NAFEMS20
UK 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

PLENARY SESSION

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

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	2A - COMPOSITES	2B - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING 2	2C - SHEET METAL FORMABILITY – MATERIAL PROPERTIES, FAILURE AND SIMULATION	2D - UNCERTAINTY QUANTIFICATION 1
14.00	**European Materials Modelling Council** INVITED PRESENTER: **Gerhard Goldbeck, Goldbeck Consulting**	**Increase CAE Productivity Levels Utilizing Machine Learning** Tom Rosenwinkel, Open IT	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.	**Stochastic Topology Optimization For Robust And Reusable Designs** Johannes Neumann, Rafinex SARL
14.25	**Supporting Innovative Composite Technologies** Andrew Main, MSC software UK Ltd	**Artificially Intelligent Segmentation of a Shock Absorber X-ray CT Scan and Beyond** Emmanuela Baksiova, BETA CAE Systems UK Ltd		**Dealing with Uncertainty with Confidence** Edoardo Patelli, University of Strathclyde
14.50	**Multiscale Modelling of Random and Hybrid Discontinuous Tow Based Composites** Rizwan Choudhry, University of Derby	**Development of a Real-time Engine Temperature Monitoring System, Using AI Based on Accurate and Validated Thermal Simulation Data** Christian Semler, MAYA HTT	**WORKSHOP TOPICS – PART 1:** • **Introduction to sheet metal forming processes**	**Model Reduction and Uncertainty Quantification for Weld Simulations on Ferritic Materials** Jefri Draup, EDF Energy R&D
15.15			• **Characterisation of sheet metal material properties for use in simulation** • **Definition of process failureSimulations**	**Uncertainty in Simulation and Test** Jack Reijmers, Nevesbu

15.40 — SHORT BREAK & VENDOR PRESENTATION

	3A - ELECTROMAGNETICS	3B - INFRASTRUCTURE	3C - SHEET METAL FORMABILITY – MATERIAL PROPERTIES, FAILURE AND SIMULATION	3D - FROM GRAINS TO PROPERTIES	3E - UNCERTAINTY QUANTIFICATION 2
15.55	**Motor Design Optimisation Including Electromagnetic Performance and Mechanical Stress** Tamara Monti, Dassault Systemes UK Ltd	**Innovative Techniques for Bridge Assessment** Ricardo Teixeira , Mott MacDonald	**WORKSHOP TOPICS – PART 2:** • **Discussion of the different materials used in sheet metal forming**	**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.	**Effective Quadratures: Empowering Engineers with Open Source Computational Methodologies** Pranay Seshadri, The Alan Turing Institute
16.20	**3D Electromagnetic Eddy-Current Problems within the Finite Element Framework of Computing Platform FEniCS** Nunzio Palumbo, Rolls Royce plc		• **Description of how materials are tested to establish the required material parameters** • **Application of simulation with an example using the Forming Limit Test**		**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

10.35 **Rapid 3D Inspection of AM Components Using CT: From Defect Detection to Thermal Performance Simulation**
Celia Butler, Synopsys

11.00 **Structural Simulation of Components with Defects - A Workflow from Computed Tomography to Finite Element Simulation**
Beate Lauterbach, Volume Graphics GmbH

4B - CFD 1

10.35 **High-Fidelity CFD the Automotive and Motorsport Sectors In The Cloud**
INVITED PRESENTER:
Neil Ashton, Amazon Web Services

11.00 **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

11.40 **Finite Element Simulation of the Braiding Process**
Melodie Cueto Carrion, National Composites Centre

12.05 **Understanding the Manufacturing Cost Drivers of Tolerances**
Amanda Bligh, aPriori Technologies

12.30 **Understanding Powder Behaviour in an Additive Manufacturing Process by Using DEM**
Marina Sousani, DEM Solutions Ltd

12.55 **Manufacturing Process Chain Model in Composites Manufacturing**
Melodie Cueto Carrion, National Composites Centre

5B - CFD 2

11.40 **Using Fluid Dynamics for Simulating Exterior Ballistics Phenomena**
Véronique de Briey, Royal Military Academy

12.05 **Employing Advanced CFD to Predict Oil Distribution, Churning Losses and Gearbox Cooling**
David Percival, EnginSoft UK Limited

12.30 **Numerical and Experimental Evaluation of Tile Stoves Mode of Operation**
Florian Schüssler, ACAM Engineering GmbH

12.55 **Increasing Product Reliability with Reduced Order Models**
John Parry, Mentor, A Siemens Business

13.20 LUNCH BREAK & VENDOR PRESENTATION

6A - INNOVATIVE APPLICATIONS

14:20 — **Rule-based Automatic Mesh Sizing for FEA and CFD**
Henry Bucklow, ITI

14.45 — **E-Motor Development At Porsche: Using An Optimization-Driven Multi-Physics Design Process**
Simon Guicheteau, Altair Engineering Ltd.

15.10 — **The Story Behind Building the World's Fastest Fully Electric Aircraft**
Sabrina Hafid, ANSYS UK Ltd

15.35

16.00 — REFRESHMENT BREAK & VENDOR PRESENTATION

7A - DIGITAL TWINS

16.15 — **Digital Twin : Myth or Reality?**
INVITED PRESENTER:
Prashant Khapane, Jaguar Land Rover

16.40 — **Digital Twins in the Nuclear Industry: Implementation and Key Lessons**
Konstantin Vikhorev, Virtual Engineering Centre

17.05 — **Hardware and Software System for Managing the Life Cycle of Gas Turbines**
Danil Pimanov, Satratek

END OF DAY 2

6B - CFD 3

Windtech Technology - Measuring Cold Exposure via Conjugate Heat Transfer
Hassan Khawaja, UiT The Arktic University of Norway

Evaluation of Volume Cavity Replacement Technique on Industrial High-Fidelity CFD Models
Mahmoud Aboukhedr, BETA CAE Systems UK Ltd.

Design and Optimization of Cooling System Component for Enhanced Airflow
Rachana Rao Mallyala, Dassault Systemes UK Ltd

Process Optimisation in Robotic Arc Welding by Computational Fluid Dynamics Methods
Alessio Basso, TWI Ltd

7B - CFD 4

A Reduced Order Modelling for Flight Mechanics Simulation of a Tilt Wing EVTOL Concept Hovering in a Cross-Wind Condition
Indi Tristanto, Rolls-Royce

A Conceptual Study of an Externally Cooled, High Voltage Underground Cable Crossing
Stephen King, Dassault Systemes UK Ltd

6C - SIMULATION GOVERNANCE

A value-focussed approach to the deployment of Simulation Data Management in Aerospace
Mark Norris, The SDMConsultancy

How to succeed at SPDM
Mark Norris, The SDMConsultancy

7C - INNOVATIVE APPLICATIONS

VMAP Enabling Interprobabilty Integrated CAE Simlution Workflows
Gino Duffett, NAFEMS

Parallel Engineering Codes: Performance Optimisation with POP Methodology
Fouzhan Hosseini, The Numerical Algorithms Group Ltd (NAG)