### 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 Abdal, Mott MacDonald

**A New Method for Fast Finite Element Explicit Crash Simulations**  
Alex Van Der Velden, Dassault Systemes Inc

### 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

**Utilising Computational Tribology to Realise Multi-Scale Behaviour of Thin Solid Films**  
Robin Hildyard, 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**

### 1E - DYNAMIC BENCHMARKS

**SHARING GOOD PRACTICE IN EXPLICIT DYNAMICS**  

Workshop details coming soon.
DAY 1 - AFTERNOON SESSION

13:35 PLENARY SESSION

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

14:45 REFRESHMENT BREAK

16:50 SHORT BREAK

17:55 END OF DAY 1
<table>
<thead>
<tr>
<th>4A - ADDITIVE MANUFACTURING</th>
<th>4B - CFD 1</th>
<th>4C - COMPUTATIONAL TRIBOLOGY 2</th>
<th>4D - OPEN SPACES</th>
<th>4E - GETTING STARTED WITH ENGINEERING ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid 3D Inspection of AM Components Using CT: From Defect Detection to Thermal Performance Simulation</td>
<td>High-Fidelity CFD the Automotive and Motorsport Sectors</td>
<td>Multi-body Based Multi-physics Approaches to Simulate Modern Powertrain Tribodynamic Challenges</td>
<td>'Open Spaces' is a way to enable everyone attending the conference an opportunity to have their say and ask some poignant questions.</td>
<td>This exclusive free series of sessions will provide non-users of simulation with the information they need to take their next steps towards implementing an engineering analysis solution within their organisation. Through a series of training sessions, Q&amp;A's, discussions and case studies, this event will provide a platform for simulation success.</td>
</tr>
<tr>
<td>Celia Butler, Synopsys</td>
<td>INVITED PRESENTER: Neil Ashton, Amazon Web Services</td>
<td>INVITED PRESENTER: Günter Offner, Loughborough University &amp; AVL List GmbH</td>
<td>Delegates will create their own parallel working sessions around a central theme of strategic importance, such as:</td>
<td></td>
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<tr>
<td>Beate Lauterbach, Volume Graphics GmbH</td>
<td>Neeraj Cherukunnath, Rolls Royce Plc</td>
<td>Harry Questa, Loughborough University</td>
<td>• &quot;What is the future of linear elements in FEA analysis?&quot;</td>
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<tr>
<th>5A - MANUFACTURING PROCESS</th>
<th>5B - CFD 2</th>
<th>5C - WHAT ARE THE CHANCES OF THE SHIP SNAPPING? CONSIDERATIONS WHEN USING PROBABILISTIC ANALYSIS</th>
<th>5D - OPEN SPACES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finite Element Simulation of the Braiding Process</td>
<td>Using Fluid Dynamics for Simulating Exterior Ballistics Phenomena</td>
<td>In the April 2019 issue of NAFEMS BENCHMARK magazine, two challenge problems are presented.</td>
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<tr>
<td>Melodie Cueto Carrion, National Composites Centre</td>
<td>Véronique de Briey, Royal Military Academy</td>
<td>The first one consists of two normal distributions, producing an analytical (theoretical) solution. The second one contains several distributions (normal, uniform and lognormal), and therefore an exact solution is not available.</td>
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<tr>
<td>Understanding the Manufacturing Cost Drivers of Tolerances</td>
<td>Employing Advanced CFD to Predict Oil Distribution, Churning Losses and Gearbox Cooling</td>
<td>At the NAFEMS World Congress 2019 these problems were presented. In this special session at the UK Conference, these solutions and additional ones will be deliberated in combination with the theoretical background and the pitfalls of these methods.</td>
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<tr>
<td>Amanda Bligh, aPriori Technologies</td>
<td>David Percival, EnginSoft UK Limited</td>
<td>The NAFEMS Stochastics Technical Working Group</td>
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</tr>
<tr>
<td>Understanding Powder Behaviour in an Additive Manufacturing Process by using DEM</td>
<td>Numerical and Experimental Evaluation of Tile Stoves Mode of Operation</td>
<td>It is hoped that the result of ‘open spaces’ is a powerful, effective connecting and strengthening of what’s already happening in the engineering analysis community, planning and action, learning and doing.</td>
<td></td>
</tr>
<tr>
<td>Marina Sousani, DEM Solutions Ltd</td>
<td>Markus Trenker, Flowdynamics</td>
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<tr>
<td>Manufacturing Process Chain Model in Composites Manufacturing</td>
<td>Increasing Product Reliability with Reduced Order Models</td>
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</tr>
<tr>
<td>Melodie Cueto Carrion, National Composites Centre</td>
<td>John Parry, Mentor Graphics Corp.</td>
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**DAY 2 - MORNING SESSION**

08:30 **PLENARY SESSION**

**Climate Change – How Can Climate Models Help us to Respond?**

KEYNOTE SPEAKER: Vicky Pope, Met Office

**Innovation through Engineering Simulation - A Rolls-Royce Perspective**

INVITED PRESENTER: Akin Keskin, Rolls Royce

10:25 **SHORT BREAK**

11:25 **REFRESHMENT BREAK**

13:25 **LUNCH**

**TUESDAY 10TH NOVEMBER 2020 | DAY 2 - MORNING SESSION**

08:30 **PLENARY SESSION**

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13:25 **LUNCH**
DAY 2 - AFTERNOON SESSION

14:15
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 Halid, ANSYS UK Ltd

15:55
7A - DIGITAL TWINS

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

Survey Data Assimilation in Construction Sequence Simulation of a Large-scale Commercial Building
Ian Watson, Robert Bird Group

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
Egor Dobretsov, Satratek

REFRESHMENT BREAK

16:15
6B - CFD 3

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

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

Design and Optimization of Cooling System Component for Enhanced Airflow
Joe Amodeo, Dassault Systemes UK Ltd

Process Optimisation in Robotic Arc Welding by Computational Fluid Dynamics Methods
Alessie 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

SDM Discussion?

18:05
6D - VMAP STANDARD (RELEASE 0.4.0) FOR SIMULATION PROCESS INTEROPERABILITY

VMAP (vmap.eu.com), created via the almost-complete ITEA-VMAP project, has released a public version of the vendor-neutral standard for CAE data storage and transfer to enhance interoperability in virtual engineering workflows. This open and free-to-use standard defines data structures for geometry, discretization, material parameters, results and state variables and includes a software library to read/write the VMAP data files; test cases are also provided. The standard is supported by a strong community made up of industrial and software companies and vendors, experts from academia, etc.

This workshop/discussion will present the VMAP release, current software implementations, test and use cases and the VMAP community. There will be ample time for Q&A and enable participants to discuss their simulation process requirements, their data transfer, etc. with the possibility of engaging in the creation of functioning simulation processes.

6E - MULTIPHYSICS TECHNICAL WORKING GROUP PANEL DISCUSSION SESSION

Multiphysics Technical Working Group Workshop details coming soon.

19:05
7B - CFD 4

A Reduced Order Modelling for Flight Mechanics Simulation of a Tilt Wing VTOL 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

CFD Discussion Session

7C - INNOVATIVE APPLICATIONS

Simulation, Driving and Supporting Better Physical Experimentation
INVITED PRESENTER: Rob Lewis, TotalSim Ltd.

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

Industrial Digitalisation - Using Immersive Simulation to better Understand Data
Ian Cant, Virtual Engineering Centre

An Aircraft System Level Simulation for Feasibility Study of Electrification on Strategic Air Transports
Josepha Tristanto, Welbeck DSFC

7D - SHORT TASTER COURSE: COMPLETE GUIDE TO AUTOMATIC DESIGN OPTIMISATION

The short course will explain some practicalities of doing automatic design optimization as completely as possible. The course treats optimization generically, independent of sector, and will start by discussing design cycles, process simulation integration, design evaluations, design of experiments and move onto single and multi-disciplinary (MDO) and multi-objective optimizations (MOO). Time will limit the information provided and will not enable in depth discussion of more difficult concepts such as meta models, response surface, robust and statistical design.

Examples from different sectors will be used to discuss and highlight the different issues, advantages and disadvantages of the tools available.

Gino Duffett, NAFEMS