
NWC
NAFEMS
NAFEMSWORLDCONGRESS2015
21-24 JUNE | SAN DIEGO | CALIFORNIA | USA
A WORLD OF ENGINEERING SIMULATION
incorporating spdm INTERNATIONAL CONFERENCE
Simulation Process & Data Management
Agenda
nafems.org/congress

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Welcome

Dear Colleagues,

The biennial NAFEMS World Congress was established in order to strengthen worldwide alliances and working relationships between industry, research institutes, and academia in the area of engineering analysis and simulation. This international forum provides unique opportunities for the presentation and discussion of technical and scientific efforts by leading experts and managers in the domain.

Since its very beginning NAFEMS has remained consistent in providing up-to-date information on the latest technology in this area to the engineering community. I believe that the NAFEMS organisation has progressed over the past few years to take into account technology changes, membership priorities, the market place, and the ways in which engineers access information and progress their own professional development. Education and training remains a prime NAFEMS target, and much effort has been devoted in this area by the various NAFEMS Working Groups, the Executive, and the Council.

It is natural that specialists have the tendency to discuss their problems and findings with colleagues in the same technology field. However, there is an increasing tendency for engineers to look for solutions to their problems in other fields. NAFEMS provides such opportunity to connect these different specialists and bring them together for the advancement of analysis and simulation techniques and sharing of respective experiences with software vendors and computer providers for various engineering and scientific applications. World Congress participants are specially invited to join NAFEMS and benefit from the services which are being provided to its members.

It is our pleasure and honour to welcome you to the NAFEMS World Congress 2015 and we hope you will participate actively with the many leading professionals attending the valuable programme events which have been established. I hope you will find this event both enjoyable and rewarding.

Prof. Dr. C. Stavrinidis
NAFEMS Chairman

Contents

join the conversation #NAFEMS15

Sunday 21st June

Pre-Congress

09:30 - 11:00

Structural Optimization in FE Analysis

CFD for Structural Designers and Analysts

12:00 – 13:30

Composites FE Analysis

Introduction to Practical CFD

Introduction to SPDM

14:30 – 16:00

Fatigue & Fracture Mechanics in FE Analysis

Elements of Turbulence Modeling

Introduction to Business Value from Simulation Data Management - NAFEMS White Paper

16:30 - 18:00

Simulation V&V for Managers

15:00 Registration Opens

19:00 Congress & Exhibition Opening

20:00 - 21:00 NAFEMS Members Meeting

Please note that the official opening of the congress is at 19:00 on Sunday 21st of June.

These optional training courses are being offered as an additional free service on a first-come, first-served basis to delegates.

Monday 22nd June

08:30

Welcome: Costas Stavrinidis, NAFEMS Chairman
Sponsor Presentation: Steve Levine, Dassault Systèmes, USA
Keynote Presentation: Ferdinand Dirschmid, BMW Group, GER
Invited Presentation: Dennis Nagy, BeyondCAE, USA
Keynote Presentation: Klaus-Jürgen Bathe, Massachusetts Institute of Technology, USA
SPDM Keynote: Peter Coleman, Airbus Operations Ltd., GBR
Invited Presentation: Georg Schöpf, Additive Fertigung Magazine, AUT

Session 1

13:30 - 15:15

1A CFD 1
1B Dynamics 1
1C Composites 1
1D Optimization 1
1E Multiphysics 1 - Electro Mechanical /Electro Thermal
1F Systems Engineering 1
1G Emerging Issues
1H Analysis Management 1
1J Forum 3D-Printing / Additive Manufacturing
1K SPDM 1 - Introduction / Applications

Training Courses:
T1 Practical Modeling of Joints & Connections

Session 2

16:00 - 17:45

2A CFD 2
2B Dynamics 2
2C Composites 2 / Multiscale
2D Fracture & Fatigue 1
2E Stochastics 1 - Uncertainty Characterization
2F Systems Engineering 2
2G Manufacturing 1
2H Analysis Management 2 - V&V
2J Impact 1
2K SPDM 2 - Automotive

Training Courses:
T1 Dynamic FE Analysis
T2 CFD for Structural Designers and Analysts

18:30 Optional Dinner

Tuesday 23rd June

08:30

Keynote Speaker: Zlatko Penzar, Continental AG, GER
Keynote Speaker: Ahmed Noor, Old Dominion University, USA
Invited Presentation: Costas Stavrinidis, European Space Agency, ESTEC, NED
Invited Presentation: Joe Walsh, intrinSIM, USA

Session 3

11:00 - 12:25

3A CFD 3 / Acoustics
3B Multibody Simulation 1
3C Composites 3 - Failure
3D Computational Structural Mechanics
3E Multiphysics 2
3F High Performance Computing 1
3G Business Issues 1
3H ASME V&V
3J Forum 3D-Printing / Additive Manufacturing
3K SPDM - Vendor 1

Training Courses:
T1 Structural Optimization in FE Analysis
T2 Introduction to Practical CFD

Session 4

13:30 - 14:55

4A Fracture & Fatigue 2
4B Multibody Simulation 2
4C Composites 4 - Fibre-Reinforced
4D Impact 2 / Life Sciences
4E Multiphysics 3
4F High Performance Computing 2
4G CAE Driven Product Design 1
4H Simulation Governance
4J Forum 3D-Printing / Additive Manufacturing
4K SPDM - Aerospace

Training Courses:
T1 Fatigue & Fracture Mechanics in FE Analysis

Session 5

15:35 - 17:00

5A Premium Sponsor: Dassault Systèmes Simulia
5B Gold Sponsor: Ansys
5C Gold Sponsor: Siemens PLM Software
5D Gold Sponsor: Altair Engineering
5E Silver Sponsors: Autodesk / MSC Software
5F Silver Sponsor: Phoenix Integration
5G High Performance Computing 3 - Cloud
5H Stochastics 2 - Discussion
5J Forum 3D-Printing / Additive Manufacturing
5K SPDM - Sponsors: Esteco / Front End Analytics

Session 6

17:20 - 18:45

6A Premium Sponsor: Dassault Systèmes Simulia
6B Multibody Simulation 3
6C Education & Training
6D CAE Driven Product Design 2
6E SPDM - Vendor 2 A (in parallel with 6K)
6F Systems Engineering 3
6G High Performance Computing 4 - Cloud
6H Geometry Interaction with Simulation
6J Forum 3D-Printing / Additive Manufacturing
6K SPDM – Vendor 2 B (in parallel with 6E)

Training Course:
T1 Composites FE Analysis
T2 Simulation V&V for Managers

19:30 Gala-Dinner USS Midway

Wednesday 24th June

08:30

Keynote Speaker: Johan Jergeus, Volvo Car Corporation, SWE
Keynote Speaker: Walter Schmidt, Stryker Orthopaedics, USA
Invited Presentation: David Fitzsimmons, Airbus Operations, GER
Invited Presentation: Louis Komzsik, Siemens PLM, USA

Session 7

11:00 - 12:45

7A CFD 4 - Thermal
7B Materials
7C Optimization 2
7D Joints 1
7E Preprocessing 1
7F Stochastics 3 - Uncertainty Management
7G Analysis Management
7H Methods 1
7J Simulation & Systems Engineering
7K SPDM - Democratising CAE with SPDM

Training Course:
T1 Nonlinear FE Analysis
T2 Elements of Turbulence Modeling

Session 8

13:45 - 15:30

8A CFD 5 - V&V
8B Fracture & Fatigue 3
8C Optimization 3
8D Joints 2
8E Manufacturing 2
8F Preprocessing 2
8G Methods 2
8H Dynamics 3
8J CAD Geometry for Meshing
8K SPDM - Deploying SPDM

Training Course:
T1 Finite Element Analysis of Rotating Structures

15:45 Best Papers Awards Manfred Zehn (Vice Chairman of NAFEMS Council / TU Berlin)
AMD Raffle
Wrap-up & Farewell by Rod Dreisbach (Chairman NAFEMS Americas / Boeing, USA)
16:00 End of Congress

Keynote Speakers

NAFEMS is delighted to announce the first keynote presentations for the 2015 World Congress, as well as a series of invited presentations.

To complement the outstanding program of technical papers, workshops, discussion groups and training courses, the line-up of keynote and invited speakers is equally as strong, including experts and class-leaders in industry and academia from around the world.

Ferdinand Dirschmid
BMW Group
The CFRP Lightweight Structure of the BMW i8

Dr.-Ing. Ferdinand Dirschmid has been part of BMW Group in Munich, Germany since 2000. Having held various leading positions in the fields of structural design and passive safety, since 2010 Ferdinand has been responsible for structural design within "BMW I" (i3 and i8), which the company describes as "an all-encompassing, groundbreaking concept for sustainable mobility".

Klaus-Jürgen Bathe
Massachusetts Institute of Technology
Advanced Finite Element Analysis and its Future

Klaus-Jürgen Bathe is Professor of Mechanical Engineering at M.I.T. He teaches and performs research in the areas of applied and computational mechanics of structures, fluids, and electromagnetics. He is also the Founder of ADINA R & D, Inc. where he leads the development of the ADINA system. He has been honored by ASME, ASCE, U.S. National Academy of Engineering, M.I.T. for his achievements and for bridging the gap between academia and industry.

Peter Coleman
Airbus Operations
Reflections on SPDM for collaborative, multidisciplinary and agile Aircraft Product Development

Peter joined Airbus in 1999. His current role in the Airbus Engineering Research and Technology organization has a focus on next generation aircraft design definition and evaluation capabilities. This includes PLM, DMU, multi-physics and systems modelling & simulation technologies, as well as related interoperability standards and ICT infrastructure.

Zlatko Penzar
Continental AG
How Small (but fine) Simulations can also Radically Improve Industrial Products

Dr. Zlatko Penzar has been active in the field of CAE at Continental AG since 1991, and is currently a Senior Expert for Mechatronic Simulation. His role focusses on the simulation of new mechatronic brake systems, specifically system performance and its coupling to vehicle dynamics, and component properties such as hydraulic, mechanical, thermal, electro-magnetic and sensors.

Ahmed Noor
Old Dominion University
Potential of Cognitive Computing for Engineering Analysis and Design

Dr. Ahmed Noor has taught at numerous highly prestigious academic institutions including Stanford University, Cairo University, University of Baghdad, the University of New South Wales, George Washington University and the University of Virginia before joining Old Dominion University. Dr. Noor was also adjunct Professor of Mechanical and Aerospace Engineering, University of Florida, and the Florida Space Research Institute Distinguished Scholar of Advanced Learning Systems.

Johan Jergeus
Volvo Cars
Safety CAE in the Development of the All New Volvo XC90

Since 1998, Dr. Johan Jergeus has been working with Crashworthiness and Safety CAE at Volvo Cars Safety Centre. He worked with roof crush resistance and rear impact in the previous generation of V70 and S60 and was responsible for frontal impact CAE in the recently discontinued XC90. He is currently Technical Specialist with responsibility for all method development within Crashworthiness and Safety CAE.

Walter Schmidt, P.E.
Stryker Orthopaedics
The Drive to make Healthcare Better One Patient at a Time - Challenges and Opportunities for Modeling and Simulation

Walter Schmidt is a Senior Manager of the Modeling & Simulation group within the Advanced Technology department at Stryker Orthopaedics. He is currently a co-chairman of the American Society of Testing & Materials International (ASTM) "FEA in Orthopaedics" subcommittee, which is dedicated to the development of finite element analysis procedural standards for orthopaedic implants used in Food and Drug Administration (FDA) device submissions.

Invited Speakers

Costas Stavrinidis, European Space Agency, ESTEC

Dennis Nagy, BeyondCAE

David Fitzsimmons, Airbus Operations

Joe Walsh, intrinSIM

Louis Komzsik, Siemens PLM

Georg Schöpf, Additive Fertigung Magazine

nafems**membership**

More the 1,200 companies worldwide are members of NAFEMS encompassing industrial practitioners, vendors and academic institutions.

why**join**?

better collaboration

Build lasting business alliances

NAFEMS events and participation in our various working groups provide outstanding opportunities to forge lasting professional contacts throughout the world of engineering simulation.

Exchange knowledge & experience

NAFEMS is the ultimate forum for exchange of knowledge and experience. Learn from companies who face the same challenges.

Learn about the resources available

The requirements of your organisation are unique. We can empower you with the knowledge you need to take the correct business-critical decisions on your requirements.

Enhance your company's visibility worldwide

NAFEMS is the only organisation that brings together the major software developers, manufacturers, consultancies, and academic institutions from across the globe. Ensure your organisation is visibily part of this global community.

enhanced innovation

Develop your skills with the latest engineering simulation techniques

Your skills need to keep pace with the ever-advancing world of engineering simulation technology. NAFEMS is the only organisation dedicated to ensuring its members have access to the most advanced, sophisticated methods and thinking in the industry.

Be at the forefront

The competitive advantage provided by being at the cutting-edge of simulation technology is immeasurable. NAFEMS keeps you there.

Produce better-engineered products with enhanced customer satisfaction

Customer satisfaction will always be key. NAFEMS provides you with the opportunity use the latest technology in the most efficient manner, ensuring your customers will always receive the most innovative and effective products possible.

increased productivity

Optimize the design process

Learn about potential pitfalls and pick up time saving techniques.

Minimise costly physical testing

Increase confidence in your company's engineering simulation capabilities.

improved quality

Be committed to the highest standards

NAFEMS membership reinforces your focus on best practice.

Benchmark your organisation's simulation process

Learn first-hand about experiences of other organisations similar to your own.

nafems.org/join

Short Training Courses

As part of the NAFEMS World Congress 2015, attendees will have access to many training courses being held over the course of the congress. These courses will be t by NAFEMS tutors, and cover topics as diverse as Non-Linear Analysis, FEA for Managers, Practical CFD and Elements of Turbulence Modelling.

Attendees should have already booked their places in advance, as space is limited. If you have not already booked, please enquire at the NAFEMS registration desk and we will accommodate you if places are available.

Please note that the official opening of the congress is at 19:00 on Sunday 21st of June.

These optional training courses are being offered as an additional free service on a first-come, first-served basis to delegates.

Pre-Congress: Sunday 21st June

09:30 - 11:00

Structural Optimization in FEA **Tony Abbey**
This short over-view course is a condensed version of the standard NAFEMS training course on the topic. The objective of this course is to show you a broad overview of the range of FEA based tools available and what the methods and specializations of each encompass. Plentiful hints and tips will demonstrate powerful ways to use these methods. The goal is to achieve meaningful structural optimization in support of the most effective products.

CFD for Structural Designers and Analysts **Kamran Fouladi**
This course aims to introduce the essential principles of fluid dynamics, important flow phenomena, and basics of CFD process to structural engineers and how CFD can be beneficial for their multidisciplinary problems.

12:00 - 13:30

Composite FEA **Tony Abbey**
Due to the nature of the composite, the stress components can include many more terms than a conventional metallic material, for example. Whatever the nature of the challenge, the objective of this course is to break down the composite analysis process into clearly defined steps, give an overview of the physics involved and show how to successfully implement practical solutions using Finite Element Analysis.

Introduction to Practical CFD **Kamran Fouladi**
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. 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 best practices.

Introduction to SPDM **Peter Bartholomew**
This session will provide an overview to the fundamentals of Simulation Data Management. It will serve equally well as a basic introduction to those that are new to the technology, and a refresher for those who already have an elementary understanding of the concepts. It will provide an excellent foundation for delegates intending to attend aspects of the SPDM conference.

14:30 - 16:00

Fatigue & Fracture Mechanics in FEA **Tony Abbey**
The objective of this course is to break down the fatigue analysis process into clearly defined steps, give an overview of the physics involved and show how to successfully implement practical solutions using Finite Element Analysis.

Elements of Turbulence Modeling **Kamran Fouladi**
The objective of turbulence modeling is to develop equations that will predict the time-averaged velocity, pressure, and temperature fields without calculating the complete turbulent flow pattern as a function of time.

Introduction to Business Value from Simulation Data Management - NAFEMS White Paper **Mark Norris, Peter Bartholomew**
There are many strategies that companies can deploy when looking to implement an SDM solution. The NAFEMS SDM Working Group has developed and published a White Paper which has the clear objective of helping engineers to understand and to communicate the business value of SDM to their organization. This short training session will provide a summary of the White Paper and an interpretation of its key messages.

16:30 - 18:00

Simulation Verification & Validation for Managers **Jean-Francois Imbert**
This course provides an overview of simulation V&V for managers confronted with simulation-based decisions. It highlights the importance of simulation V&V in demonstrating simulation credibility in industrial contexts. It introduces the foundations of simulation V&V in line with current standards, relationships with product V&V, benefits for industrial organizations, implementation issues, and recommended practices.

Monday 22nd June

13:30 - 15:15

Practical Modeling of Joint and Connections

Tony Abbey

Most structures involve some form of jointing or connection. Traditional fabricated structures have used many thousands of bolts and rivets to connect components together in a continuous manner; in the case of ships and aircraft, the total can run into millions. The objective of this course is to review the various connection and joint technologies in use and give an overview of the physics involved and show how to successfully implement practical solutions.

16:00 - 17:45

Dynamic FEA

Tony Abbey

Based on the highly successful Basic and Advanced Dynamic FE Analysis e-learning courses, this combined short course will examine the breaking down of the dynamic problem into clearly defined steps.

CFD for Structural Designers and Analysts

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This course aims to introduce the essential principles of fluid dynamics, important flow phenomena, and basics of CFD process to structural engineers and how CFD can be beneficial for their multidisciplinary problems.

Tuesday 23rd June

11:00 - 12:25

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Wednesday 24thJune

11:00 - 12:45

Nonlinear FEA

Tony Abbey

Many problems facing designers and engineers are nonlinear in nature. The response of a structure cannot be simply 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. This short-course will examine these issues, and look at the best ways of dealing with these problems.

Elements of Turbulence Modeling

Kamran Fouladi

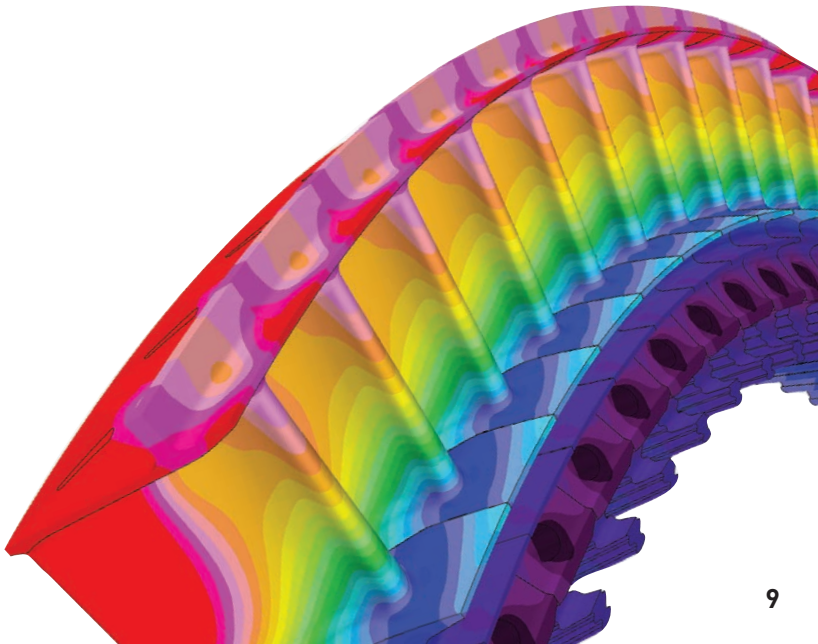
The objective of turbulence modeling is to develop equations that will predict the time-averaged velocity, pressure, and temperature fields without calculating the complete turbulent flow pattern as a function of time.

13:45- 15:30

Finite Element Analysis of Rotating Structures

Louis Komzsik

Rotational dynamics of flexible bodies with irregular shapes, such as propeller and turbine blades, requires FEA techniques, and this course covers the theoretical foundation and engineering application of the analysis of these structures.



Working Groups

The strong reputation that NAFEMS has earned, for inspiring engineering practitioners and promoting the effective use of simulation technology, is due in large part to the invaluable guidance and practical advice that is encapsulated within our publications. This material is developed by the many experts who volunteer their time to serve on our Technical Working Groups.

During the World Congress, we will be thrusting a spotlight on to these committees. The themes for the main conference sessions have been selected with the aim of highlighting the key areas of technical interest of the working groups. There will be an overview of their activities during various sessions, and representatives of the groups will be on hand to discuss topics further and to answer your questions. Do use this opportunity to speak with them and to ask about possibilities for getting involved.

Analysis Management

The NAFEMS Analysis Management Working Group has the remit to produce, monitor and maintain; guidance, procedures and advice relating to improving business practice and performance and best practice with respect to the definition and execution of engineering simulation.

Composites

The NAFEMS Composites Working Group was formed to create awareness and education for the simulation of composites by gathering independent information and providing independent analysis of composites simulation capabilities and needs.

Computational Fluid Dynamics

The NAFEMS CFD Working Group is concerned with all aspects of Computational Fluid Dynamics, including the flow of fluids (gases and liquids), heat and particulate flows. All computational approaches are included and the related technologies required whether for pre-processing, solving or post-processing.

Computational Structural Mechanics

The NAFEMS Computational structural mechanics working group is concerned with the branch of engineering that uses numerical methods to calculate deformations, deflections, internal forces and stresses within structures.

Dynamics and Testing

The NAFEMS Dynamics and Testing Working Group brings together analysts and experimentalists to form a common body of understanding in dynamics.

Dynamic analysis is required when a load or excitation is varying with time and the inertia of the structure is significant. In particular, the possibility of resonance must be considered.

Education & Training

The NAFEMS Education and Training Working Group is formed to examine the education and training needs for all numerical analysts and to provide information and documents to satisfy these needs.

The Education and Training Working Group are responsible for accrediting courses run by NAFEMS and other external agencies. In addition the working group support the NAFEMS Professional Simulation Engineer Scheme

Geotechnical

The NAFEMS Geotechnical Working Group was formed with the aim of developing guidelines for the practical application of numerical methods in geotechnical engineering.

Numerical analysis using finite element and finite difference methods has become a mainstream design tool within geotechnics in the last decade or so. This is due to the development of sophisticated yet accessible computer programs that can realistically model the ground and adjacent structures.

High Performance Computing

The NAFEMS High Performance Computing Working Group aims to provide a vendor-neutral, end-user driven consortium that promotes the effective use of High Performance Computing in engineering simulation.

High Performance Computing is used as an umbrella term for a range of technologies such as traditional supercomputing, grid computing, cloud computing, high throughput computing, hardware acceleration, data storage and visualization.

Multibody Dynamics

The NAFEMS Multibody Dynamics working group aims to foster discussions, benchmark methodologies, develop guidelines and highlighted the benefits gained by the use of multi body dynamics simulations.

Multi Body Simulation consists in modelling the dynamic behaviour of interconnected rigid or flexible bodies, each of which may undergo large translational and rotational displacements. It addresses the problems of modelling multiple bodies mechanical dynamics in complex systems, the design and validation of the control laws.

Multiphysics

The NAFEMS multiphysics working group has been set up to promote and support the use of Multiphysics simulation in industry

Industrial use of multiphysics simulations is a diverse and challenging topic. The main driving force is the need for more realistic numerical simulations of coupled problems, combined with the continuing improvements in hardware and software.

Optimisation

The NAFEMS Optimisation Working Group is responsible for promoting the adoption, further development and best practice of optimisation theory and methods to engineering simulation for the benefit of the analysis community.

Optimisation is the process of selecting the best option from a range of possible choices

nafems.org/groups

Simulation Data Management

The NAFEMS Simulation Data Management Working Group promotes the advancement of the technology and practices associated with the management of engineering simulation data management and processes.

Engineering simulation data encompasses the data, models, processes, documents and metadata intrinsic to performing modelling, simulation, and analysis.

Simulation Data Management provides for the management of data objects and metadata at all levels of granularity and abstraction, including design and analysis parameters, requirements, and results.

Stochastics

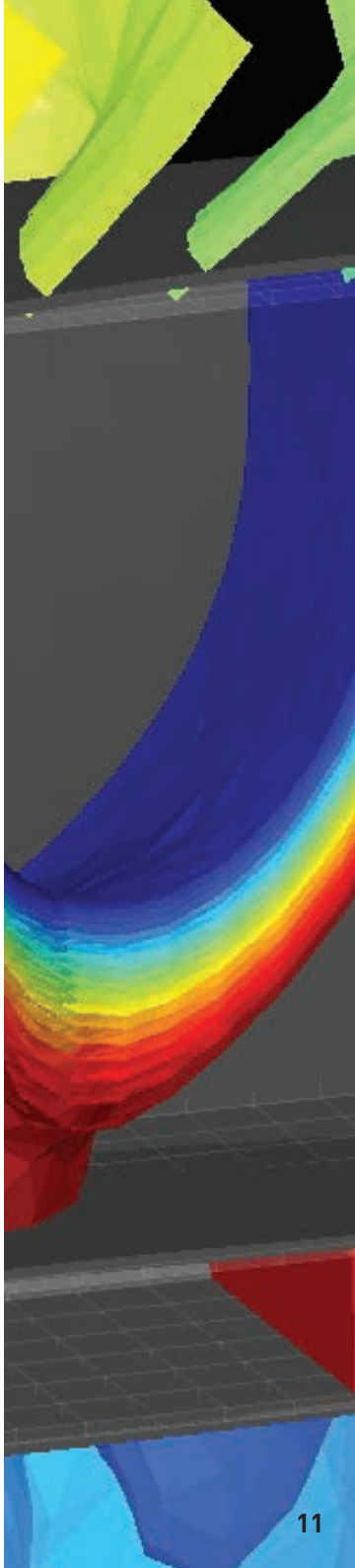
The NAFEMS Stochastics Working Group aim to accelerate the adoption and further the development of stochastic methods.

Uncertainty enters into numerical simulation from a variety of sources, such as variability in input parameters. Knowledge of the effect of uncertainties can lead the analyst to drastically different conclusions regarding which input parameters are most important. Quantifying the effect of uncertainty provide the analyst with an estimate of the true performance of a design.

Systems Modelling & Simulation

The NAFEMS Systems Modelling and Simulation Working Group focus is on the merging of engineering analysis with overall systems analysis to perform more realistic, accurate and lifelike behaviour modelling and simulation.

The Systems Modelling & Simulation Working Group is a collaboration between NAFEMS and INCOSE (the International Council on Systems Engineering).



Plenary Room

08:30 Opening / Welcome — C. Stavrinidis (Chairman NAFEMS Council), T. Morris, R. Oswald (NAFEMS)

09:00 Sponsor Presentation: Realistic Simulation Powers Innovation ..... S. Levine (Dassault Systèmes, USA)

09:15 Keynote Presentation: The CFRP Lightweight Structure of the BMW i8 ..... F. Dirschmid (BMW Group, GER)

09:40 Invited Presentation: Engineering Simulation: The Road Ahead ..... D. Nagy (BeyondCAE, USA)

10:00 Break

11:00 Keynote Presentation: Advanced Finite Element Analysis and its Future ..... K.-J. Bathe (Massachusetts Institute of Technology, USA)

11:25 Keynote Presentation: Reflections on SPDM for Collaborative, Multidisciplinary and Agile Aircraft Product Development ..... P. Coleman (Airbus Operations, GBR) spdm

11:50 Invited Presentation: How Additive Manufacturing and Engineering Simulation Influence Each Other ..... G. Schöpf (Additive Fertigung Magazin, AUT) Forum: Additive Manufacturing

12:15 Lunch break

1A CFD 1 — Room A

13:30 Chairman Welcome

13:35 Numerical and Experimental Stability Analysis Predicting Natural Laminar Flow Extension on Realistic Swept Wing
D. de Rosa, R. S. Donelli (CIRA Italian Aerospace Research Centre, ITA); D. G. Romano (Piaggio Aero Industries, ITA)

13:55 A Mixed Hybrid Finite Volume Scheme for Incompressible Navier-Stokes
M. Oriani (ESI Group, FRA / University of London, GBR); G. Pierrot (ESI Group, FRA)

14:15 Implementation of a Surface-to-Surface UV Radiation Model into a Commercial CFD Package
M. Benke (BHR Group, GBR)

14:35 Development of Validated CFD Methodology for Modelling of Pick Up Pipe with Screen
R. Chechare, S. Pachpund, J. Madhavan, S. Jakkan (Eaton, IND); K. Westwood (Eaton, GBR)

14:55 Stall Prediction of the Piaggio Aerospace P1XX Aircraft using a Lattice-Boltzmann Method Solution
D. M. Holman, Z. Abiza, R. Brionnaud (Next Limit Dynamics, ESP); G. Travostino (Piaggio Aerospace, ITA)

1B Dynamics 1 — Room B

13:30 Chairman Welcome

13:35 Reliability Analysis of Heat Exchanger Fuel Cell for Life Improvement
Y.-H. Jang, J.-M. Lee, B.-H. Ahn, J.-M. Ha, B.-K. Choi (Gyeongsang National University, KOR); S.-H. Kim (Posco Energy, KOR)

13:55 Three-Dimensional Vibration Isolator for Suppressing High-Frequency Responses for Sage III Contamination Monitoring Package (CMP)
Y. Li, S. Cutright, R. Dyke, J. Templeton, J. Gasbarre, F. Novak (NASA Langley Research Center, USA)

14:15 Case Study: Use of FE Modal Simulation to Solve Vibration Problems in a Solid-Liquid Separation Centrifuge
J. Fernando, P. Alves, R. Chune (AP Dynamics, CDN)

14:35 Coupled Facility/Payload Vibration Modeling Improvements
T. Carnahan (NASA-GSFC, USA); M. Kaiser (ASRC Federal Space and Defense, USA)

14:55 How to Cope with Uncertainties in Boundary Conditions and Couplings of Substructures
N. Wagner, R. Helfrich (Intes, GER)

1C Composites 1 — Room C

13:30 Chairman Welcome

13:35 Composite Structures Optimization Including Non-Linear Analysis, Design and Manufacturing Considerations
M. Bruyneel, P. Morelle (Siemens PLM Software, BEL); L. Hudson (Siemens PLM Software, GBR); S. Grihon (Airbus Civil Aircraft, FRA)

13:55 A Computational Design Approach for Composite Structures at the Early Embodiment Design Stage
D. Klein, W. Malezki, S. Wartzack (University of Erlangen-Nuremberg, GER)

14:15 FP7 European Project: Application to Hybrid Thermoplastic Yarn for 3D Complex Shaped Thermoplastic Composite Structures
A. Tramecon, Y. Duplessis Kergomard, M. Blondel (ESI Group, FRA); E. Lamers (Reden BV, NED)

14:35 Modeling and Performance Analysis of Aluminium Metal Matrix Composite Pistons by using CAE Tools
A. L. Ramanath (Cambridge Institute of Technology, IND); S. K. N. Kulkarni (BTL Institute of Technology, IND)

14:55 Industrial Validation of Progressive Damage Models for Laminated Composite Materials and Structures: Automotive Applications
M. Bruyneel, C. Lequesne, P. Jetteur, J. P. Delsemme (Siemens PLM Software, BEL); B. Magneville, V. Maurice, L. Soppelsa (Siemens PLM Software, FRA); Y. Urushiyama, T. Naito (Honda R&D, JPN)

1D Optimization 1 — Room D

13:30 Chairman Welcome

13:35 Composite Materials Multi Objective Optimization of a Formula 1 Front Wing
G. Korbetis, D. Drougkas (Beta CAE Systems, GRE)

13:55 Optimizing Thermomechanical Strength of High-Load Turbochargers
E. Rieder, P. A. Klumpp (Audi, GER); M. Werner, F. Jurecka (Dassault Systèmes, GER)

14:15 Multi-Strategy Intelligent Optimization Algorithm for Computationally Expensive CAE Simulations
S. Costanzo, M. Engel (Esteco, ITA); Z. Xue, S. Parashar (Esteco North America, USA); C.-H. Chuang (Ford Motor Company, USA)

14:35 Virtualizing the Flexible Hose Design Process
P. Andry, J. Coloos, M. Bruyneel (Siemens PLM Software, BEL)

14:55 A Novel Topology Optimisation Approach Applied for the Design of Hollow Turbine Blades
K. S. Raghavan (Cyient, IND)

1E Multiphysics 1 - E.-Mech/E.-Therm — Room E

13:30 Chairman Welcome

13:35 A Comprehensive Integration Methodology based on Multi-Physics Cosimulation. Case Study: Electro-Thermal Simulation of a Drilling System in a Harsh Environment
P. Boulon (Chiastek, USA); M. Garay, E. Hidalgo Lopez, B. Triquigneaux, M. Bareille (Altran Technologies, FRA)

13:55 Large Transformers - Challenges and Opportunities in Electro-Thermal Simulation for Optimal Electric Performance and Thermal Management
A. Khebir, A. Krishnan (ElectroMagneticWorks, CAN); R. Castro Lopes, (efafec Transformers, POR)

14:15 A Numerical Analysis of a Digital Micro Mirror Device (DMD) Performance
K. Jain, A. Roy (ESI Group, USA)

14:35 Co-Simulation Algorithm for Handling Field-Signal Interaction
V. Belsky, A. Kürkchübasche, (Dassault Systèmes Simulia, USA); S. Sicklinger (Technical University Munich, GER)

14:55 Thermal Performance Evaluation of Air Circuit Breaker (ACB) using Coupled Electric-Thermal Analysis
V. Deshmukh, A. Guha, S. Singh, Subhash NN (Eaton India Engineering Centre, IND); R. Kanapady (Eaton, USA)

15:15 Break

2A CFD 2

16:00 Chairman Welcome

16:05 Computational Analysis of Spray Injection Inside Quench Tower
W. Kalata, K. J. Brown, R. J. Schick (Spraying Systems, USA)

16:25 Evaluating Water Film and Radiation Modeling Technologies in CFD for Automotive Lighting
G. Dumnov, A. Ivanov, A. Muslaev, M. Popov (Mentor Graphics, RUS); J. C. Watson (Mentor Graphics, USA)

16:45 A Study on CFD Application for Scroll Compressor Analysis
I. G. Son, Y. Kil Cha, K. I. Kim (Halla Visteon Climate Control, KOR); J. Hyoung Jun (CD-adapco Korea, KOR)

17:05 Effects of Turbulence Model and Grid Resolution on the Performance Prediction of a Bulb Turbine
D. Jošt, M. Morgut (Turboinštitut, SLO); A. Škerlavaj (University of Trieste, ITA); E. Nobile (Università degli Studi di Trieste, ITA)

17:25 Numerical Evaluation of a Gas Liquid Axial Cyclone Separator
L. D. Pérez, (Intevep, VEN); H. Zambrano, M. Asuaje (Universidad Simón Bolivar, VEN)

2B Dynamics 2

16:00 Chairman Welcome

16:05 Prediction of Damaging Downhole Shock and Vibration for Rotary Steerable Drilling Systems using Finite Element Simulation
N. Abedrabbo, L. Lines, L. Ring (Weatherford, USA)

16:25 Accurate Estimation of Peak von Mises Stress and Composite Failure Metrics in Random Simulation
J. Desfossés, P. Tremblay (MAYA HTT, CDN); A. MacLean (McGill University, CDN)

16:45 Modeling of Geometric Mistuning in Bladed Rotors
N. Wagner, R. Helfrich (Intes, GER)

17:05 High Fidelity Rotordynamic Analysis
D. Kumar, P. R. Pamidi, H. Patel (MSC.Software, USA)

17:25 Analysis of Flexible Shaft – Bladed Disks Rotating Systems based on Equivalent Axi-Symmetrical Models
F. D'Ambrosio, N. Kill, P. Morelle (Siemens PLM Software, BEL); F. Hiss (Siemens AG, GER)

2C Composites 2 / Multiscale

16:00 Chairman Welcome

16:05 Progressive Damage and Nonlinear Analysis of Discontinuous Long-Fiber Thermoplastic Composites
M. H. Kilic, A. Khawaja (Greene, Tweed & Co., USA)

16:25 Impact and Post Impact Delamination Evolution of Honeycomb Sandwich Structure
F. Abdi, M. R. Talagani, C. Godines, M. Villa (AlphaSTAR, USA); R. Yancey, H. Thomas (Altair Engineering, USA)

16:45 Fiber Reinforced Plastic Durability: From Material Microstructure to Structural Part Life Predictions
P.-Y. Lavertu, B. Bidaine, L. Adam, K. Danielson, R. Assaker (e-Xstream engineering, BEL); G. Robert, O. Moulinjeune (Solvay Engineering Plastics, FRA)

17:05 Experimental Validation and Uncertainty Quantification of Partitioned Models
G. Stevens, S. Atamturktur (Clemson University, USA)

17:25 Innovative Metal Forming Simulations Based on Hierarchical Multi-Scale Modelling
P. Eyckens, J. Gawad, D. Roose, M. Seefeldt, P. Van Houtte, A. Van Bael (KU Leuven, BEL)

2D Fracture & Fatigue 1

16:00 Chairman Welcome

16:05 Simulation of Stable Ductile Tearing using Re-Mesh Techniques Coupled with Nodal Release
E. Hutchison, T. London (TWI, GBR)

16:25 XFEM Application to Crack Growth Correlation in Aeronautical Structures
I. Rivero Arevalo, J. Gómez-Escalonilla (Airbus Defence & Space, ESP); Á. García, V. Ramírez, D. Garijo (Safran Engineering Services, ESP)

16:45 Advanced Simulations for AGR Nuclear Power Plants' Structural Integrity
P. Martinuzzi, V. X. Tran, A. Steer, N. McLachlan (EDF Energy, GBR); M. Bérot (University of Manchester, GBR

17:05 Comparison of Different Local Stress Approaches for Fatigue Assessment of Subsea Equipment Based on Finite Element Analysis
H. Bottino Di Gioia Almeida, A. M. Calhau, C. F. Bandeira (Technip, BRA)

17:25 Fatigue Life From Sine-On-Random Excitations
F. Kihm (HBM-nCode Products, FRA); A. Halfpenny (HBM-nCode Products, GBR)

2E Stochastics 1 - Uncertainty Characterization

16:00 Chairman Welcome

16:05 Statistical Results and Sensitivity Analysis of a Monte Carlo Fatigue Simulation for an Aluminum Arc-Shaped Specimen
J. Raphael (J R Technical Services, USA); B. McPheeters (Autodesk, USA)

16:25 Efficient Epistemic-Aleatory Uncertainty Quantification: Application to the NAFEMS Challenge Problem
R. Rocchetta, E. Patelli, M. Broggi (University of Liverpool, GBR)

16:45 The Ramifications for Design Performance of Max Metal Machining Practices in High Value, High Precision Applications
G. May, A. Kumar Sinha (Rolls Royce, GBR); P. Rowe (Bourton Group, GBR)

17:05 A Fast Uncertainty Quantification with Some Examples
P. Qian (SmartUQ, USA)

17:25 Uncertainty Management and Resilient Design of Safety Critical Systems
E. Patelli, M. Broggi (University of Liverpool, GBR)

17:45 End of day 1

18:30 Optional Dinner

1F Systems Engineering 1

Room F

13:30 Chairman Welcome

13:35 Predictive Evaluation of the Fuel Economy vs. NVH Trade-Off using Co-Simulation
M. Felice, J. Liu (Ford Motor Company, USA); J. Zeman, L. Forasté Gómez (Gamma Technologies, USA); M. Platten (Romax Technology, GBR); W. Sun (MSC. Software, USA)

13:55 A Primer on Model Based Systems Engineering
B. Brothers (Dassault Systemes Simulia Corp., USA)

14:15 Determination of Functional Intersections between Multiple Tolerance-Chains by the Use of the Assembly-Graph
F. Litwa, M. Gottwald, J. Forstmeier (Daimler, GER); M. Vielhaber (Saarland University, GER)

14:35 Model Based Systems Engineering: Successful Requirements Development, System Design, Process Integration and Design Optimization for Systems Engineering
S. Kleiner, M. Krastel (:em engineering methods, GER)

14:55 State-Aware Calibration for Inferring Systematic Bias in Computer Models of Complex Systems
S. Atamturktur, A. Brown (Clemson University, USA)

1G Emerging Issues

Room G

13:30 Chairman Welcome

13:35 Modelling Sand and its Impact with Vehicle to Design Robust Vehicles
P. Khapane (Jaguar Land Rover, GBR); M. Bhagwani (Jaguar Landrover ODEC, IND)

13:55 Modeling of Tires Rolling on Roads in Wintry Weather with Material Point Method
A. Clucas, P. Sannecy, E. Zhang, Y. Zhang (Oregon State University, USA)

14:15 Deep Water Wading Simulation of Automotive Vehicles
P. Khapane, U. Ganeshwade, J. Senapathy (Jaguar Land Rover, GBR); I. Kalmykov, P. Bayrasy, K. Wolf (Fraunhofer Institut SCAI, GER)

14:35 New Methodologies Applied to Medium and High Energy Impact on Aeronautical Parts
J. R. Sainz de Aja, Y. Essa, F. Martin de la Escalera (Aernnova, ESP)

14:55 Discussion

1H Analysis Management 1

Room H

13:30 Chairman Welcome

13:35 A NAFEMS QSS001 Compliant Analysis Management System – An Overview
M. Nurbhai, S. Chetwynd (AWE, GBR)

13:55 A Method for Assigning a Confidence Rating to Finite Element Analyses
S. Chetwynd (AWE, GBR)

14:15 A Concept for FE Plausibility Checks in Structural Mechanics
T. C. Spruegel, M. Hollman, S. Wartzack (University of Erlangen-Nuremberg, GER)

14:35 Improving User Confidence in Structural Modelling
S. Hendry (Oasys, GBR); C. Kaethner, R. Kannan (Arup, GBR)

14:55 Incorporating Workflow for V&V/UQ in the Sandia Analysis Workbench
E. J. Friedman-Hill, E. L. Hoffman, M. J. Gibson, R. L. Clay (Sandia National Laboratories, USA); K. H. Olson (SAIC, USA)

Forum: Additive Manufacturing and 3D Printing in Design and Engineering

Room J

1J - Forum: Additive Manufacturing

13:30 Chairman Welcome

13:35 Variability in Mechanical Properties of ABS Parts Produced by Fused Deposition Modeling
M. Faes, B. van Hooreweder, Y. Wang, P. Lava, D. Moens (KU Leuven, BEL)

13:55 Process Simulation of Additively Manufactured Fiber Reinforced Thermoplastic Vehicle
F. Abdi, F. Talagani, C. Godines, R. Dutton, S. DorMohammadi (AlphaSTAR, USA); V. Kunc, B. Compton, B. Post, S. Simunovic, C. Duty, L. Love, C. Blue (Oak Ridge National Laboratory, USA)

14:15 Mechanical Strength Validation Strategy for High Performance Additive Manufactured Material
S. Forsman, T. Månsson (GKN Aerospace Engine Systems, SWE)

14:35 3D Printing as Ideal Method to Create 3D High-Performing Flow Duct Designs
J. Iseler (Dassault Systèmes Simulia, GER)

14:55 Discussion

spdm INTERNATIONAL CONFERENCE Simulation Process & Data Management

Room K

1K - SPDM 1 – Introduction / Applications

13:30 Chairman Welcome

13:35 Introductory Presentation: SPDM3.0 is Here, How to Succeed with Three Generations of SPDM
M. Norris (theSDMconsultancy, GBR)

13:55 Behavior Based Engineering Collaboration
A. Navarro, P. Grimberg (Digital Product Simulation, FRA); J. Walsh (intrinSIM, USA)

14:15 Discussion Contribution: Getting SPDM Requirements Right to Drive Broad Adoption at Procter & Gamble
K. Comstock (The Procter & Gamble Company, USA)

14:35 Multidisciplinary Multimodel Design Optimization from an Enterprise Perspective
M. Nicolich (Esteco, ITA)

14:55 Engineering for Everyone: „Lights-Out" Automation Through Intelligent Fit-for-Purpose Applications
J. F. Betts, M. A. Walker (Front End Analytics, USA)

T1 / T2 Short Training Courses

Short Training Courses:
Practical Modeling of Joints & Connections (Training Room 1)

2F Systems Engineering 2

16:00 Chairman Welcome

16:05 Model-Learning for Power Consumption Simulation through Control Signals
P. Eberspächer, A. Lechler (University Stuttgart, GER); A. Verl (Fraunhofer-Gesellschaft, GER)

16:25 Integrating Physical Interaction and Signal Flow Simulation with Systems Engineering Models
C. Bock, (National Institute of Standards and Technology, USA); I. Matei (Palo Alto Research Center, USA); R. Barbau (Engsys, USA)

16:45 Simulation of Hydraulic Downhole Drilling Tool Validated with Experimental Data and Case Studies is used to Optimise Drilling Programmes and Conduct Design Sensitivity Analysis
I. Milsom, D. Minett-Smith, N. Holmes (Weatherford International, GBR); V. Coveney (University of Bath, GBR)

17:05 Using System Simulation to Generate Validated Loss Coefficients for System Simulation
J. Murray (Mentor Graphics, GBR)

17:25 Discussion

2G Manufacturing 1

16:00 Chairman Welcome

16:05 Application of the Lattice Boltzmann Method for Simulation of the Mold Filling Process in the Casting Industry
M. Szucki, J. S. Suchy, J. Lelito, P. Malinowski (AGH University of Science and Technology, POL); J. Sobczyk (The Strata Mechanics Research Institute, POL)

16:25 Induction Heating Simulation for the Plastic Injection Molding Process
D. Robbins (Autodesk, USA); C. Kietzmann, D. Astbury (Autodesk Australia, AUS); J. Feigenblum, S. Quilliet (RocTool, Savoie Technolac, FRA); L. Chen (Autodesk, CHN)

16:45 Advances in Virtual Process Chain and Connection with On-Line Monitoring Methods for First Time Right Manufacturing of Thermoset Laminated Composites
C. Brauner, A. Miene, R. Gaitzsch, A.S. Hermann (Bremen University, GER); F. Pascon, M. Bruyneel (Siemens PLM Software, BEL)

17:05 Development of Numerical Simulation Tool for Peen-Forming Process Parameters Optimization
Y. Essa, F. Martín de la Escalera (Aernnova, ESP); M. Laspalas (Technological Institute of Aragon, ESP); E. Zamora (Aerometallic, ESP); Á. Escolán, B. Hernández-Gascón (Itainnova, ESP)

17:25 The Development and Application of E-Coating Prediction Technique for Chassis Part
I. Hong, B. Park, Y. Yoo (Hyundai Motor Company, KOR)

2H Analysis Management 2 - V&V

16:00 Chairman Welcome

16:05 Foundations of Verification and Validation – A Logical Derivation from the Scientific Theory of Truth
J. Smith (Compusis, GBR)

16:25 Large Scale Models for A350
D. Fitzsimmons, M. Mahé (Airbus, FRA)

16:45 Review of CAE-TEST Correlation and Prediction Level Based on Data
K. Dong Ho (Hyundai Motor Company, KOR)

17:05 Convergence Checks in the Presence of Nonmonotonic Convergence
J. Beisheim (Ansys, USA); G. Sinclair, L. A. Bilich (Louisiana State University, USA)

17:25 Structural Components Based Verification Process for FEA Models
C. Teague (Saratech, USA); W. Van den Bos (Delft University of Technology, NED)

2J - Impact 1

Room J

16:00 Chairman Welcome

16:05 Hypervelocity Impact Simulation on Hard Ballistic Composites
M. May, T. Lässig (Fraunhofer Institute EMI, GER)

16:25 An Overview of Crash and Impact Simulation at Airbus
B. Malherbe (Airbus Operations, FRA)

16:45 Coupled Euler Lagrangian Analysis – Flexible Pipe – Seabed Interaction during Dropped Object Impact
A. E. Gill (Wild Well Control, USA)

17:05 Analysis and Verification Approach for Design of a Lightweight Orion Heat Shield Carrier Structure
E. Gustafson, J. Jeans (Structural Design and Analysis, USA); J. Ainsworth (Collier Research, USA)

17:25 Influence of Drop Test Setups on the Dynamic Impact Response of Inductive Components
C. Simoes-Kuhlmann, J. Schliewe, S. Weber (Epcos, GER)

2K SPDM 2 – Automotive

16:00 Chairman Welcome

16:05 Discussion Contribution: The Future of Simulation Collaboration in the Auto Industry
A. Diachun (Ford Motor Company, USA

16:25 Meta Modelling of Body-in-White Processes as a Sustainable Knowledge Base during Series Production
A. Beckmann, F. Litwa, M. Bohn (Daimler, GER); P. Gust (University Wuppertal, GER)

16:45 Discussion Contribution: A New Innovative Methodology of Simulation Process & Data Management in Hyundai Motors
K. R. Yoon (Hyundai Motors, KOR)

17:05 Development of Automated Durability Analysis System for Chassis Module
J. Koo (Hyundai Mobis, KOR)

Simulation Data Management in Ashok Leyland
D. Karmakar (MSC.Software, IND); S. Sarma Akella, P. T. Haridas (Ashok Leyland, IND)

Short Training Courses:
Dynamic FE Analysis (Training Room 1)
CFD for Structural Designers and Analysts (Training Room 2)

Conference agenda subject to alterations.

* Subject to final review approval

Plenary Room

08:30 Keynote Presentation: How Small (but ne) Simulations can also Radically Improve Industrial Products ..... Z. Penzar (Continental, GER)

08:55 Keynote Presentation: Potential of Cognitive Computing for Engineering Analysis and Design ..... A. Noor (Old Dominion University, USA)

09:20 Invited Presentation: Space Vehicle Development and Veri cation ..... C. Stavrinidis (European Space Agency, ESTEC, NED)

09:45 Invited Presentation: The Changing Role of Simulation ..... J. Walsh (intrinSIM, USA)

10:10 Break

11:00

3A CFD 3 / Acoustics — Room A

11:00 Chairman Welcome

11:05 Noise Propagation from Vibrating Structures
R. Helfrich, M. Spriegel (Intes, GER)

11:25 Acoustic Finite Element Model Validation of Vehicle Interior Cabin from Acoustic Mode and Transfer Function
K. H. Hwang, S. C. Choi (Hyundai Motor Company, KOR); B. V. Genechten, J. H. Jeon, E. Brechlin (Siemens Industry Software, BEL)

11:45 Finite Element Vibro-Acoustic Simulation of Roll-Formed Steel Studs in Partition Walls
A. Arjunan, K. Yahiaoui (University of Wolverhampton, GBR); C. J. Wang (University of Sussex, GBR); T. Morgan, M. English (Hadley Industries, GBR)

12:05 Simulating Sound Transmission Loss through Aircraft Fuselage Panels: An Update on Recent Technology Evolutions
A. Peiffer, C. Moser (Airbus Group Innovations, GER); N. Tzannetakis, K. De Langhe, R. Boeykens (Siemens PLM Software, BEL)

3B Multibody Simulation 1 — Room B

11:00 Chairman Welcome

11:05 Towing CAE Capability Growth using Multi-Body Simulation at JLR
P. Khapane, A. Blows, J. Senapathy (Jaguar Land Rover, GBR)

11:25 Multibody Analysis of a Two Axis Oriented Deployable Solar Array
A. Giovannini (Thales Alenia Space, FRA)

11:45 Unsteady Aerodynamics in Multibody Simulation For Aircraft Loads Prediction
A. Castrichini, Y. Lemmens (Siemens PLM Software, BEL); J. E. Cooper (University of Bristol, GBR)

12:05 Discussion

3C Composites 3 - Failure — Room C

11:00 Chairman Welcome

11:05 Models for Intralaminar Damage and Failure of Fiber Composites – A Review (Part 1)
K. Rohwer (German Aerospace Center, GER)

11:25 Models for Intralaminar Damage and Failure of Fiber Composites – A Review (Part 2)
K. Rohwer (German Aerospace Center, GER)

11:45 Facesheet/Core Disbond Growth in Honeycomb Sandwich Panels Subjected to Ground-Air-Ground Pressurization and In-Plane Loading
Z. M. Chen (University of California, USA); R. Krueger (National Institute of Aerospace, USA); M. Rinker (Rolls-Royce Deutschland, GER)

12:05 Post-Buckling Behaviour Simulation of thin Curved Composite Panels in Airbus Defence and Space: Review of Numerical Methods
E. Oslé, R. Tejerina, F. Sánchez-Iglesias, G. Baños (Airbus Defence and Space, ESP)

3D Computational Structural Mech. — Room D

11:00 Chairman Welcome

11:05 Nonlinear Contact Analyses and its Applications
W. N. Liu, F. Yu (MSC.Software, USA); C. Gelten (MSC.Software, NED)

11:25 Extending Standard Sizing of Ball Screws to Consider Unequal Load Distributions
T. Münzing, H. Binz (University of Stuttgart, GER); F. Pacieri, S. Toro (Umbra Cuscinetti, ITA)

11:45 Static Load Test with Nonlinear Material Analysis of Rionegro Bajo, Lajas and El Reposo Segmental Concrete Bridges
S. Ayala, I. Ayala (Tensex Engineering, COL)

12:05 Discussion

3E Multiphysics 2 — Room E

11:00 Chairman Welcome

11:05 Fixing Thrust Reverser Composite Cascades Aerodynamic Loading Issues
O. Calme, Q. Desbonnets, F. Ribour (Ingeliance Technologies, FRA)

11:25 Fluid-Structure-Control Interaction for Simulating the Emergency Brake Maneuver of Wind Turbines
S. Sicklinger (Technical University Munich, GER); A. Kürkchübasche, V. Belsky (Dassault Systèmes Simulia, USA)

11:45 Durability Analysis of HD Engine Exhaust Manifold using CFD-FE Coupling
S. Eroğlu, A. H. Güzel (Ford Otosan, TUR)

12:05 Coupled Thermal Mechanical Simulation of Aero Engines
M. Donley (Siemens PLM Software, USA); S. Prabhakar (Maya Heat Transfer, CAN)

12:25 Lunch break

13:30

4A Fracture & Fatigue 2

13:30 Chairman Welcome

13:35 Development of Parametric Stress Intensity Magni cation Factor Equations for Pipeline Girth Weld Root Defects
T. London, D. De Bono, Y. H. Zhang, E. Hutchison (TWI, GBR)

13:55 A Uni ed Model of Axisymmetric Stress Intensity Factors Computation
J. Zuo, G. Lin, G. Bhashyam (Ansys, USA)

14:15 Examination of Non-Intuitive Stress Intensity Solution Trends for Thick-Wall Cylinder Internal Cracks from ASME STP-PT-072
G. Thorwald (Quest Integrity Group, USA)

14:35 The Study on Fracture Analysis Method using Wilkins Rupture Model
J. Song (Hyundai Motor Company, KOR)

4B Multibody Simulation 2

13:30 Chairman Welcome

13:35 High Fidelity, Nonlinear Powertrain NVH System Modelling Approach using Multi-body Simulation and Non-Linear FEA Solution
M. Felice, D. Jimenez, W. Nie, N. Gummadi (Ford Motor Company, USA); W. Röver, R. Solomon (Dassault Systems Simulia, USA)

13:55 Strongly Coupled Approach for Integrating Non-Linear Local Finite Element Models in Multibody Dynamics Simulations
F. Cugnon, P. Jetteur, F. Pascon, T. van Eekelen (Siemens PLM Software, BEL)

14:15 An Enhanced Algorithm for Co-Simulation of Large Multi-Body and Finite Element Systems
M. Tateishi, I. Ishikawa (MSC.Software, JPN); J. Ortiz (MSC.Software, USA)

14:35 Combined Solving Of Multi-Body and Nonlinear Finite Element Equations – Illustrated with Simulation Of Pressing Machine Dynamics
G. Conti (Siemens PLM Software, ITA); P. Trost (Siemens PLM Software, GER); R. Canti, B. Krönauer, L. Schaller (AUDI, GER); C. Gaber (Technical University Munich, GER)

4C Composites 4 - Fibre-Reinforced

13:30 Chairman Welcome

13:35 Progressive Failure Analysis of As-Manufactured Short Fiber Filled Injection Molded Parts
A. Morrison, R. Dalgarno, D. Robbins (Autodesk, USA)

13:55 Development of a Material Model for Organic Sheets for the Simulation of FRP Components in Full Vehicle Crash
X.F. Fang, M. Grote (University of Siegen, GER)

14:15 A Practical Method for Quantifying the Variability of Continuous Fibre-Reinforced Composite Structures to Uncertainty in Ply Orientation
M. Arnold, A. Ngai (Penso, GBR)

14:35 Numerical Simulation of Transversely Isotropic Constitutive Model for Composite Laminates
E. Casoni, M. Vázquez (Barcelona Supercomputing Center, ESP); A. Quintanas, P. Maimí, J. A. Mayugo (Amade, Universitat de Girona, ESP)

4D Life Sciences

13:30 Chairman Welcome

13:35 Modelling the Mechanical Response of Piezoelectric Force Transducers
A. Cowell, D. McGlinchey, J. R. Pugh, M. Ibrahim (Glasgow Caledonian University, GBR)

13:55 Improvements of an Air-Liquid Interface In-Vitro Testing Method for Inhalable Compounds Using CFD-Methods
C. Brodbeck, D. Ritter, J. Knebel (Fraunhofer SCAI, GER)

4D Impact 2

14:15 Numerical Simulation of Damage in Dropped Plastic Housings
V. Vijayan, C. K. Ghosh (Robert Bosch Engineering & Business Solutions, IND)

14:35 A Parametric Study of Selfdynamisable Internal Fixator used in Femoral Fracture Treatment
N. Korunovic, M. Trajanovic, N. Vitkovic, D. Stevanovic (University of Nis, SCG); M. Mitkovic (Clinical Center of Nis, SCG)

4E Multiphysics 3

13:30 Chairman Welcome

13:35 Solving Flow Induced Vibration of Subsea Piping Structures using Coupled CFD and FEA
D. Jia (Genesis, USA)

13:55 Novel Technique to Model Anisotropic Silicon Crystal in Diamond Light Source
H. Huang (Diamond Light Source, GBR)

14:15 Effective Life Prediction of HD Cylinder Head using Coupled Multi-Physics Simulations
S. Eroglu, S. Güryuva, C. Cengiz, A. Guzel (Ford Otosan, TUR)

14:35 Numerical Analysis of Triple Duty Valve
S. D. Jadhav, S. N. Shukla, R. S. Birajdar (Kirloskar Brothers, IND)

14:55 Break

Room K

Room J

T1 / T2

Short Training Courses

Forum: Additive Manufacturing and 3D Printing in Design and Engineering

SPDM INTERNATIONAL CONFERENCE Simulation Process & Data Management

3F High Performance Computing 1

Room F

11:00 Chairman Welcome

11:05 **Is CAE Leveraging Advances in Hardware?**
L. Margetts (University of Manchester, GBR)

11:25 **Accelerating Commercial FEA Software through High-Performance Computing**
V. Belsky (Dassault Systèmes Simulia, USA)

11:45 **A Communication-Minimizing Approach to Multi-GPU Computing in Modal Frequency Response**
L. Hoffnung, W. Zhang (Siemens PLM Software Inc., USA)

12:05 **Leveraging Xeon Phi Coprocessors**
J. Beisheim (Ansys, USA)

3G Business Issues 1

Room G

11:00 Chairman Welcome

11:05 **Next Generation Software: Simulation Process Modeling**
A. J. Svobodnik (Konzept-X, GER)

11:25 **The Engineering Designer in the Role of a Design Analyst – An Industrial Survey**
H. Petersson (Halmstad University, SWE); D. Motte, R. Bjärnemo, M. Eriksson (Lund University, SWE)

11:45 **Critical-Path Simulation: Case Studies in the Identification and Execution of Finite-Element Analyses Early in the Design Process to Assure Feasibility and Increase ROI**
B. A. Range (Acorn Product Development, USA)

12:05 **Innovative Pricing Schemes to Popularize the Adoption of Simulation Software Packages**
A. Krishnan (ElectroMagneticWorks, CAN)

3H ASME V&V

Room H

11:00 Chairman Welcome

11:05 **ASME Codes and Standards V&V Committee – Development of Standards for Verification, Validation and Uncertainty Assessments in Modeling and Simulation**
C. J. Freitas (Southwest Research Institute, USA)

11:25 **Discussion**

C. J. Freitas will review the work that has been undertaken by the ASME V&V Committee to formulate methods and procedures for verification, validation and quantifying numerical uncertainty. New methods including the development of V&V procedures using PIRT methods, the implication of risk in V&V and the propagation of validation metrics to other set points where validation is not present will also be discussed. Dr. Freitas's paper will be followed by a panel discussion involving:
R. Crane (ASME, USA);
K. Dowding (Sandia National Laboratories, USA);
C. J. Freitas (Southwest Research Institute, USA);
W. Oberkampf (W L Oberkampf Consulting, USA)
Moderated by
ASME V&V Standards Committee

3J Forum: Additive Manufacturing

11:00 Chairman Welcome

11:05 **Opportunities and Challenges in Design for Additive Manufacturing**
J. den Hartog (Autodesk, USA)

11:25 **Hyproline Project Review: Geometry Processing for 3D Printing and the Automated Post Finishing of AM Parts in a High Speed 3D Printing Environment**
J. H. Bucklow (ITI TranscenData Europe, GBR)

11:45 **Integrating Simulation of Lightweight Structures into the Product Development Process of Metal Additive Manufacturing**
C. Rossmann, T. Craeghs, S. Cornelissen (Materialise, BEL); W. Van Paepegem (Ghent University, BEL), L. Farkas (Siemens Industry Software, BEL)

12:05 **Optimize Additive Manufacturing – Design to Amplify the Benefits of the Manufacturing Process**
M. Zhou (Altair Engineering, USA)

3K SPDM – Vendor 1

11:00 Chairman Welcome

11:05 **Managing Parameters in a Simulation Data and Process Management System**
R. J. Licursi, N. Kondragunta, R. Kashi (Siemens PLM Software, USA)

11:25 **Enhancing Data Management Workflows through CAD Integrated Simulation**
O. Zohni, R. Lakshmipathy (Dassault Systèmes SolidWorks, USA)

11:45 **Comprehensive Management of Simulation Models**
I. Makropoulou, M. Pappas (Beta CAE Systems SA, GRE)

12:05 **Discussion Contribution: Comparing and Contrasting Requirements of a Materials Process & Data Management (MPDM) System and a Simulation Process & Data Management (SPDM) System**
L. Kilfoy (MSC.Software, USA)

Short Training Courses:
Structural Optimization in FE Analysis (Training Room 1)
Introduction to Practical CFD (Training Room 2)

4F High Performance Computing 2

13:30 Chairman Welcome

13:35 **Using High-Performance Computing for the Modeling of High-Speed Dynamics**
A. Ramezani, D. Huber, H. Rothe (University of the Federal Armed Forces Hamburg, GER)

13:55 **Developing Scalable Components for Massively Parallel Adaptive Simulatons**
M. Shephard (Scientific Computation Research Center, USA); C. Smith, D. Ibanez, M. Beall, S. Tendulkar (Simmetrix Inc., USA)

14:15 **Massively Parallel Simulations by Open Source Building Blocks**
M. Blatt (Dr. Blatt – HPC-Simulation-Software & Service, GER)

14:35 **Recent Progress in the Massively Parallel Solution of Implicit Problems**
L. Margetts (University of Manchester, GBR)

4G CAE Driven Product Design 1

13:30 Chairman Welcome

13:35 **Decathlon Leverages Simulation to Design more Efficient and Stronger Sports Products in Less Time**
A. Callens, R. P. Carreira (Decathlon, FRA)

13:55 **Advanced Modeling of Air- and Rotorcraft in a Multi-Disciplinary Environment at Early Design Stages**
D. B. Schwinn (German Aerospace Center, GER)

14:15 **Crash CAE Process Automation and Management for Digital Lot during Vehicle Development at Nissan**
R. Natarajan, N. Sou (Renault Nissan Technology & Business Centre, IND); S. Tchouikov (Nissan Motors, JPN)

14:35 **A Complete Simulation Environment for Oil & Gas Industry Pumping Machinery**
A. Winkler (Dassault Systemes Simulia, SWE); S. Tropkin (Ufa State Petroleum Technological University, RUS)

4H Simulation Governance

13:30 Chairman Welcome

13:35 **Simulation Governance: Managing Simulation as a Strategic Capability**
K. Meintjes (CIMdata, USA)

13:55 **Discussion**

Companies are increasingly turning towards analysis and simulation to try and improve component performance. With the increase in uptake in CAE tools the ability of a company to perform simulation well so that it is repeatable, reliable and robust is an important factor in overall competitiveness. This discussion session will look at why some companies are failing to achieve an effective return on the investment in simulation.

Moderated by
K. Meintjes (CIMdata, USA)
B. A. Szabó (Washington University in St. Louis, USA)
W. Oberkampf (W L Oberkampf Consulting, USA)
J.-F. Imbert (SIMconcept Consulting, FRA)
R. Dreisbach (The Boeing Company, USA)

4J Forum: Additive Manufacturing

13:30 Chairman Welcome

13:35 **Accelerated Certification of Additively Manufactured Metals**
A. Anderson (ACAMM – Accelerated Certification of Additively Manufactured Metals Initiative, Lawrence Livermore National Laboratory, USA)

13:55 cont´d

14:15 **3D Printing: The Future of Manufacturing**
J. Cobb (Stratasys, USA)

14:35 cont´d

4K SPDM – Aerospace

13:30 Chairman Welcome

13:35 **Virtual Testing for High Lift Systems at Airbus – Simulation Process & Data Management (SPDM) GEN. 2.0**
T. Ulmer, J. Amin (Airbus, GER)

13:55 **The Airbus A350 XWB Aircraft's Structural Detailed Analysis with a Common Shared Platform**
C. Raick, B. Colson (Siemens PLM Software, BEL); B. Malherbe (Airbus Operations SAS, FRA)

14:15 **Aircraft Thermal Architecture Trade Off Management use Case**
O. Tabaste (MSC.Software, FRA); P. P. Borrelli (Alenia Aermacchi, ITA); Y. Baudier (Airbus Group Innovation, FRA); A. Gazaix (Airbus Operations SAS, FRA)

14:35 **Discussion**

Short Training Courses:
Fatigue & Fracture Mechanics in FE Analysis (Training Room 1)

Conference agenda subject to alterations.

*** Subject to final review approval.**

5A Dassault Systèmes Simulia — Room A

15:35
15:35
Advances in Scalable and Collaborative Simulation
S. Sett (Dassault Systèmes Simulia)
15:55
Process Integration and Parametric Optimization with Isight
M. Macias (Dassault Systèmes Simulia)
16:25
Virtual Human Simulation
S. Levine (Dassault Systèmes Simulia)
16:45
Questions & Answers

5B Ansys — Room B

15:35
Multiphysics Presentation: Analyzing Fluid Film Bearings and Rotor Dynamics with Ansys
Using Ansys multiphysics, the performance of fluid bearings is predicted, including calculating the static equilibrium position and characterizing dynamic performance.
C. Wolfe (Ansys, USA)

16:20
An Integrated Approach for Model-Based Systems and Software Engineering
Reduced-order modeling (ROM) is a key enabler for model-based engineering, spanning systems engineering, embedded software development, and virtual system prototyping.
B. Dion (Ansys, USA)

5C Siemens PLM Software — Room C

15:35
Siemens Vision for Product Engineering
This session will provide an overview of Siemens' vision for product engineering, capabilities, and key investment areas.

16:20
Integrated Workflow for Composite Product Development
This session will show how Siemens software products can be used for a closed-loop composites development process that covers design, simulation, and manufacturing.

5D Altair Engineering — Room D

15:35
Design Exploration and Optimization
Advances in HPC and access to computational resources in the cloud have made design exploration a much more affordable and accessible reality. Join this session to learn how Altair's technology for design exploration and simulation lifecycle management in the cloud has been applied to a variety of products in many industries. Altair experts will provide you with best practices through live demos and real-life examples of application. Attendees may also qualify for a free trial of Altair's HyperWorks Unlimited Virtual Appliance.
F. Kocer-Poyraz, V. Parameshwaran
(Altair Engineering, USA)

5E Autodesk / MSC.Software — Room E

15:35
Autodesk
Generative Modeling at the Intersection of Geometry, Simulation, and Additive Manufacturing
J. den Hartog (Autodesk Inc., USA)

16:20
MSC.Software
Moving beyond The Status Quo and Incremental Solutions to Engineering Challenges
L. Kilfoy, M. Kokaly (MSC.Software, USA)

17:00 **Break**

6A Dassault Systèmes Simulia

17:20
17:20
Solutions for Durability & Reliability with fe-safe
A. Winkler (Dassault Systèmes Simulia)
17:45
Co-Simulation with Abaqus, Simpack, and Dymola
B. Solomon (Dassault Systèmes Simulia)
18:15
Structural and Fluid Optimization with Tosca
F. Jurecka (Dassault Systèmes Simulia)
18:35
Questions & Answers

6B Multibody Simulation 3

17:20 Chairman Welcome
17:25 **Dynamical Simulation of Elastic Cages**
D. Vlasenko, H. Golbach, M. Dinchev (Schaeffler, GER)
17:45 **Modelling and Simulating Flexible Gears – A Solution-Oriented Approach**
C. Schulz, S. Mulski (Simpack, GER)
18:05 **Unified Automotive Vehicle Performance Analysis using Co-Simulation**
Y. Hahn, J. I. Cofer, (Dassault Systèmes Simulia, USA)

6C Education & Training

17:20 Chairman Welcome
17:25 **Theoretical Elastic Stress Singularities much Maligned and Misunderstood**
J. Wood, M. O. Robbie, N. Hamilton, D. Easton, Y. Zhang (University of Strathclyde, GBR)
17:45 **Round Robin NAFEMS Benchmark LE5**
J. J. Reijmers, R. Buis (Nevesbu, NED)
18:05 **Evaluation and the Progress of Concrete Girder Nonlinear Analysis by Contests**
A. de Boer (Ministry of Infrastructure and the Environment, NED); C. Vanderveen, S. Ensink (Delft University of Technology, NED); M. A. N. Hendriks (Delft University of Technology, NED / NTNU, NOR); B. Belletti (University of Parma, ITA)
18:25 **Case Study of Simulation Driven Designed Components in Use for a Hydrogen-Powered Prototype Vehicle**
D. Trojer, S. Henneke (University of Applied Sciences Munich, GER) **

6D CAE Driven Product Design 2

17:20 Chairman Welcome
17:25 **The Added Value of Engineering Simulation Throughout the Product Lifecycle of a Mini-Satellite**
A. Keereman (QinetiQ Space, BEL)
17:45 **FEA and CFD in Concurrent Design Analysis and Realistic Simulation**
M. R. Tabatabai (Dassault Systèmes Solidworks, USA)
18:05 **How Can Usage Data of Your Applications Drive Cost Savings and Innovations? Why Now?**
L. M. Cole (Open iT, USA)

6E SPDM – Vendor 2 A (in parallel with 6K)

17:20 Chairman Welcome
17:25 **Configuring Specialized 3rd-Party CAE Analysis Tools within a CAD/PLM Environment**
C. Blake (MAYA Simulation Technologies, CAN); M. Halbish (TI Automotive, USA)
17:45 **Frontloading Simulations and SPDM**
M. Schlenkrich (MSC.Software, GER)
18:05 **Challenges and Strategies to Reduce, Extract and Visualize the Key Simulation Data for Effective SPDM Implementations**
P. Mandava, G. Shastry, M. V. Uppalapati (Visual Collaboration Technologies, IND)

18:45 **End of day 2**
19:30 **Congress Banquet USS Midway**

5F Phoenix Integration

Room F

15:35
Integrate, Explore, and Organize in ModelCenter: The Framework for Model Based Engineering

This session introduces Phoenix Integration and the three pillars of MBE in ModelCenter.

- Integrating engineering models to create and automate simulation workflows
- Exploring trade spaces through sensitivity analysis, visualization, optimization, and probabilistic analysis to find improved designs
- Organizing engineering models and simulation results to capture engineering knowledge, facilitate team collaboration, and improve communication with stakeholders

The session concludes with coverage of the new ModelCenter cloud deployment option for sharing simulation workflows across organizations.

J. Simmons (Phoenix Integration, USA)

5G HPC 3 - Cloud

Room G

15:35 Discussion Session:

HPC in the Cloud

Using remote computing facilities is a concept that the analysis and simulation community is familiar with. Recent developments in a number of areas including software license models, remote visualisation and ease of use mean that operating in the cloud is no longer the domain of an HPC expert. This `birds of a feather´ session is intended to bring together members of the simulation and analysis community with experience or an interest in cloud computing.

Moderated by L. Margetts (University of Manchester, GBR)

5H Stochastics 2 - Discussion

Room H

15:35 Discussion Session:

Stochastics Challenge Problem

At the Salzburg NAFEMS World Congress in 2013 the Stochastics Working Group launched the `Stochastics Challenge Problem´. The challenge was launched in the hope of sharing and showcasing different approaches to uncertainty quantification. This discussion session will be based around some of the key messages that the SWG have taken from the challenge problem.

Moderated by the NAFEMS Stochastics Working Group:
A. Karl (Rolls-Royce, USA)
D. Vogt (Airbus Group Innovations, GER)

5J Forum: Additive Manufacturing

Room J

15:35 Workshop Session:

Aspects of Simulation That Come into Play as a Part of 3D Fabrication

- F. Abdi, Chief Scientist and CEO, AlphaSTAR, USA
- V. Kunc, Research Scientist, Deposition Science and Technology, Materials Science and Technology Division, Oak Ridge National Laboratory, USA – lead researcher on 3D printing of cars
- C. Hiel, President Composite Support and Solutions, Inc. and Full Professor/Associate Professor, Department of Materials Engineering and Mechanical Constructions (MEMC), University of Brussels (VUB), BEL
- tbd, Dassault Systèmes Simulia, USA

Moderated by AlphaSTAR, USA

5K Esteco / Front End Analytics

Room K

15:35
Esteco

Design Optimization and Decision Making Process: Practical considerations for formulation, algorithm choice and data analysis. Data analysis is not only important for decision making while solving for multiple objectives, but also to optimize the problem formulation itself. The talk will highlight various uses of data analysis as well as cover advanced data analysis techniques.

16:20
Front End Analytics (FEA)

Front End Analytics (FEA) will be demonstrating example use cases of our Smart Product Generators Apps. Example to be presented include products cases in the Automotive, Industrial, High Tech and Medical Devices sectors.

T1 / T2

Short Training Course:
Composites FE Analysis (Training Room 1)
Simulation V&V for Managers (Training Room 2)

6F Systems Engineering 3

17:20 Chairman Welcome

17:25 Automatic Generation of Standardized System Models from 3D-Simulations in a Systems Engineering Context
D. Hartmann (Siemens, GER);
M. Mahler (Siemens Industry Software, GER)

17:45 A Platform Approach for Enabling System Engineering – Unmanned Aerial System Use Case
K. Patel, F. Chauvin, G. Fanmuy (Dassault Systèmes, FRA);
E. Bolognini (Dassault Systèmes, USA)

18:05 A Parametric Virtual Prototyping Process for the Conceptual Design of Complex Systems
S. I. Briceno, A. Ramamurthy, D. N. Mavris
(Georgia Institute of Technology, USA) **

6G HPC 4 - Cloud

17:20 Chairman Welcome

17:25 Utilizing Cloud HPC Resources for CAE Simulations
I. Graedel, J. Poort (Rescale, Inc., USA)

17:45 The CloudSME One-Stop-Shop – European Market Place for HPC Supported Simulation
A. Ocklenburg (SanderWerbun, GER); N. Fantini (Scaletools Suisse, SUI); S. Taylor, A. Anagnostou (Brunel University, GBR); S. Reboux (Ascomp, SUI); T. Kiss, G. Terstyanszky (Westminster University, GBR); P. Kacsuk (MTA Sztaki, HUN)

18:05 Unified Cloud Orchestration Framework for Elastic High Performance Computing on Microsoft Azure
L. Miroslaw, V. Baros, M. Pantic, H. Nordborg
(Microsoft Innovation Center Rapperswil, SUI)

18:25 Leverage the Cloud Base HPC for Innovative Virtual Prototyping Methodology
F. El Khaldi, P. Gregori (ESI Group, FRA);
M. Niess (Gestamp, FRA); O. David (Bull, FRA)

6H Geometry Interaction with Simulation

17:20 Discussion Session:

The Future of Geometry Interaction with Simulation

The simulation industry is on the verge of another paradigm shift in pre-processing; advanced geometry tools. Reliance on native CAD for clean geometry is yielding to a new class of geometry-based preprocessors for analysts. Are analysts ready to accept this responsibility? Will CAD designers be expected to learn a 3rd party geometry pre-processor to support analysts? The potential for these new tools is high but their place in the workflow is uncertain. Experts from industry leaders Ansys and Autodesk will share their vision behind this exciting technology and anchor an interactive discussion on user expectations, requirements, and challenges. Attendees will have an opportunity to help shape the future of geometry-based preprocessing with their input.

Industry Experts:
W. Raban (Ansys, USA)
J. de Hartog (Autodesk, USA))
Moderated by V. Adams (Autodesk, USA)

6J Forum: Additive Manufacturing

17:20 Workshop Session:

Aspects of Simulation That Come into Play as a Part of 3D Fabrication

Moderated by AlphaSTAR, USA

6K SPDM – Vendor 2 B (in parallel with 6E)

17:20 Chairman Welcome

17:25 Integrating Design Portal System
R. Ramanna (ESI North America);
J. Zhang, B.Liu (ESI, CHN)

17:45 Optimising Materials Data and Data-Modeling Workflow, in Support of CAE and SPDM
A. Fairfull, D. Williams (Granta Design, GBR)

18:05 Global Architecture-Based Simulation Object Management with Integration of Local Toolchains
C. Gnandt, C. Hepperle (Tesis DYNAware, GER)

18:25 Integrated Framework for Process Data Management with Simulation Tools
M. Jayakkumar, H. M. Harikrishnan, A. V. Muralikrishna
(Cognizant Technology Solutions, IND)

Conference agenda subject to alterations.

*** Subject to final review approval.**

**** Student Presentation**

Plenary Room

08:30 Keynote Presentation: Safety CAE in the development of the all new Volvo XC90 ..... J. Jergeus (Volvo Car Corporation, SWE)
08:55 Keynote Presentation: The Drive to make Healthcare Better One Patient at a Time - Challenges and Opportunities for Modeling and Simulation ..... W. Schmidt (Stryker Orthopaedics, USA)
09:20 Invited Presentation: The Airbus A350 XWB: A Simulation Success Story ..... D. Fitzsimmons (Airbus Operations, GER)
09:45 Invited Presentation: Five Decades of Finite Element Analysis ..... L. Komzsik (Siemens PLM, USA)

10:10 Break

7A CFD 4 - Thermal — Room A

11:00 Chairman Welcome

11:05 High-Fidelity Aerothermal Modelling for Aircraft Equipment Thermal Integration in Powerplant Compartment
Y. Sommerer, Q. H. Nguyen, S. Jeanmougin, O. Verseux (Airbus Operations, FRA)

11:25 A CFD Analysis of a Solid Target
Y. Ma, D. Jenkins, L. Jones (Science and Technology Facilities Council, (STFC) Rutherford Appleton Laboratory (RAL), GBR)

11:45 Flow Simulation and Conjugate Heat Transfer in a Plate Heat Exchanger
M. Kröger, W. Ottow (ESI Software, GER)

12:05 Thermal Design and Analysis for High Power Automotive Electronic Product
R. A. Pattnayak, L. Biswal (Robert Bosch Engineering and Business Solutions, IND)

12:25 Understanding of Air Flow Pattern and Heat Transfer Phenomena in a Domestic Tumble Dryer using CFD
V. Miranda, L. Urbiola (Mabe, MEX)

7B Materials — Room B

11:00 Chairman Welcome

11:05 Porting a Complex User Material Model to Two State-of-the-Art Commercial Codes
G. S Kalsi (Atomic Weapons Establishment, GBR)

11:25 Practical Finite Element Modelling for Sprayed Concrete Lined Tunnels
A. Mar (Underground Professional Services, GBR)

11:45 Effective Parameter Identification to Validate Numerical Simulation Models
S. Kunath, T. Most, R. Niemeier (Dynardo, GER)

12:05 Constitutive Modeling of Polyethelyne
N. Elabbasi, J. Bergstrom (Veryst Engineering, USA); O. Lever, E. Lever (Gas Technology Institute, USA)

12:25 Discussion

7C Optimization 2 — Room C

11:00 Chairman Welcome

11:05 Use of Swarm Intelligence for Topology Optimization of Truss Structures with Stochastic Loading Conditions
M. Röber, M. Todtermuschke, E. Voigt (Fraunhofer Institut, GER)

11:25 The Optimization of Semi Medium Bus FMC RnH Performances using Analytical Target Cascading
K. C. Ko (Hyundai Motor, KOR)

11:45 Weld Fatigue Considerations in Structural Optimization
X. Yu (MSC.Software, USA)

12:05 Leveraging the Continuous Adjoint Method for Industrial Scale Application
G. K. Karpouzas, E. de Villiers (Engys, GBR); D. P. Combest (Engys, USA)

12:25 Discussion

7D Joints 1 — Room D

11:00 Chairman Welcome

11:05 Advances and Perspectives in Multi-Phase Meso-Scale Rupture Models for Weld Joints
P. Culière, A. Dumon, J. Ma (ESI Group, CHN); E. Higuchi (Honda R&D, JPN); M. Inoue (Nihon ESI, JPN)

11:25 Crash Simulation of Adhesively Bonded Structures
M. May (Fraunhofer EMI, GER)

11:45 Material Characterization and Modeling for the Simulation of Adhesive Joints with Polyurethane Adhesives
S. P. Sikora (German Aerospace Center, GER); G. Meschut (University of Paderborn, GER); S. Kolling (Technische Hochschule Mittelhessen, GER)

12:05 Bolted Connections in Composite Laminate Joints: A Comparison between Experimental Results, FE Analysis and Analytical Analysis
D. Veinbergs, R. Dalgarno, D. Robbins (Autodesk, USA)

12:25 Discussion

7E Preprocessing 1 — Room E

11:00 Chairman Welcome

11:05 Adapting FE-Meshes to Real, 3D Surface Detected Geometry Data to Improve FE-Simulation Results
S. Katona, M. Koch (Technical University Nuremberg, GER); T. C. Sprügel, S. Wartzack (University Erlangen-Nuremberg, GER)

11:25 CFD Meshing by Automatic Partitioning with the 3D Medial Object
J. H. Bucklow, R. M. Fairey (TranscenData Europe, GBR)

11:45 Advanced Meshing and Mesh Adaptation for Complex Flow Problems
S. Tendulkar, M. Beall, R. Nastasia (Simmetrix, USA); O. Sahni, S. Tran, M. Shephard (Scientific Computation Research Center, USA)

12:05 Fully Automatic Meshing: Automatic CAD Data Preparation for CAE
H. Steiner (Caelynx, USA); B. Komberger (Geom, AUT); M. Schifko (Engineering Software Steyr, AUT)

12:25 New Tools for Image-Based Meshing and Simulation for Digital Rock Physics
R. Cotton, P. Tompsett, W. Smiga (Simpleware, GBR); K. Genc (Simpleware, USA)

12:45 Lunch Break

8A CFD 5 - V&V

13:45 Chairman Welcome

13:50 Competing with a CAD Embedded CFD Software Against Traditional CFD Codes in a Blind JSAE Benchmark to Prove Result Accuracy
B. Marovic (Mentor Graphics, GER)

14:10 The Validation and Verification of an Open Source Fully-Coupled Navier-Stokes Solver
D. P. Combest (Engsys, USA); E. de Villiers (Engsys, GBR)

14:30 Fan Modeling Validation using CFD
S. O'Halloran, V. Kumar (Agco, USA); P. Hannukainen, P. Makkonen (Agco International, FIN); M. Krosser (Agco, GER); L. Meyer (Agco, FRA)

14:50 Developing Recommended Practice for the CFD Applications in Offshore Floater Design
J. Kim, H. Jang, J. Kyoung, A. Baquet, J. O'Sullivan (Technip, USA)

15:10 The Impact of Mesh Quality and Mesh Adaptation on the Results of Numerical Solution of the Axial Fans
M. Majcher, S. Wrzesien, M. Frant (Military University of Technology, POL)

8B Fracture & Fatigue 3

13:45 Chairman Welcome

13:50 Investigation for Obtaining an Equivalent Test Spectrum of a Vertical Stabilizer with Crack Initiation and Fracture Mechanics Approaches
K. Pasinlioğlu (Turkish Aerospace Industries, TUR)

14:10 Acoustic Fatigue of Thermoplastic Composite Welded Joints
N. Bijl (Fokker Aerostructures, NED)

14:30 How to Speed up Fatigue Life Evaluation by Integrating Fatigue Solution Inside FEA
H. Chang (MSC.Software, USA)

14:50 Dang-Van, Prismatic Hull and Findley Approaches for High Cycle Fatigue Assessment of Powertrain Components
G. De Morais, G. Teixeira, J. Draper (Dassault Systèmes Simulia, GBR); R. Silva, A. Rodrigues (ThyssenKrupp, BRA); A. Colombo, V. Wrubel (Agrale, BRA)

15:10 Application of Robust Design Techniques for the Calibration of Cohesive Models for Modeling Fracture of Aluminium 7475
F. Martín de la Escalera, Y. Essa (Aernnova, ESP); S. Zeballos, V. Acosta, M. A. Jimenez (Instituto Tecnológico de Aragón, ESP); R. Rodriguez (Escuela Tecnica Superior de Ingenieros de Minas, ESP)

8C Optimization 3

13:45 Chairman Welcome

13:50 Nonlinear Topology Optimization for Vehicle Rear Seat Backframe Design
O. T. Kwon (Hyundai-dymos, KOR)

14:10 Flow Topology Optimization of a Turbo Charger's Inflow Duct
J. Iseler, F. Huck, B. Butz (Dassault Systèmes Simulia, GER)

14:30 Seat Design for Crash in the Cloud
F. Koçer-Poyraz, (Altair HyperWorks, USA); E. A. Nelson (Altair Product Development, USA)

14:50 Automated Optimization Methodology Applied to Car External Aerodynamics for Aero-drag Reduction
M. Carello, A. Serra (Politecnico di Torino, ITA); M. D'Auria, R. d'Ippolito (Noesis Solutions, BEL)

15:10 Discussion

8D Joints 2

13:45 Chairman Welcome

13:50 Critical Problems of Bolted Joint Design for Gas Turbine Engine used in Civil Transport
H. N. Ganesha, A. Subramaniaan (Innovent Engineering Solutions, IND)

14:10 Simulation of Threaded Fasteners for Ultimate Load Conditions
K. S. Raghavan (Cyient Ltd., IND)

14:30 FEA Study of a High Strength Stud Failure
Y. Song (Sinowind Technology, CHN)

14:50 Discussion

8E Manufacturing 2

13:45 Chairman Welcome

13:50 Virtual Manufacturing Versus Challenges in Lightweight Vehicle Programmes
R. Said (ESI Group, GBR); H. B. Nadendla (Brunel University London, GBR); D. Watson (Jaguar Land Rover, GBR); M. Mohamed (Imperial College London, GBR); D. Szegda (Impression Technologies, GBR); A. Endruweit (University of Nottingham, GBR); T. James (Formax, GBR)

14:10 HPC Simulation and Optimization of Material Forming Processes
J.-L. Chenot, E. Perchat, O. Jaouen, L. Ville (Transvalor, FRA)

14:30 From Design / Concept to Virtual Reality – Virtual Hot Forming Engineering Illustrated
J. Babeau, B. Dahmena, M. Holecek, M. Hoss, D. Lorenz, H. Porzner, Y. Vincent, M. Vrolijk (ESI Group, FRA); J. Friberg, C. Koroschetz, M. Skrikerud (AP&T, SWE)

14:50 Identification of Suitable Cycloid Hub Geometries for Shaft-Hub Connections Manufactured by Lateral Extrusion
M. Funk, F. Dörr, H. Binz, M. Liewald (University of Stuttgart, GER)

15:10 Design and Simulation of Starter Motor Casing using Multi Stage Metal Forming
G. Thampan, S. Bade, K. Srinivas, K. Chandar, A. S. Takalkar (Tube, IND)

15:30 Break

15:45 Best Paper Awards: M. Zehn (Vice Chairman of NAFEMS Council / TU Berlin)
AMD Raffle
Wrap-up & Farewell: R. Dreisbach (Chairman NAFEMS Americas / The Boeing Company, USA)
16:00 End of Congress

7F Stochastics 3 - Uncertainty

Room F

11:00 Chairman Welcome

11:05 **Design of Advanced Gas Turbines using Stochastic Methods and Robust Design Principles**
A. Karl, Z. Grey, G. Modgil
(Rolls-Royce, USA)

11:25 **Improvement of Pulling Phenomenon during the Braking of a Truck by a Robust Design Method**
J.-M. Kim, Y.-K. Kim (Hyundai-Kia Motors, KOR)

11:45 **Reliability Based Pressure Hull Design**
J. Reijmers (Nevesbu, NED)

12:05 **Robust Design Optimization and Operating Maps for Computational Fluid Dynamics**
R. Niemeier, S. Kunath,T. Most, J. Will (Dynardo, GER);
J. Einzinger (Ansys, GER)

12:25 **Stochastic Analysis of a Containment Vessel Subject to Dynamic Loading**
P. Evrard, G. Defaux (CEA, FRA)

7G Analysis Management

Room G

11:00 **Discussion Session:**

ASME V&V 10 Restrictive View of Validation and Application to ISO 9001

ASME committees on verification and validation have described a logical, yet restrictive, interpretation of validation as being justification against physical test. Simulation results for the common situation where experimental data are not available, is referred to as predictive capability. This discussion session will examine the implications of these concepts in regard to simulation-informed decision-making and product qualification. The discussion will also aim to examine how this restrictive view fits with the requirements of ISO 9001 for validation. Audience participation will be encouraged.
The discussion session panel will include:

C. Rogers (CREA Consultants, GBR)
W. Oberkampf (W L Oberkampf Consulting, USA)
J. Smith (Compusis, GBR)
J.-F. Imbert (SIMconcept Consulting, FRA)
R. Dreisbach (The Boeing Company, USA)
Moderated by the NAFEMS AM Working Group

7H Methods 1

Room H

11:00 Chairman Welcome

11:05 **Fast Solutions for the FE Simulations of Thin-Walled Structures**
D. Marinkovic, M. Zehn (TU Berlin, GER)

11:25 **Error Driven Adaptive Meshing for Coupled Thermal Mechanical Simulation**
M. Donley, M. Lamping, J. Cabello, V. Reddy, P. Patel, M. Otte (Siemens PLM Software, USA)

11:45 **The Moving Force Problem Revisited**
N. Wagner, R. Helfrich (Intes, GER)

Let's Make Benchmarking More Virtual
U. Jankowski (Tecosim Venture, GER)

12:05 **Numerical Algorithms for the Analysis of Propagation of Nonlinear Waves in Prestressed Solids**
V. Levin, A. Vershinin (Fidesys, RUS);
K. Zingerman (Tver State University, RUS)

12:25 **Discussion**

7J Simulation & Systems Eng.

Room J

11:00 **Discussion Session:**

Simulation & Systems Engineering: A Roadmap for Future Collaborations between NAFEMS and INCOSE

Three years ago, NAFEMS and the International Council on Systems Engineering (INCOSE) formed the Systems Modeling & Simulation Working Group (SMSWG) to advance engineering simulation and model based systems engineering. Through this collaboration, the SMSWG has started writing a white paper on the Functional Mock-up Interface, as well as collating an exhaustive list of terms & definitions in an effort to support international standards and develop a joint approach for interfacing with other organizations in related professional areas. Individuals attending this session will have an opportunity to learn more about INCOSE, provide feedback on the SMSWG's deliverables, as well as influence the roadmap for future SMSWG activities.

Moderated by the NAFEMS SMS Working Group / INCOSE

7K SPDM – Democratising CAE with SPDM

Room K

spdm INTERNATIONAL CONFERENCE Simulation Process & Data Management

11:00 **Workshop: Practical Deployment of Expert-Developed Simulation Processes to Non-Experts**

Democratised solutions use 'simulation templates' of prescribed scope, developed and maintained by Expert Analysts and made available for use by Non-Experts. These templates are used to manage best practices, control the allowable data sets (input fields) and manage the audit trail. There is an expanding role for Simulation Experts in the organisation to include method development and deployment.

Democratising CAE with SPDM
G. Valine (GKN Driveline, USA)

Making the Full Power of Simulation Available to Everyone – At the Confluence of Solution-Specific Web Apps, "Lights-Out" Automation, Design Optimization Tools, and "Infinite, Elastic Computing" on the Cloud
M. Panthaki, R. Sahu, J-C. Mahuet, T. Keer (Comet Solutions, USA); G. Steyer (American Axle Manufacturing,USA); M. Z. Eckblad (Intel, USA); S. Anandavally (Cosma International - Magna, USA); M. Tiller (Xogeny, USA)

Web-Based Engineering Analysis: Deployment and Collaborations
M. Tiller (Xogeny, USA)

T1 / T2

Short Training Courses

Short Training Course:
Nonlinear FE Analysis (Training Room 1)
Elements of Turbulence Modeling (Training Room 2)

8F Preprocessing 2

13:45 Chairman Welcome

13:50 **A Software-Based Accurate Analysis of Measurement Points for Identification and Optimization of Quadric and Nurbs Surfaces in Fluid Dynamics**
S. Zietarski, S. Kachel, A. Kozakiewicz, A. Olejnik
(Military University of Technology, POL)

14:10 **Bridging the Gap from CT-Analysis to Predictive Finite Element Modeling**
M. Büttner, S. Moser, M. May (Fraunhofer EMI, GER)

14:30 **The Process Control of Design for Integration CAD/CAE System for Static and Dynamic Analysis of the Fanner**
S. Kachel, A. Kozakiewicz, S. Wrzesien
(Military University of Technology, POL)

14:50 **Discussion**

8G Methods 2

13:45 Chairman Welcome

13:50 **Developing a Method for Component Design in Vehicle Body Structure without Availability of the Complete Vehicle Data**
X. Fang, F. Zhang (University of Siegen, GER)

14:10 **Improvement of the Designing Method of Hybrid Interference Fits**
M. Krautter, H. Binz (University of Stuttgart, GER)

14:30 **CAD-Enhanced Contact Simulation**
H. Harkness, D. Cojocaru, D. Reece
(Dassault Systèmes Simulia, USA)

14:50 **Discussion**

8H Dynamics 3

13:45 Chairman Welcome

13:50 **Determination of Seismic Accelerations at Nodal Points within a Finite Element Model**
M. Spence, W. Price (National Nuclear Laboratory, GBR)

14:10 **Efficient Normal Modes Analysis with Contact Conditions**
B.-S. Liao, L. Hoffnung, L. Komzsik, J. Krieglstein
(Siemens PLM Software, USA)

14:30 **Modal Analysis of Slender Curved Beams Preloaded Through Clamping**
R. Helfrich, N. Wagner (Intes, GER)

14:50 **High Performance Frequency Response Solver**
M. Belyi (Dassault Systemés Simulia, USA)

15:10 **New Possibilities for Durability & NVH Optimizations of Engines by Combining Parameterization & Nonlinear Dynamic FE Analyses**
E. Payer, M. Pucher, A. Kainz, K. Payer
(evolution OSSP GmbH, AUT)

8J CAD Geometry for Meshing

13:45 **Workshop Session:**

CAD Geometry for Meshing – What Could Possibly Go Wrong?

This would look at engineering geometry, including a detailed look at the make-up and definition of the CAD model, underlying surface definitions etc, hidden issues and the impact this can have on achieving mesh-ready analysis geometry from CAD. The workshop would serve to educate people about details of CAD model make-up that they might not normally see, and help to explain the root causes of some of the issues that the analysis engineer frequently has to tackle.
Moderated by
J. H. Bucklow (TranscenData Europe Ltd, GBR)

8K SPDM – Deploying SPDM

13:45 **Workshop: From Industrial Requirements to Deployed Solutions and Beyond**

Following the two days of technical papers, Industrial Practitioners with experience of designing, deploying and operating a simulation environment based on an SPDM platform, will present their full lifecycle SPDM project experience. This workshop is intended to enable team-leaders and managers who are either considering or already engaged in an SPDM project to discuss how SPDM fits into an overall industrial simulation strategy and how to make an SPDM project successful.

Agenda

Introduction to the Workshop, SPDM Challenges
M. Norris (theSDMconsultancy, GBR)

Lessons Learnt from the Project to Democratise Simulation on an SPDM Platform
G. Valine (GKN Driveline, USA)

Lessons Learnt Deploying SPDM for High Lift System Testing
T. Ulmer (Airbus, GER)

Lessons Learnt Deploying SPDM at Embraer
R. Britto Maria (Embraer, BRA)

Panel Discussion
Industrial practitioners

Short Training Course:
Finite Element Analysis of Rotating Structures (Training Room 1)

Conference agenda subject to alterations.

* Subject to final review approval

spdm INTERNATIONAL CONFERENCE
Simulation Process & Data Management

Monday 22nd June 11:25
SPDM Keynote: Peter Coleman, Airbus Operations
Reflections on SPDM for collaborative, multidisciplinary and agile Aircraft Product Development

Monday 22nd

Session 1K
13:30 - 15:15

SPDM 1
Introduction / Applications

Session 2K
16:00 - 17:45

SPDM 2
Automotive

Tuesday 23rd

Session 3K
11:00 - 12:25

SPDM 3
Vendor 1

Session 4K
13:30 - 14:55

SPDM 4
Aerospace

Session 5K
15:35 - 17:00

SPDM 5 Sponsors
Esteco
Front End Analytics

Session 6E/K
17:20 - 18:45

SPDM 6
Vendor 2 A

SPDM 7
Vendor 2 B

Wednesday 24th

Session 7K
11:00 - 12:45

SPDM 8
Democratising CAE with SPDM

Session 8K
13:45 - 15:30

SPDM 9
Deploying SPDM

Forum: Additive Manufacturing and 3D Printing in Design and Engineering

• Opportunities • Challenges • Benefits • Applications • Constraints

Monday 22nd June 11:50
Invited Presentation: Georg Schöpf, Additive Fertigung Magazin
How Additive Manufacturing and Engineering Simulation Influence Each Other

Monday 22nd

Session 1J
13:30 - 15:15

Tuesday 23rd

Session 3J
11:00 - 12:25

Session 4J
13:30 - 14:55

Session 5J
15:35 - 17:00

Session 6J
17:20 - 18:45

Plan

The Heart of NAFEMS

For over 30 years, NAFEMS has been at the very heart of the simulation community. Our members come from all walks of life, from every corner of the globe. As an international, non-profit association, NAFEMS wants to look further than our own membership, and actively contribute to society at large.

This is why, starting at NWC15, NAFEMS will be raising funds for Plan International, a charitable organization which aims to help deprived children throughout the world. In 51 countries in Africa, Asia and Latin America, Plan International implements self-help projects in the domains of education, health, child protection, participation, micro finance and disaster risk management.

The programs are all based on the UN Convention on the Rights of the Child. All of the projects are child-centred. Children are partners with equal rights and participate in all the phases of project planning and implementation. This approach contributes to effectively promoting independence, own initiative and self-confidence from the very beginning. **Find out more at** nafems.org/heart

Gala Dinner

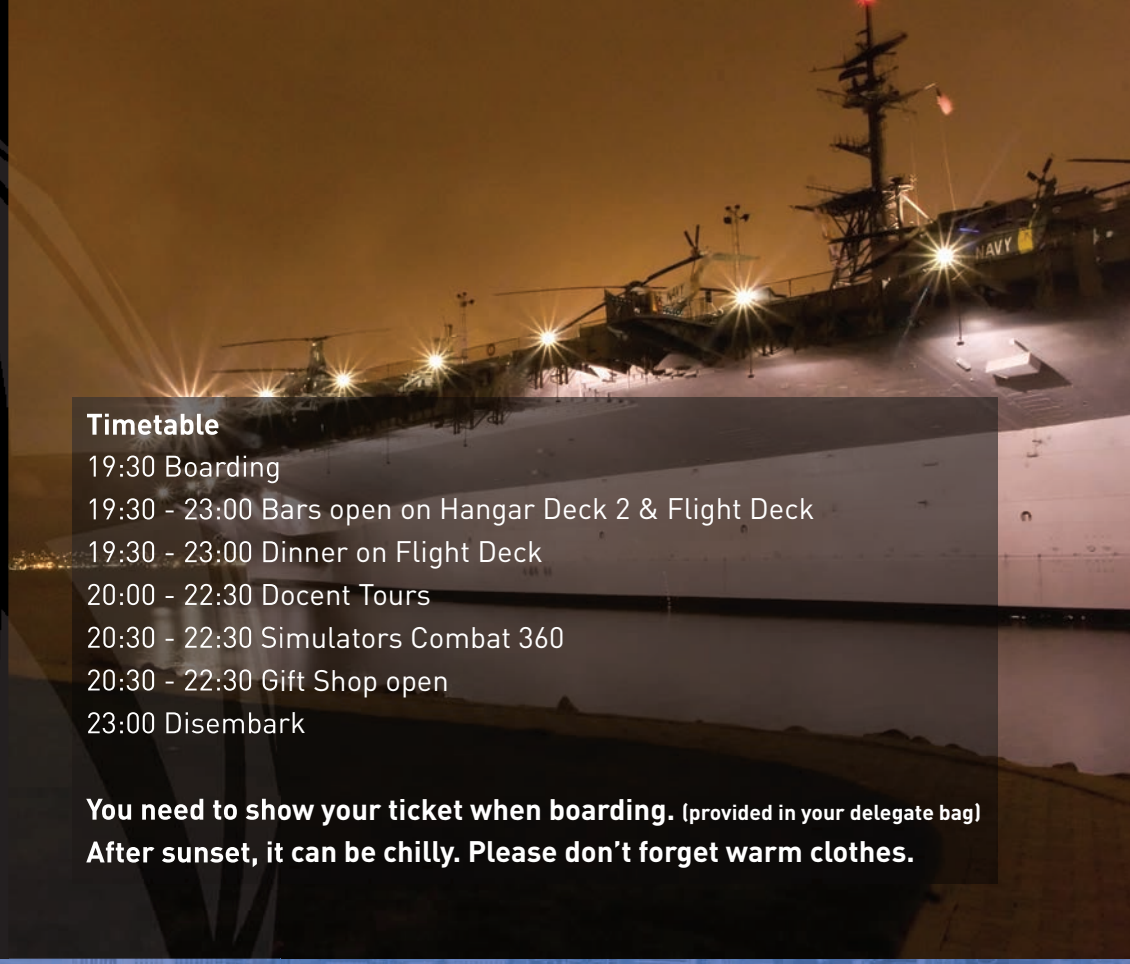
19:30 Tuesday June 23rd

The official NAFEMS World Congress 2015 Gala Dinner will be held onboard the USS Midway on the evening of June 23rd.

The longest-serving US Navy aircraft carrier of the 20th century will provide a truly spectacular setting for what is sure to be a once in a lifetime gala occasion, and guests will have the opportunity to explore more than 60 exhibits with a collection of 29 restored aircraft. The Midway was the largest ship in the world until 1955, with a revolutionary hull design giving her better maneuverability than previous carriers. She served for an unprecedented 47 years, before taking up position in 2004 as the world's largest museum devoted to carriers and naval aviation.

As well as an exceptional dinner, delegates will have the opportunity to experience a guided tour of the ship and use the on-board simulators.

The Gala Dinner is included with your congress registration.



Timetable

19:30 Boarding
19:30 - 23:00 Bars open on Hangar Deck 2 & Flight Deck
19:30 - 23:00 Dinner on Flight Deck
20:00 - 22:30 Docent Tours
20:30 - 22:30 Simulators Combat 360
20:30 - 22:30 Gift Shop open
23:00 Disembark

You need to show your ticket when boarding. (provided in your delegate bag)
After sunset, it can be chilly. Please don't forget warm clothes.

Optional Dinner Cruise

18:30 Monday June 22nd (not included in the congress registration fee)

On Monday evening, we give you the possibility to attend the optional dinner cruise (not included in the Conference price).

You'll enjoy gentle bay breezes, glittering waves, and the dramatic San Diego skyline on this 3 Hour Yacht Cruise on San Diego Bay.

NAFEMS World Congress optional dinner cruise includes:

- 3-Course Seated Dinner
- Standard Open Bar Ticket 3 per person
- DJ Entertainer
- Boarding Glass of Champagne or Sparkling Cider
- Complementary Coffee and Hot Tea and Water
- Views that Change with each Course

If you have not already booked, there may still be limited places available. Please enquire at NAFEMS registration if you are interested.

Exhibitors

AUTODESK
BETA CAE Systems SA
CD-adapco
CHIAS TEK
CONVERGENT SCIENCE
SIMULIA
dynardo dynamic software & engineering
EMWORKS
engys
eon reality
esi get it right
ESTECO
TechnoStar
Fraunhofer SCAI
Front End Analytics (FEA) Delivering Business Advantage
GRANTA MATERIAL INTELLIGENCE
nCode ...an HBM brand
INCOSE International Council on Systems Engineering
INTES
ITI TranscenData
Mentor Graphics Mechanical Analysis
MSC Software
nag
PENGUIN COMPUTING
PHOENIX INTEGRATION
RAND 3D
sharc
SIEMENS
Systematic Paris Region Systems & ICT Cluster
TRANSVALOR MATERIAL FORMING SIMULATION
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Bamberg April 25-27

Nordic
Göteborg May 10-11

Americas
Seattle June 7-10

France
Paris June 8-9

UK
Telford June 15-16

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Exhibitors

01 Altair Engineering
02 Ansys
03 Autodesk
04 Beta CAE Systems
05 CD-adapco
06 Convergent Science
07 Dassault Systemes Simulia
08 Dynardo
09 Electro Magnetic Works
10 Eon Reality
11 ESI
12 Esteco
13 Fraunhofer SCAI
14 Front End Analytics (FEA)
15 Granta Design
16 Intes
17 ITI TranscenData
18 Mentor Graphics
19 MSC Software
20 NAFEMS
21 Numerical Algorithms Group
22 Penguin Computing
23 Phoenix Integration
24 Plan International
25 Rand 3D
26 Sharc
27 Siemens PLM Software
28 Transvalor Americas
29 zSpace
30 HBM-nCode
32 System@tic
33 ChiasTek
34 Engys
35 Weidlinger Associates Inc.
38 Incose
39 e-Technostar
Exhibits: Polaris, Ruag & BMW i8