NAFEMS20 UK CONFERENCE

MONDAY 9TH NOVEMBER 2020 | DAY 1 - MORNING SESSION

09:35 **OPENING OF CONFERENCE**

PLENARY SESSION

09:40 **The National Digital Twin**
KEYNOTE SPEAKER: Mark Enzer, Mott MacDonald

10.25 **Introduction to NAFEMS Membership**
Paul Steward, NAFEMS

10.40 REFRESHMENT BREAK & VENDOR PRESENTATION

	1A - OPTIMISATION	1B - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING 1	1C - COMPUTATIONAL TRIBOLOGY
10.55	**Using Optimisation in the Design of the RWUAS Air Vehicle Structure** **INVITED PRESENTER:** **Gordon Mackenzie, Leonardo Helicopters**	**Torsional Stiffness Simulation of Metallic Disc Membrane Couplings Considering Pre-Stretch and Post-Buckling Behaviour** Murat Islam, John Crane UK Ltd.	**Recent Developments in Modelling Techniques to Study Surface Interactions in Tribology** **INVITED PRESENTER:** **Daniele Dini, Imperial College London**
11.20	**Rapid Stochastic Broadband Acoustics on GPUs** Mark Allan, Zenotech Ltd	**The Development of Machine Learning Tools to Automate and Improve on the Identification of Invasive Non-native Species and Help Keep Boots off Ballast** Sam Ahdab, Mott MacDonald	**Optimization of Piston-Cylinder Liner Conjunction Micro-Geometry for Enhanced Tribo-Dynamic Performance** Stephen Bewsher, AVL List GmbH
11.45	**Automated Shape Optimization Technology Coupled with Upfront CFD** Sean Horgan, 80/20 Engineering Ltd	**A New Method for Fast Finite Element Explicit Crash Simulations** Jing Bi, Dassault Systèmes SIMULIA	**Tribodynamic Modelling of High-speed Rolling Element Bearings Using Experimentally Obtained Boundary Conditions** Harry Questa, Loughborough University

12.10 LUNCH BREAK & VENDOR PRESENTATION

DAY 1 - AFTERNOON SESSION

PLENARY SESSION

13:00 **Saving the Russian Mir Space Station : The Role of Computerised Simulation**
KEYNOTE PRESENTER: Michael Foale CBE, British-American Astrophysicist & Former NASA Astronaut

2A - COMPOSITES

14:00 **European Materials Modelling Council**
INVITED PRESENTER:
Gerhard Goldbeck, Goldbeck Consulting

14.25 **Supporting Innovative Composite Technologies**
Andrew Main, MSC software UK Ltd

14.50 **Multiscale Modelling of Random and Hybrid Discontinuous Tow Based Composites**
Rizwan Choudhry, University of Derby

15.15

2B - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING 2

Increase CAE Productivity Levels Utilizing Machine Learning
Tom Rosenwinkel, Open IT

Artificially Intelligent Segmentation of a Shock Absorber X-ray CT Scan and Beyond
Emmanuela Baksiova, BETA CAE Systems UK Ltd

Development of a Real-time Engine Temperature Monitoring System, Using AI Based on Accurate and Validated Thermal Simulation Data
Christian Semler, MAYA HTT

2C - SHEET METAL FORMABILITY – MATERIAL PROPERTIES, FAILURE AND SIMULATION

This workshop is intended to assist all those involved in the design of sheet metal components to identify the key material properties and potential failure modes during manufacture. The session will demonstrate how CAE methods can be used to simulate the manufacturing method in order to identify any potential problems with the process and establish if part design changes are required.

WORKSHOP TOPICS – PART 1:

- **Introduction to sheet metal forming processes**
- **Characterisation of sheet metal material properties for use in simulation**
- **Definition of process failureSimulations**

2D - UNCERTAINTY QUANTIFICATION 1

Stochastic Topology Optimization For Robust And Reusable Designs
Johannes Neumann, Rafinex SARL

Dealing with Uncertainty with Confidence
Edoardo Patelli, University of Strathclyde

Model Reduction and Uncertainty Quantification for Weld Simulations on Ferritic Materials
Jefri Draup, EDF Energy R&D

Uncertainty in Simulation and Test
Jack Reijmers, Nevesbu

15.40 SHORT BREAK & VENDOR PRESENTATION

3A - ELECTROMAGNETICS

15.55 **Motor Design Optimisation Including Electromagnetic Performance and Mechanical Stress**
Tamara Monti, Dassault Systemes UK Ltd

16:20 **3D Electromagnetic Eddy-Current Problems within the Finite Element Framework of Computing Platform FEniCS**
Nunzio Palumbo, Rolls Royce plc

3B - INFRASTRUCTURE

Innovation Through Simulation in Built Environment
Ganga Kasi, Sir Robert McAlpine Ltd

Innovative Techniques for Bridge Assessment
Ricardo Teixeira , Mott MacDonald

3C - SHEET METAL FORMABILITY – MATERIAL PROPERTIES, FAILURE AND SIMULATION

WORKSHOP TOPICS – PART 2:

- **Discussion of the different materials used in sheet metal forming**
- **Description of how materials are tested to establish the required material parameters**
- **Application of simulation with an example using the Forming Limit Test**

3D - FROM GRAINS TO PROPERTIES

CALCULATING BULK SCALE BEHAVIOUR FROM MICROSTRUCTURES

Computational Structural Mechanics Working Group

Modern engineering uses material design to obtain advantageous properties for challenging applications. This material design is underpinned by advanced simulation methods that use knowledge of the microstructure of the materials to predict the bulk-scale material response. This session will focus on one such technique, crystal plasticity finite element analysis, and will serve as an introduction to what it does and how it can be used.

3E - UNCERTAINTY QUANTIFICATION 2

Effective Quadratures: Empowering Engineers with Open Source Computational Methodologies
Pranay Seshadri, The Alan Turing Institute

Supporting the Design of Composite Components using Multi-physics Simulations
Olivia Stodieck, Daptablade Ltd.

END OF DAY 1

DAY 2 - MORNING SESSION

PLENARY SESSION

09.00 **Climate Change – How Can Climate Models Help us to Respond?**
KEYNOTE SPEAKER: Vicky Pope, University College London

09.45 **Innovation through Engineering Simulation - A Rolls-Royce Perspective**
INVITED PRESENTER: Akin Keskin, Rolls Royce

10.20 SHORT BREAK & VENDOR PRESENTATION

	4A - ADDITIVE MANUFACTURING	4B - CFD 1
10.35	**Rapid 3D Inspection of AM Components Using CT: From Defect Detection to Thermal Performance Simulation** Celia Butler, Synopsys	**High-Fidelity CFD the Automotive and Motorsport Sectors In The Cloud** **INVITED PRESENTER:** **Neil Ashton, Amazon Web Services**
11.00	**Structural Simulation of Components with Defects - A Workflow from Computed Tomography to Finite Element Simulation** Beate Lauterbach, Volume Graphics GmbH	**Novel Multi-billion Degrees-of-freedom FEA Models for Rapid Simulation of the Multi-Physics Behaviour of a Complete Aero Engine** Neeraj Cherukunnath, Rolls Royce Plc

11.25 REFRESHMENT BREAK & VENDOR PRESENTATION

	5A - MANUFACTURING PROCESS	5B - CFD 2
11:40	**Finite Element Simulation of the Braiding Process** Melodie Cueto Carrion, National Composites Centre	**Using Fluid Dynamics for Simulating Exterior Ballistics Phenomena** Véronique de Briey, Royal Military Academy
12.05	**Understanding the Manufacturing Cost Drivers of Tolerances** Amanda Bligh, aPriori Technologies	**Employing Advanced CFD to Predict Oil Distribution, Churning Losses and Gearbox Cooling** David Percival, EnginSoft UK Limited
12.30	**Understanding Powder Behaviour in an Additive Manufacturing Process by Using DEM** Marina Sousani, DEM Solutions Ltd	**Numerical and Experimental Evaluation of Tile Stoves Mode of Operation** Florian Schüssler, ACAM Engineering GmbH
12.55	**Manufacturing Process Chain Model in Composites Manufacturing** Melodie Cueto Carrion, National Composites Centre	**Increasing Product Reliability with Reduced Order Models** John Parry, Mentor, A Siemens Business

13.20 LUNCH BREAK & VENDOR PRESENTATION

DAY 2 - AFTERNOON SESSION

	6A - INNOVATIVE APPLICATIONS	6B - CFD 3	6C - SIMULATION GOVERNANCE	6D - MULTIPHYSICS TECHNICAL WORKING GROUP PANEL DISCUSSION SESSION
14:20	**Drag Coefficient Calculation of Cylindrical Structures Oscillating in Confined Fluid Environments** Rezana Zarshat, Expro North Sea Ltd.	**Windtech Technology - Measuring Cold Exposure via Conjugate Heat Transfer** Hassan Khawaja, UiT The Arktic University of Norway	**A value-focussed approach to the deployment of Simulation Data Management in Aerospace** Mark Norris, The SDMConsultancy	**Multiphysics Technical Working Group** Workshop details coming soon.
14.45	**Rule-based Automatic Mesh Sizing for FEA and CFD** Henry Bucklow, ITI	**Evaluation of Volume Cavity Replacement Technique on Industrial High-Fidelity CFD Models** Mahmoud Aboukhedr, BETA CAE Systems UK Ltd.	**How to succeed at SPDM** Mark Norris, The SDMConsultancy	
15.10	**E-Motor Development At Porsche: Using An Optimization-Driven Multi-Physics Design Process** Simon Guicheteau, Altair Engineering Ltd.	**Design and Optimization of Cooling System Component for Enhanced Airflow** Rachana Rao Mallyala, Dassault Systemes UK Ltd	**Democratization of the Dough Baking Process** James Dean, Double Precision Consultancy	
15.35	**The Story Behind Building the World's Fastest Fully Electric Aircraft** Sabrina Hafid, ANSYS UK Ltd	**Process Optimisation in Robotic Arc Welding by Computational Fluid Dynamics Methods** Alessio Basso, TWI Ltd		
16.00	REFRESHMENT BREAK & VENDOR PRESENTATION			

	7A - DIGITAL TWINS	7B - CFD 4	7C - INNOVATIVE APPLICATIONS
16.15	**Digital Twin : Myth or Reality?** **INVITED PRESENTER:** **Prashant Khapane, Jaguar Land Rover**	**A Reduced Order Modelling for Flight Mechanics Simulation of a Tilt Wing EVTOL Concept Hovering in a Cross-Wind Condition** Indi Tristanto, Rolls-Royce	**VMAP Enabling Interprobabilty Integrated CAE Simlution Workflows** Gino Duffett, NAFEMS
16.40	**Digital Twins in the Nuclear Industry: Implementation and Key Lessons** Konstantin Vikhorev, Virtual Engineering Centre	**A Conceptual Study of an Externally Cooled, High Voltage Underground Cable Crossing** Stephen King, Dassault Systemes UK Ltd	**Parallel Engineering Codes: Performance Optimisation with POP Methodology** Fouzhan Hosseini, The Numerical Algorithms Group Ltd (NAG)
17.05	**Hardware and Software System for Managing the Life Cycle of Gas Turbines** Danil Pimanov, Satratek		

END OF DAY 2