NAFEMS20 UK CONFERENCE

OPENING OF CONFERENCE

MONDAY 9TH NOVEMBER 2020 | DAY 1 - MORNING SESSION

PLENARY SESSION

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

Introduction to NAFEMS Membership
Paul Steward, NAFEMS

REFRESHMENT BREAK & VENDOR PRESENTATION

1A - OPTIMISATION

Using Optimisation in the Design of the RWUAS Air Vehicle Structure
INVITED PRESENTER:
Gordon Mackenzie, Leonardo Helicopters

Rapid Stochastic Broadband Acoustics on GPUs
Mark Allan, Zenotech Ltd

Automated Shape Optimization Technology Coupled with Upfront CFD
Sean Horgan, 80/20 Engineering Ltd

1B - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Torsional Stiffness Simulation of Metallic Disc Membrane Couplings Considering Pre-Stretch and Post-Buckling Behaviour
Murat Islam, John Crane UK 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

A New Method for Fast Finite Element Explicit Crash Simulations
Jing Bi, Dassault Systèmes SIMULIA

1C - COMPUTATIONAL TRIBOLOGY 1

Recent Developments in Modelling Techniques to Study Surface Interactions in Tribology
INVITED PRESENTER:
Daniele Dini, Imperial College London

Optimization of Piston-Cylinder Liner Conjunction Micro-Geometry for Enhanced Tribo-Dynamic Performance
Stephen Bewsher, AVL List GmbH

Tribodynamic Modelling of High-speed Rolling Element Bearings Using Experimentally Obtained Boundary Conditions
Harry Questa, Loughborough University

1D - INTRODUCTION TO THE ESSENTIALS OF SPDM

This short taster training course will include an introduction to SPDM based on 20 years of production experience for engineers currently not using an SPDM solution. It will cover SPDM project successes, the core technology of SDM and SPDM, the different classes of solutions available, how SPDM fits with other engineering systems and the value obtainable from SPDM, including functional Digital Twins.

Mark Norris, the SDMConsultancy

LUNCH BREAK & VENDOR PRESENTATION

DAY 1 - AFTERNOON SESSION

PLENARY SESSION

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

REFRESHMENT BREAK & VENDOR PRESENTATION

2A - COMPOSITES

European Materials Modelling Council
INVITED PRESENTER:
Gerhard Goldbeck, Goldbeck Consulting

Supporting Innovative Composite Technologies
Andrew Main, MSC software UK Ltd

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

2B - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

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

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

SHORT BREAK & VENDOR PRESENTATION

3A - ELECTROMAGNETICS

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

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

PLENARY SESSION

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

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

SHORT BREAK & VENDOR PRESENTATION

4A - ADDITIVE MANUFACTURING

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

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

4B - CFD 1

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

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

REFRESHMENT BREAK & VENDOR PRESENTATION

5A - MANUFACTURING PROCESS

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

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

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

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

5B - CFD 2

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

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

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

Increasing Product Reliability with Reduced Order Models
John Parry, Mentor Graphics Corp.

LUNCH BREAK & VENDOR PRESENTATION

DAY 2 - AFTERNOON SESSION

6A - INNOVATIVE APPLICATIONS

Drag Coefficient Calculation of Cylindrical Structures Oscillating in Confined Fluid Environments
Rezana Zarshat, Expro North Sea Ltd.

Rule-based Automatic Mesh Sizing for FEA and CFD
Henry Bucklow, ITI

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

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

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

6C - SIMULATION GOVERNANCE

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

Democratization of the Dough Baking Process
James Dean, Double Precision Consultancy

How to succeed at SPDM
Mark Norris, The SDMConsultancy

REFRESHMENT BREAK & VENDOR PRESENTATION

7A - DIGITAL TWINS

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

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

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

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

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)

END OF DAY 2