented by Chris Wolfe, Sandeep Medikonda (Ansys)</p>	<p>E12 Multiscale Simulation</p> <p>13:20 Computing FLD Diagrams and Effective Properties of Polycrystalline Metals G. Lemoine (Hexagon, LUX)</p> <p>13:40 Predictive Modeling of Void Closure During the Hot Rolling of Bars Using Finite Element Analysis C. Pondaven, B. Erzar (ABS Centre Métallurgique, FRA); J.M. Colomer (Datadvance, FRA)</p> <p>14:00 Multi-scale Modelling to Estimate Wafer Bow in 3D NAND Applications S. Varadharajan, R. Patil (Lam Research India Pvt. Ltd., IND)</p> <p>14:20 Fast Prediction of the Effective Properties of 3D Woven Composites A. Cheruet (Hexagon, LUX); G. Lemoine (Hexagon, BEL)</p>	<p>F12 Additive Manufacturing 3</p> <p>13:20 Evaluation of the Temperature History During Extrusion Based Additive Manufacturing R. Hein (DLR - Deutsches Zentrum für Luft- und Raumfahrt, DEU)</p> <p>13:40 Finite Element Analysis of Post-build and Inter-layer Rolling for Large-scale Components Deposited by Wire Arc Additive Manufacturing Y. Sun, V. Gornyyakov, J. Ding, S. Williams (Cranfield University, GBR)</p> <p>14:00 Printing Path Based Modeling of FFF Meso-structures for Finite Element Analysis M. Springmann, S. Mirzaei, P. Middendorf (Universität Stuttgart IFB, DEU)</p> <p>14:20 Thermo-mechanical Modelling for Metal Additive Manufacturing M. Mashhood, A. Zilian, B. Peters, (Universität Luxemburg, LUX); D. Baroli (Aachen Institute for Advanced Study in Computational Engineering Science (AICES), DEU); E. Wyard (Plastic Omnium Advanced Innovation and Research, BEL)</p>
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Coffee Break

15.25

<p>WS A13 Automotive - Discussion 2</p> <p>Automotive Panel Discussion 2</p> <p>Join us for this expert discussion session covering the latest challenges for simulation in the automotive industry. Topics will include:</p> <ul style="list-style-type: none"> - Battery Simulation - ADAS and Autonomous driving - Electric Vehicles - Crash Simulation <p>Invited panelists: M. Felice (virsoTech Engineering Consulting, USA) - Moderator W. Dirschmid (Consultant, DEU) M. Wierse (Dr. Ing. h.c. F. Porsche, DEU) G. Göß (Schaeffler Technologies, DEU) B. Fachbach (Virtual Vehicle Research, AUT) S. Stadler (Magna Steyr Fahrzeugtechnik, AUT) T. Pohl (Stellantis, Opel Automobile, GER) J. Noack (ZF Group - ZF Active Safety, DEU)</p>	<p>Sponsor B13 Gold Sponsor Siemens Digital</p> <p>Four key imperatives to accelerating innovation with digital twins</p> <p>Companies looking toward the future are driven by innovation, striving to out-perform their competitors. At the same time, they are faced with increasing complexity across multiple dimensions such as integrating mechanical, electrical, and controls behaviors, incorporating new materials and manufacturing methods, and opportunities from cloud and IoT. Products can no longer be designed in isolation, which makes development even more complex to manage. To different levels, these and other elements of complexity are impacting companies in every industry. Four critical business imperatives have emerged that will drive operational excellence and digital transformation:</p> <ol style="list-style-type: none"> 1) The 4 key imperatives for evolving and maturing engineering development capabilities 2) The role of the digital twin in realizing the vision 3) Examples of how companies are already benefitting from investing in these domains <p>Presented by Jean-Claude Ercolanelli, Senior Vice President Simulation and Tests Solutions, Siemens</p>	<p>Sponsor C13 Gold Sponsor Cadence</p> <p>Accelerating System Design with Multiphysics Simulation Software</p> <p>System design advancements in 5G, automotive, data center, and IoT are driving faster and smarter electronic solutions. Cadence's Clarity™ 3D Solver and Celsius™ Thermal Solver are bringing in a new era of massively parallel system-level multiphysics simulation solution delivering unparalleled capacity and performance to efficiently analyze large system structures by distributing the simulation over 1,000s of CPU cores, either on-premises or over a cloud.</p> <p>Presented by Ben Gu, Vice President of R&D, Cadence</p> <p>OMNIS for the Automotive Industry - from Design to Optimization in One Dedicated Multiphysics Environment</p> <p>Accelerated product development at a reduced cost through automated CFD simulation The automotive industry is remaking itself in an era of technological transformation that is revolutionizing mobility and vehicle design. Cadence helps engineers accelerate product development, enhance vehicle performance, and optimize fuel consumption and durability.</p> <p>Presented by Olivier Thiry, Sr. Product Engineering Manager, Cadence</p>	<p>Sponsor D13 SPDM Sponsor Esteco</p> <p>15:30 - 16:10 ESTECO</p> <p>Products in the industry are reaching a very high level of complexity as they require to satisfy an increasing number of requirements. At the same time they require the usage of standardized components allowing the product to be used in multiple domains and applications, making the overall product innovative and still affordable. The multidisciplinary nature of those products doesn't allow development processes to be handled in silos anymore, but forces companies to have teams of experts collaborate with each other, ensuring a good understanding of the product performance at any time across the development phase. In this presentation, a special focus will be given to the ESTECO web based Simulation Process and Data Management (SPDM) platform, which enables a collaborative experience. People belonging to different teams can share models while keeping their ownership, allowing regular model updates and tracking those changes at any time within the development process. Within this process, collaboration is the key factor to use shared models, generate useful data and insights to allow the entire team to participate in the whole simulation process.</p> <p>A. Mugnal (ESTECO)</p>	<p>Sponsor E13 Silver Sponsor Microsoft</p> <p>15:30 - 16:10</p> <p>Microsoft sponsor presentation:</p> <p>Reduce simulation cost and increase productivity by leveraging Microsoft Azure HPC powered by AMD EPYC</p> <p>Design and deployment of HPC infrastructure is often constrained by physical resources, internal know-how and policies. That can be a challenge in the current era of new hardware architectures, programming paradigms and constantly changing simulation software. The cloud gives rise to a new paradigm for running industrial simulations. Instead of trying to fit the job into existing resources it is possible to adapt the architecture and compute resources to the simulation requirements. This not only gives more flexibility to the engineers, but it also encourages them to prioritize design space over limited resources and helps ensure performance portability. During this presentation we will demonstrate some performance and scalability examples related to industrial applications of significant performance coming from various customers.</p> <p>Presented by Lukasz Miroslaw (HPC Specialist, Microsoft)</p>	<p>F13 Additive Manufacturing 4</p> <p>15:30 Towards the Virtual Fatigue Characterization of Additive Manufacturing Defects: Mesh-based and Meshfree Simulations D. Garjo, Z. Mugica, I. Rivero, M. Lozano, A. Palomar, J. Gómez-Escalonilla (Airbus Defence and Space, ESP)</p> <p>15:50 Simulation Driven Product Development and DFAM* for Next Generation Products (*Design for Additive Manufacturing) S. Acharya, W. Schwarz, M. Masoomi(Ansys Inc., USA); R. O'Hara (nTopology, USA); K. Genc (Synopsys Inc, USA); J. Spragg (EOS, USA)</p> <p>16:10 Generating, Simulating and Additively Manufacturing Minimal Surface Heat Exchangers J. Coronado (PTC, CAN); A. Vlahinos (Advanced Engineering Solutions LLC, USA); D. Rakestraw (PTC, USA); D. Krzeminski (EOS North America USA); F. Alefel (EOS, DEU)</p> <p>16:30 Microstructure, Porosity and Meltpool Simulations as a Method for Process Parameter Optimization in Metal Additive Manufacturing C. Robinson (ANSYS, USA)</p>
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Coffee Break

13.15

<p>G12 Civil Engineering</p> <p>13:20 Modeling the Effective Properties of Rocks at the Core Sample Scale Taking into Account Pre-loading and Using the Finite Element Method M. Yakovlev (Fidesys LLC, RUS); I. Bystrov, V. Levin (Lomonosov Moscow State University, RUS); A. Vershinin (Schmidt Institute of Physics of the Earth of RAS, RUS); K. Zingerman, (Tver State University, RUS)</p> <p>13:40 Requirements for Facade Engineers to be Certified in FEA E. Secillano (Arup, AUS)</p> <p>14:00 Poroelastoplastic Modeling of Shear Banding Nearby the Borehole Using Spectral Element Method and CUDA A. Vershinin, V. Levin (Fidesys LLC, RUS); Y. Podladchikov (Lomonosov Moscow State University, CHE)</p>	<p>H12 Biomedical 1</p> <p>13:20 Numerical Method to Predict the Condensation in Medical Instruments During Sterilization Process A. Ansari, V. Perumal, P. Bhardwaj (Stryker Global Technology Center, IND); C. Veerappan, K.S. Ravichandran, S. Nagesh (PES University, IND)</p> <p>13:40 Numerical Investigation of Impeller Design on the Performance of Left Ventricular Assist Device (LVAD) S. Gopalakrishnan, S.S. Nair, V.V. Pillai, N.D. Sulochana (Sree Chitra Tirunal Institute for Medical Sciences and Technology, IND)</p> <p>14:00 Model Based Systems Engineering in Medical Device Industry S. Moda, U. Mohammad (Stryker Instruments, USA); J. Solomon, R. Rogers (gtisoft, USA)</p>	<p>J12 Acoustics 2</p> <p>13:20 From Micro-structure to Component Behavior: Acoustic Properties of Polymer Foams C. Moser, C. Schuecker (Montanuniversitaet Leoben, AUT); K. Echallier, M. H. Luxner (Luxner Engineering ZT GmbH, AUT)</p> <p>13:40 Simulation of Alpha Cabin Reverberent Room to Estimate Absorption Coefficient under Diffuse Sound Field X. Robin, E. Richard, M. Raskin, T. Poulos (Hexagon, BEL)</p> <p>14:00 Analytical Prediction of Whoosh Noise & Blade Pass Frequency Noise at AIS Orifice S. Mishra, A. Karim (Ford Motor Company, USA)</p>	<p>K12 Fatigue 1</p> <p>13:20 New Method for Evaluation of Adhesive Joint Failure Under Cyclic Loads M. Frank, K. Hofwimmer (Magna Powertrain Engineering Center Steyr GmbH & Co KG, AUT); C. Lay (Porsche AG, DEU)</p> <p>13:40 Critical Plane Analysis in the Frequency Domain (with Additional Considerations for Rubbers) N. Bishop (Hexagon, USA); S. Datta (Stellantis, USA)</p> <p>14:00 Frequency Domain Fatigue Methodology Applied to Boat Design S. Kerr (Hexagon, USA); L. Macfarlane, L. Walker (Nauti-Craft, AUS)</p>	<p>L12 Computational Fluid Dynamics 2</p> <p>13:40 A Streamlined Approach to Couple In-cylinder and Conjugate Heat Transfer Engine Models J. Fernandes, W. Seeley (Siemens Digital Industries Software, GBR)</p> <p>14:00 Simulation Studies for Condensation in Domestic Refrigerators P. Goel, V. Marathe, S. Sahoo, A. Shukla (Whirlpool India, IND)</p>	<p>M12 Engineering Data Science 2</p> <p>13:20 Analysis of Numerical Crash Simulation Data Using Dimensionality Reduction and Machine Learning N. Ballal, M. Dlugosch (Fraunhofer EMI, DEU)</p> <p>13:40 Anomaly Detection with Generative Adversarial Networks (GANs) Leveraging Failure Simulation Data R. Duquette (Maya HTT, CAN)</p> <p>14:00 Combining Reduced-order Modeling and Machine Learning for Local-global Simulation: Short Circuit Prediction in Electric Vehicle Crash Simulation F. Daim, A. Dumon (ESI Group, FRA); N. Hascoët (ENSAM, FRA); M. Andres (Volkswagen, DEU); C. Breittfuss (Virtual Vehicle Research, AUT); E. Cortelletti (C.R.F. S.C.p.A, ITA); C. Jimenez (Applus+ IDIADA Group, ESP); F. Chinesta (ESI/ENSAM, FRA)</p> <p>14:20 Deep Convolutional Neural Networks for Lid Driven Cavity Flows B. Karnam (Tata Consultancy Services, IND)</p>
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Coffee Break

15.25

<p>G13 Reduced Order Modelling</p> <p>15:30 Deep-Learning from Raw, Heterogeneous Engineering Data in the Cloud P. Baqué (Neural Concept Ltd., CHE); L. Miroslaw, A. Jean (Microsoft, CHE)</p> <p>15:50 Interactive Design Space Exploration and How to Make it Happen M. Bauer, J. Lohse (Navasto GmbH, DEU)</p> <p>16:10 Bringing Electrical and Thermal Design Together with Reduced Order Models B. Blackmore (Siemens Digital Industries Software, CAN)</p> <p>16:30 Model-based Integration of Flow and Acoustic Performance Optimization for Axial Fans in Building HVAC Systems C. Luzzato, B. Afsharpoya (Dassault Systèmes, USA); D. Lauzon (Dassault Systemes, CAN)</p>	<p>H13 Education</p> <p>15:30 Evolving to Help Engineers Develop Methods that Greatly Increase Productivity C. Wolfe (Ansys, Inc., USA)</p> <p>15:50 Augmenting and Amplifying Engineering Education and Research Through RealTime 3D Analysis Tools D. Choudhury, R. Borker (Ansys Inc., USA)</p> <p>16:10 Development of a Simulation-based Knowledge Representation for the Simplification of Structural Aero Engine Components B. Spieß, K. Höschle (BTU Cottbus-Senftenberg, DEU); M. Fanter (Rolls-Royce Deutschland Ltd. & Co KG, DEU)</p>	<p>J13 Simulation Governance</p> <p>15:30 TE Connectivity (TE) - Simulation Strategy H. Brück, R. Golle, (TE Connectivity GmbH, DEU)</p> <p>15:50 Mesh Convergence Study on a Notched Specimen Under Axial Load for the Evaluation of Maximum Stress and Stress Gradient on the Surface E. De Tomaso (TU Darmstadt, DEU); J. Baumgartner (Technical University of Darmstadt, Mechanical Engineering Department, Research Group SAM - Fraunhofer LBF, Institute for Structural Durability and System Reliability, Darmstadt, DEU)</p> <p>16:10 Simulation Governance and Management B. Szabo, R. Actis (ESRD, USA)</p> <p>16:30 Quality Enhancement by Automated Consideration of Modelling Guidelines D. Friedemann, J. Rademann (Hochschule für Technik und Wirtschaft Berlin, DEU); B. Naeser (BMW Group, DEU)</p>	<p>K13 Crack Growth</p> <p>15:30 Fatigue Crack Growth of a Bolt Loaded in Tension using The Boundary Element Method S. Haugland, R. Grant, K.E. Frøysa (Western Norway University of Applied Sciences, NOR); R. Nordrik (Bergen Engines, NOR)</p> <p>15:50 Computational Study of Temperature-dependent Fiber/Matrix Interfacial Debonding in CFRPs G. Zaverdinos, D. Dragatogiannis, C. Charitidis, NTUA, Greece (Athens National Technical University, GRC)</p> <p>16:10 Implementation and Validation of a Finite Element Method to Model Interlaminar Fatigue Damage for Continuous Composite Material C. Lequesne (Siemens Digital Industries Software, BEL); H. Xiong (Samtech SA, a Siemens Company, BEL); L. Carreras, E. Lindgaard, B. L. V. Bak (2. The CrACS Research group, Aalborg University, DNK)</p> <p>16:30 Fracture Mechanics Analysis and Fitness-for-Service of Cracking in the High Pressure Stage 1 Blade T-Hooks of a Steam Turbine Rotor E. Jensen, G. Thorwald (Quest Integrity, LLC, USA)</p>	<p>L13 Uncertainty Quantification</p> <p>15:30 Machine Learning Approach to Model Correlation for Vehicle Model Mobility Characteristics G. Jones (SmartUQ, USA); H. Koler, V. Jeganathan, E. Pesheck (Hexagon Manufacturing Intelligence, USA)</p> <p>15:50 Response Surface Model Development for Uncertainty Quantification and Model Verification and Validation Frameworks D. Riha, E. Decarlo, M. Kirby (Southwest Research Institute, USA)</p> <p>16:10 Comparative Uncertainty Quantification of Simplified Structural Dynamic Models for Performance Quality Prediction L. Harris (Aerospace Systems Design Laboratory, USA); A. Cox, D. Mavris (Georgia Institute of Technology, USA)</p> <p>16:30 Northrop Grumman Mk44 Chain Gun Optimization Using Predictive Analytics and Multibody Dynamics B. Thornton (MSC Software, USA); J. Behren (Northrop Grumman, USA); G. Jones (SmartUQ, USA)</p>
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Coffee Break

17.30

A14 Automotive 2	B14 INCOSE-NAFEMS 2	WS C14 Multiphysics Today & Tomorrow	WS D14 Simulation Confidence Discussion	E14 Computational Electromagnetics 2	F14 Manufacturing Process Sim 1
<p>17:35 Using Super-element Approach to Improve Automotive FEA E. Czerlunczakiewicz (Valeo, POL)</p> <p>17:55 Co-simulation of Semi-active Dampers for Durability Road Load Simulations H. Kolera-Gokula (MSC Software, USA); J. Zakrisson (Volvo, SWE); T. Nygard (Hexagon Manufacturing Intelligence, SWE)</p> <p>18:15 Design Exploration and Prediction of Automotive Hood Designs based on Non-Uniform Feature Parameters S. Ramnath, A. Li, J. Shah (The Ohio State University, USA); D. Detwiler (Honda R&D Americas, USA)</p> <p>18:35 Intrusion Vehicle Body Optimization Combining Frontal and Side Crash Responses F. Leonov S. López (LURI Engineering, MEX)</p>	<p>17:35 The Democratization of the Digital Twin F. Popielas, E. Ladzinski (SMS_ThinkTank LLC, USA)</p> <p>17:55 Simulation of Automotive in the New Context of Validations E. Landel (ELC, FRA)</p> <p>18:15 SysML v2 in Support of Multi-Disciplinary Model-Based Engineering H. de Koning (DEKonsult, NLD)</p> <p>18:35 Data Integration is More Than Aligning Formats M. Williams (The Boeing Company, USA)</p>	<p>Multiphysics Today and in the Future H. Nordborg (OST – Ostschweizer Fachhochschule IET, CHE); C. Wolfe (Ansys, USA); A. Limone (Siemens Digital Industries Software, USA); A. Puri (NAFEMS Technical Fellow, GBR); G. Boiger – tbc (ZHAW Zurich University of Applied Sciences, SUI)</p> <p>In this discussion session, we'll look at the following topics: - What is Multiphysics? - Why do Multiphysics? - Application Cases - Challenges</p>	<p>Simulation Governance B. Szabo (ESRD, Inc., USA)</p> <p>Advances in predictive computational science make it possible to increase reliance of numerical simulation, necessitating fewer experiments for substantial savings in time and costs in product development projects. This session will focus on the central role of simulation governance in the coordination of experimental and analytical work necessary for proper use of the tools and techniques of predictive computational techniques with the purpose to maximize the reliability of computed information.</p>	<p>17:35 Greater System-level Design Insight and Efficiency Achieved With 3D FEM and FDTD Cross-domain Integrated Field Solver Simulation X. Tian, J. Wang, Y. Liu, W. Lin, J. Liu, Cadence, United States (Cadence Design Systems, Inc., USA)</p> <p>17:55 Launching Optimized High-Power Consolidated Millimetre-Wave RF Filters to Space L. Salman (Ansys Canada Ltd., CAN); S. Acharya (Ansys Inc, USA); D. Liu (Synmatrix Technologies, CAN)</p> <p>18:15 Crosstalk Measurement Between Antenna Arrays Carrying Orbital Angular Momentum (OAM) U. Tariq, D. Macfarlane, H. Shahoei (Southern Methodist University, USA)</p>	<p>17:35 Machining Induced Distortion Modelling of 316L Stainless Steel Using FEM A. Zonuzi, T. Syed (Nuclear AMRC, University of Sheffield, GBR)</p> <p>17:55 Integrated Process Simulation and Optimization of Injection Moulding Process S. Kulkarni, D. Fust (Vanderplaats R&D DBA OmniQuest, USA)</p> <p>18:15 Efficient Cure Cycle Optimization with Recurrent Neural Network Surrogate Models A. Floyd, S. Reid, A. Stewart (Convergent Manufacturing Technologies Inc, CAN)</p> <p>18:35 Linking Manufacturing Process to Advanced Material Performance Using Multiscale Modeling H. Cornwell (Siemens Digital Industries Software, USA)</p>

17.30

G14 HPC 3	H14 Integration of Analysis & Test 2	J14 Simulation for Tomorrow	K14 System Level Simulation 2	L14 Coupling / Co-simulation	M14 Engineering Data Science 3
<p>17:35 Creating Connections: Enabling High Performance Computing for Industry through a Data Exchange & Workflow Platform J. Schüssler, J. Grimm (SSC-Services GmbH, DEU)</p> <p>17:55 Algebraic Multigrid (AMG) for Large-scale CFD Simulations B. Metsch, H.-J. Plum (Fraunhofer SCAI, DEU)</p> <p>18:15 GPU Accelerated Radiative View Factor Calculations: Applications in Headlamp Design and Thermal Analysis M. Kenward, M.T. Nguyen, M. Saghir, N. Hayi-Slayman, P. Wen, Z. Zarei (Maya HTT, CAN)</p> <p>18:35 Democratizing a Highly Parallelized CFD Model to Facilitate the Study of Formation Flight A. Perez, Dr. A. Tejada-Martinez (University of South Florida, USA); P. Pennington (EASA, Inc. USA)</p>	<p>17:35 Approach to Automated Testing by Combining Simulations and Bench Tests Conducted on an Electrohydraulic Actuator M. Dörr, M. Karam, F. Leitenberger, T. Gwosch, S. Matthiesen (Karlsruher Institut für Technologie (IPEK), DEU)</p> <p>17:55 Testing/Calculation Dialogue Pyramid for Rotomolded Structures: a Predictive Design Tool E. Laine (ENSMA, FRA); J.-C. Grandidier, J.-C. Dupré (Institut Pprime, FRA); E. Maziers, (TOTAL Petrochemicals, BEL); S. Lewis (Vision Plastics Limited, NZL)</p> <p>18:15 Spacecraft Model Based System Testing – Correlation of Test & Simulation P. Tremblay, J. Frachon (Maya HTT, CAN)</p> <p>18:35 Data Assimilation for Prediction Enhancement and Uncertainty Reduction in Process Simulation O. Fernlund, A. Forghani, G. Fernlund (Convergent Manufacturing Technologies Inc, CAN)</p>	<p>17:35 What to do About Global Warming: Modeling the Problem and Solutions R. Carson (University of Washington, USA)</p> <p>17:55 Water Management Simulations for Hydrogen Fuel Cells W. Seeley (Siemens Digital Industries Software, USA); C. Locci (Siemens Digital Industries Software, DEU)</p> <p>18:15 Achieving Rapid Optimization Convergence in Non-Linear Structural Design J. Pablo Leiva, H. Dong, B. Watson (Vanderplaats R&D DBA OmniQuest, USA)</p>	<p>17:35 Managing Distributed Model-Based Design Projects C. Rygaard (Blend Dynamics, USA)</p> <p>17:55 How Multi-Fidelity Analytical Modeling Can Reduce Risk at All Levels of System Development G. Garstecki (Garstecki Modeling Solutions, LLC, USA)</p> <p>18:15 Towards a VR-Based Early Design Interaction for Electric Vertical Take-Off & Landing (eVTOL) Cyber-Physical Models M. Podlaski, L. Vanfretti, A. Khare, J. Monteneri, J. Lewin, E. Segall (Rensselaer Polytechnic Institute, USA)</p> <p>18:35 Quality Assurance of Engineering Simulations: a Review of Concepts, Methods, and Standards F. Santandrea (RISE Research Institutes of Sweden, SWE); M. Eriksson (Validus Engineering, SWE)</p>	<p>17:35 A Weak Coupling Approach to Calculating the Effects of Electromechanical Interactions in an EV Drivetrain B. Lukasik (Romax Technology Ltd., GBR); A. Shahaj (Romax Technology Ltd, GBR)</p> <p>17:55 Teaching Cyber-physical Systems co-simulation Using Jupyter-Lab T. Roudier (E-Sim Solutions, CAN)</p> <p>18:15 Multi-scale Drop Test Analysis of Printed Circuit Boards (PCB's) S. Medikonda, A. Srivastava, D. Lyu, W. Hu, A. Sengupta, R. Meena (Ansys Inc., USA)</p> <p>18:35 Electrical-Thermal-Stress Co-Simulation for 3D-IC Integrated with Package and PCB Board Designs Z. Han, X. Ai, Z. Li, Y. Li (Cadence Design Systems, Inc., USA)</p>	<p>17:35 Real Time Stress Prediction Using Machine Learning J. Anthony, M. Rajamony, S. Leblanc, H. Bensoudane, A. Brener (Maya HTT, CAN)</p> <p>17:55 AI Powered Product Design F. Kocer (Altair Engineering, Inc., USA)</p> <p>18:15 Application of Machine Learning and CFD to Model the Flow in an Internal Combustion Engine J. Hodges (Siemens Digital Industries Software, USA); M. Emmanuelli, S. Sathyanandha (Monolith AI, GBR); J. Fernandes (Siemens Digital Industries Software, GBR)</p> <p>18:35 Machine Learning for Stress Hot Spot Recognition F. Cordisco, F. Dri (Dassault Systemes, USA)</p>

08.30

<p>A15 Automotive 3</p> <p>08:35 Virtual Design of SMC Parts Suitable for Automotive Mass Production S. Wehler, J.-H. Langer (Volkswagen AG, DEU); D.Hühn, S. Müller, A. Berger (Engineering System International Group, DEU)</p> <p>08:55 Improving Collaboration in Vehicle Performance Simulation Process Through the Introduction of a System Centric Digital Thread E. Mottola (Toyota Motor Europe NV/SA, BEL)</p> <p>09:15 Effective Use of Simulation in Root Cause Investigations for Automotive Sensors M. Van Noorden (Sensata Technologies, NLD)</p>	<p>B15 SDM 6</p> <p>08:35 SPDM Introduction in Airbus Helicopters in Frame of DDMS Initiative L. Fine, T. Berthelon (Airbus Helicopters, FRA); B. Garat (Dassault Systèmes, FRA); G. Neveu (Digital Product Simulation, FRA)</p> <p>08:55 A Standardised Approach to Building CAE Application Connectors to an Open-source SPDM Solution M. Norris (the SDMCConsultancy, GBR)</p> <p>09:15 Central Management of Virtual Prototypes from a Lifecycle Perspective M. Elbs (IPG Automotive GmbH, DEU)</p> <p>09:35 Simulation Data Structuring as a Key Success Factor of Your SPDM Journey H. Giagnorio, S. Grau (Inensia, BEL)</p>	<p>C15 Manufacturing Process Sim 2</p> <p>08:35 Virtual Prototyping for Curing Control and Distortion Prediction of the HTP Leading Edge Manufacturing A. De Gregorio De Juan (ESI Spain, ESP); F. Martin de la Escalera, M. Hernandez Garcia (Aermovna Engineering Solutions Ibérica, ESP); S. Masqué Barrí, C. Terrés Abórtiz (ESI, ESP)</p> <p>08:55 Impregnation and Flow Analysis Under a Roller in Double Belt Press for Manufacturing Thermoplastic Composites O. Ishida, K. Nunotani, K. Uzawa (Kanazawa Institute of Technology, JPN); Y. Aono (ESI Japan Ltd., JPN); J. Kitada, (IPCO K.K., JPN)</p> <p>09:15 Manufacturing Simulation of Sheet Molding Compound (SMC) S. Revfi, A. Abers (Karlsruher Institut für Technologie (IPEK), DEU); N. Meyer, L. Kärger (Karlsruhe Institute of Technology (KIT), Institute of Vehicle System Technology (FAST), DEU); M. Bartkowiak, L. Schoettl (Karlsruhe Institute of Technology (KIT),</p> <p>09:35 An Updated Simulation Framework for the Prediction of Process Induced Shape Distortion in Thermoset Composites N. Traiforos, D. Fernass, F. Glock, G. Schuhmacher (Airbus Defence and Space GmbH, DEU); T. Turner, D. Chronopoulos (The University of Nottingham, GBR); P. Runeberg (Premium AEROTEC GmbH, DEU)</p>	<p>D15 Multiphysics 7</p> <p>08:35 Development and Validation of a Fully Coupled Electrical – Thermomechanical Li-ion Cell Model F. Möller, N. Jakhya (EDAG Engineering GmbH, DEU)</p> <p>08:55 Mastering Aeroelasticity for Transonic Flight with Multiphysics-focused CFD J. Wiggart (MSC Software Sweden AB, SWE); S. Hatazawa (Hexagon, JPN)</p> <p>09:15 Advanced Simulation and Uncertainty Quantification of Multiphysics Problems V. Gravemeier, J. Biehler, J. Nitzler, C. Schmidt, S. Sinzig, W. Wall (AdCo Engineering GW GmbH, DEU)</p>	<p>E15 V&V 2</p> <p>08:35 Modelling and Experimental Validation of Cable and Hose Dynamics R. Faassen, B. Bukkems, D. Laro (MI-Partners, NLD)</p> <p>08:55 Simulation Validation Through the Prism of Optical Measurements - Construction of a Validation Platform F. Mathieu (EikoSim, FRA)</p> <p>09:15 On the Impact and Validation of Modelling Assumptions During the Virtual Design Process A. Hardenberg (BTU Cottbus-Senftenberg, DEU); M. Fanter (Rolls-Royce Deutschland, DEU)</p> <p>09:35 Plastic Properties of Sleeve/Tape Reinforced Electric Multi-Wire Harnesses C. Diaconu (Siemens Digital Industries Software, JPN); P. Andry (Siemens Digital Industries Software, BEL);</p>	<p>G15 Fatigue 2</p> <p>08:35 Fatigue Analysis of Solder-Joints for Vibration and Shock Loads H. Ziegelwanger, W. Hinterberger (Magna Powertrain Engineering Center Steyr GmbH & Co KG, AUT)</p> <p>08:55 Influence of the Additive Manufacturing Process on CAE-based Life Estimation of a Medical Application S. Vervoort (Hottinger Brüel & Kjaer GmbH, DEU)</p> <p>09:15 Multi-axial Fatigue simulation of Dishwasher Door Tab N. Bhargava, K. Kusupudi, A. Nalawade (Whirlpool of India Ltd, IND)</p>
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Coffee Break

10.35

<p>WS A16 Automotive Discussion 3</p> <p>Automotive Panel Discussion 3</p> <p>Join us for this expert discussion session covering the latest challenges for simulation in the automotive industry. Topics will include:</p> <ul style="list-style-type: none"> - Prototyping - Management of varying results - Artificial Intelligence & Machine Learning - Virtual Simulation - Sensor operation and design - How to eliminate physical testing - Incorporation of DFSS - MBSE ... and more <p>Invited panelists: M. Felice (virsoTech Engineering Consulting, USA) - Moderator W. Dirschmid (Consultant, DEU) G. GÖß (Schaeffler Technologies, DEU) S. Stadler (Magna Steyr Fahrzeugtechnik, AUT) T. Pohl (Stellantis, Opel Automobile, GER)</p>	<p>B16 SDM 7</p> <p>10:40 Enabling Simulation Data Management for Custom CAE Processes A. Mahl (PDTEC AG, DEU)</p> <p>11:00 Successful Use Cases and Application Examples for the Integration of Artificial Intelligence into SPDM A. Kuhn, N. Stalánich (Andata Entwicklungstechnologie GmbH & Co KG, AUT)</p> <p>11:20 Data analysis and exploration with SDM Systems M. Liebscher, M. Thiele (SCALE GmbH, DEU)</p> <p>11:40 How Schmitz Cargobull uses SPDM as a Strategic Approach in Virtual Product Development Cycles J. Lamann (Schmitz Cargobull AG, DEU); Z. Petrovic (Siemens Digital Industries Software, DEU)</p>	<p>C16 Manufacturing Process Sim 3</p> <p>10:40 Materials & Process Modelling in Aerospace -- from PhD Topic to Everyday Engineering Task S. Van Der Veen (AIRBUS CTO, FRA)</p> <p>11:00 Simulation of Hot Rolling of AISI 430 Ferritic Stainless-steel Slabs at Industrial Scale Using Finite Element Method A. Ojeda Lopez (University of Cadiz, ESP); M. Botana Galvín, P. Astola Gonzalez (Titania, ESP); J. Contreras Fortes (Acerinox, ESP); J. Botana Pedemonte (University of Cadiz, ESP)</p> <p>11:20 Virtual Testing for Predicting Effect of Automated Fiber Placement Manufacturing Defects A. Chiappini, (Stelia Aerospace, FRA); S.G. Rodriguez, S. Miot, L. Barriere (IRT Saint Exupery, FRA); C. Huchette, C. Faglano (ONERA, FRA)</p> <p>11:40 Calculating Stress-free Shapes of Sheet Metal Parts Measured with Over-constrained Fixtures F. Claus, H. Hagen (TU-Kaiserslautern, DEU); B. Hamann (UC Davis, USA)</p>	<p>E16 Materials 2</p> <p>10:40 Smart Material Database Enrichment Using a Mixed Approach combining Data Science with Experimental Data and Virtual Testing M. Salmi (MSC Software France - groupe Hexagon, FRA)</p> <p>11:00 Application of the Finite Element Method to Modeling the Effective Mechanical and Thermomechanical Properties of Metamaterials of the 3D Lattice Structure M. Yakovlev, P. Tanasevich (Fidesys LLC, RUS); A. Vershinin, V. Levin (Lomonosov Moscow State University, RUS); K. Zingerman (Tver State University, RUS)</p> <p>11:20 Creep Modelling of a Short Glass Fiber Reinforced Thermoplastic B. Schneider, E. Moosbrugger (Robbert Bosch GmbH, DEU)</p> <p>11:40 Simulation of Adhesive Squeezing in Car Body Assembly E. Husser (Simufact Engineering GmbH - Part of Hexagon, DEU); L. Jusufi (Audi AG, DEU)</p>	<p>F16 MBSE</p> <p>10:40 Cross-domain Impact Analysis Using the Artifact Model C. Bühler, M. Brandstätter, K. Steinkirchner (Prostep AG, DEU); M. Mayer (FOM, DEU)</p> <p>11:00 Integrating Simulation With the MBSE Approach to Increase Product Performances G. Neveu, P. Grimberg, N. Marguet, J. Daziano (Digital Product Simulation, FRA)</p> <p>11:20 Integration of MBSE and Simulation for System Integration, Verification and Validation S. Kleiner, K. Mai (em engineering methods AG, DEU)</p>	<p>G16 Comp Struct Mechanics</p> <p>10:40 A Finite Element Study of Elastic Stress Singularities and Stress Concentrations in the Vicinity of Inclusions in Forged ANSI 4330 Steel J. Wood, G. Barnard, (University of Strathclyde, GBR)</p> <p>11:00 Electrofusion Couplers for Thermoplastic Composite Pipes M. Gierulski (The University of Sheffield, GBR)</p> <p>11:20 Simulation of Power Springs G. Hannig, C. Beck (Scherdel Siment GmbH, DEU)</p> <p>11:40 Fast and Accurate Contact Dynamics With a Detailed FE Mesh on the Base of Contact and Stress Modes W. Witteveen (FH OÖ Forschungs- und Entwicklungs GmbH, AUT)</p>
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Lunch Break

Lunch Break

13.00

A17 Hardware-In-The-Loop

13:05 Hardware-in-the-Loop-Simulation for Collision Avoidance in Drone Swarms
 M. Natke (BTU Cottbus-Senftenberg, DEU)

13:25 Personal Driving Simulator: Display of a Hybrid Twin
 S. Gimpel, M. Strobel (aSR advanced Simulated Reality GmbH, DEU)

13:45 Introduction to Recently Developed HIL Methods: Impulse Response Functions and Non-simultaneous Iterative Hybrid Simulation/Testing
 W. Witteveen (FH OÖ Forschungs- und Entwicklungs GmbH, AUT)

14:05 Validating Heavy Equipment Transmission Design Using Multibody Simulation in Real-time
 N. Ki (John Deere Waterloo, USA); M. Furman, W. Prescott (Siemens Digital Industries Software, USA)

B17 SDM 8

13:05 The Basics of Successful Simulation Data Management. Part 1: Planning and Recording Simulation Data
 S. Howell, P. Middha (Abercus Limited, GBR)

13:25 How to Get Started with Simulation Data Management - a Value-focussed Approach
 M. Norris (the SDMConsultancy, GBR)

13:45 The Basics of Successful Simulation Data Management, Part 2: Practical Automation of Simulation Activities
 S. Howell, P. Middha (Abercus Limited, GBR)

D17 Interoperability

13:05 ITEA VMAP Project and the VMAP Standards Community
 e.V. K. Wolf (Fraunhofer SCAI, DEU)

13:25 VMAP Enabling Interoperability in Integrated CAE Simulation Workflows
 P. Gulati (Fraunhofer SCAI, DEU)

13:45 An Integrative Optimization Concept for Extrusion Blow Molded Parts
 O. Bruch, D. Grommes (Dr. Reinold Hagen Stiftung - Consultancy, DEU); P. Michels (Hochschule Bonn-Rhein-Sieg, DEU)

E17 Materials 3

13:05 Integration of Materials Modelling into Processing Simulation – The Current Status
 Z. Guo, N. Saunders, J-P. Schillé (Sente Software, GBR)

13:25 Further Development of a Simulation Model for the Description of the Crystallization Kinetics of Semicrystalline Thermoplastics
 F. Winkelmann (DLR - Deutsches Zentrum für Luft- und Raumfahrt, DEU)

13:45 Viscoelastic Simulation of Fast Assembly Processes to Improve Handling of Elastomer Seals
 C. Wehmann, C. Schüle (Trelleborg Sealing Solutions GmbH, DEU); A. Astbury (Trelleborg Sealing Solutions Inc., USA)

14:05 Material Data Fusion of CAE and Experimental Data in a Case Study for a Car Seat Back Shell
 J. Lienhard, T. Herrmann, T. Schweiger, F. Huberth (Fraunhofer IWM, DEU)

F17 System Level Simulation 3

13:05 Advances in Collaborative Multidisciplinary Simulation for Aircraft Preliminary Design
 E. Moerland (DLR - Deutsches Zentrum für Luft- und Raumfahrt, DEU)

13:25 Predictive Maintenance for Wind Farms: Combining ML and Physics-based Modelling to Reduce Wind Turbine Asset Downtime
 M. Cameron (ESI Group, FRA); A. Alsaab, ESI, R. Said (ESI, GBR)

13:45 Cluster-based Metamodeling
 D. Steffes-lal, R. Iza-Teran, T.N. Klein (Fraunhofer SCAI, DEU); J. Garcke (Fraunhofer SCAI and Universität Bonn, DEU)

14:05 A Massively Parallel Fast Multipole Library for Industrial Applications
 J. Zechner, L. Kielhorn, T. Rübner (Tailsit GmbH, AUT)

Coffee Break



Coffee Break

14.30

P18 Day 4 - Plenary

14:30 From Start-Up Simulations to Now! With Plans for the Future
 I. Krajinović (Rimac Automobili d.o.o., HRV)

15:00 Engineering Design in the Age of Big Data and Big Compute
 K. Willcox (University of Texas at Austin, USA)

Coffee Break

16.00

WS B19 AI in Engineering Design	WS C19 Virtual Qualification of Composites	WS D19 SWG Panel Session	E19 Methods 1	F19 Simulation Management
<p>AI (ML) in Engineering Design: Its Status and Readiness for it</p> <p>AI (ML) in Engineering Design: Its Status and Readiness for it</p> <p>If you are a product design engineer, a CAE analyst, a test engineer tasked with using machine learning and wondering what that means, where you would start from; this panel will help you to navigate through your options.</p> <p>In this panel, industry thought leaders in engineering data science will discuss how machine learning will benefit the engineering design process, how to identify the right projects to apply machine learning, discuss key challenges to overcome. Whether you are a product design engineer, a CAE analyst, a test engineer, or a leader tasked with using machine learning and need to know what that means and how to get started; this panel will help you determine the right path and answer your questions. We invite you to join us for a lively discussion on this exciting topic.</p> <p>Moderators: Fatma Kocer, Altair Todd DePauw, Boeing</p> <p>Panelists: Alexander Karl, Rolls-Royce Mahmood Tabaddor, Underwriters Laboratory Catherine Amodeo, Ford Alex Steere, Boeing Jeremy Jarrett, Kinetic Vision</p>	<p>Virtual Qualification of Composites</p> <p>In this discussion session members of the NAFEMS Composites Working Group will discuss the Virtual Qualification of Composites.</p> <p>The session will be moderated by Robert Yancey (Hexcel) and Kim Parnell (Parnell Engineering & Consulting), chair and vice-chair of the Composites Working Group.</p> <p>The panelists are: Stephanie Miot, IRT Saint Exupery Anthony Cheruet, Hexagon Michael Bruyneel, GD&T Charles Roche, Western New England University Mike Hinton, High Value Manufacturing Catapult Rashid Miraj, AlphaSTAR Corporation</p>	<p>Uncertainty Quantification, Bringing Together Physical and Virtual Experiments in Product Verification and Validation</p> <p>A. Karl (Rolls-Royce, USA); D. Vogt (Airbus Operations, DEU); D. Riha (Southwest Research Institute, USA); F. Guenther (Knorr-Bremse, DEU); F. Santandrea (RISE Research Institutes of Sweden, SWE); J. Reijmers (Nevesbu, NLD).</p> <p>Members of the NAFEMS Stochastics Working Group will discuss the role that UQ plays in physical and virtual experiments which support product V&V.</p>	<p>16:05 Thin Film Flow Modelling of a Vertically Rotating Disk Using an Immersed Boundary Method U. Janoske, M. Bürger (Bergische Universität Wuppertal, DEU)</p> <p>16:25 Calculation of Pump Characteristics with Operating Point-Adapted Computational Meshes P. Galpin (ISIMQ Ltd, CAN); G. Scheuerer, T. Hansen (ISIMQ GmbH, DEU); N. Wyman (Pointwise Inc., USA)</p> <p>16:45 Virtual Blade Model Utilising Artificial Intelligence Driven 3D Corrections G. Zipszer, B. Darázs, M. Gyöngyösi, Á. Horváth (eCon Engineering Kft., HUN)</p> <p>17:05 Application of Spectral Element Method for Solving Problems With a Cyclic Symmetry at Unstructured Non-conformal Curvilinear Meshes A. Vershinin, V. Levin (Lomonosov Moscow State University, RUS); A. Kukushkin, D. Kononov (Fidesys LLC, RUS)</p>	<p>16:05 Measuring the True Value of Your IT Assets K. Trappe, S.M. Stenseth (Open IT Norge AS, NOR)</p> <p>16:25 Best & Worst Practices To Exploit Simulation Tools and Capability Across Enterprises : Lessons Learned S. Demattè, N. Saccenti, F. Franchini, V. Primavera (EnginSoft SpA, ITA)</p> <p>16:45 A Capability Scale for Engineering Simulation K. Meintjes (NAFEMS Technical Fellow, USA); B. Webster (Fidelis FEA, USA)</p> <p>17:05 Functional Decomposition (FuDe) Method as a Simulation Planning Tool Z. Turhan (ASML Netherlands B.V., NLD)</p>



Coffee Break

16.00

G19 Generative Design

16:05 Generative Design of Lattice Structures
J. Coronado (PTC, USA); A. Vlahinos (Advanced Engineering Solutions LLC, USA)

16:25 Towards Generative Design With Improved Geometry Outcomes and Faster Performance
D. Weinberg (Autodesk Inc., USA); N-H. Kim (University of Florida, Gainesville, USA)

16:45 Multi-objective Optimization of Flat and Dished Pressure Vessel Heads With Bionic Principles
D. Becker, N. Kockmann, S. Gerling, T. Nissalk (Technical university Dortmund, DEU)

17:05 Reduce Part Count in Complex Assemblies by Combining Generative Design with Additive Manufacturing in a New Workflow
L. Maasjost (MSC Software GmbH, DEU)

H19 Impact Shock & Crash 2

16:05 Release of Locking Mechanism in Completion Tubing String: A Dynamic Loading Analysis
Z. Zhou (Halliburton Carrollton Technology Center, USA); A. Zhong, M. Macek (Halliburton Energy Services, USA)

16:25 New Concept of Geometry-Based Finite Element Model Generation for Crash Simulation within the Graph- and Heuristic-Based Topology Optimisation
T. Pohl (Stellantis, DEU); F. Beyer, A. Schumacher (Bergische Universität Wuppertal, DEU)

16:45 Innovative Restraint Systems – Virtual Verification Respecting the Variety of Human Population
L. Kovar, J. Holeček (Mecas ESI s.r.o, CZE); J. Vychytil, L. Hynčík (University of West Bohemia, CZE)

17:05 Structural Performance Validation of Handheld Consumer Electronic Devices
B. Hurlbut (Dassault Systemes, USA); J. Pawar (Dassault Systemes, IND)

J19 Optimisation 3

16:05 Design Optimization of Thin Aluminum Windows for Pressurized Systems in Spallation Neutron Source Instruments
S. Kaminskas (Oak Ridge National Laboratory, USA)

16:25 Adjoint-based Topology Optimization - Maximizing Heat Transfer of a Brake Cooling Duct
S. Petropoulou (Siemens Digital Industries Software, GBR); J. Gaenz (Siemens Digital Industries Software, DEU); F. Ross (Siemens Digital Industries Software, USA)

16:45 Improving the Contact Lens Wearer Daily Experience by Simulation and Optimization Across Multiple Aspects of Performance
S. Zeinali, G. Richardson (Johnson & Johnson Vision, USA)

17:05 Utilizing CFD Fields for Fluid Domain Optimization
M. Vlahinos (nTopology, USA)

K19 Materials 4

16:05 Evaluation and Validation of Rubber FEA for High Pressure High Temperature Applications Through a Large-Scale O-Ring Test Program
A. Zhong (Halliburton Carrollton Technology Center, USA); Z. Fan (Halliburton, SGP)

16:25 Simulation-based Design and Prediction of Effective Mechanical Properties of Woven, Weft and Warp Knitted Fabrics
D. Neusius, J. Orlik, O. Sivak, K. Steiner (Fraunhofer ITWM, DEU)

16:45 Mechanical Modeling of Nonwovens from Polymeric Fibers
Y. Chen, Y. Lin (The Dow Chemical Company, USA)

17:05 Modeling and Experimental Characterization of Adhesive Curing Processes
D. Lindeman, A. Hedegaard (3M Company, USA)

L19 CAE in the Design Process

16:05 Evaluation of Automated Tools to Construct CAD Geometry from Discrete Mesh Data
R. Jennings (Honeywell Federal Manufacturing & Technologies, USA)

16:25 Smart-engineering Tools Dedicated to Sports Product Design
L. Chec, P. Maury (DATADVANCE France SAS, FRA); A. Callens (Decathlon, FRA)

16:45 A Comparative Study of a Lubricating System of Reciprocating Compressors for Refrigerators Using Two Commercial CFD Codes
M. Tada (Embraco-Nidec, BRA)

17:05 CFD Modeling in Design of 3D Printer Enclosures
T. May, K. Fouladi, B. Eslami (Widener University School of Engineering, USA)

M19 Image Based Modelling

16:05 Using Real World Computed Tomography Data for Fatigue Analyses
P. Sugg, P. Pinter (Volume Graphics GmbH, DEU)

16:25 Large Deformations of Metal Foams: Dynamic CT Results, Simulations and Modeling
E. Glatt (Math2Market GmbH, DEU); M. Hümbert, A. Griebler, S. Rief, L. Hunter (Tescan, USA); W. De Boever (Tescan, BEL); M. Kabel (Fraunhofer ITWM, DEU); H. Gimm-Strele (Fraunhofer ITWM, GRC)

16:45 Utilizing Test Data from DIC for Polymer Material Modeling
S. Teller (Veryst Engineering LLC, USA)

17:05 Application of Image-based Modelling to Qualification and Simulated Testing of Next Generation Heat Exchangers
K. Genc, T. Spirka (Synopsys Inc., USA); B. Muehlhauser (North Star Imaging, USA); S. Acharya (Ansys Inc., USA)

11.00

Training A20 Intro to Nonlinear FEA

Training: A brief introduction to Nonlinear FEA
Adib Becker (NAFEMS Technical Fellow, GBR)

This session presents a brief overview of some practical aspects of modelling non-linear problems using FE software. The contents are extracted from the two-day (14 hours) NAFEMS short course on "Practical Introduction to Non-Linear FE Analysis". The course is intended for delegates interested in using FE software to analyse advanced non-linear problems involving material non-linearities, geometric non-linearities and contact problems. Mathematical derivations will not be covered in this lecture. Potential difficulties that may be encountered in using FE software to analyse non-linear problems will be

12.45

Training A21 Process Integration & Design Optimisation

Training: Process Integration and Design Optimization - A Practical Guide
G. Duffett (NAFEMS Iberia, ESP)

Training B21 Elements of Turbulence Modeling

Training: Elements of Turbulence Modeling
K. Fouladi (Southwest Research Institute, USA)

This course is focused on understanding turbulence, need for turbulence modeling, and various modeling approaches. Discussions on the advantages and limitations of various models should help CFD users in selecting appropriate turbulence models for their

14.30

WS A22 Wrap-up - MPS

Wrap-up Session – Manufacturing Process Simulation
NAFEMS Manufacturing Process Simulation Working Group

In this wrap-up session members of the NAFEMS Manufacturing Process Simulation Working Group will give you their view on the content presented at the 2021 NAFEMS World Congress.

Panelists:
Peter Giddings, National Composites Centre
Sunil Acharya, ANSYS
Johannes Balvers, Airbus Helicopters Deutschland GmbH
Anders Winkler, Dassault Systemes AB

WS B22 Wrap-up - AM Simulation

Wrap-up Session – Additive Manufacturing Process Simulation
NAFEMS Metallic Additive Manufacturing Process Simulation Focus Team

In this wrap-up session members of the NAFEMS Metallic Additive Manufacturing Focus Team will give you their view on the content presented at the 2021 NAFEMS World Congress.

Panelists:
Sjoerd Van der Veen, Airbus
Anas Yaghi, Consultant
Tyler London, TWI North East
Yongle Sun, Cranfield University
Pratheek Shanthraj, University of Manchester

WS C22 Wrap-up - Multibody Dynamics

Wrap-up Session – Multibody Dynamics
NAFEMS Multibody Dynamics Working Group

In this wrap-up session members of the NAFEMS Multibody Dynamics Working Group will give you their view on the content presented at the 2021 NAFEMS World Congress.

Panelists:
Patrick Morelle, Consultant
Martin Ortega, Mabe S.A. de C.V.
Devashish Sarkar, ANSYS
Girish Mudgal, TimeTooth Technologies

15.30

WS A23 Wrap-up - Stochastics

Wrap-up Session – Stochastics
NAFEMS Stochastics Working Group

In this wrap-up session members of the NAFEMS Stochastics Working Group will give you their view on the content presented at the 2021 NAFEMS World Congress.

Panelists:
Alexander Karl, Rolls-Royce
David Rhia, South West Research

WS B23 RevolutionInSimulation

The 3-Year-Old RevolutionInSimulation.org Community – What Are You Waiting For?
M. Panthaki (Aras Corporation, USA)

Generative Design – a new design paradigm. Is the excitement justified?

This panel has the expected range of stakeholders (from users to technology providers to sales and marketing professionals) that enable a powerful new technology to cross the chasm from experimental to useful in real-world scenarios. We will vigorously discuss various aspects of Generative Design, ranging from the pros and cons of the two approaches (topology optimization vs lattice-based methods) to the reality vs the hype that is generated by marketing efforts.

Malcolm Panthaki, VP of Analysis Solutions at Aras Corporation (Moderator)
Dr. Andreas Vlahinos, CTO Advanced Engineering Solutions (User of the technology)
Dr. Ir. Lieven Vervecken, CEO Diabatix nv (Thermal Generative Design software)
Dr. Juan Pablo Leiva, CTO OmniQuest (Topology Optimization software)
Erica Vlahinos, Account Executive nTopology (Sales and marketing for modern Generative Design software)

WS C23 Wrap-up - Automotive

Wrap-up Session – Automotive Symposium
M. Felice (virsoTech Engineering Consulting, USA); W. Dirschmid (Consultant, DEU); G. Göß (Schaeffler Technologies, DEU); S. Stadler (Magna Steyr Fahrzeugtechnik, AUT); T. Pohl (Stellantis, Opel Automobile, GER); J. Noack (ZF Group - ZF Active Safety, DEU)

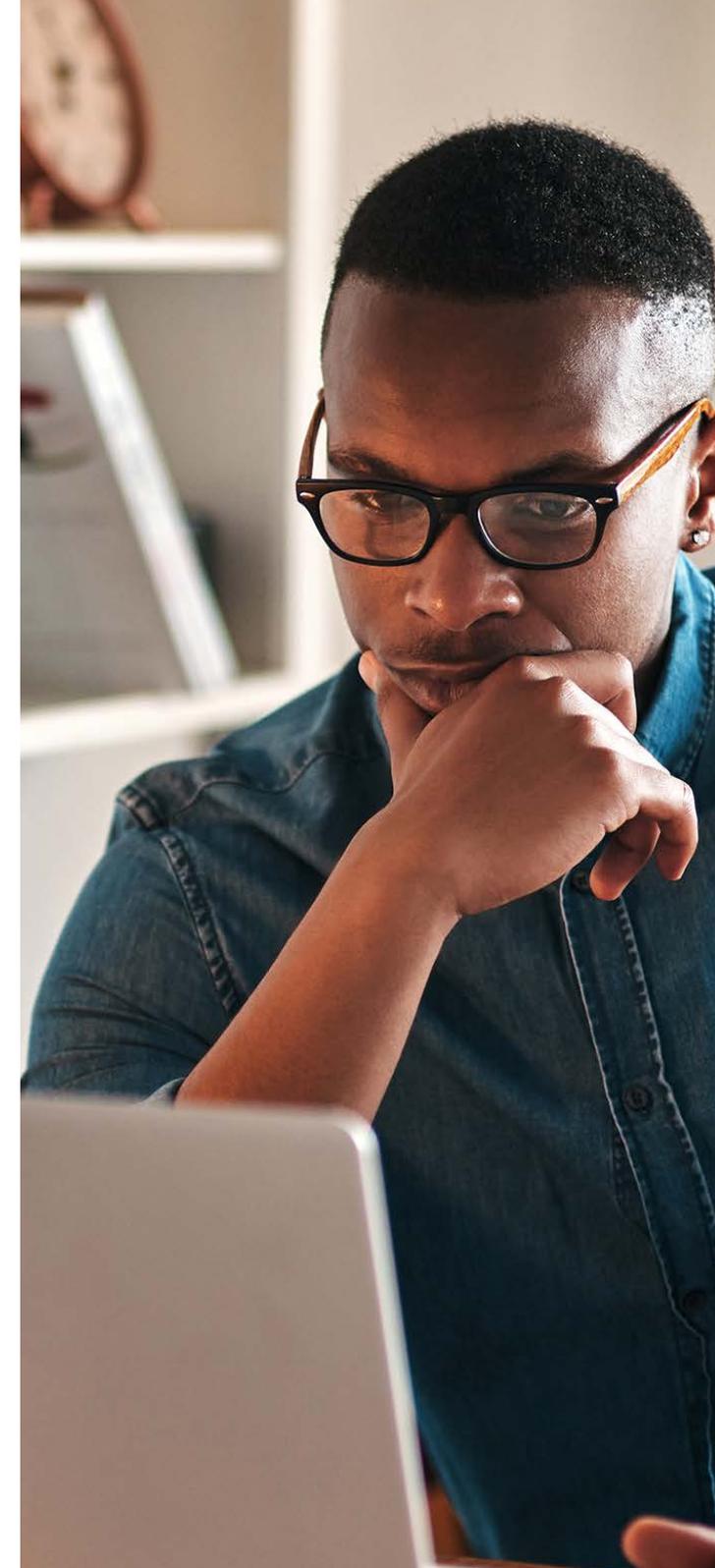
Topics:
- Salient Technical Points summarizing Automotive Symposium Presentations
- Emerging Simulation technologies critical to delivering next generation vehicles
- Future needs in automotive simulation not covered in the Symposium
- Interest in establishing a NAFEMS Automotive Simulation Work Group

Invited panelists:
- M. Felice (virsoTech Engineering Consulting, USA) -Moderator
- W. Dirschmid (Consultant, DEU)
- G. Göß (Schaeffler Technologies, DEU)
- S. Stadler (Magna Steyr Fahrzeugtechnik, AUT)
- T. Pohl (Stellantis, Opel Automobile, GER)

16.30

P24 Conference Close

16:30 Conference Wrap-Up
M. Zehn (Technische Universität Berlin, DEU)



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