# congress at a glance

## Monday 15th May

### Pre-Congress Short Training Courses & Meetings

**12:30 Congress Registration Opens**

**13:15 - 14:45**
ROOM
- **G** **Training:** 10 Steps to Successful Explicit Dynamic Analysis
- **H** **Training:** CFD for Structural Designers and Analysts
- **J** **Workshop:** ASSESS Workshop on UMC4ES
- **K** **Training:** Introduction to SPDM - The Foundation for Digital Engineering.
- **L** **Workshop:** Business Impact of Simulation
- **M** **Training:** Fatigue and Fracture Mechanics in FEA - Live Online Training

**15:30 - 17:00**
ROOM
- **G** **Training:** Process Integration and Design Optimization - A Practical Guide
- **H** **Training:** Introduction to Practical CFD
- **J** **Training:** Polymer Testing and Modeling for FE Simulation
- **K** **Workshop:** The Use of SPDM Solution to Manage Computational Fluid Dynamics Analyses
- **L** **Training:** How to Implement a Modelling and Simulation Strategy
- **M** **Training:** Non-linear FEA - Live Online Training

**18:00**
- **F** Technical Working Group / Regional Steering Committee Reception

### 19:00
### Congress and Exhibition Opening Reception
**(Exhibition Hall)**

## Tuesday 16th May

**08:30**

| | |
|---|---|
| Welcome | Constantinos Stavrinidis (Chair of NAFEMS Council) |
| Introduction | Tim Morris (NAFEMS) |
| ASSESS: a NAFEMS Initiative | Joe Walsh (ASSESS) |
| The Future of Simulation | Jan Paul Stein (McKinsey & Company) |
| Platinum Sponsor Dassault Systemes | Mark Bohm (Dassault Systemes) |
| Keynote: The History of the Iconic Boeing 747 and the Evolution of Simulation Utilization Over its Development | Steve Chisholm (The Boeing Company) |
| SPDM Today: The Foundation of Digital Engineering | Mark Norris (the SDMConsultancy) |
| Keynote: Digital Transformation of System Performance Development by a Flexible Digital Thread | Ernesto Mottola (Toyota Motor Europe) |

### SESSION 1
**11:40 - 13:05**
- **1A** Platinum Sponsor Session: Dassault Systemes
- **1B** Gold Sponsor Session: TotalCAE
- **1C** Gold Sponsor Session: Rescale
- **1D** Noise Vibration & Harshness
- **1E** Computational Structural Mechanics
- **1F** Dynamics & Vibration 1
- **1G** Additive Manufacturing
- **1H** Optimisation 1
- **1J** Democratisation
- **1K** Simulation Data Management 1
- **1L** **Workshop:** Real Validation Case Studies
- **1M** **Training:** Elements of Turbulence Modeling

### SESSION 2
**14:15 - 15:40**
- **2A** Platinum Sponsor Session: Dassault Systemes
- **2B** Gold Sponsor Session: Ansys
- **2C** Gold Sponsor Session: Siemens
- **2D** Acoustics
- **2E** Joints & Connections
- **2F** Impact Shock & Crash
- **2G** Welding
- **2H** Design of Experiments
- **2J** Generative Design
- **2K** Simulation Data Management 2
- **2L** **Workshop:** CFD100: Past, Present & Future
- **2M** **Workshop:** The Rapidly Growing RevolutionInSimulation.org Initiative

### SESSION 3
**16:40 - 18:05**
- **3A** Heat Transfer 1
- **3B** Particle Methods
- **3C** Contact
- **3D** Multiphysics
- **3E** Aerospace
- **3F** Dynamics & Vibration 2
- **3G** Manufacturing Process Simulation
- **3H** Optimisation 2
- **3J** System Level Simulation
- **3K** Simulation Data Management 3
- **3L** **Round Table Panel Discussion:** Challenges of Adopting HPC for CAE Simulation
- **3M** **Workshop:** Applications of Machine Learning using Simulation Data

# Wednesday 17th May

## SESSION 4
**11:10 - 12:35**

**4A** Platinum Sponsor Session: Hexagon
**4B** Platinum Sponsor Session: Microsoft/Nvidia
**4C** Silver Sponsor Sessions: 3M & AMD
**4D** Silver Sponsor Session: Visual Collaboration Technologies + NAFEMS Membership
**4E** Integration of Analysis & Test
**4F** Automotive 1
**4G** Digital Twins 1
**4H** Simulation Governance 1
**4J** Materials
**4K** **Workshop:** Panel Discussion: SPDM: Today's Challenges, New Capabilities and Upcoming Developments
**4L** **Workshop:** Stochastics Challenge Problems

## SESSION 5
**13:45 - 15:10**

**5A** Platinum Sponsor Session: Hexagon
**5B** Platinum Sponsor Session: Microsoft/Nvidia
**5C** How to get the most from a NAFEMS Membership
**5D** CAE in the Design Process
**5E** Engineering Data Science
**5F** Automated Driving
**5G** Simulation Strategy
**5H** Verification & Validation
**5J** Multiscale
**5K** **Workshop:** NAFEMS SPDM Best-Practices Focus Team Workshop
**5L** Solvers
**5M** **Training:** Probabilistic Analysis Methods and Approaches for PSE in Probabilistic Analysis

## SESSION 6
**16:10 - 17:55**

**6A** Fatigue
**6B** Process Simulation
**6C** Simulation Supporting Certification
**6D** Computational Electromagnetics
**6E** Machine Learning / Artificial Intelligence
**6F** Electric Vehicles
**6G** Digital Twins 2
**6H** Simulation Governance 2
**6J** Integrated Computational Materials Engineering
**6K** Cloud Computing
**6L** **Workshop:** The Role of Blind Benchmarking in Validation

**19:00** | **Congress Dinner at Cruise Ship - 19:00 boarding time / 19:30 departure**

# Thursday 18th May

## SESSION 7
**11:10 - 12:35**

**7A** Heat Transfer 2
**7B** Computational Fluid Dynamics 1
**7C** Biomedical 1
**7D** Automotive 2
**7E** Methods
**7F** Reduced Order Modelling 1
**7G** Composites 1
**7H** VMAP 1
**7J** Multibody Dynamics 1
**7K** **Workshop:** Uncertainty Quantification and Stochastics Enabled by Digital Continuity
**7L** **Workshop:** Reports from the ASSESS Congress
**7M** **Training:** Dynamic Analysis using FEA - live online training

## SESSION 8
**13:35 - 15:00**

**8A** Meshing
**8B** Computational Fluid Dynamics 2
**8C** Biomedical 2
**8D** Model Based Systems Engineering
**8E** Civil Engineering
**8F** Reduced Order Modelling 2
**8G** Composites 2
**8H** VMAP 2
**8J** Multibody Dynamics 2

**8L** **Workshop:** ASSESS Discussion Session
**8M** **Training:** Effective Post-Processing in FEA - Live Online Training

**15:30** | Conference Wrap-up

**16:00** | Delegate Feedback Questionnaire - Prize Draw

**16:15** | NWC Awards / Farewell

**Monday 15th May 2023**

12:30 | Congress Registration Opens

| Track G | Track H | Track J | Track K | Track L | Track M |
|---|---|---|---|---|---|
| 13:15 | 10 Steps to Successful Explicit Dynamic Analysis | 13:15 | CFD for Structural Designers and Analysts | 13:15 | ASSESS Workshop on UMC4ES | 13:15 | Introduction to Simulation Process and Data Management – The Foundation for Digital Engineering... | 13:15 | Business Impact of Simulation | 13:15 | Fatigue and Fracture Mechanics in FEA - Live Online Training |
| Gino Duffett *(NAFEMS)* | Kamran Fouladi *(InfoMec Consulting)* | Joe Walsh *(ASSESS)* | Mark Norris *(the SDMConsultancy)* | Andy Richardson *(Phronesim)* | Tony Abbey *(FETraining)* |
| This short course provides a brief overview of the full explicit dynamics course that is structured according to a simulation set-up, guiding the engineer through the solution steps and decisions in carrying out an explicit dynamic analysis. The theoretical nature together with its software implementation and advantages and disadvantages are discussed to help engineers carry out explicit dynamic simulations, ensuring accurate and robust solutions with correct analysis choices avoiding possible typical pitfalls. https://www.nafems.org/training/courses/10-steps-to-successful-explicit-dynamic-analysis/ | Structural engineers often need to resort to more sophisticated thermal fluid simulations to obtain boundary conditions, loading, performance, etc. for their designs and analyses. This course aims to introduce the essential principles of fluid dynamics, important flow phenomena, and basics of CFD process to structural engineers for their multidisciplinary problems. Adapted from a NAFEMS e-learning course, CFD for Structural Designers and Analysts, this condensed version provides a brief overview on important concepts and principles of fluid dynamics, CFD, turbulence, and heat transfer relevant to structural analyses will be discussed through simple examples and case studies. | Enabling informed decision-making through Engineering Simulation requires that the decision-maker understands the key characteristics of the Engineering Simulation Models involved in making any particular decision. Enabling simulation-informed decision making across the entire product/process system lifecycle requires a common set of Engineering Simulation Model characteristics (metadata) that multiple decision-makers and other models can reference to ensure consistency of goals, assumptions, terminology, and behavior. The Unified Model Characteristics for Engineering Simulation (UMC4ES) is an attempt by the ASSESS Initiative to define a comprehensive set of model characteristics of interest... | There is broad agreement that model and simulation-based development is the future of engineering, and that models and data must be managed on a digital platform to provide through-life support. The US Department of Defence mandated Digital Engineering for all programs in 2018, so all organisations wishing to work with the DoD need to adopt model-based system definition and simulation. Simulation Process and Data Management is simply the technology developed to manage models and simulation data on a digital platform. SPDM has been deployed, particularly by organisations in Germany and continental Europe, for over 20 years. SPDM technology is well defined and understood but overall adoption ... | In this workshop following topics will be discussed: - How does, or could, simulation add value in your business or organisation - Business goals for simulation - The different ways of achieving, measuring and maximising simulations contribution towards achieving business goals - How to measure the value of simulation. Establishing a business case and return on investment - Challenges in delivering value Moderation: Andy Richardson (Phronesim), Roger Keene (Consultant) | This short course is based on the successful full e-Learning course. The key elements broken out and emphasized here are the fundamentals of fatigue analysis. An overview is then given of high cycle fatigue. This is contrasted with low cycle strain-based fatigue analysis. Two important topics are the effect of mean stress and the influence of notches. A taste of more complex fatigue scenarios is given, including proportional and multiaxial loading. Finally, a brief overview of fracture mechanics is provided. Emphasis is given to how each of these three fundamental methods each fit into the strategy for fatigue and damage tolerance analysis. |

14:45 | Break

| Track G | Track H | Track J | Track K | Track L | Track M |
|---|---|---|---|---|---|
| 15:30 | Process Integration and Design Optimization - A Practical Guide | 15:30 | Introduction to Practical CFD | 15:30 | Polymer Testing and Modeling for FE Simulation | 15:30 | The Use of SPDM Solution to Manage Computational Fluid Dynamics Analyses | 15:30 | How to Implement a Modelling and Simulation Strategy | 15:30 | Non-linear FEA - Live Online Training |
| Gino Duffett *(NAFEMS)* | Kamran Fouladi *(InfoMec Consulting)* | Sean Teller *(Veryst Engineering)* | Steve Howell *(Abercus)* | Andy Richardson *(Phronesim)* | Tony Abbey *(FETraining)* |
| This short course provides a brief overview of the full course that is offered, discussing simulation process integration and optimization methods that engineers could use to enhance their working methods and improving their designs. The course provides information and guidelines on using multi-objective and multi-disciplinary optimization in component and process design using many variable types including the important issue of considering restrictions. Different algorithms are discussed in a practical way including meta-model and statistical methodologies to help guide engineers in the creation of successful, efficient optimization strategies. https://www.nafems.org/training/courses/proce... | This course provides a view into practical application of CFD in real life applications and the challenges faced due to presence of turbulence, heat transfer, phase changes, and movement of boundaries. Adapted from a NAFEMS e-learning introductory CFD course, this condensed version briefly describes the steps in the CFD process and provides benefits and issues for using CFD analysis in understanding of complicated flow phenomena and its use in the design process. Through a simple and moderately technical approach, this course covers topics such as the role of CFD, basic formulation, governing equations and use of model equations, steps in CFD process, need for turbulence modeling, and CFD be... | This course is intended for finite element engineers who simulate polymers and are interested in advancing their modeling skills beyond hyperelastic material models and rate-independent plasticity. We will review polymer behavior, fundamental continuum mechanics for material modeling, selecting material parameters, and case studies on hyperelastic, viscoelastic, and viscoplastic material models. We will also discuss material model validation and its importance in material testing and material model selection. | Steve Howell developed the JET SPDM solution in 2002, to manage CFD based technical safety analyses in the energy sector. Steve has presented the value of SPDM in terms of supporting ISO 9001 certification, providing traceability and a secure system of record for his consultancy at previous NAFEMS conferences. Importantly, effective SPDM solutions enable time saving by analysts at the point of use. It is critical to the adoption of an information system that it delivers tangible benefits to its target users, especially if those users are busy, expensive, mission-critical staff members. In this workshop, Steve will describe and demonstrate how an SPDM solution helps an analyst to perform a ... | This course will cover a number of topics, including: - Why do we need a strategy for modelling and simulation? - Trends challenges and opportunities for Modelling and Simulation - Organisation leadership questions for M&S - Establishing product and business goals for M&S - The critical elements necessary for an effective and efficient modelling and simulation capability - The simulation strategy framework - Getting organised for collaboration - Assessing your current state. Maturity assessment. - Establishing a business case. - Practicalities of implementation. | Many problems facing designers and engineers are nonlinear in nature. The response of a structure cannot always be assessed using linear assumptions. Nonlinear behavior can take many forms and can be bewildering to the newcomer. All physical systems in the real world are inherently nonlinear in nature. One of the most difficult tasks facing an engineer is to decide whether a nonlinear analysis is really needed and if so what degree of nonlinearity should be applied. The objective of this course, which is consist of extracts from the full e-Learning course is to break down the nonlinear problem into clearly defined steps, give an overview of the physics involved and show how to successfully i... |

17:00 | End of Pre-Congress: Short Trainings and Workshops

18:00 | Technical Working Group / Regional Steering Committee Reception

19:00 | Official Congress and Exhibition Opening - Reception in the Exhibition Hall

21:00 | End of Day 1

# Tuesday 16<sup>th</sup> May 2023

**07:30 | Congress Registration Opens**

**08:30 | Welcome**
Constantinos Stavrinidis (NAFEMS)

**08:35 | Introduction**
Tim Morris (NAFEMS)

**08:45 |ASSESS: Analysis, Simulation & Systems Engineering Software Strategies, a NAFEMS Initiative**
Joe Walsh (ASSESS)

**08:55 | The Future of Simulation**
Jan Paul Stein (McKinsey & Company)

**09:10 | Platinum Sponsor Dassault Systemes: SIMULIA: Bringing Simulation Tools, People, Data and Processes Together**
Mark Bohm (Dassault Systemes)

**09:25 | Keynote: The History of the Iconic Boeing 747 and the Evolution of Simulation Utilization Over its Development**
Steve Chisholm (The Boeing Company)

**09:55 | SPDM Today: The Foundation of Digital Engineering**
Mark Norris (the SDMConsultancy)

**10:05 | Keynote: Digital Transformation of System Performance Development by a Flexible Digital Thread**
Ernesto Mottola (Toyota Motor Europe)

**10:35 | Break in the Exhibition Hall**

| Track A | Track B | Track C | Track D | Track E | Track F |
|---|---|---|---|---|---|
| **1A - Platinum Sponsor Dassault Systemes:** | **1B - Gold Sponsor TotalCAE** | **1C - Gold Sponsor Rescale** | **1D - Noise Vibration & Harshness** | **1E - Computational Structural Mechanics** | **1F - Dynamics & Vibration 1** |

**11.40**

**Track A — 1A - Platinum Sponsor Dassault Systemes:**

11:45 | Platinum Sponsor Dassault Systemes: The Power of Unified Modelling and Simulation in Revolution...
Matthew Pais, Rick Shock (Dassault Systèmes)
Designer-driven simulation, or MODSIM, is a crucial tool for product development that unifies modeling and simulation into a single process. This approach enables designers and engineers to optimize the design and performance of their products with greater efficiency and accuracy. In this presentation, we will showcase the potential of unified designer-driven simulation in transforming businesses by applying it to different industries and scenarios. We investigate how fundamental aerodynamic and structural engineering concepts and computational tools can be applied at the concept/early-design stage to create quick designs for car roof assemblies that ensure safety and structural stability be...

**Track B — 1B - Gold Sponsor TotalCAE**

11:45 | Gold Sponsor TotalCAE: Reduce CAE Simulation Runtime with TotalCAE Managed HPC Clusters and Clo...
TotalCAE
Attendees will learn how TotalCAE clients overcome their HPC simulation challenges to reduce simulation runtime with their turnkey TotalCAE Infinite HPC cluster appliances and managed cloud services. Join TotalCAE in this workshop to learn: • Learn the pros and cons between HPC clusters, cloud, and ISV clouds for reducing CAE simulation runtime. • See when on-prem HPC is more cost-effective than cloud. • Learn the challenges of do-it-yourself (DIY) options. • See how to calculate the actual ROI of on-prem and cloud options. • See TotalCAE solutions for common pitfalls when adopting the cloud, such as license access, data transfer, and data orchestration. • See how to calculate if pay-as-you...

**Track C — 1C - Gold Sponsor Rescale**

11:45 | Gold Sponsor Rescale: Democratizing Computational Engineering and AI-Accelerated R&D in the Clo...
Rescale
Modern R&D and engineering increasingly rely on HPC and AI in the cloud to deploy broad portfolios of new software and hardware, bringing all new opportunities and challenges to maximizing compute-driven innovation. In this session, we will share insights about HPC application trends, technological advancements from GPU-accelerated CAE to workload-aware performance optimization and best practices in computational engineering and science in the cloud. Hear real-world stories about how our customers are digitally transforming their R&D capabilities and new product development. We will also show how Rescale can help organizations take advantage of cloud HPC to accelerate innovation and bring...

**Track D — 1D - Noise Vibration & Harshness**

11:40 | Session Introduction

11:45 | NVH Simulation and Validation of eBike Drive Units
Kevin Steinbach (Bosch eBike Systems)

12:05 | Hybrid NVH Modeling Approach: High Quality of NVH Results Enables Psychoacousti...
Tim Kamper (HEAD acoustics)

12:25 | Generation of Modal Map Using Reduced Order Full System NVH Model
Savitri Ratnam Bhatta (BETA CAE Systems)

12:45 | Methodology for E-Drive NVH Assessment Demonstrated on an Industrial Use Case
Jonas Verhoogen (Siemens Digital Industries Software)

**Track E — 1E - Computational Structural Mechanics**

11:40 | Session Introduction

11:45 | Torsional Buckling Analysis of Thin Cylindrical Shell with Internal Confinement...
Christopher Champion (Curtiss-Wright Electro-Mechanical C...

12:05 | Overcoming Barriers to Model Sharing in Finite Element Analysis using Embedded ...
Tony Favaloro (Hexagon)

12:25 | Analysis of Failure of (Quasi-)brittle Structure: Comparison Between Experiment...
Jihed Zghal (University Paris Nanterre)

12:45 | Design Space Exploration and Optimization of Structures under Consideration of ...
Nils Wagner (Intes)

**Track F — 1F - Dynamics & Vibration 1**

11:40 | Session Introduction

11:45 | The Harmonic Balance Method and its Applications in Structural Dynamics

12:05 | Tooth Root Modeling Induced Variations of the Calculated Transmission Error
Carsten Schulz (University of Applied Sciences Regensburg...

12:25 | Non Zero Frequency RB Mode Effect on Simulation Results
Haydar Dirik (ASML Netherlands)

12:45 | A Fully Integrated Simulation Approach of Drive Trains towards Tonality Free Wi...
Benjamin Marrant (ZF Friedrichshafen)

**13:05 | Lunch Break**

| Track A | Track B | Track C | Track D | Track E | Track F |
|---|---|---|---|---|---|
| **2A - Platinum Sponsor Dassault Systemes** | **2B - Gold Sponsor Ansys** | **2C - Gold Sponsor Siemens** | **2D - Acoustics** | **2E - Joints & Connections** | **2F - Impact Shock & Crash** |

**14.15**

**Track A — 2A - Platinum Sponsor Dassault Systemes**

14:20 | Platinum Sponsor Dassault Systemes: The Future of Aircraft Development from Concept to Certific...
Swen Noelting, Matthew Pais (Dassault Systèmes)
The ability to simulate complex physical problems in the aircraft development process with ever increasing levels of accuracy has made amazing advances in the last decade. But many of these capabilities remain in the domain of experts and are limited to niche problems that are solved in silos rather than being fully integrated and democratized in the development process. The full potential of simulation to revolutionize the aircraft development process is far from being realized today and physical tests on the ground and in the air are still dominant in most areas. In this presentation we will demonstrate a new way of unified modeling and simulation, integrated on a platform that provides a ...

**Track B — 2B - Gold Sponsor Ansys**

14:20 | Gold Sponsor Ansys: The Ansys 2023 Product Showcase
Ansys
Discover more about the new capabilities across Ansys solvers, new workflows that help take you from an idea to a solved geometry and new high performance computing capabilities that allow you to solve problems on your own HPC cluster or the Cloud.

**Track C — 2C - Gold Sponsor Siemens**

14:20 | Gold Sponsor Siemens: Enhancing product design with simulation, optimization, and workflow inte...
Siemens Digital Industries Software
What are the critical factors that influence simulation productivity? How can you explore the design space for complex product designs? What types of simulation workflows and integrations really add value? Join us in this unique interactive session as we learn from examples across different industries. Dan Mekker will discuss Siemens Energy's journey to successfully meet challenging customer product needs with short time-to-market solutions, through use of advanced product design methodologies like multi-discipline optimization and seamless dataflow Enabled by powerful software tools. Max Dixon will share some examples of how Crux Product Design are using advanced simulation tools an...

**Track D — 2D - Acoustics**

14:15 | Session Introduction

14:20 | Designing Thermoacoustic Engines using Simulation Methodologies
Satheesh Kandasamy (Dassault Systèmes)

14:40 | A Krylov Subspace Based Reduced Order Model Technique for Structural and Acoust...
Jeff Beisheim (Ansys)

15:00 | GPU Accelerated Computational Aeroacoustics Modelling for Prediction of Side-mi...
Fred Ross (Siemens Digital Industries Software)

15:20 | A Computational Solution to Design Quiet and Efficient Cooling Systems for Cons...
Richard Shock (Dassault Systèmes)

**Track E — 2E - Joints & Connections**

14:15 | Session Introduction

14:20 | Integrated Fatigue Evaluation for Riveting based on Neutral Algorithms
Manuel José Rebollo Rosa (Airbus Defence & Space)

14:40 | Analysis of Insertion and Extraction Processes
Pablo González (Principia)

15:00 | Considerations for Using a Linear Viscoelastic Model in the Simulation of Adhes...
John McAllister (3M Company)

15:20 | Method for Developing Surrogate Models Supporting Pin Interface Optimization in...
Robert Renz (Karlsruhe Institute of Technology (IPEK)

**Track F — 2F - Impact Shock & Crash**

14:15 | Session Introduction

14:20 | Simplified FEA of Missile Impact on Reinforced Concrete Structures with Attache...
Genadijs Sagals (Canadian Nuclear Safety Commission)

14:40 | Sensitivity Study for Probabilistic Finite Element Analysis of Fragmentation Im...
Daniel Armstrong (DSTL)

15:00 | Generative-Adversarial-Networks for Airbag Impact Pulse and Driver's Injury
June Young Song (Hyundai Mobis)

15:20 | Reduced Order Modelling for Bird Strike Simulations
Georgios Papantonakis (Noesis Solutions)

**15:40 | Break in the Exhibition Hall**

| Track A | Track B | Track C | Track D | Track E | Track F |
|---|---|---|---|---|---|
| **3A - Heat Transfer 1** | **3B - Particle Methods** | **3C - Contact** | **3D - Multiphysics** | **3E - Aerospace** | **3F - Dynamics & Vibration 2** |

**16.40**

**Track A — 3A - Heat Transfer 1**

16:40 | Session Introduction

16:45 | Assess and Characterise Damage Caused Due to Lightning Strike on Wind Turbine B...
Swen Noelting (Dassault Systèmes)

17:05 | Comprehensive Electric Motor Cooling Modeling
Anthony Megel (Southwest Research Institute)

17:25 | Multi-Disciplinary Simulation of Automotive Insulated-Gate Bipolar Transistor (...
Aaron Godfrey (Siemens Digital Industries Software)

17:45 | Optimizing Battery Range & Thermal Comfort for Battery Electric Vehicles (BEVs)...
Vijaisri Nagarajan (Dassault Systèmes)

**Track B — 3B - Particle Methods**

16:40 | Session Introduction

16:45 | A Parallelized Discrete Element Tool for Polyhedral Particles
Travis Shoemaker (University of Illinois Urbana-Champaign)

17:05 | A Novel Method on Numerical Analysis to Predict Non-Newtonian Lubricant (Grease...
Fabrizio Mandrile (SKF)

17:25 | Exploring Multi-Resolution Particle CFD Methods
Brant Ross (EnginSoft USA)

17:45 | CFD Simulation of Gearbox Lubrication
Mohitha Ulaganathan Mugundan (TriMech)

**Track C — 3C - Contact**

16:40 | Session Introduction

16:45 | Weight Optimization of Transmission Housings
Michael Klein (Intes)

17:05 | Effects of Meshes on FEA Predictions of Contact between Multiple bodies with Di...
Allan Zhong (Halliburton Carrollton Technology Center)

17:25 | Modelling Contact of Curved Surfaces in FE Models
Sunit Mistry (AWE)

**Track D — 3D - Multiphysics**

16:40 | Session Introduction

16:45 | Digital Multiphysics Simulation Platform for Thermal Management Improvement in ...
Alrik Mabire (Valeo)

17:05 | A Novel Mortar Multiphysics Computational Method for Thermo-Fluid-Structure Int...
Volker Gravemeier (AdCo Engineering GW)

17:25 | 2-Way Coupled FSI Simulation between Multi Flexible Body Dynamics and Moving Pa...
Taeyoung Kim (Functionbay)

17:45 | Fluid Structural Interaction Study for a Low Reynolds Number, Low Gap Flow Acro...
Anoop Gopinathan (Sree Chitra Tirunal Institute for Medic...

**Track E — 3E - Aerospace**

16:40 | Session Introduction

16:45 | Practical Application of Machine Learning for Physics-Informed Structural Analy...
Todd Depauw (The Boeing Company)

17:05 | Fully Leveraging Component Commonality in Assembly Modeling
David Gray (Hexagon)

17:25 | Model-based Design Optimization Taking into Account Design Viability via Classi...
Malte Niehoff (BTU Cottbus-Senftenberg)

17:45 | Virtual Testing of CFRP Coupons Including Effect of Defects
Pierre-yves Lavertu (Hexagon)

**Track F — 3F - Dynamics & Vibration 2**

16:40 | Session Introduction

16:45 | Development and Realization of a Rotating MagLev Sample Manipulator
Ronald Faassen (MI-Partners)

17:05 | Creating a Physics Based High-fidelity NVH CAE Model Using Simulated Annealing
Vageswar Akula (BETA CAE Systems)

17:25 | Standardized Testing with Simulation Support in Structural Dynamics
Michael Klein (Intes)

17:45 | Application of Automated Component Mode Synthesis (ACMS) to a Large Industrial ...
David Gray (Hexagon)

**18:05 | End of Day 2**

| Track G | Track H | Track J | Track K | Track L | Track M |
|---|---|---|---|---|---|
| **1G - Additive Manufacturing** | **1H - Optimisation 1** | **1J - Democratisation** | **1K - Simulation Data Management 1** | **1L - Real Validation Case Studies** | **1M - Elements of Turbulence Modeling** |
| 11:40 \| Session Introduction | 11:40 \| Session Introduction | 11:40 \| Session Introduction | 11:40 \| Session Introduction | 11:40 \| Session Introduction | 11:40 \| Session Introduction |
| 11:45 \| Benchmarking Geometric Nonlinearities for Distortion and Buckling of Laser Powd... <br> Tyler London *(TWI North East)* | 11:45 \| Invited presentation: Geometric Deep Learning with Historical Simulation Data f... <br> Fatma Kocer *(Altair Engineering)* | 11:45 \| Implementing Democratized Structural Simulation <br> Steven Huston *(Club Car)* | 11:45 \| Succeed in Your SPDM Journey <br> Hernan Giagnorio *(Inensia)* | **SGM Working Group** <br> There are several sources of guidance for verification and validation of engineering simulation, including the NAFEMS ESQMS and the seven levels of validation concept that has been previously been presented at NAFEMS events. But how effective is this guidance for real validation activities in industry? This workshop will look at real-life examples of end-user validation efforts, looking at what worked well, and where there may be room for improvement. To maximise the discussions, delegates are encouraged to give thought to and prepare information (where possible) in advance, relating to their own real validation efforts in their day to day work, and bring it along to the workshop to share an... | **Kamran Fouladi** *(InfoMec Consulting)* <br> Successful application of turbulence modeling requires engineering judgment depending on physics of the flow, accuracy, project requirements, turnaround time, and available computational resources. This course is focused on understanding turbulence, need for turbulence modeling, and various modeling approaches. Adapted from a NAFEMS e-learning course, Elements of Turbulence Modeling, this condensed version briefly covers topics such as turbulent flow characteristics, eddies in turbulent flows, turbulence production, energy cascade, scales in turbulent flows, simulation strategies, principles of turbulence modeling, wall effects and choosing a model. |
| 12:05 \| Reliability-based Damage Tolerance of Additive Manufacturing Parts <br> Xueyong (kevin) Qu *(The Aerospace Corporation)* | 12:05 \| An Optimization-Based Design Methodology for the Flow Geometries of Centrifugal... <br> Mert Alpaya *(Numesys İleri Muhendislik Hizmetleri)* | 12:05 \| Caterpillar Democratized Spreadsheet Apps <br> Keith Thompson *(Caterpillar)* | 12:05 \| Addressing Challenges in the BiW Model Build-up Process in AUDI AG <br> Athanasios Fassas *(BETA CAE Systems)* | | |
| 12:25 \| Impact of Surface Roughness on Additively Manufactured X-Band Waveguide Compone... <br> Laila Salman *(Ansys)* | 12:25 \| Enhanced Virtual Products to Optimize CAD-CAE Loops in Automotive Engineering P... <br> Alexander Kreis *(Technical University Graz)* | 12:25 \| Development of Parametrized FE Models with a Geometry-based Approach for Power ... <br> Kshitij Kolas *(Fraunhofer Institute for Electronic Nano S...)* | 12:25 \| Data Compression for Simulation Results <br> Stefan Müller *(Sidact)* | | |
| 12:45 \| Mechanical Performance of an FDM Printed Control Bellcrank <br> Pierre-yves Lavertu *(Hexagon)* | 12:45 \| Parametric Optimization of Body in White (BIW) Structures Using Simulation-driv... <br> Muhammad Shahrukh Saeed *(Swinburne University of Technology)* | 12:45 \| Simple, Quick, and Reliable Simulation Process Automation <br> Davis Evans *(Novus Nexus)* | 12:45 \| Virtual Product Development with an SDM System Demonstrated by Playing with LEG... <br> Marko Thiele *(Scale)* | | |

| Track G | Track H | Track J | Track K | Track L | Track M |
|---|---|---|---|---|---|
| **2G - Welding** | **2H - Design of Experiments** | **2J - Generative Design** | **2K - Simulation Data Management 2** | **2L - CFD 100: Past, Present and Future…** | **2M - The Rapidly Growing RevolutionInSimulation.org Initiative - A Valuable Community Resource** |
| 14:15 \| Session Introduction | 14:15 \| Session Introduction | 14:15 \| Session Introduction | 14:15 \| Session Introduction | 14:15 \| Session Introduction | 14:15 \| Session Introduction |
| 14:20 \| Multi-physical Modelling of Resistance Spot Welding Including Validation <br> Bouwe Verkens *(KU Leuven)* | 14:20 \| Structural Performance Evaluation of Foldable Displays for Consumer Electronic ... <br> Matthew Pais *(Dassault Systemes)* | 14:20 \| Combining Generative Design and Simulation Driven Lattice Structures for High P... <br> Andreas Vlahinos *(Advanced Engineering Solutions)* | 14:20 \| Enabling Design & Simulation Digital Continuity Thanks to SPDM Change Control <br> Leonel Garategaray *(Inensia)* | **Steve Howell** *(Abercus)* <br> In this session we'll cast a reflective gaze on the evolution of Computational Fluid Dynamics (CFD) over the last 100 years and try to imagine what the future might hold for the discipline. To illustrate the evolution of CFD during the last century, NAFEMS CFDWG has constructed a timeline detailing the chronology of key contributions, starting with Lewis Fry Richardson (LFR) and his seminal work 'Weather Prediction by Numerical Process', which was published in 1922. In fact, there are several strands to the timeline representing the contributions from physical/fluid-dynamic, mathematical, numerical/ computational, algorithmic, and technological (computer) developments. The timeline will be... | **Malcolm Panthaki** *(Revolution in Simulation)* <br> The democratization of simulation software is increasing the number of simulation users by an order of magnitude. Similar dramatic expansions of use of complex technologies have been witnessed in many other technology-driven industries such as the Internet, automobiles, personal computers, navigation systems, music devices, and mobile phones. In each of these cases, the real expansion occurs when the nascent, complex, hard-to-use technology is packaged into a form that is simple-to-use, robust, affordable, and accurate, and made available to everyone. But this turning point is never simple to accomplish and is hard to predict. However, when it does happen, it has always resulted in an explos... |
| 14:40 \| Direct Modeling of Liquid Metal Embrittlement in Resistance Spot Welding of GEN... <br> Fernando Okigami *(Hexagon)* | 14:40 \| Assessment of Reliability Issues in a Microelectronics Device by a Simulation-d... <br> Anu Mathew *(Fraunhofer Institute for Electronic Nano Syst...)* | 14:40 \| Generative Design - Topology Optimization from CAD to CAD <br> Nils Wagner *(Intes)* | 14:40 \| Enabling Hyperautomation in an SPDM Framework: Unified CAE Workflow and Busines... <br> Marco Turchetto *(Esteco)* | | |
| 15:00 \| Thermoplastic Induction Welding Simulation using a Parametric Heat Source <br> Patrick De Luca *(ESI Group)* | 15:00 \| Handling Complex Parameterization Using Automation for Structural Performance O... <br> Ravi Nimbalkar *(BETA CAE Systems)* | 15:00 \| Generative Engineering with Sustainability-oriented Topology Optimization for A... <br> Klaus Hoschke *(Fraunhofer EMI)* | 15:00 \| Simulation and Process Data Management in the Digital Thread <br> Brandon Jennings *(SAIC)* | | |
| 15:20 \| Advanced Microstructure Damage Modeling for Welded Joints <br> Fernando Okigami *(Hexagon)* | | | 15:20 \| Simulation Database – Detect and Search Deformation Patterns <br> Dominik Borsotto *(Sidact)* | | |

| Track G | Track H | Track J | Track K | Track L | Track M |
|---|---|---|---|---|---|
| **3G - Manufacturing Process Simulation** | **3H - Optimisation 2** | **3J - System Level Simulation** | **3K - Simulation Data Management 3** | **3L - Challenges of Adopting HPC for CAE Simulation - Round Table Panel Discussion** | **3M - Applications of Machine Learning using Simulation Data** |
| 16:40 \| Session Introduction | 16:40 \| Session Introduction | 16:40 \| Session Introduction | 16:40 \| Session Introduction | 16:40 \| Session Introduction | 16:40 \| Session Introduction |
| 16:45 \| A Cost-effective Cold Roll-Forming FE Model for Industrial Applications <br> Timothy Senart *(CRM Group)* | 16:45 \| Multi-objective Optimization Problem with Varying Constraints in High Voltage C... <br> Sami Kotilainen *(Hitachi Energy)* | 16:45 \| Optimization of an Electric Machine Cooling System <br> Shanmugasundaram Chandrakesan *(AVL - Simulation Technolog...)* | 16:45 \| How to Get Started with Simulation Data Management – A Value-focussed Approach <br> Mark Norris *(the SDMConsultancy)* | **Lee Margetts** *(University of Manchester)* <br> This session will focus on common high performance computing (HPC) challenges when adopting HPC for CAE simulation. It will start with a short talk to set the scene, highlighting the pros and cons of on-premise high performance computing, cloud, ISV clouds and hybrid clouds. A carefully selected panel will bring a variety of perspectives to the subject. The audience may simply observe or participate by asking questions. / Moderator: Lee Margetts, Chair of the HPC Technical Working Group | **Fatma Kocer (Altair), Shane Mooney (Kinetic Vision) - Members of the Engineering Data Science Working Group** <br> Engineers created and continue creating significant amount of data using physics-based simulations. Some of us generates large datasets using Design of Experiments or Optimization but most of us generate data points using trial and error process. Those who use DOEs or optimization can learn from the entire datasets by using descriptive and predictive analytics which allows for enhanced design exploration and leads to better design decisions. Recently, ML methods that can use historical dataset compiled from one off trial and errors have been also developed. In this workshop, we will be showing applications of data science to engineering applications using simulation data. We will talk th... |
| 17:05 \| Age Forming Tool Design for Manufacturing Cost Savings <br> Benjamin Walke *(Gulfstream Aerospace Corporation)* | 17:05 \| Influence of Different Building Directions on a Topology Optimization Method fo... <br> Jan Holoch *(Karlsruhe Institute of Technology (IPEK))* | 17:05 \| Efficient Simulation Strategies for Battery Thermal Management <br> Benoit Magneville *(Siemens Digital Industries Software)* | 17:05 \| Simulation Process and Data Management in an MBSE Context: A Day in the Life of... <br> S. Ravi Shankar *(Siemens Digital Industries Software)* | | |
| 17:25 \| Application of Advanced Simulations to Optimize the Manufacturing Process of He... <br> Arman Zonuzi *(Nuclear AMRC)* | 17:25 \| A New Approach of Multi-objective System Optimization Supporting Automotive Ele... <br> Mario Hirz *(Technical University Graz)* | 17:25 \| FMI Based Integration of System Simulation and FEM for Efficient Simulation of ... <br> Torsten Blochwitz *(ESI Germany)* | 17:25 \| Production-level implementation of SDM for an Automotive OEM Crash/Safety Team <br> Irene Makropoulou *(BETA CAE Systems)* | | |
| 17:45 \| Simulation of the Distortions due to the Welding Process Optimal Welding Sequen... <br> M. Armindo Guerrero *(Fundacion Idonial)* | 17:45 \| Multidisciplinary Labyrinth Weir Spillway Optimization <br> Tobias Gloesslein *(Esteco Software)* | | 17:45 \| SDM on an xLM Platform Delivers the FAIR Principles of Findability, Accessibili... <br> Mark Norris *(the SDMConsultancy)* | | |

# Wednesday 17th May 2023

**08:00 | Congress Registration Opens**

**08:30 | Keynote: The Science and Mission of the James Webb Space Telescope**
Michael T. Menzel *(NASA GSFC)*

**09:00 | Keynote: A Half-Century of Research and Mentoring in Fluid Dynamics from Hemodynamics to Hypersonics**
Wesley Harris *(Massachusetts Institute of Technology)*

**09:30 | Platinum Sponsor Hexagon: Innovating into the Unknown: Opportunities and Advancements in Engineering Simulations**
Bruce Engelmann *(Hexagon)*

**09:45 | Platinum Sponsors Microsoft/Nvidia: Microsoft and Nvidia Together: AI and Simulation at its Best**
Wolfgang De Salvador (Microsoft), Ian Pegler (NVIDIA)

**10:00 | Break in the Exhibition Hall**

| Track A | Track B | Track C | Track D | Track E | Track F |
|---|---|---|---|---|---|
| **4A - Platinum Sponsor Hexagon** | **4B - Platinum Sponsors Microsoft/Nvidia** | **4C - Silver Sponsors 3M / AMD** | **4D - Sponsored: Visual Collaboration Technologies / NAFEMS** | **4E - Integration of Analysis & Test** | **4F - Automotive 1** |

**11.10**

**Track A — 4A - Platinum Sponsor Hexagon**

11:15 | Platinum Sponsor Hexagon: Industrial Consortium for Rotordynamics Analysis to Support Next Gene...
**David Gray (Hexagon)**
Industrial Consortium for Rotordynamics Analysis to Support Next Generation Propulsion Systems / One of the most challenging engine design and certification requirements for Aircraft OEMs is to understand and mitigate the effects of "Windmilling" caused by Fan Blade Out (FBO) while continuing to safely land the plane. Dynamic analysis of the aero-engine rotor system is an essential requirement of aviation authorities and is vital to aero-engine safety. The "windmilling imbalance" scenario occurs in aero-engines after a fan blade has come off during flight, and the incoming airflow rotates the fan after engine shut-down. OEMs need to understand the complex, highly nonlinear vibration caused b...

**Track B — 4B - Platinum Sponsors Microsoft/Nvidia**

11:15 | Platinum Sponsors Microsoft/Nvidia: Cloud-based physics-driven AI to accelerate design and engi...
**Thomas Von Tschammer (Neural Concept)**
To stay competitive in a highly dynamic markets, engineers need radically new capabilities, including more effective ways to accelerate the design and engineering workloads and shorten the simulation time. Access to additional compute, visualization and storage resources in the cloud is important for collaborative engineering, knowledge sharing and reducing the design time, however the design processes are still complex, require a feedback-loop between different teams and are costly in terms of infrastructure and licensing. Recent advances in deep learning and GPU-based accelerators have shown a potential to completely disrupt this process by using physics-driven surrogate models to provide...

**Track C — 4C - Silver Sponsors 3M / AMD**

11:15 | Silver Sponsors 3M / AMD
**3M / AMD**
**11:15 - 11:55 - 3M:** Simulation-driven design using Tapes and Adhesives Tapes and adhesives offer various advantages over other mechanical attachment methods by enabling the joining of lightweight and dissimilar materials, increasing production efficiency, and offering unique performance char...

**11:55 - 12:35: AMD:** Cloud-Based HPC: 2023 Update At the 2020 NAFEMS conference on Advancing Analysis & Simulation in Engineering (CAASE), I gave a talk entitled "Will the Cloud Ever Work for HPC?". At the time, it was my contention that we have been doing Cloud-based HPC in various forms fo...

**Track D — 4D - Sponsored: Visual Collaboration Technologies / NAFEMS**

11:15 | Sponsored: Visual Collaboration Technologies / NAFEMS
**NAFEMS**
**11:15 - 11:55: Visual Collaboration Technologies:** Connecting the Enterprise with Intelligent CAE Information for Faster Design Decisions: The pressure on organizations today to do more simulation than ever before is increasing dramatically. There is a Drastic Reduction in Product Development...

**11:55 - 12:35: NAFEMS:** How to get the most from a NAFEMS Membership / Paul Steward, Head of Business Development at NAFEMS, will cover off how to access membership benefits and advantages available through various membership models. The session will also highlight a walk through tour of the ...

**Track E — 4E - Integration of Analysis & Test**

11:10 | Session Introduction
11:15 | Hybrid NVH Modeling Approach: How Numerical and Experimental Methods Complement...
**Matthias Wegerhoff (HEAD acoustics)**
11:35 | Development of a Sensor-based System for Structural Health Monitoring of Rail V...
**Carl-jonas Braun (Institute of Machine Components (IMA) -...**
11:55 | Approach to Twinning with High Twinning Rates: Enabling the Use of Data-Driven ...
**Felix Leitenberger (Karlsruher Institut für Technologie (...**
12:15 | Leveraging Sensor Fusion with Physics-based Digital Twin to Predict Outliers an...
**Remi Duquette (Maya HTT)**

**Track F — 4F - Automotive 1**

11:10 | Session Introduction
11:15 | Automotive Product Validation with High-performance Simulations
**Mike Sheh (Intes)**
11:35 | Real-time Visualization of Simulation Results Using Animation Tools
**Tavish Pattanayak (Georgia Institute Of Technology - MAIN)**
11:55 | A Stochastic Approach to Designing Robust Automotive Structures Considering Var...
**Jeff Robertson (Hexagon)**
12:15 | Electric Vehicle NVH Design: Design Space Exploration of Battery Pack / Body in...
**Mark Lamping (Siemens Digital Industries Software)**

**12:35 | Lunch Break**

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**13.45**

| **5A - Platinum Sponsor Hexagon** | **5B - Platinum Sponsors Microsoft/Nvidia** | **5C - How to get the most from a NAFEMS Membership** | **5D - CAE in the Design Process** | **5E - Engineering Data Science** | **5F - Automated Driving** |

**5A - Platinum Sponsor Hexagon**

13:50 | Platinum Sponsor Hexagon: Virtual Assembly Solution to Improve the Manufacturing Process and Re...
**Jeff Robertson (Hexagon)**
Manufacturing OEMs and suppliers are facing continuous pressure to reduce product development, launch, and production cost and time. There is an emergence of technologies as part of the Industry 4.0 transformation that can enable fundamental changes in the basic approach used to prototype and launch automobiles and other products. Hexagon is calling this approach the digital manufacturing process the Smart Assembly Shop (SAS). It integrates multiple technologies including: multi-physics process simulation, CAD morphing, scanning and metrology to enable a comprehensive model of the assembly process. The goal of the Smart Assembly Shop is two fold: 1. optimize the manufacturing process, 2....

**5B - Platinum Sponsors Microsoft/Nvidia**

13:50 | Platinum Sponsor Microsoft/Nvidia: Accelerating CAE with NVIDIA GPUs on Microsoft Azure
**Ian Pegler (Nvidia)**
Join us for an informative session on leveraging GPGPUs to enhance the performance of leading industry CAE tools on the Microsoft Azure cloud platform. We'll explore the benefits of using GPGPUs in terms of improved turnaround time, reduced power consumption, and lower hardware costs, as well as review the certification of these workloads on Azure. We'll dive into the technical details of the latest GPU hardware available on Azure and showcase Ansys' portfolio of tools, which have been optimized to take advantage of NVIDIA GPUs. Specifically, we'll highlight TWO solvers: (1) Ansys Speos for lighting simulation, (2) CPFD-'s Barracuda Virtual Reactor while providing benchmark information to ...

**5C - How to get the most from a NAFEMS Membership**

13:50| Session Introduction
**Paul Steward (NAFEMS)**
Paul Steward, Head of Business Development at NAFEMS, will cover off how to access membership benefits and advantages available through various membership models. The session will also highlight a walk through tour of the NAFEMS website providing insight of how to leverage membership resources and guidance. Paul will also share how you can use your membership strategically, and there will also be opportunities to see how you can use your membership for a deeper dive into participation within the International community.

**5D - CAE in the Design Process**

13:45 | Session Introduction
13:50 | Leveraging the Industrial Metaverse for Fusion Power Plant Design
**Lee Margetts (School of Mechanical Aerospace and Civil...**
14:10 | Development of a Segmentation Method as an Interweaving of Topology Optimisatio...
**Konstantin Szengel (University Stuttgart)**
14:30 | Designer-oriented AI-aided Design Optimization
**Dong-hoon Choi (Dassault Systemes)**
14:50 | Towards 3D Interactive Design Exploration via Neural Networks
**Victor Oancea (Dassault Systemes)**

**5E - Engineering Data Science**

13:45 | Session Introduction
13:50 | Crash Simulation as a Physical Graph
**Anahita Pakiman (Fraunhofer SCAI)**
14:10 | Empowering Engineering Organizations with Deep-Learning: Applications to a Fast...
**Thomas Von Tschammer (Neural Concept)**
14:30 | A Methodology for Efficient Generation and Optimization of Simulation-based Tra...
**Niranjan Ballal (Fraunhofer EMI)**
14:50 | Exploring Simulation Research Trends through Keyword Network Analysis
**Jasuk Koo (Hyundai Mobis)**

**5F - Automated Driving**

13:45 | Session Introduction
13:50 | High Fidelity Physics-Based Electromagnetics Simulation of Advanced Driver Assi...
**Ushe Chipengo (Ansys)**
14:10 | How to Integrate Simulation Skills in the Area of Autonomous Driving into Highe...
**Tobias Peuschke-bischof (Technical University of Applied ...**
14:30 | Occupant Safety Prediction Using Real Crash Conditions
**Dimitrios Drougkas (BETA CAE Systems)**
14:50 | Simulate and Validate ADAS and Autonomous Algorithms with the Best Vehicle Dyna...
**Bruce Engelmann (Hexagon)**

**15:10 | Break in the Exhibition Hall**

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**16.10**

| **6A - Fatigue** | **6B - Process Simulation** | **6C - Simulation Supporting Certification** | **6D - Computational Electromagnetics** | **6E - Machine Learning / Artificial Intelligence** | **6F - Electric Vehicles** |

**6A - Fatigue**

16:10 | Session Introduction
16:15 | Load Recovery of an Off-Highway Chassis Structure Using an FEM Augmented Compon...
**Joshua Hogg (Hyster-Yale Group)**
16:35 | Quantifying Electronics System-Level Effects on Solder Fatigue with Submodeling...
**Tyler Ferris (Ansys)**
16:55 | Hybrid Finite Element Analyis and Machine Learning to Predict the Endurance of ...
**Julien Said (RTE)**
17:15 | Simulation of the Effects of Underfill Solidification on Flip Chip Fatigue Life
**Josh Thomas (AltaSim Technologies)**

**6B - Process Simulation**

16:10 | Session Introduction
16:15 | Shelf-Life Prediction for Consumer Packaged Goods (CPG) Bottles
**Arindam Chakraborty (VIAS)**
16:35 | Coupled CFD Model of Lyophilization for the Laboratory Freeze Dryer Case as a S...
**Matej Zadravec (University of Maribor)**
16:55 | A DEM Approach to Medical Glass Primary Pack Conveying in Pharmaceutical Manufa...
**Peter Harley (Crux Product Design)**
17:15 | CFD Modeling of a Rotating Packed Bed for CO2 capture
**Muhammad Sami (Ansys)**

**6C - Simulation Supporting Certification**

16:10 | Session Introduction
16:15 | Support the Certification by Analyisis process of Aircraft Seats with a FAA Hyb...
**Daniel Berger (Siemens Digital Industries Software)**
16:35 | Reduced Order Models for Subsurface Radionuclide Transport in Nuclear Waste Man...
**Joel Khristy (Illinois Rocstar)**
16:55 | Design Optimization Based on Verification According to Standards
**Oleg Ishchuk (SDC Verifier)**
17:15 | Mission-driven and Safety-critical Software Development for Aerospace and Defen...
**Bernard Dion (Ansys)**

**6D - Computational Electromagnetics**

16:10 | Session Introduction
16:15 | Non-parametric Optimization for Electrical Machines
**Matthew Pais (Dassault Systèmes)**
16:35 | Magnetohydrodynamics Modeling of Submerged Arc Furnace using Vector Potential M...
**Yonatan Tesfahunegn (Reykjavik University)**
16:55 | Engineering Design Challenges of Silver-Based Low -Emissivity Coating Technolog...
**Duane Mateychuk (Ansys)**
17:15 | Fast Frequency Sweep Method Based SVD
**Wang Yu (Zwsoft)**

**6E - Machine Learning / Artificial Intelligence**

16:10 | Session Introduction
16:15 | Machine Learning Aided Optimization of Non-Metallic Seals in Downhole Tools
**Shobeir Pirayeh Gar (Halliburton Carrollton Technology Ce...**
16:35 | Resin Avatar for Industry 4.0
**Cristian Lira (National Composites Centre)**
16:55 | Using Deep Operator Networks for Solving a Multi-Disciplinary Design Optimizati...
**Juan Betts (PredictiveIQ)**
17:15 | Reinforced Learning of Neural Network Controllers
**Bruce Engelmann (Hexagon)**

**6F - Electric Vehicles**

16:10 | Session Introduction
16:15 | The Essential Need for Multi-fidelity, Parametric Model for Electric Drive Deve...
**Satheesh Kandasamy (Dassault Systèmes)**
16:35 | Optimization and Quick Verification of an Electric Vehicle Side-frame Design u...
**Christina Chatzigeorgiadou (BETA CAE Systems Internationa...**
16:55 | A Simulation Strategy for Dynamic Response of an Electric Drive Stator
**Satheesh Kandasamy (Dassault Systèmes)**
17:15 | Ensuring Structural Compliance of Electric Vehicle Battery Pack Against Crush L...
**Arindam Chakraborty (VIAS)**

**17:55 | End of Presentations Day 3**

**19:00 | Congress Dinner at Cruise Ship - boarding time / 19:30 departure**

**22:00 | End of Day 3**

| Track G | Track H | Track J | Track K | Track L | Track M |
|---|---|---|---|---|---|

### 4G - Digital Twins 1 | ### 4H - Simulation Governance 1 | ### 4J - Materials | ### 4K - SPDM Panel Discussion: SPDM: Today's Challenges, | ### 4L - Workshop on Stochastics Challenge Problems: Including Data Uncertainty in Probabilistic Solutions |

| Track G | Track H | Track J | Track K | Track L |
|---|---|---|---|---|
| **4G - Digital Twins 1** | **4H - Simulation Governance 1** | **4J - Materials** | **4K - SPDM Panel Discussion: SPDM: Today's Challenges,** | **4L - Workshop on Stochastics Challenge Problems: Including Data Uncertainty in Probabilistic Solutions** |
| 11:10 \| Session Introduction | 11:10 \| Session Introduction | 11:10 \| Session Introduction | 11:10 \| Session Introduction | 11:10 \| Session Introduction |
| 11:15 \| Decision Making and Visualization Tool for Automotive Vehicle Setup<br>Mariam Emara *(Georgia Institute Of Technology - MAIN)* | 11:15 \| Considerations in Implementing a Simulation Maturity Assessment System<br>Gregory Westwater *(Fisher Controls International)* | 11:15 \| Construction of Stress-Strain Curves of Metallic Material from Small Punch Test...<br>Saleem Lubbad *(Oxford University)* | Mark Norris *(the SDMConsultancy)*<br>Industrial practitioners, and vendors will share their point of view in 5 minutes and then respond to questions from the audience. The aim is to inform the audience about the state of the art and allow the audience to share their point of view with the panelists. A shared view of current challenges will provide valuable input to the NAFEMS SPDM best practices focus team's activities. Panelists: Ernesto Mottola (Toyota), Steve Howell (Abercus), Tobias Ulmer (Airbus), Brandon Jennings (SAIC chief engineer), Mark Norris (theSDMconsultancy) | Ian Paulson, David Riha *(SwRI)*, Alexander Karl *(Rolls-Royce)*<br>The focus of the Stochastics Working Group (SWG) is to champion and improve best practices that relate to stochastic engineering analysis and simulation methods and tools. By considering various sources and forms of uncertainty that exist in an engineering setting, the outcomes of virtual product development activities can be brought closer to the real world behavior of the modelled systems and components through the use of stochastic tools and methods. This will allow significantly more business value to be extracted from investments in engineering analysis and simulation. To promote discussion and challenge current practices and the state-of-art of stochastic methods related specifically t... |
| 11:35 \| Fast Digital Twins: A Cornerstone for the Industrial Metaverse<br>Juan Manuel Lorenzi *(Siemens)* | 11:35 \| Governance for Virtual Design & Verification Community<br>Carol Plouffe *(John Deere ISG - Moline)* | 11:35 \| Smart Material Data Generation with Materials Informatics<br>Dustin Souza *(MSC Software France - groupe Hexagon)* | | |
| 11:55 \| Advanced Systems Engineering - The Future of Model-based Engineering of Cyberph...<br>Sven Kleiner *(:em engineering methods)* | 11:55 \| How Do You Know if you are Executing the Right Simulations at the Right Time?<br>Greg Garstecki *(Garstecki Modeling Solutions)* | 11:55 \| Computational and Experimental Determination of Long-Term Material Properties f...<br>Wolfgang Korte *(PART Engineering)* | | |
| 12:15 \| FEM Based Digital Twin for Online Estimation of Remaining Useful Lifetime of Me...<br>Torsten Blochwitz *(ESI Germany)* | 12:15 \| Simulation Knowledge Management<br>Daniel Berger *(Siemens Digital Industries Software)* | 12:15 \| Prediction of Creep Deformation of Short Fiber Reinforced Thermoplastic Parts<br>Dustin Souza *(Hexagon)* | | |

| Track G | Track H | Track J | Track K | Track L | Track M |
|---|---|---|---|---|---|
| **5G - Simulation Strategy** | **5H - Verification & Validation** | **5J - Multiscale** | **5K - NAFEMS SPDM Best-Practices Focus Team Workshop** | **5L - Solvers** | **5M - Probabilistic Analysis Methods and Approaches for PSE in Probabilistic Analysis** |
| 13:45 \| Session Introduction | 13:45 \| Session Introduction | 13:45 \| Session Introduction | 13:45 \| Session Introduction | 13:45 \| Session Introduction | 13:45 \| Session Introduction |
| 13:50 \| How Mature is your Simulation Capability? Maximising the Benefit of your Engine...<br>Andy Richardson *(Phronesim)* | 13:50 \| Storage Tank Response to Large-scale Blast: Numerical Analysis, Experimental Te...<br>Alexander Rogers *(AWE)* | 13:50 \| Multiscale Simulation Methodology for Part Qualification of Additive Manufactu...<br>Sunil Acharya *(Ansys)* | Mark Norris *(the SDMConsultancy)*<br>This a forum for SPDM practitioners from industry vendors and systems integrators to share opinions and experience on current technical issues, especially those which could lead to best-practice definitions and standards. The first topics are the core SDM data-model and a standardised approach to connecting interactive CAE applications to SPDM platforms using standard protocols and vocabularies. We will share presentations of possible standard decoupled approaches to CAE application integration and then discuss what a standard approach could look like. See paper from NWC21-558: A standardised approach to building CAE application connectors to SPDM solutions. Please join Ernesto Mottola (... | 13:50 \| Game Engine Physics Solvers for Engineering Processes<br>Shane Mooney *(Kinetic Vision)* | David Riha *(Southwest Research Institute)*<br>The NAFEMS Stochastic Working Group recently updated the competencies for the Professional Simulation Engineer (PSE) in Probabilistic Analysis. This training supports gaining understanding and knowledge for several key PSE competencies. This session will include an overview of the PSE competencies in probabilistic analysis, why uncertainty matters in engineering analysis, problem formulation (random variables and limit-states), select probabilistic methods, and examples. This is intended as an introductory course but content will be applicable for those with probabilistic analysis backgrounds and engineering managers. Details about some of the topics that will be covered are described below... |
| 14:10 \| Simulation Powering Destination Zero<br>Bob Tickel *(Cummins Engine Company - Technical Center)* | 14:10 \| Comprehensive Comparison of Finite Element Analysis and Strain Measurement of C...<br>Eda Gök *(Roketsan Missiles)* | 14:10 \| A Mean-field Homogenization Method-based Design of Experiments for Fiber-reinfo...<br>Deepak Kumar Patel *(Dassault Systèmes)* | | 14:10 \| GPU-accelerated Optimization with Structural Analysis<br>Daniel Weber *(Fraunhofer IGD)* | |
| 14:30 \| Manifesting Digital Transformation Through Practical Modeling and Simulation in...<br>Garrett Swindlehurst *(General Mills)* | 14:30 \| Improved Accuracy of Virtual Prototypes through Physical Test Correlation and D...<br>Mark Lamping *(Siemens Digital Industries Software)* | 14:30 \| Data Driven Modelling of Crash Barriers Combining Multiscale Analysis and Physi...<br>Sebastian Müller *(ESI Germany)* | | 14:30 \| Benefits from Integrating Fatigue Analysis into the FEM Solver<br>Michael Klein *(Intes)* | |
| 14:50 \| Do We Need Engineering Culture?<br>Gene Allen *(Decision Incite)* | 14:50 \| Simulation-driven Insights into the Thermal and Hydrodynamic Behavior of Liquid...<br>Razvan Apetrei *(Element Digital Engineering)* | 14:50 \| Novel Multi-Scale Additive Manufacturing Process Simulation Approach for Meso-s...<br>Jeff Robertson *(Hexagon)* | | 14:50 \| Large-Scale Benchmark for Parallel FEM Structural Analysis<br>Hiroshi Okuda *(Tokyo University)* | |

| Track G | Track H | Track J | Track K | Track L |
|---|---|---|---|---|
| **6G - Digital Twins 2** | **6H - Simulation Governance 2** | **6J - Integrated Computational Materials Engineering** | **6K - Cloud Computing** | **6L - The Role of Blind Benchmarking in Validation** |
| 16:10 \| Session Introduction | 16:10 \| Session Introduction | 16:10 \| Session Introduction | 16:10 \| Session Introduction | 16:10 \| Session Introduction |
| 16:15 \| MoSSEC – The Common Meta Language Supporting Digital Transformation<br>Kyle Hall *(Airbus Operations)* | 16:15 \| Best Practices of Simulation Governance for Increased Confidence in Simulation<br>Peter Langsten *(Predict Change)* | 16:15 \| Driving Innovation in Polymeric Coating Materials with Integrated Process-Struc...<br>Liangkai Ma *(The Dow Chemical Company)* | 16:15 \| A Software Architecture for Heterogeneous Engineering Workflow Interoperability...<br>Andy Gallo *(GE Global Research & Development)* | SGM Working Group<br>Results of several blind benchmarking studies in both CFD and FEA show that even experienced simulation engineers consistently fail to match physical test results. This suggests that if your primary means of solution validation is relying on a panel of experts, you could be in for a surprise! In this workshop, we'll review some of these studies, discuss how blind benchmarking can increase the rigor of your simulations, and hold an open and frank interactive discussion session to summarize our findings and propose some ways forward. Moderation: SGM Working Group |
| 16:35 \| Enhancing Digital Twin Reliability Using Test Data and an Adjoint-based Solver<br>Florian Sanchez *(Maya HTT)* | 16:35 \| On the Credibility of Modeling and Simulation Results in Cross-Domain and Cross...<br>Muhammed Atak *(Robert Bosch)* | 16:35 \| A Software Framework to Enable Automated ICME Workflows<br>Davide Di Stefano *(Ansys)* | 16:35 \| A Novel Engineering Simulation Platform For Any Cloud, Applied to Automotive,...<br>Wolfgang Gentzsch *(TheUberCloud)* | |
| 16:55 \| Development of Physics-based "Digital Twin" Platform for Process Industry Appli...<br>Sandeepak Natu *(CIMdata, Inc.)* | 16:55 \| SPDM Democratization in an Authoritative Source of Truth Digital Ecosystem<br>Malcolm Panthaki *(Aras)* | 16:55 \| An Integrated Process and Material Modeling of Fiber-Reinforced Composites<br>Deepak Kumar Patel *(Dassault Systèmes)* | 16:55 \| Microsoft and Vestas Collaboration Accelerates Deployment of Renewable Energy S...<br>Wolfgang De Salvador *(Microsoft)* | |
| 17:15 \| Using Co-simulation to Enable Direct Communication Between Different Representa...<br>Florian Sanchez *(Maya HTT)* | 17:15 \| Focused FEA and Testing for Assessment of Structural Response to Blast<br>Chris Taggart *(AWE PLC)* | 17:15 \| FE-based Virtual DMAs for Characterization of Viscoelastic Behavior in Composit...<br>Kennedy Neves *(Siemens Digital Industries Software)* | 17:15 \| Deploying Simulation Company-wide – The Advent of the All-cloud Simulation Soft...<br>David Heiny *(SimScale)* | |

# Thursday 18th May 2023

**08:00 | Congress Registration Opens**

**08:30 | Developments in Advanced, Physics-based Modelling and Simulation Techniques in the Realm of Defence and Security at DSTL**
Daniel Pope *(DSTL)*

**09:00 | Keynote: Mechanics Meets Biology: Modeling and Simulation Towards Skeletal Tissue Regeneration**
Sara Checa *(Charité - Universitätsmedizin Berlin)*

**09:30 | Keynote: The Role of Modeling and Simulation in the Age of AI**
Mahmood Tabaddor *(Accenture USA)*

**10:00 | Break in the Exhibition Hall**

| Track A | Track B | Track C | Track D | Track E | Track F |
|---|---|---|---|---|---|
| **7A - Heat Transfer 2** | **7B - Computational Fluid Dynamics 1** | **7C - Biomedical 1** | **7D - Automotive 2** | **7E - Methods** | **7F - Reduced Order Modelling 1** |
| 11:10 \| Session Introduction | 11:10 \| Session Introduction | 11:10 \| Session Introduction | 11:10 \| Session Introduction | 11:10 \| Session Introduction | 11:10 \| Session Introduction |
| 11:15 \| Gearbox Lubrication Analysis Workflow Involving Lattice Boltzmann CFD and Heat ...<br>Benjamin Beckelynck *(Optimec Consultants)* | 11:15 \| CFD Simulations at Model and Ship Scales Combined with Fluid Structure Interact...<br>Pasi Miettinen *(ABB)* | 11:15 \| Digital Twin Development of an Injection into the Subcutaneous Tissue of a Mini...<br>Max Dixon *(Crux Product Design)* | 11:15 \| Accelerating Vehicle Design Through the Use of Gaming Engines<br>Andy Diepen *(GS Engineering)* | 11:15 \| Asymmetric Constraints, a Multiphysics Modelling Application<br>Christopher Nahed *(CEA)* | 11:15 \| Development of a Simulation Model for eBike Drive Units for the Evaluation and ...<br>Marco Steck *(Robert Bosch)* |
| 11:35 \| A Digital Design Methodology to Optimize a Continuous Casting Tundish based on ...<br>Christian Windisch *(Siemens Digital Industries Software)* | 11:35 \| CFD Simulation for Zero Emissions Power Solutions<br>Sean Horgan *(UpFront Engineering Simulation)* | 11:35 \| Framework for In Silico Clinical Trials to assess the Performance of Medical De...<br>Ashley Stroh *(Dassault Systèmes)* | 11:35 \| A Digital Twin for Geometry Assurance<br>Kristina Wärmefjord *(Chalmers University of Technology)* | 11:35 \| Isogeometric Analysis for use in Industry<br>Greg Vernon *(Coreform)* | 11:35 \| Identifying Appropriate Error Metrics for Reduced Order Model Validation<br>Daniel Schmidt *(Esteco North America)* |
| 11:55 \| A CFD and Experimental Study of Conjugate Heat Transfer for Building Envelopes<br>Philippe Vincent *(Creaform)* | 11:55 \| Virtual Corrosion Testing Based on a Conjugate Heat Transfer Solver Coupled wit...<br>Uwe Janoske *(Bergische Universität Wuppertal)* | 11:55 \| Enabling Compliance of Medical Device Computational Models per the ASME V&V40 S...<br>Sunil Karri *(Ansys)* | 11:55 \| Exploring Unknown Unsafe Scenarios for ADAS and AV Development<br>Akshay Sheorey *(Siemens Digital Industries Software)* | 11:55 \| Fast and Robust Nonlinear Harmonic Responses Analysis Using a New Type of Compl...<br>Sakujiro Hatazawa *(Hexagon)* | 11:55 \| The Role of Reduced Order Models in the Executable Digital Twin<br>Remi Duquette *(Maya HTT)* |
| 12:15 \| CFD Co-Simulation Methodology for Modeling Transient Brake Cooling Simulations<br>Harshad Kulkarni *(Siemens Digital Industries Software)* | 12:15 \| Deep Learning Physics for Hydrodynamics of Trading Vessels<br>Jonas Verriere *(Extrality)* | 12:15 \| FSI Simulation of Leaflet Heart Valves<br>Josh Thomas *(AltaSim Technologies)* | 12:15 \| Deep-Learning for Enhanced Engineering: Evaluation of Crash Performance of Nove...<br>Thomas Von Tschammer *(Neural Concept)* | 12:15 \| Combining CAD Based FE Simulations with CT Based FE Simulations (Submodeling) f...<br>Roger Wende *(Volume Graphics)* | 12:15 \| Simulation Best Practices in Vibro-Acoustics to Improve on NVH Performances<br>Devashish Sarkar *(Ansys, Inc.)* |

**12:35 | Lunch Break**

| Track A | Track B | Track C | Track D | Track E | Track F |
|---|---|---|---|---|---|
| **8A - Meshing** | **8B - Computational Fluid Dynamics 2** | **8C - Biomedical 2** | **8D - Model Based Systems Engineering** | **8E - Civil Engineering** | **8F - Reduced Order Modelling 2** |
| 13:35 \| Session Introduction | 13:35 \| Session Introduction | 13:35 \| Session Introduction | 13:35 \| Session Introduction | 13:35 \| Session Introduction | 13:35 \| Session Introduction |
| 13:40 \| Enhancement of TCL/TK Scripting to Achieve Time Efficient Generation of Global ...<br>Alican Sancaktar *(Turkish Aerospace)* | 13:40 \| A Surrogate Approach to Rapidly Predict Particle Collection on Single Fiber usi...<br>Uwe Janoske *(Bergische Universität Wuppertal)* | 13:40 \| UltraViolet Germicidal Irradiation Development Method for Transportation Disinf...<br>Steven Marshall *(Valeo Thermal Systems)* | 13:40 \| Managing Engineering Analyses as Knowledge Assets in the Digital Thread<br>Paul Goossens *(Maplesoft)* | 13:40 \| ML Modelling on Prediction of Residual Strength of RC Column Exposed to Fire by...<br>Hyunkyoung Kim *(Korea Advanced Institute of Science and T...)* | 13:40 \| A Study in Reduction Methods in Transient Dynamics<br>Don Powell *(The Boeing Company)* |
| 14:00 \| Automatic Geometry-conforming Adaptive Meshing for Evolving Domain Problems<br>Saurabh Tendulkar *(Simmetrix)* | 14:00 \| Sustainable Failure Management in Data Centers with 1D-3D Co-Simulation<br>Vijaisri Nagarajan *(Dassault Systèmes)* | 14:00 \| Using CFD to Quantify the Effect of Patient Usage Variability on Inhaler Drug D...<br>Max Dixon *(Crux Product Design)* | 14:00 \| Requirements-In-the-Loop: The Future of MBSE<br>David Diaz Ascencio *(Dassault Systèmes CATIA)* | 14:00 \| Dynamic FEM Simulation for the Development of a Sensor Head for a Drone Based C...<br>Claudia Thurnherr *(SVTI Schweizerischer Verein für techni...)* | 14:00 \| Deployment of Machine Learning Models on Production Line to Predict Product Qua...<br>Laurent Chec *(Datadvance France)* |
| 14:20 \| Adaptive Analysis of Cohesive Zone Based Debonding<br>Siddhartha Mukherjee *(Ansys)* | 14:20 \| Speed up Aerodynamic Optimization Thanks to Deep Learning Physics: Stellantis T...<br>Jonas Verriere *(Extrality)* | 14:20 \| Effect of Bioprosthetic Leaflet Anisotrpy on Stent Dynamics of Transcatheter Ao...<br>Dylan Armfield *(University College Dublin)* | 14:20 \| Model Based Systems Engineering Produces Better Electric Powertrains When Coupl...<br>Ilya Tolchinsky *(Phoenix Integration, an Ansys company)* | 14:20 \| Deep-Learning for Enhanced Engineering: Real-Time Design of City Buildings<br>Frédéric Berdoz *(Neural Concept)* | 14:20 \| Optimization of Car Body Structural Crash Design Using Reduced Order Models<br>Fatima Daim *(ESI Group)* |
| | 14:40 \| Electric Drive Virtual Development and Multi-physics Integration - Project Pres...<br>Benoit Magneville *(Siemens Digital Industries Software)* | 14:40 \| Surrogate Modelling of a Medical Device Assembly Step using Gaussian Process Ma...<br>Peter Harley *(Crux Product Design)* | 14:40 \| How to Enhance PLM Platforms with an Agnostic and Fine-grained Data Management ...<br>Patrick Grimberg *(Digital Product Simulation)* | 14:40 \| Parametric Modelling of Concrete Structures with Optimization Methods<br>Lukasz Jarno *(JD Engineering)* | 14:40 \| Simulation-based Digital Twin of a High-speed Turbomachine (Fan) Used in Avioni...<br>Murat Kandaz *(Numesys İleri Muhendislik Hizmetleri)* |

**15:00 | Break in the Exhibition Hall**

**15:30 | Conference Wrap-up**

**16:00 | Delegate Feedback Questionnaire - Prize Draw**

**16:15 | NWC Awards / Farewell**

**16:30 | End of NWC 2023**

| Track G | Track H | Track J | Track K | Track L | Track M |
|---|---|---|---|---|---|
| **7G - Composites 1** | **7H - VMAP 1** | **7J - Multibody Dynamics 1** | **7K - Uncertainty Quantification and Stochastics Enabled by Digital Continuity** | **7L - ASSESS – Reports from the ASSESS Congress** | **7M - Dynamic Analysis using FEA - Live online training** |
| 11:10 \| Session Introduction | 11:10 \| Session Introduction | 11:10 \| Session Introduction | 11:10 \| Session Introduction | 11:10 \| Session Introduction | 11:10 \| Session Introduction |
| 11:15 \| Microscopic and Macroscopic Modeling of Linear Viscoelastic Vibration Behavior ...<br>Alexander Kriwet *(Mercedes-Benz)* | 11:15 \| An Ontology for Integrating VMAP Based Simulation Data into Digital Twins<br>Klaus Wolf *(Fraunhofer SCAI)* | 11:15 \| Virtual Testing for High Lift Systems - Simple and Efficient Conduction of Para...<br>Tobias Ulmer *(Airbus Operations)* | Dietmar Vogt (Airbus), Alexander Karl (Rolls-Royce), David Riha (SwRI), Steve Legensky (Intelligent Light)<br>Digital modelling and model based Engineering is currently a hot discussion topic in the engineering community. However, there is still a lot of disconnected processes in industry and most of the decisions are still based on reports. A lot of uncertainty quantification work is done in the various functional areas but an overarching end-to-end framework is missing. This topic is also relevant for the area of Machine Learning / Artificial Intelligence where models are fit to data and the uncertainties need to be aggregated, especially if these models are used in any autonomous systems activities. The panel will discuss industry trends and requirements in this area and will address questions fr... | **Joe Walsh** *(ASSESS)*<br>The ASSESS Congress 2023 was an opportunity for thought leaders to work as one to map out the future of engineering simulation and lead the way toward it. This workshop will share the Working Session reports on seven (7) active ASSESS themes. - Alignment of Commercial, Research and Government Efforts - Supporting Autonomy with Engineering Simulation - Business Challenges - Engineering Simulation Confidence & Credibility - Democratization of Engineering Simulation - Integration of Systems and Detailed Sub-System Simulations - Engineering Simulation Digital Twin(s) Moderation: Joe Walsh (ASSESS) | **Tony Abbey** *(FETraining)*<br>This short course extracts some of the key learning aspects of the full e-Learning course. This includes a strong understanding of dynamic modal characteristics and evaluation techniques. Questions such as the range of frequencies and identifying important frequencies are addressed. A concise overview of the important parameters and workflow to be used in both transient and frequency response analysis are presented. Examples include; effective time step and duration prediction, frequency response output fidelity. A summary of the important checks is provided. |
| 11:35 \| Comparative Study of Different Damage Modelling Techniques for Composite Lamina...<br>Heng Liu *(Queens University at Kingston)* | 11:35 \| A Methodology for Integrating Hierarchical VMAP-data Structures into an Ontolog...<br>Klaus Wolf *(Fraunhofer SCAI)* | 11:35 \| Multi Flexible Body Dynamic (MFBD) Methodology for NVH Performance Analysis Con...<br>Young Su Lee *(Ansys, Inc.)* | | | |
| 11:55 \| Leveraging Fiber-reinforced Additive Manufacturing Through Hybridization and Di...<br>Markus Edwin Schatz *(Ravensburg University of Cooperative...* | 11:55 \| Development of a Hierarchical Data Format for Modeling, Simulation and Postproc...<br>Martin Rädel *(DLR - Deutsches Zentrum für Luft- und Raumf...* | 11:55 \| NVH Analysis Using Multi-body Dynamics Simulation<br>Sangtae Kim *(FunctionBay, Inc)* | | | |
| 12:15 \| Machine Learning-based Multiscale Simulation of Composite Materials with Applic...<br>Sandeep Medikonda *(Ansys)* | 12:15 \| A Smart Manufacturing Platform for Process Control and Optimization<br>Sivaprasad Palla *(Swerim)* | 12:15 \| A Novel Method for Rigid-flexible Large-deformation Contacts in the FEM Framewo...<br>Rui Liang *(Zwsoft)* | | | |

| Track G | Track H | Track J | | Track L | Track M |
|---|---|---|---|---|---|
| **8G - Composites 2** | **8H - VMAP 2** | **8J - Multibody Dynamics 2** | | **8L - ASSESS Discussion Session** | **8M - Effective Post-Processing in FEA - Live Online Training** |
| 13:35 \| Session Introduction | 13:35 \| Session Introduction | 13:35 \| Session Introduction | | 13:35 \| Session Introduction | 13:35 \| Session Introduction |
| 13:40 \| Integrated FE-based Framework for High-fidelity Stochastic Progressive Failure ...<br>Minh Hoang Nguyen *(University of Michigan)* | 13:40 \| The VMAP Standard for Vendor-neutral CAE Data Storage - Workshop on Technical E...<br>Klaus Wolf *(Fraunhofer SCAI)* | 13:40 \| Template Supported Design Process for Wiper Applications to Predict Wipe Qualit...<br>Jonas Verhoogen *(Siemens Digital Industries Software)* | | **Joe Walsh** *(ASSESS)*<br>The ASSESS Initiative is a broad reaching multi-industry initiative with a primary goal to facilitate a revolution of enablement that will vastly increase the availability and utility of Engineering Simulation, leading to significantly increased business benefits across the full spectrum of industries, applications and users. The vision of the ASSESS Initiative is to bring together key players for guiding and influencing the software tool strategies for performing model-based analysis, simulation, and systems engineering. This workshop will share & discuss the role of the ASSESS Initiative within NAFEMS to Lead the Future of Engineering Simulation. Moderation: Joe Walsh (ASSESS) | **Tony Abbey** *(FETraining)*<br>Understanding the implications of a stress state is far from trivial. This specially prepared short course reviews the background to what exactly stress is, and how to best present this in result format. In many ways understanding forces, through free body diagrams, is the key to understanding resultant stress distributions. Stresses then naturally follow forces. Examples are shown of using cartesian stress components, local coordinate systems, principal stresses and von Mises stresses in a logical workflow for stress investigation. |
| 14:00 \| A Numerical Model to Predict Fire Reaction of Flax Fibre Reinforced Composites ...<br>Imran Ali *(University of Auckland)* | 14:00 \| Breaking Down the Interoperability Barrier Among Different FEA Software<br>Athanasios Fassas *(BETA CAE Systems)* | 14:00 \| Crash Pulse Variation Effect on Brain Injury Criterion (BrIC)<br>Paul Slaats *(Autoliv)* | | | |
| 14:20 \| New Method for Weight and Load-optimized Design of Hybrid Components Made of Is...<br>Lorenz Stolz *(University Siegen)* | 14:20 \| (Workshop) The VMAP Standard for Vendor-neutral CAE Data Storage<br>Klaus Wolf *(Fraunhofer SCAI)* | 14:20 \| A Sensitivity Study on Brake Groan Analysis Using a Multibody Model<br>Avijit Chauhan *(Dassault Systèmes)* | | | |
| 14:40 \| Bending Simulations of CFRP Laminates<br>Matthias Kabel *(Fraunhofer ITWM)* | | 14:40 \| A Fast and Intelligent Machine Learning Model for Predicting Vehicle Dynamics<br>Esmaeil Dehdashti *(PredictiveIQ)* | | | |

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