Congress Programme

2024

ECCOMAS

CONGRESS

Lisbon, Portugal

ECCOMAS CONGRESS 2024

9th European Congress on Computational
Methods in Applied Sciences and Engineering

3-7 June 2024,
Lisboa, Portugal

CONTENTS

Greetings from the Co-Chairmen of the Conference

ECCOMAS is a scientific organization founded in 1992, grouping together European associations with interests in the development and applications of numerical and computational methods in Engineering and Applied sciences, promoting joint efforts of European universities, research institutes and industries which are active in these fields.
We were delighted and honoured to know that the organization of ECCOMAS 2024, the 9th European Congress on Computational Methods in Applied Sciences and Engineering, would be held in Lisbon in 2024 and that its organization was assigned to APMTAC, the Portuguese Association of Theoretical, Applied and Computational Mechanics.

APMTAC was founded in 1995 by Prof. Eduardo Arantes e Oliveira, who was at the time the Director of LNEC, the National Laboratory for Civil Engineering. Prof. Carlos Mota Soares, from the University of Lisbon and the Honorary Chairperson of ECCOMAS 2024, was its first President. The APMTAC has been, since its inception, a member of IUTAM, IACM and ECCOMAS. Its roots, i.e., the use of Computational Methods in Applied Sciences and Engineering, can be traced back to the 1960s, initially at LNEC and sequentially growing steadily in Portuguese Universities. It is noteworthy that the first application of a FEM computer program, developed at the University of California by Edward Wilson and Ray Clough, was presented for the first time in 1962 at a Symposium on the Use of Computers in Civil Engineering that was held at LNEC in Lisbon, whose location is not far from this Congress venue.
ECCOMAS biennial Congresses provide an encounter for scientists and engineers from within Europe and all around the World. The Technical Programme of ECCOMAS 2024 offers nearly 2600 presentations, including 8 Plenary Lectures, 20 Semi-Plenary Lectures, and 75 Keynote Lectures, included in 188 Minisymposia and 15 Special Technical Sessions.

ECCOMAS 2024 is an excellent opportunity to disseminate the latest scientific and technical developments and to exchange new ideas on common and emerging topics. A broad spectrum of themes is addressed, ranging from the more traditional subjects in Solid and Fluid Mechanics, Computer Science and Applied Mathematics to new ideas and methods which are now spreading through all those areas to abridge existent impediments and limitations of current models for complex problems involving “multiphysics” phenomena at different scales, in time and space, and also a panoply of new paradigms related to Data-Driven Science and Engineering.
We are sure that the participants will profit from the presentations and discussions of the scientific and technical sessions, as well as from the social program and the contacts that it will provide, and we hope that they will recall this Congress as a scientific and technical reference not only in their future work but also as the start of new collaborations. The quality of the submitted abstracts, the high number of participants and the significant percentage of young researchers give us hope for the positive influence this community will continue to have in the future development of Computational Methods in Applied Sciences and Engineering and its positive impact in our societies.

We are also sure that the participants will profit from discovering Lisbon, a historical city full of stories to tell, where you feel safe wandering around. Lisbon is ageless, but it loves company and is famous for its hospitality and the family-like way it welcomes visitors.
Finally, we would like to express our gratitude to the Secretariat of CIMNE for their fantastic job in assisting us in the organization of such an important event.
We wish you all a great congress and an enjoyable stay in Lisbon.

Lisboa, 3 June 2024

José César de Sá
Chairman,
University of Porto

Helder Rodrigues
Co-Chairman,
University of Lisbon

Paulo Lourenço
Co-Chairman,
University of Minho

Carlos Pina
Co-Chairman,
University of Lisbon

Jorge Ambrósio
Co-Chairman,
University of Lisbon

Carlos B. Silva
Co-Chairman,
University of Lisbon

Carlos Mota Soares
Honorary Chairman,
University of Lisbon

Greetings from the President of ECCOMAS

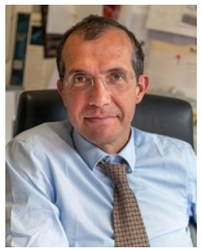
Dear colleagues, dear friends,

the Lisbon ECCOMAS Congress 2024 event is already a clear success and I am sure that the level of the scientific contributions, the warm hospitality of our Portuguese colleagues, as well as the beauty of the city and of the countryside will make the event an even greater success.
A special thanks should clearly go to José César de Sá and to all the other distinguished colleagues, who are acting as conference chairmen. The conference also sees Carlos Mota Soares as honorary chairman and I am sure that we will also have the opportunity to celebrate him.

Let me also recall that the 2024 edition of our congress will be of particular importance since we are going to elect the next ECCOMAS President, to whom I already wish a successful time and work, with the goal of making our association even broader and more effective. In this respect, a motivation for pleasure in writing the present message is that ECCOMAS is a constantly growing association, in particular in terms of on-going activities (such as thematic conferences, schools, etc.) and this is a clear measure of the association impact.

In terms of society visibility and enthusiasm a special thanks should go to ECCOMAS Young Investigators Committee (EYIC), always very dynamic, with many innovative and supportive activities.

With the best wishes for the future of all of you and of our great ECCOMAS association, I send you my regards and look forward to meeting in Lisbon.



Ferdinando Auricchio
President of the European Community on Computational Methods in Applied Sciences (ECCOMAS)

ORGANIZERS

Executive Committee

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Helder Rodrigues - Co-Chairman, University of Lisbon
Paulo Lourenço - Co-Chairman, University of Minho
Carlos Pina - Co-Chairman, University of Lisbon
Jorge Ambrósio - Co-Chairman, University of Lisbon
Carlos B. Silva - Co-Chairman, University of Lisbon
Carlos Mota Soares - Honorary Chairman, University of Lisbon

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Adélia Sequeira - University of Lisbon
Antonio Tadeu - University of Coimbra
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Paulo Vila Real - University of Aveiro
Paulo Oliveira - University Beira Interior
Manuel Alves - University of Porto
Luis Menezes - University of Coimbra
João Rocha Almeida - Nova University Lisbon
Paulo Piloto - Polytechnic Institute of Bragança
Ivo Dias - National Laboratory for Civil Engineering

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Armando Duarte - USA
Josef Eberhardsteiner - Austria
Charbel Farhat - USA
Paulo Fernandes - Portugal

Paulo Flores - Portugal
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Dan Givoli - Israel
Peter Hansbo - Sweden
Isaac Harari - Israel
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Gerhard Holzapfel - Austria
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Abílio de Jesus - Portugal
Mahmood Jabareen - Israel
Milan Jirásek - Czechia
Michael Kaliske - Germany
Michal Kleiber - Poland
Milos Kojic - Serbia
Barry Koren - Netherlands
Trond Kvamsdal - Norway
Pierre Ladevèze - France
Olivier Laffite - Canada
Ragnar Larsson - Sweden
Sanjiva Lele - USA
Stefano Lenci - Italy
Wing-Kam Liu - USA
Rainald Löhner - USA
Laura De Lorenzis - Switzerland
Erik Lund - Dennmark
Herbert Mang - Austria
Donatella Marini - Italy
Emilio Martinez-Paneda - UK
Igor Menshov - Russia
Nicolas Moes France - France
Jean-François Molinari - Switzerland

Claus-Dieter Munz - Germany
Emilio Carlo Nelli Silva - Brazil
Perumal Nithiarasu - UK
Boniface Nkonga - France
Tinsley Oden - USA
Marta Oliveira - Portugal
Xavier Oliver - Spain
Mehmet Omurtag - Türkiye
Eugenio Oñate - Spain
Anna Pandolfi - Italy
Manolis Papadrakakis - Greece
Umberto Perego - Italy
Djordje Peric - UK
Simona Perotto - Italy
Francisco Pires - Portugal
Olivier Pironneau - France
Jean-Philippe Ponthot - Belgium
Ekkehard Ramm - Germany
Alessandro Reali - Italy
Daya Reddy - South Africa
Stefanie Reese - Germany
Jerzy Rojek - Poland
Gianluigi Rozza - Italy
Peter Schlatter - Sweden
Wolfgang Schröder - Germany
Carina Schwarz - Germany
Rubén Sevilla - UK
Spencer Sherwin - UK
Ole Sigmund - Dennmark
Bert J. Sluys - Netherlands
Eduardo A. de Souza Neto - UK
Paul Steinmann - Germany
Kenjiro Terada - Japan
Tero Tuovinen - Finland
Stefan Turek - Germany
Wolfgang A. Wall - Germany
Peter Wriggers - Germany

Supporting Organizations

Turismo de Lisboa

CIM-Centro Internacional de Matemática

Sponsors & Exhibitors

XSIGHT Optical Extensometers & DIC Systems

MDPI

Conference Secretariat

CIMNE Congress Bureau
Campus Nord UPC
Building C1 - Office C4
C/ Gran Capità, S/N (08034)
Barcelona, Spain

CONFERENCE VENUE

The 9th European Congress on Computational Methods in Applied Sciences and Engineering will be held at the Lisbon Congress Centre. **CCL** is the biggest congress centre in Lisbon, comprising a total area of 29,000 sqm which includes 8 auditorium, 5 pavilions, 6 foyers and 34 meeting rooms. It also has 2 car parks with a capacity of 1100 spaces. It was chosen to carry out congresses, exhibitions, conferences and seminars both nationally and internationally. It offers flexibility, maximum comfort and efficiency, which allows CCL to carry out a range of different events simultaneously. The space is equipped with the latest technology (audiovisual and IT).

How to get to CCL

Airport

The Humberto Delgado Airport is located 12 km (approximately 15 minutes) from the Lisbon Congress Centre (CCL), providing flights to more than 125 national and international destinations.

Transportation

Around the CCL we can find various means of transport such as the Tram, the Train, the Carris Buses and Taxis.

By car

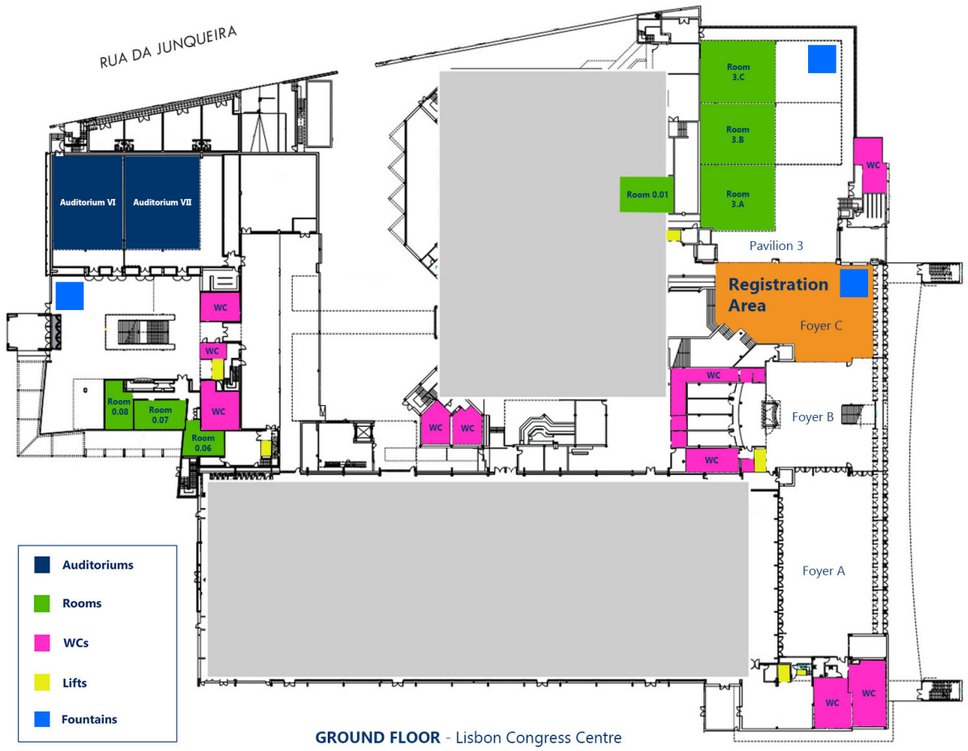
The CCL is accessible via Portugal's main national road accesses, the A5, A2 and the Ponte 25 de Abril (The April 25th Bridge). For your convenience, the CCL has an underground parking garage and an uncovered car park with 1,100 spaces

On foot or by bicycle

The CCL is close to several hotels, making it accessible on foot or by bicycle.

Ground Level

The main entrance is located to the right, "**Foyer C**", where the **registration area** is located. This floor houses **rooms 3.A, 3.B and 3.C in Pavilion 3**, as well as the **Auditoriums VI and VII** and **Room 0.01, 0.06, 0.07, 0.08.** To reach this area, attendees must go to the stairs that will lead us to the 1st floor and cross a walkway connecting **"Foyer D" with "Foyer F".**



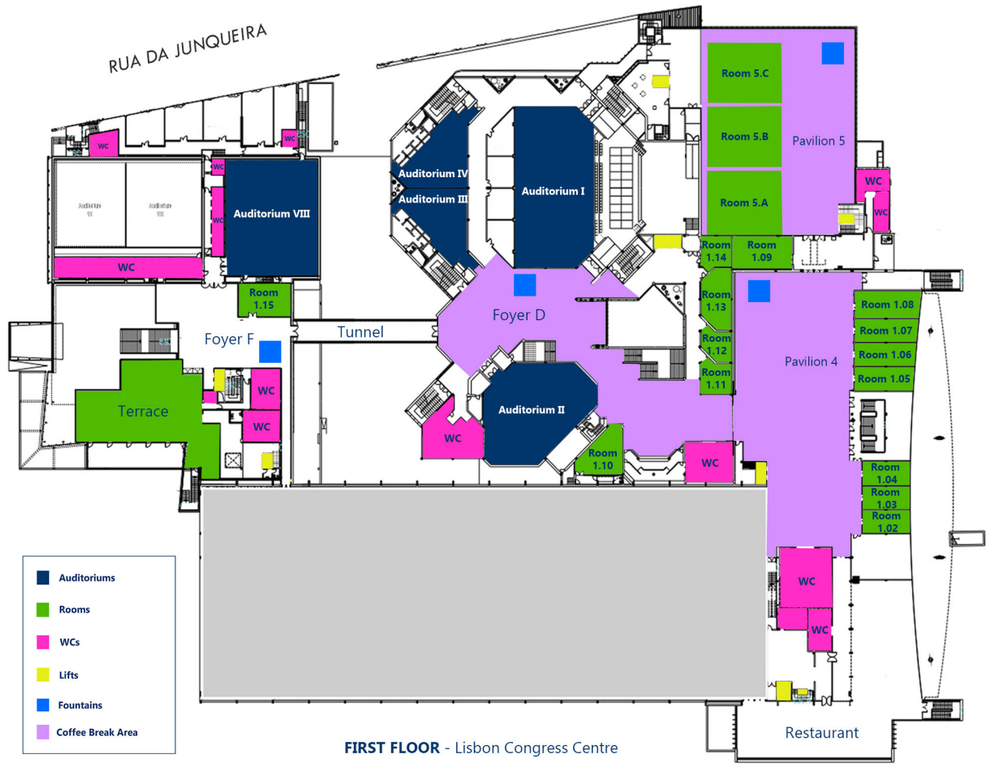
GROUND FLOOR - Lisbon Congress Centre

First Floor

This floor is accessible by stairs and lift. It houses the **Auditorium I, II, III, IV and VIII** where the plenary and semi-plenary lectures will be delivered, as well as the meeting **rooms 1.02, 1.03, 1.04, 1.05, 1.06, 1.07, 1.08,** located in Pavilion 4.

Also, **rooms 1.09, 1.10, 1.11, 1.12, 1.13, 1.14, 1.15** and **rooms 5.A, 5.B and 5.C**, located in Pavilion 5.

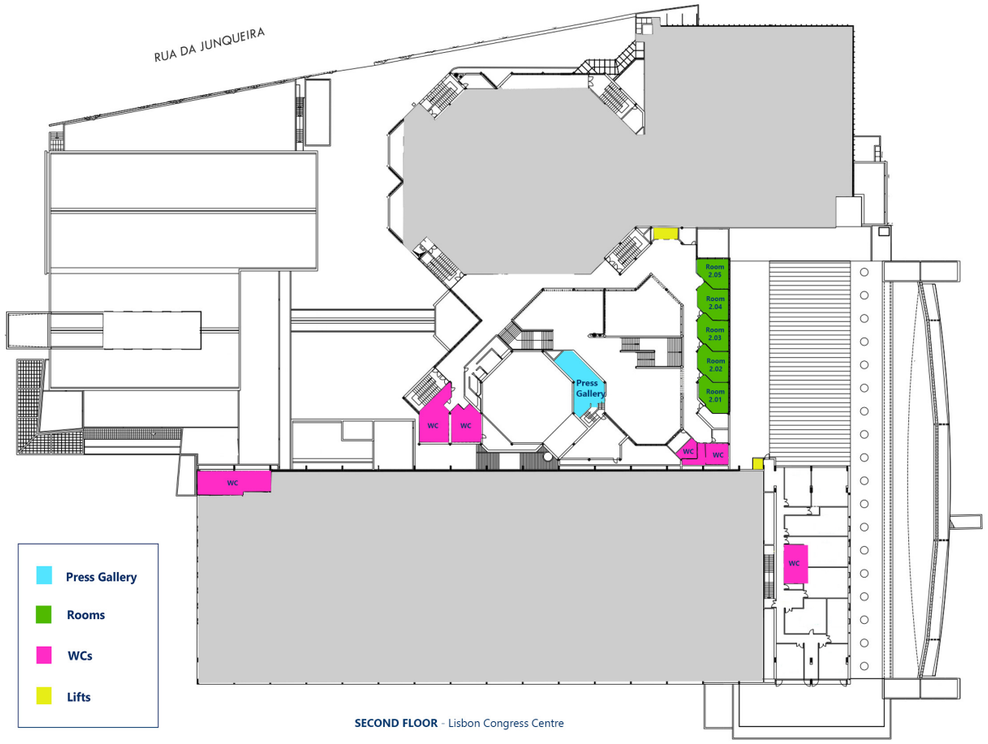
Coffee breaks will be served in Pavilion 4, Pavilion 5 and Foyer D.



FIRST FLOOR - Lisbon Congress Centre

Second Floor

This floor is also accessible by stairs and lift and it houses rooms 2.01, 2.02, 2.03, 2.04 and 2.05 as well as the Press Gallery.



SECOND FLOOR - Lisbon Congress Centre

CONFERENCE INFORMATION

Registration and Check in

All attendees are required to check in at the registration desks, located in the registration area, at the Lisbon Congress Centre.

Identification Badge

Participants are kindly requested to always wear their personal badges in the congress area. Access to coffee breaks and technical sessions will be denied in absence of the badge. Please note that accompanying persons are not allowed to attend technical sessions.

Secretariat Timetable

Sunday: 16:00 to 19:00
Monday: 07:00 to 12:30 / 13:30 to 18:00
Tuesday, Wednesday, Thursday: 08:00 to 12:30 / 13:30 to 18:00
Friday: 08:00 to 12:30 / 13:30 to 17:00

Conference website & Programme updates: https://eccomas2024.org/

The Congress organisers have also arranged to include NFC chips in the badge for all the registered participants of the ECCOMAS Congress 2024

The NFC chip inside the badge allows wireless communication with your smart phone. After holding an NFC-capable smartphone near the badge, the contents about the scientific programme of the Congress and last-minute information will pop-up on the screen.

Technical Sessions and Presentations

The Technical Programme consists of 8 Plenary Lectures, 20 Semi-Plenary Lectures, 75 Keynote Lectures, 188 Minisymposia, 15 Special Technical Sessions, the EYIC Young Investigators Minisymposium, the EYIC Junior Workshop, the 14th PhD ECCOMAS Olympiad, 11 General Sessions, namely, 2578 presentations overall.
Technical Sessions will last 2 hours. Each regular presentation is allocated 20 minutes, Plenary Lectures (PL) and Semi-Plenary lectures (SP) last 45 minutes. Due to large amount of the contributions received, some sessions are allowed to schedule 7 presentations of 17 minutes. Times include questions.

The conference will not provide computers for presentations. Speakers are kindly requested to bring and use their own laptop. An LCD projector will be present in each room. Please test your laptop with the projector in your session room during the coffee-break before your presentation.

The connector available on the projector will be HDMI. You should make sure your laptop has an HDMI port designated as your default output connection. Also note that if your computer does not have an HDMI port, we kindly request you to bring your own adapter.

Coffee Areas

Coffee will be served inside the Pavillon 4, 5 and Foyer D.

Lunch Options

Lunch Bags
Purchased Lunch bags can be collected at the conference information desk (Foyer C).

Eating out at the Venue
The LCC has a small restaurant with a **daily buffet** and a Cash Bar for baguettes, salads, savoury, located in the Foyer D.

Food Trucks
Two different food trucks parked in front of LCC (9:00 – 18:00) will be serving a variety of food from morning coffee to Guacamole, Mexican Burritos, Hot Dogs, Argentinian Burgers, with vegan and vegetarian options available. Glance over the menus below for an overview of the options.

SOCIAL EVENTS

The social events of ECCOMAS 2024 coincide with the Welcome Icebreaking reception and the Conference Banquet.

Ice breaking reception

Sunday, June 2nd afternoon
19:00 to 20:00
Lisbon Congress Centre, Pavilion 4, 5

Following the **Pre-Registration (16:30 - 19:00)**, the icebreaker reception is a great way to start off the week and mark the beginning of ECCOMAS 2024. It is the perfect way to meet delegates, colleagues and friends from around the world, in an informal networking setting. A variety of free drinks and canapés will be served throughout the Pavilion 4, 5.

Congress banquet

Thursday, June 6th 2024
20:30 to 22:30
FIL Pavilhão 1 - Rua do Bojador, Parque das Nações 1998-010 Lisboa

How to arrive

How to arrive:

- Subway - Red Line - Station: Oriente
- Buses - 728, 782, 26B
- Taxi

The Congress banquet is the perfect opportunity for delegates to continue conversations sparked by the Congress' lectures and presentations in a more relaxed space over a delightful three course meal and one of the most beloved ways of intercultural exchange: good food paired with interesting and stimulating conversation.

SCIENTIFIC PROGRAMME

Introduction

Close to 2800 abstracts have been received, resulting in more than 2550 technical presentations across computational solid and fluid mechanics, coupled problems, and associated numerical and computational techniques. The vast majority of these presentations are part of the 188 mini-symposia that have been organised by the scientific community but the programme also includes 8 plenary and 20 Semi-Plenary Lectures, 75 Keynote lectures, the EYIC Young Investigators Minisymposium, the EYIC Junior Workshop, the 14th PhD ECCOMAS Olympiad, 15 Special Technological Sessions and 11 contributed sessions.

A short guide to the Scientific Programme

Opening Ceremony: The conference will commence at 8:30 a.m, on Monday, June 3.

Plenary lectures will be delivered in the morning in the Auditorium I until full capacity is reached, then in streaming in Auditorium II and VIII.

Semi-Plenary lectures will be delivered in the afternoon (right after lunch time) in Auditorium I, II, VI and VIII

EYIC Young investigators MS (MS139A) is schedule on Tuesday, June 4

EYIC Junior Workshop is scheduled on Tuesday, June 4

The 14th PhD ECCOMAS Olympiad is scheduled on Monday, June 3, in the morning.

Programme Updates: For the most updated version of the programme please view the online version on the conference website: www.eccomas2022.org and the NFC chip inside the badge.

Technical Sessions will last 2 hours. The regular format will consist of:

- Sessions with a Keynote Lecture (KL): KL presentation (40 minutes) + 4 presentations of 20 minutes each.
- Sessions without a Keynote Lecture: up to 6 regular presentations (20 minutes each).
- Exceptional sessions scheduling 7 presentations (17 minutes each)
- Time includes Q&A.

Session Codes:

OC: Opening Ceremony - PL: Plenary Lecture - SPL: Semi-Plenary Lecture
MS: Minisymposium - GS: General Session - STS: Special Technological Session
EJW: EYIC Junior Workshop - OLY: ECCOMAS Olympiads

Programme Overview

<table>
<tr><th></th><th>Sunday</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th></tr>
<tr><td>7:00 - 8:30</td><td rowspan="11"></td><td>Registration</td><td colspan="4"></td></tr>
<tr><td>8:30 - 10:00</td><td>Opening Ceremony, ECCOMAS Awards, PL1</td><td>PL2
PL3</td><td>PL4
PL5</td><td>PL6
PL7</td><td>COM
PL8</td></tr>
<tr><td>10:00 - 10:30</td><td colspan="5">Coffee Break</td></tr>
<tr><td>10:30 - 12:30</td><td>MS/GS</td><td>MS/GS</td><td>MS/GS</td><td>MS/GS</td><td>MS/GS</td></tr>
<tr><td>12:30 - 13:45</td><td colspan="5">Lunch Time</td></tr>
<tr><td>13:45 - 14:30</td><td>SPL 1-4</td><td>SPL 5-8</td><td>SPL 9-12</td><td>SPL 13-16</td><td>SPL 17-20</td></tr>
<tr><td>14:30 - 16:30</td><td>MS/GS</td><td>MS/GS</td><td>MS/GS</td><td>MS/GS</td><td>MS/GS</td></tr>
<tr><td>16:30 - 17:00</td><td rowspan="2">Registration</td><td colspan="4">Coffee Break</td></tr>
<tr><td>17:00 - 19:00</td><td>MS/GS</td><td>MS/GS</td><td>MS/GS</td><td>MS/GS</td><td>Closure</td></tr>
<tr><td>19:00 - 20:00</td><td>Ice-breaking Drink</td><td colspan="4"></td></tr>
<tr><td>20:30 - 22:30</td><td colspan="4"></td><td>Congress Banquet</td><td></td></tr>
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INVITED LECTURES

Plenary Lectures overview

		Monday	Tuesday	Wednesday	Thursday	Friday
8:30 – 09:15	Auditorium I		Gerhard A. Holzapfel	Marek Behr	Xavier Oliver	Communicatios
09:15 – 10:00	Auditorium I	J. Nathan Kutz	Stefanie Reese	Martin J. Gander	Gunilla Kreiss	Pedro Camanho

**Plenary lectures will be delivered in the Auditorium I until full capacity is reached, then in streaming in Auditorium II and VIII.*

Plenary Speakers

Marek Behr - RWTH Aachen University, Germany
Digital Representation of Blood in Biomedical Applications

Pedro Camanho - University of Porto, Portugal
Design of Composite Materials and Structures Across the Scales: Physical and Data-driven Models

Martin J. Gander - University of Geneva, Switzerland
Time Parallel Time Integration

Gerhard A. Holzapfel -Graz University of Technology, Austria & NTNU, Norway
Microstructural reconstruction of fibrous tissue with corresponding modeling and application to patients

Gunilla Kreiss - Uppsala University, Sweden
Cut-Galerkin methods for wave-propagation

J. Nathan Kutz - University of Washington, United States
Deep Learning Architectures for Science and Engineering

Xavier Oliver - Universitat Politècnica de Catalunya (UPC/ BarcelonaTech), Spain
Multiscale modelling and computational material design: from problems to model

Stefanie Reese - RWTH Aachen University, Germany
Multiscale modeling by combining data-driven approaches and Fourier transforms

Semi-Plenary Lectures overview

		Monday	Tuesday	Wednesday	Thursday	Friday
13:45 – 14:30	Auditorium I	Marc Geers	Junuthula N Reddy	Laura De Lorenzis	Manuel Doblaré Castellano	Alessandro Reali
	Auditorium II	Trond Kvamsdal	Paola F. Antonietti	Matthias Möller	Emilio Martinez-Pañeda	Sandra May
	Auditorium VI	Daniel Reckzeh	Peter Betsch	Elias Cueto	Nuno Silvestre	José V. Lemos
	Auditorium VIII	Maurizio Quadrio	Spencer Sherwin	Simona Perotto	Michael Kaliske	Katharina Kormann

Semi-Plenary Speakers

Paola F. Antonietti - Politecnico di Milano, Italy
Modeling neurodegenerative diseases

Peter Betsch - Karlsruhe Institute of Technology (KIT), Germany
GENERIC-based structure-preserving numerical methods for coupled problems

Elías Cueto - Universidad de Zaragoza, Spain
Thermodynamics of learning physical phenomena

José Vieira de Lemos - National Laboratory for Civil Engineering (LNEC), Lisbon, Portugal
Modelling the dynamics of masonry structures with discrete elements

Laura de Lorenzis - ETH Zürich, Switzerland
Lattice Boltzmann schemes for solid mechanics

Manuel Doblare - University of Zaragoza, Spain
On Modelling cell plasticity in continuum mathematical biology

Marc Geers - Eindhoven University of Technology, Netherlands
Particle based methods for additive manufacturing and fracture

Michael Kaliske - Technische Universität Dresden, Germany
Computational Methods for Conservation of Wooden Artwork

Katharina Kormann - Ruhr University Bo¬chum, Germany
Structure-preserving methods for high-dimensional problems

Trond Kvamsdal - Norwegian University of Science and Technology (NTNU), Norway
Predictive Digital Twins

Matthias Moller - Delft University of Technology, Netherlands
Bridging the gap between isogeometric analysis and deep operator learning

Sandra May - Uppsala University, Sweden
Solution of hyperbolic problems on cut cell meshes

Emilio Martinez-Pañeda - Oxford University, United Kingdom
Phase field modelling of multi-physics problems, from Li-Ion battery degradation to hydrogen assisted failures

Simona Perotto - Politecnico di Milano, Italy
Exploring the potential of mathematical methods for sustainability: mesh adaptation and model reduction towards a greener future

Maurizio Quadrio - Politecnico di Milano, Italy
The fluid mechanics of the human nose: Where surgery meets flow control

Alessandro Reali - University of Pavia, Italy
Isogeometric analysis: recent advances with applications to complex and coupled problems

Daniel Reckzeh - Airbus Technology, Germany
Energy Efficiency - A key lever for Sustainable Flight

J. N. Reddy - Texas A&M, USA
GraFEA: A Thermodynamically-Consistent Computational Approach for Damage and Failure

Spencer Sherwin - Imperial College London, United Kingdom
Advancing spectral/hp element high fidelity simulation of incompressible and compressible flows

Nuno Silvestre - University of Lisbon, Portugal
On the Improvement of Solar Sail Membranes through a Multiscale Approach using Graphene-Based Composites

SPECIAL TECHNOLOGY SESSIONS

Special Technology Sessions (STS) on Greening of Aviation, Transport and Renewable Energy

Special Technology Sessions (STS) in Aviation, Surface Transport, Renewable Energy, Information Technology and Related Industry Areas

Already since the ECCOMAS Congress 1996 in Paris, Special Technology Sessions (STS) have been organised on technologies and research especially of relevance for industrial applications, mainly in the field of aeronautics but also for research in renewable energy, transport, information technology and other industry areas. At every ECCOMAS Congress and CFD Conference since then, by numerous papers the STS presented the progress and achievements of research and industrial technology activities, especially also from activities within the Research Framework Programmes of the European Union.

Session	Title	Organized by
STS233	Advanced Computational Physics / Computational Mathematics methods and tools for improving a Climate Neutral Digitalized Transport	J. Periaux (CIMNE, France) and G. Bugeda (CIMNE, Spain)
STS234	Drag Reduction for Transport Aircraft	G. Schrauf (esploro projects, Germany)
STS237	Multi-Disciplinary Design & Optimization of Novel HEX (Heat-Exchangers) for Green Aviation	S. Shahpar (Rolls-Royce Plc, United Kingdom)
STS239	STS - Cold transportation	P. Neittaamäki (University of Lappeenranta, Finland)
STS240	STS: Advanced CFD applications for complex aircraft configurations	J. Wild (DLR, Germany)
STS243	Contributions of EU-funded projects managed by CINEA towards greener and digital transport	G. Bampanis (European Commission - CINEA, Belgium) and D. Knoerzer (Aeronautics Consultant, Belgium)
STS244	The Leading-Edge Computational Methods for Green Aviation	W. Bai (Chinese Aeronautical Establishment (CAE), China)
STS245	Prospects for Green Aircraft: Critical Technologies and Operational Aspects driving Overall Design	L. Braga da Costa Campos (Instituto Superior Técnico, Portugal)
STS247	Disruptive Aircraft's Wing Configurations towards Greening of Aviation	M. Braza (Institut de Mécanique des Fluides de Toulouse, France) and Y. Hoarau (ICUBE - University of Strasbourg, France)
STS248	Aerodynamic Shape Optimisation for Reducing Aircraft Emission and Increasing Wind Turbine Efficiency	N. Qin (The University of Sheffield, United Kingdom)
STS267	The impact of Multi-Disciplinary Optimization, Artificial Intelligence and Uncertainty Quantification for a Greener Aviation and Transport system	A. Clarich (ESTECO, Italy)
STS268	Stability and Sensitivity Methods for Flow Control and Industrial Design	E. Valero (Universidad Politécnica de Madrid (UPM), Spain)
STS269	Engineering the Future: Advancements in Industrial Aerodynamic Simulations	O. Lehmkuhl (Barcelona Supercomputing Center (BSC), Spain)
STS271	High Aspect Ratio Wing Design and Development for Short- and Medium Range Aircraf	J. VANKAN (NLR, Netherlands) and B. Stefes (Airbus, Germany)
STS272	Towards Next-Generation Aircraft Design with High-Fidelity Simulation Technologies	Y. Abe (Tohoku University, Japan), K. Shirasu (Tohoku University, Japan), T. Okabe (Tohoku University, Japan) and S. Obayashi (Tohoku University, Japan)

YOUNG INVESTIGATORS MINISYMPOSIUM

Organizers

Simone Morganti, University of Pavia, Italy
Enrique Nadal, University of Valencia, Spain
Bastian Oesterle, Hamburg University of Technology, Germany
Konrad Perzynski, AGH University of Krakow, Poland
Carina Schwarz, University of Duisburg-Essen, Germany
Lorenzo Tamellini, CNR-IMATI, Italy

The ECCOMAS Young Investigators Minisymposium (MS139A) is organized by young investigators for young investigators. The format, which has been first introduced at the ECCOMAS Congress 2016 with great success, is quite different from the regular minisymposia in order to particularly attract young researchers.

There are three possibilities for presentations:

1. Presentations in pairs.

Two presenters prepare and submit their abstract together, and they also give the presentation together – whether as a "duet" or more as a "duel" is up to you. The two presenters should know each other but should ideally not work at the same institution. The idea is to view a topic from two different perspectives, thus leading to discussions on pros and cons or complementarity of the presented approaches. Presentations in pairs are allowed 1.5 times the time of regular talks.

2. Presentation of things that did not work (as expected).

This session is dedicated to those works which did not work or led to different outcomes than expected. This gives the chance to present "negative" results. Authors should discuss why things went "wrong" with the aim to prevent others from falling into the same traps.

3. Presentation of open/unsolved problems.

The main idea of this scientific format is to present a problem that you have been working on for quite some time, but for which you could not yet find a good solution. This gives the chance to present "unfinished" work and to get valuable input from an audience full of "fellow sufferers". Authors should give a clear and comprehensive introduction to their unsolved problem, but allow for more time than usual to interact with the audience and to discuss new ideas and suggestions.

14TH PHD ECCOMAS OLYMPIAD

The purpose of the ECCOMAS PhD Olympiads is to present the best PhD Theses approved by a University or Research Organization in Europe during the previous year and to act as a forum for exchanging new ideas, disseminating recent developments in the fields of ECCOMAS and sharing common research interests among young investigators. Every National or Regional Association affiliated to ECCOMAS is represented by a number of selected PhDs submitted for consideration for the two ECCOMAS PhD Awards.

The Olympiad is scheduled on **Monday, June 3**

Michele Bucelli, Politecnico di Milano, Italy

Manuel Colera Rico, Universidad Politécnica de Madrid, Spain

Anna Dalklint, Technical University of Denmark, Denmark

Quercus Hernandez, University of Pennsylvania, United States

Marina Kontou, National Technical University of Athens, Greece

Alice Nassor, ENSTA Paris, France

Alessandro Marengo, Tetra Pak, Italy

Denisa Martonová, FAU Erlangen-Nürnberg, Germany

Marzena Mucha, Cracow University of Technology, Poland

Alessio Pappa, University of Mons, Belgium

Maximilian Ries, FAU Erlangen-Nürnberg, Germany

Paulo R. Refachinho de Campos, Swansea University, United Kingdom

Thibault Roch, University of Amsterdam, Netherland

Samir Suljevic, University of Sarajevo, Bosnia and Herzegovina

Rui Yang, University of Twente, Netherlands

Jonathan Weissmann, Yale University, United States

Marco Zecchetto, Instituto Superior Técnico, Portugal

EYIC JUNIOR WORKSHOP

The Junior workshop aims at providing introductory thematic lectures for young investigators within a relaxed and familiar atmosphere to foster interactive discussions between the attendees and the lecturers. Therefore, four invited experts, along two sessions, will give lectures on interesting topics related to the congress.

Organizers

Tuesday, June 4, 14:30 - 16:30

Mechanics applied to living systems: issues and hopes for predictability.
Anna Pandolfi, Politecnico di Milano, Italy

Introduction to quantum computing and non-linear finite-element (re)formulation for quantum annealing.
Ludovic Noels, Liège Université, Belgium

Tuesday, June 4, 17:00 - 19:00

Neural Topology Optimization: the future of inverse design
Miguel Bessa, Brown University

Extracorporeal life support: Fluid dynamics for Life
Lisa Prahl Wittberg, KTH Royal Institute of Technology

LIST OF MINISYMPOSIA

100 Advanced Discretization Techniques

MS010 ISOGEOMETRIC METHODS
Organized by: A. Reali (University of Pavia, Italy), Y. Bazilevs (Brown University, United States), D. Benson (Ansys, United States), R. de Borst (University of Sheffield, United Kingdom), T. Hughes (University of Texas at Austin, United States), T. Kvamsdal (Norwegian University of Science and Technolog, Norway), G. Sangalli (University of Pavia, Italy) and C. Verhoosel (Eindhoven University of Technology, Netherlands)

MS061 NEW DIRECTIONS FOR SOLVING STOKES AND NAVIER-STOKES PROBLEMS
Organized by: E. Jamelot (Université Paris-Saclay, CEA, France)

MS064 EFFICIENT CAD-BASED DISCRETIZATION METHODS
Organized by: R. Bouclier (IMT & ICA, INSA-Toulouse, France), P. Antolin (EPFL (Lausanne), Switzerland), T. Hirschler (ICB UMR 6303, UTBM, Belfort, France), M. Tani (University of Pavia, Italy), B. Marussig (Institute of Applied Mechanics, TU Graz, Austria), A. Mantzaflaris (Inria Center, Sophia Antipolis, France), S. Takacs (Johannes Kepler University Linz, Austria) and A. Buffa (EPFL (Lausanne), Switzerland)

MS067 ENRICHED FINITE-ELEMENT FORMULATIONS FOR FRACTURE
Organized by: B. Sluys (Delft University of Technology, Netherlands) and J. Alfaiate (Universidade de Lisboa, Portugal)

MS127 ROBUST DISCRETIZATION AND SOLUTION OF COUPLED PROBLEMS IN POROUS MEDIA
Organized by: F. Bertrand (TU Chemnitz, Germany) and J. Both (University of Bergen, Norway)

MS150 ADVANCES AND APPLICATIONS IN MESHFREE, PARTICLE, AND PERIDYNAMIC METHODS
Organized by: J. Chen (University of California, San Diego, United States), Z. Chen (University of Missouri, Columbia, United States), M. Hillman (Karagozian & Case, United States) and P. Seleson (Oak Ridge National Laboratory, United States)

300 Biomechanics and Mechanobiology

MS027 HEAD AND NECK INJURY BIOMECHANICS
Organized by: R. Alves de Sousa (Universidade de Aveiro, Portugal), D. MacManus (University College Dublin, Ireland) and M. Ptak (Wroclaw University of Science and Technology, Poland)

MS035 COMPUTATIONAL MODELS AND METHODS FOR PREDICTING CANCER PROGRESSION AND TREATMENT RESPONSE
Organized by: G. Lorenzo (University of Pavia, Italy), R. Woodall (City of Hope, United States), D. Hormuth II (The University of Texas at Austin, United States), M. Abdelmalik (Eindhoven University of Technology, Netherlands), R. Rockne (City of Hope, United States), A. Reali (University of Pavia, Italy), T. Yankeelov (The University of Texas at Austin, United States) and T. Hughes (The University of Texas at Austin, United States)

MS037 SIMULATION AND EXPERIMENTAL VALIDATION OF BONE-IMPLANT-SYSTEMS IN CLINICAL APPLICATIONS
Organized by: M. Roland (Saarland University, Germany), B. Braun (University Hospital Tuebingen; BG Hospital, Germany) and S. Diebels (Saarland University, Germany)

MS039 RECENT ADVANCES OF COMPUTATIONAL METHODS IN CARDIOVASCULAR AND CEREBROVASCULAR BIOMECHANICS
Organized by: S. Pinto (FEUP - INEGI, Portugal) and L. Sousa (FEUP - INEGI, Portugal)

MS057 MICROSTRUCTURE-BASED MODELING OF BIOMECHANICAL SYSTEMS
Organized by: M. Terzano (Graz University of Technology, Austria), S. Budday (FAU Erlangen-Nürnberg, Germany) and G. Holzapfel (Graz University of Technology, Austria)

MS096 ACTIVE AND PASSIVE MECHANICS IN PATIENT-SPECIFIC MODELLING OF SOFT BIOLOGICAL TISSUES
Organized by: L. Dede' (Politecnico di Milano, Italy) and A. Pandolfi (Politecnico di Milano, Italy)

MS102 NUMERICAL METHODS FOR THE VASCULAR SYSTEM IN HEALTH AND DISEASE
Organized by: R. Schussnig (University of Augsburg, Germany), A. Ranno (RWTH Aachen University, Germany), I. Steinbrecher (University of the Bundeswehr Munich, Germany), M. Rolf-Pissarczyk (Graz University of Technology, Austria), G. Melito (Graz University of Technology, Austria) and C. Armour (National Heart & Lung Institute, United Kingdom)

MS114 COMPUTER METHODS IN CELL-SCALE BIOMECHANICS AND MECHANOBIOLOGY
Organized by: A. Ehret (Empa, Switzerland), S. Loerakker (Eindhoven University of Technology, Netherlands) and E. McEvoy (University of Galway, Ireland)

MS119 AGENT-BASED MODELLING TO SIMULATE CELL- AND MULTISCALE PROBLEMS IN BIOLOGY
Organized by: R. Bauer (University of Surrey, United Kingdom), M. Manca (SCImPULSE Foundation, Netherlands), A. Caiazzo (The Weierstrass Institute for Applied Analysi, Germany), M. Oraiopoulou (CRUK, University of Cambridge, United Kingdom), A. Montagud (Barcelona Supercomputing Center, Spain) and V. Vavourakis (University of Cyprus, Cyprus)

MS158 COMPUTATIONAL BIOMECHANICS AND APPLICATIONS
Organized by: P. Fernandes (IDMEC, Instituto Superior Técnico, Portugal), J. Folgado (IDMEC, Instituto Superior Técnico, Portugal) and H. Rodrigues (IDMEC, Instituto Superior Técnico, Portugal)

LIST OF MINISYMPOSIA

MS208 HEMODYNAMICS MODELS FOR THE DESIGN OF MECHANICAL CIRCULATORY SUPPORT (MCS) TECHNOLOGIES
Organized by: R. Mongrain (McGill University, Canada), R. Leask (McGill University, Canada) and L. Prahl Wittberg (KTH Royal Institute of Technology, Sweden)

MS211 MULTISCALE MODELING OF VASCULAR GROWTH AND REMODELING
Organized by: A. Corti (Politecnico di Milano, Italy), S. Avril (Mines Saint-Etienne, France) and C. Chiastra (Politecnico di Torino, Italy)

MS221 MODELING AND ARTIFICIAL INTELLIGENCE DECISION SUPPORT SYSTEM FOR HEART FAILURE
Organized by: N. Filipovic (BIOIRC doo Kragujevac, Serbia) and M. Kojic (BIOIRC doo Kragujevac, Serbia)

400 Geomechanics and Natural Materials

MS113 RECENT ADVANCES IN COMPUTATIONAL GEOMECHANICS
Organized by: Y. Wang (Universität für Bodenkultur Wien, Austria) and W. Wu (Universität für Bodenkultur Wien, Austria)

MS147 ADVANCEMENTS IN MULTI-SCALE, MULTI-PHYSICS COMPUTATIONAL METHODS FOR HETEROGENEOUS POROUS MEDIA
Organized by: P. Newell (The University of Utah, United States) and F. Aldakheel (Leibniz University Hannover, Germany)

500 Computational Applied Mathematics

MS015 ADVANCES IN COMPUTATIONAL MATHEMATICS
Organized by: C. Fernandes (University of Porto, Portugal), Â. Ribau (University of Porto, Portugal), N. Gonçalves (University of Porto, Portugal), L. Ferrás (University of Porto, Portugal) and A. Afonso (University of Porto, Portugal)

MS017 PHASE FIELD MODELING AND COMPUTATION
Organized by: M. ten Eikelder (TU Darmstadt, Germany), L. De Lorenzis (ETH Zürich, Switzerland), K. Garikipati (University of Michigan, United States), Y. Leng (Purdue University, United States), H. van Brummelen (Eindhoven University of Technology, Netherlands) and H. Gomez (Purdue University, United States)

MS077 EFFICIENT SPLINE METHODS FOR COMPLEX (ISO)GEOMETRIC MODELING AND SIMULATION
Organized by: C. Giannelli (University of Florence, Italy), A. Reali (University of Pavia, Italy) and G. Sangalli (University of Pavia, Italy)

MS080 ADVANCES IN TURBULENCE MODELING USING NONLOCAL DERIVATIVES, IMPLICIT LES AND DEEP LEARNING
Organized by: P. Pranjivan Mehta (SISSA, International School of Advanced Study, Italy), M. D'Elia (Pasteur Labs and Stanford University, United States) and G. Rozza (SISSA, International School of Advanced Study, Italy)

MS084 DATA-ENHANCED REDUCED ORDER MODELING
Organized by: M. Tezzele (University of Texas at Austin, United States), N. Aretz (University of Texas at Austin, United States) and R. Maulik (Pennsylvania State University, United States)

MS093 EMERGING TRENDS IN MODEL REDUCTION FOR NONLINEAR MECHANICS PROBLEMS
Organized by: S. Jain (TU Delft, Netherlands) and M. Li (SUSTech, China)

MS155 MAGNETOHYDRODINAMIC NUMERICAL MODELING OF MAGNETISED PLASMAS.
Organized by: B. Nkonga (UCA INRIA/CASTOR, France), H. Guillard (INRIA UCA/CASTOR, France) and F. Rapetti (UCA INRIA/CASTOR, France)

MS156 SHEAR SHALLOW WATER : MODELING AND APLLICATIONS
Organized by: B. Nkonga (UCA INRIA/CASTOR Nice, France), P. Chandrashekar (TIFR-CAM Bangalore, India), M. Dumbser (Univ. of Trento, Italy) and S. Gavrilyuk (IUSTI Aix Marseille Univ, France)

MS159 NOVEL KINETIC APPROACHES IN OPTIMIZATION AND UNCERTAINTY QUANTIFICATION
Organized by: A. Medaglia (University of Pavia, Italy) and G. Borghi (RWTH Aachen University, Germany)

MS171 ELECTROMAGNETIC PROBLEMS ARISING IN INDUSTRY: MODELLING AND NUMERICAL TECHNIQUES
Organized by: I. Cortés (Eindhoven University of Technology, Netherlands), D. Gómez (USC and CITMAga, Spain) and S. Schoeps (Technische Universität Darmstadt, Germany)

600 Data Science, Machine Learning and Artificial Intelligence

MS002 MACHINE LEARNING AND DATA-DRIVEN APPROACHES FOR OPTIMIZATION AND UNCERTAINTY QUANTIFICATION IN AERODYNAMICS
Organized by: E. Andrés Pérez (INTA, Spain)

MS007 MACHINE LEARNING METHODS FOR MULTISCALE AND MULTIPHYSICS MATERIAL MODELING
Organized by: F. Aldakheel (Leibniz Universität Hannover, Germany), O. Weeger (TU Darmstadt, Germany), M. Bessa (Brown University, Virgin Islands, USA), N. Bouklas (Cornell University, Virgin Islands, USA) and W. Sun (Columbia University, Virgin Islands, USA)

MS014 ACCELERATING SCIENTIFIC DISCOVERY FOR DYNAMICAL SYSTEMS WITH PHYSICS-INFORMED MACHINE LEARNING
Organized by: R. Maulik (Pennsylvania State University, United States) and G. Mengaldo (National University of Singapore, Singapore)

LIST OF MINISYMPOSIA

MS041 PHYSICS-INFORMED MACHINE LEARNING FOR STRUCTURAL HEALTH MONITORING: EMERGING TRENDS AND OPEN ISSUES
Organized by: A. Barontini (University of Minho, ISISE, ARISE, Portugal), F. Ubertini (University of Perugia, Italy) and E. Chatzi (ETH Zürich, Switzerland)

MS051 DATA-DRIVEN SIMULATION OF FLOW AND MULTI-PHYSICS PROBLEMS
Organized by: A. Coutinho (Federal University of Rio de Janeiro, Brazil), A. Reali (University of Pavia, Italy) and G. Rozza (SISSA Trieste, Italy)

MS052 EFFICIENT SCIML TECHNIQUES WITH APPLICATIONS TO CFD
Organized by: S. Ganesan (Indian Institute of Science, India) and A. Heinlein (Delft University of Technology, Netherlands)

MS062 MACHINE LEARNING AND DATA-DRIVEN APPROACHES IN RAILWAY DYNAMICS
Organized by: A. Mosleh (Porto University, Portugal), D. Robeiro (Polytechnic of Porto, Portugal), J. Fink (TU Wien, Austria), A. Stollwitzer (TU Wien, Austria) and A. Meghoe (University of Twente, Netherlands)

MS071 AI/MACHINE-LEARNING IN EARTHQUAKE ENGINEERING: INSIGHTS FROM SEISMIC RISK TOWARDS DISASTER-RESILIENT CITIES
Organized by: S. KARIMZADEH (University of Minho, Portugal), S. RAGHUKANTH (Indian Institute of Technology Madras, India) and P. LOURENÇO (University of Minho, Portugal)

MS075 RECENT ADVANCES IN DEEP REINFORCEMENT LEARNING OF COMPLEX DYNAMICAL SYSTEMS
Organized by: N. Botteghi (University of Twente, Netherlands) and S. Fresca (Politecnico di Milano, Italy)

MS088 STATE-OF-THE-ART MACHINE LEARNING TECHNIQUES FOR COMPUTATIONAL FLUID DYNAMICS
Organized by: A. Schwarz (University of Stuttgart, Germany), J. Keim (University of Stuttgart, Germany) and A. Beck (University of Stuttgart, Germany)

MS132 RECENT ADVANCES IN DATA-DRIVEN MODELING AND UNCERTAINTY QUANTIFICATION OF COMPLEX DYNAMICAL SYSTEMS
Organized by: S. Dutta (The University of Texas at Austin, United States) and M. Farthing (USACE Engineer Research Development Center, United States)

MS140 REDUCED ORDER MODELS AND ARTIFICIAL INTELLIGENCE FOR INDUSTRIAL APPLICATIONS
Organized by: M. Carlino (DAAA, ONERA, Université Paris-Saclay & INRIA, France), N. Ferro (MOX, Dipartimento di Matematica, Politecnico, Italy), M. Lupo Pasini (Oak Ridge National Laboratory, United States) and S. Perotto (MOX, Dipartimento di Matematica, Politecnico, Italy)

MS145 MACHINE AND DEEP LEARNING TECHNIQUES APPLIED TO COMPUTATIONAL MECHANICS
Organized by: J. Belinha (ISEP - INEGI, Portugal) and S. Tavares (Universidade de Aveiro, Portugal)

MS148 ADVANCES IN MACHINE LEARNING FOR COMPOSITE MATERIALS
Organized by: M. Mirkhalaf (University of Gothenburg, Sweden), I. Rocha (Delft University of Technology, Netherlands) and R. Bostanabad (University of California, United States)

MS160 ADVANCING PREDICTIVE SIMULATIONS UNDER UNCERTAINTY: AI AND UQ FOR COMPUTATIONAL MECHANICS
Organized by: S. Kaltenbach (ETH Zurich / Harvard SEAS, United States), S. Litvinov (ETH Zurich / Harvard SEAS, United States) and P. Koumoutsakos (Harvard SEAS, United States)

MS161 UNRAVELLING NEURAL NETWORKS WITH STRUCTURE-PRESERVING COMPUTING
Organized by: B. Koren (TU EIndhoven, Netherlands) and W. Schilders (TU Eindhoven, Netherlands)

MS163 SCIENTIFIC MACHINE LEARNING - A CATALYST FOR ALGORITHMIC PERFORMANCE IN INDUSTRIAL COMPUTER AIDED ENGINEERING
Organized by: D. Hartmann (Siemens Industry Software GmbH, Germany) and T. Richter (Otto-von-Guericke-Universität Magdeburg, Germany)

MS165 SCIENTIFIC MACHINE LEARNING FOR MODELLING AND SIMULATION
Organized by: I. Cortes Garcia (Eindhoven University of Technology, Netherlands) and M. Abdelmalik (Eindhoven University of Technology, Netherlands)

MS166 ADVANCING SCIML SURROGATES VIA NUMERICAL METHODS AND VICE VERSA
Organized by: S. Goswami (Brown University, United States), A. Heinlein (Delft University of Technology, United States) and A. Kopanicakova (Brown University, United States)

MS173 EXPLAINABLE AI FOR COMPUTATIONAL MECHANICS
Organized by: E. Raponi (Technical University of Munich, Germany), N. van Stein (Leiden University, Netherlands), T. Bäck (Leiden University, Netherlands) and F. Duddeck (Technical University of Munich, Germany)

700 Digital Twins

MS006 DEVELOPMENT AND APPLICATIONS OF COMPUTATIONAL METHODS FOR DIGITAL TWINS
Organized by: A. Jiménez Rios (Oslo Metropolitan University, Norway), V. Plevris (Qatar University, Qatar) and M. Nogal (Delft University of Technology, Netherlands)

MS047 COMPUTATIONAL METHODS FOR ENABLING DIGITAL TWINS
Organized by: D. Loukrezis (Siemens AG, Germany), D. Manvelyan (Siemens AG, Germany), M. Guo (University of Twente, Netherlands) and D. Giovanis (Johns Hopkins University, United States)

LIST OF MINISYMPOSIA

MS073 TOWARDS DIGITAL TWINS FOR INFRASTRUCTURES
Organized by: M. Kaliske (TU Dresden, Germany), J. Blankenbach (RWTH Aachen University, Germany), A. Popp (University of the Bundeswehr Munich, Germany), S. Reese (RWTH Aachen University, Germany), I. Wollny (TU Dresden, Germany) and M. von Danwitz (German Aerospace Center (DLR), Germany)

MS121 IN-SILICO VS. IN-VIVO: ACCURACY AND RELIABILITY OF PATIENT-SPECIFIC CARDIAC MODELING
Organized by: E. Balaras (George Washington University, United States), F. Capuano (Universitat Politècnica de Catalunya, Spain), Y. Loke (Children's National Hospital, United States) and P. Vlachos (Purdue University, United States)

MS164 DIGITAL TWINS FOR PREDICTIVE DECISION-MAKING OF ENGINEERING SYSTEMS
Organized by: M. Torzoni (Politecnico di Milano, Italy), M. Tezzele (Oden Institute, United States), S. Mariani (Politecnico di Milano, Italy) and A. Manzoni (Politecnico di Milano, Italy)

MS184 PREDICTIVE DIGITAL TWINS
Organized by: T. Kvamsdal (NTNU, Norway), K. Mathisen (NTNU, Norway) and Ø. Klemetsdal (SINTEF, Norway)

800 Fluid Dynamics and Transport Phenomena

MS016 COARSE GRAINING TURBULENCE: MODELING AND DATA-DRIVEN APPROACHES AND THEIR APPLICATIONS
Organized by: F. Grinstein (Los Alamos National Laboratory, United States), F. Pereira (Los Alamos National Laboratory, United States) and M. Germano (Duke University, United States)

MS025 20 YEARS OF PARTIALLY-AVERAGED NAVIER-STOKES EQUATIONS: PROGRESS, CHALLENGES, AND FUTURE
Organized by: F. Pereira (Los Alamos National Laboratory, United States), B. Basara (AVL List GMBH, Austria) and S. Wallin (KTH, Engineering Mechanics, Sweden)

MS029 COMPUTATIONAL & DATA-DRIVEN APPROACHES FOR TURBULENT DYNAMICAL SYSTEMS
Organized by: F. Garcia (Universitat Politècnica de Catalunya, Spain), L. Jofre (Universitat Politècnica de Catalunya, Spain), J. Calafell (Barcelona Supercomputing Center, Spain) and J. Príncipe (Universitat Politècnica de Catalunya, Spain)

MS046 CUTTING-EDGE MODEL ORDER REDUCTION TECHNIQUES FOR COMPUTATIONAL FLUID DYNAMICS
Organized by: G. Stabile (University of Urbino Carlo Bo, Italy), M. Strazzullo (Politecnico di Torino, Italy) and D. Torlo (SISSA, International School of Advanced Studi, Italy)

MS053 ADVANCES IN MODELLING AND SIMULATION FOR HIGH-SPEED AERODYNAMICS
Organized by: J. Fang (STFC, Daresbury Laboratory, United Kingdom), B. John (STFC, Daresbury Laboratory, United Kingdom), D. Emerson (STFC, Daresbury Laboratory, United Kingdom) and D. Modesti (Delft University of Technology, Netherlands)

MS068 COMPUTATIONAL METHODS FOR MULTIPHASE FLOWS WITH LIQUID-VAPOR TRANSITION
Organized by: L. Brandt (NTNU, Norway), M. Pelanti (ENSTA Paris - Institut Polytechnique de Paris, France), M. Rodriguez (Brown University, United States) and S. Tanguy (IMFT Universite Paul Sabatier, France)

MS098 RECONCILING PHYSICAL FIDELITY, ROBUSTNESS AND EFFICIENCY IN COMPUTATIONAL FLUID DYNAMICS
Organized by: F. Capuano (Universitat Politècnica de Catalunya, Spain), G. Coppola (Università di Napoli "Federico II", Italy), E. Komen (Nuclear Research & Consultancy Group, Netherlands), B. Sanderse (Centrum Wiskunde & Informatica, Netherlands), F. Trias (Universitat Politècnica de Catalunya, Spain), N. Valle (Technische Universiteit Delft, Netherlands) and R. Verstappen (University of Groningen, Netherlands)

MS100 COMPUTATIONAL KINETIC THEORY
Organized by: M. Abdelmalik (Eindhoven University of Technology, Netherlands), H. van Brummelen (Eindhoven University of Technology, Netherlands), J. Koellermeier (University of Groningen, Netherlands), T. Pichard (École Polytechnique, France) and T. Kessler (Eindhoven University of Technology, Netherlands)

MS101 MODERN APPROACHES TO MULTIPHASE FLOWS IN MICROFLUIDICS: BUBBLES, DROPLETS, WETTING, AND TRANSPORT IN COMPLEX MEDIA
Organized by: S. Afkhami (NJIT, United States), T. Maric (TU Darmstadt, Germany), M. Fricke (TU Darmstadt, Germany), M. Hashemi (CIMNE, Spain) and P. Ryzhakov (UPC, Spain)

MS128 FROM THE NOSE TO THE LUNG: FLUID DYNAMICS OF THE UPPER AIRWAYS
Organized by: L. Krenkel (OTH Regensburg, Germany), M. Ruetten (German Aerospace Center (DLR), Germany) and M. Quadrio (Politecnico Milano, Italy)

MS138 NUMERICAL METHODS FOR INTERFACE-RESOLVED MULTIPHASE FLOWS
Organized by: N. Valle (Technische Universiteit Delft, Netherlands), F. Trias (Universitat Politècnica de Catalunya, Spain) and A. Veldman (Rijkuniversiteit Groningen, Netherlands)

MS141 ELECTROHYDRODYNAMIC AND BEYOND
Organized by: M. Abdollahzadehsangroudi (C-MAST- Center for Mechanical and Aerospace S, Portugal) and M. ESMAEILPOUR (Marshall University, United States)

MS142 MULTIPHASE FLOW AND NON-NEWTONIAN FLUID - MODELLING AND APPLICATIONS
Organized by: C. Li (Swansea University, United Kingdom)

MS167 MODELING AND COMPUTATIONS OF FLOW THROUGH NETWORK-BASED POROUS MEDIA
Organized by: L. Kondic (NJIT, United States) and L. Cummings (NJIT, United States)

LIST OF MINISYMPOSIA

MS188 EXPLORING NOVEL APPLICATIONS AND ADVANCES IN LATTICE BOLTZMANN METHODS
Organized by: A. De Rosis (University of Manchester, United Kingdom) and M. Camps Santasmasas (University of Manchester, United Kingdom)

MS192 KINETIC-BASED COMPUTATIONAL FLUID DYNAMICS FOR CONTINUUM AND RAREFIED FLOWS
Organized by: H. Yu (Indiana University-Purdue University, Indiana, United States), S. A (Indian Institute of Technology Madras, India) and J. Salazar (Universidade Federal de Santa Catarina, Brazil)

900 Fluid-structure Interaction

MS020 ADVANCEMENTS IN OFFSHORE WIND STRUCTURES
Organized by: A. Kampitsis (Aristotle University of Thessaloniki, Greece), K. Kapasakalis (National Technical University of Athens, Greece) and E. Sapountzakis (National Technical University of Athens, Greece)

MS202 INNOVATIVE METHODS FOR FLUID-STRUCTURE INTERACTION
Organized by: H. van Brummelen (TUE, Netherlands), T. Kvamsdal (NTNU, Norway), Y. Bazilevs (Brown University, United States), J. DeGroote (Ghent University, Belgium) and R. Ohayon (CNAM, France)

MS209 NEW TRENDS IN THE MATHEMATICAL AND NUMERICAL ASPECTS OF FLUID-STRUCTURE INTERACTION
Organized by: M. Fernández (Inria, France), C. Grandmont (Inria, France) and M. Vidrascu (Inria, France)

MS210 FLUID-STRUCTURE INTERACTION IN MULTIPHYSICS SYSTEMS
Organized by: M. de Tullio (Polytechnic University of Bari, Italy), M. García-Villalba (Technische Universität Wien, Austria), A. Nitti (Polytechnic University of Bari, Italy), F. Picano (University of Padova, Italy), A. Reali (University of Pavia, Italy) and F. Viola (Gran Sasso Science Institute, Italy)

1000 Fracture, Damage and Failure Mechanics

MS003 ADVANCED MATERIALS: COMPUTATIONAL ANALYSIS OF PROPERTIES AND PERFORMANCE
Organized by: V. Silberschmidt (Loughborough University, United Kingdom)

MS008 COMPUTATIONAL MECHANICS IN HIGH-STRAIN RATE AND IMPACT DYNAMICS
Organized by: P. Longère (Institut Clément Ader, France) and E. Deletombe (ONERA, France)

MS011 MODELING OF FAILURE OF ADDITIVELY MANUFACTURED PARTS
Organized by: N. Dialami (CIMNE-UPC, Spain) and M. Cervera (CIMNE-UPC, Spain)

MS054 ADVANCES IN COMPUTATIONAL TECHNIQUES FOR FRACTURE
Organized by: S. Marfia (University of Roma TRE, Italy), S. LÖHNERT (Technische Universität Dresden, Germany) and L. De Lorenzis (ETH Zürich, Switzerland)

MS104 MODELING FAILURE IN COMPOSITE MATERIALS
Organized by: J. Gonilha (CERIS, Instituto Superior Técnico, U. Lisboa, Portugal) and N. Silvestre (IDMEC, Instituto Superior Técnico, U. Lisboa, Portugal)

MS115 FAILURE MECHANICS OF SOFT MATERIALS: MODELING AND EXPERIMENTAL APPROACHES
Organized by: M. Moreno Mateos (FAU Erlangen-Nürnberg, Germany), P. Kumar (FAU Erlangen-Nürnberg, Germany) and P. Steinmann (FAU Erlangen-Nürnberg, Germany)

MS181 PHASE-FIELD AND GRADIENT DAMAGE MODELS FOR FRACTURE IN COMPLEX MATERIALS
Organized by: F. Aldakheel (Leibniz Universität Hannover, Germany), P. Carrara (ETH Zürich, Switzerland), M. Kalina (TU Dresden, Germany), M. Kästner (TU Dresden, Germany), L. Svolos (University of Vermont, United States) and H. Waisman (Columbia University, United States)

MS197 ADVANCES IN MODELING HYDROGEN-ASSISTED FRACTURE PHENOMENA
Organized by: E. Martínez-Pañeda (Imperial College London, United Kingdom), A. Jesus (Faculty of Engineering of University of Porto, Portugal), L. Malcher (INEGI, Portugal) and E. Azinpour (INEGI, Portugal)

MS205 PHASE FIELD FORMULATION FOR FRACTURE AND ITS APPLICATIONS
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Organized by: D. Cerroni (Pirelli tyre S.p.A., Italy), N. Parolini (MOX, Dipartimento di Matematica, Politecnico, Italy) and G. Negrini (MOX, Dipartimento di Matematica, Politecnico, Italy)

MS144 HPC SIMULATIONS AND AI FOR THE WIDE INDUSTRIAL REALM
Organized by: M. Tsubokura (RIKEN Center for Computational Science, Japan), T. Aoki (Tokyo Institute of Technology, Japan), A. Lintermann (Jülich Supercomputing Centre, Germany), S. Herff (Jülich Supercomputing Centre, Germany) and G. Houzeaux (Barcelona Supercomputing Center, Spain)

MS175 DISCRETE ELEMENT METHOD SIMULATIONS OF PHARMACEUTICAL PROCESSES
Organized by: P. Böhling (RCPE GmbH, Austria) and M. Trogrlic (RCPE GmbH, Austria)

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MS012 COMPLEX FLUID FLOWS IN ENGINEERING: MODELING, SIMULATION, AND OPTIMIZATION
Organized by: F. Key (TU Wien, Austria), M. Behr (RWTH Aachen University, Germany) and S. Elgeti (TU Wien, Austria)

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Organized by: B. Kriegesmann (Hamburg University of Technology, Germany), T. Rung (Hamburg University of Technology, Germany), R. Seifried (Hamburg University of Technology, Germany), A. Düster (Hamburg University of Technology, Germany), K. Welker (TU Bergakademie Freiberg, Germany) and W. Wollner (Universität Hamburg, Germany)

MS018 COMPUTATIONAL METHODS FOR INVERSE PROBLEMS
Organized by: D. Givoli (Technion - Israel Inst. of Tech., Israel) and H. Waisman (Columbia University, United States)

MS022 Advances in structural and multidisciplinary optimization
Organized by: J. Madeira (IDMEC, IST, Universidade de Lisboa, Portugal) and A. Araujo (IDMEC, IST, Universidade de Lisboa, Portugal)

MS028 PROGRESS IN RAPID METHODS FOR AERODYNAMIC DESIGN
Organized by: S. Marques (U. Surrey, United Kingdom), J. Doherty (U. Surrey, United Kingdom) and A. Da Ronch (U. Southampton, United Kingdom)

MS048 METHODS FOR IDENTIFICATION/MACHINE LEARNING AND UNCERTAINTY QUANTIFICATION OF REDUCED ORDER MODELS OF COUPLED SYSTEMS
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MS081 GRADIENT-BASED AND GRADIENT-FREE OPTIMIZATION METHODS, WITH EMPHASIS ON INNOVATIVE DESIGNS FOR A CLIMATE NEUTRAL AVIATION
Organized by: M. Carini (ONERA, France), K. Giannakoglou (National Technical University of Athens, Greece) and M. Abu-Zurayk (DLR, Germany)

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Organized by: M. Giacomini (Universitat Politècnica de Catalunya - CIMNE, Spain) and L. Tamellini (Consiglio Nazionale delle Ricerche, Italy)

MS107 OPTIMIZATION UNDER UNCERTAINTY
Organized by: O. Kanjilal (Technical University of Munich, Germany), R. Holdorf Lopez (Federal University of Santa Catarina, Brazil), I. Papaioannou (Technical University of Munich, Germany) and D. Straub (Technical University of Munich, Germany)

MS123 BAYESIAN INVERSION FOR MODEL CALIBRATION AND DIGITAL TWINNING IN ENGINEERING
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Organized by: A. Catapano (Université de Bordeaux, France), G. Giunta (Luxembourg Institute of Science and Technolog, Luxembourg), M. Montemurro (Université de Bordeaux, France), A. Pagani (Politecnico di Torino, Italy) and R. Vescovini (Politecnico di Milano, Italy)

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Organized by: D. Oliveira (INEGI, LAETA, Portugal) and E. Silva (INEGI, LAETA, Portugal)

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Organized by: N. Ferro (Politecnico di Milano, Italy), M. Montemurro (Arts et Métiers Sciences et Technologies, France), M. Bruggi (Politecnico di Milano, Italy), M. Giacomini (Universitat Politècnica de Catalunya, Spain) and J. Norato (University of Connecticut, United States)

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Organized by: C. Dapogny (CNRS & Université Grenoble Alpes, France) and F. Jouve (Laboratoire Jacques-Louis Lions, France)

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Organized by: J. Bruchon (Mines Saint-Étienne, France), N. Moulin (Mines Saint-Étienne, France), M. Shakoor (IMT Nord Europe, France) and L. Silva (École Centrale de Nantes, France)

MS045 MODELLING AND SIMULATIONS OF ADDITIVELY MANUFACTURED METAMATERIALS
Organized by: F. Auricchio (University of Pavia, Italy), M. Carraturo (University of Pavia, Italy) and S. Morganti (University of Pavia, Italy)

MS185 MODELLING AND SIMULATION OF WELDING AND WIRE ARC ADDITIVE MANUFACTURING PROCESSES
Organized by: J. DELMAS (Électricité de France, France), V. ROBIN (Électricité de France, France), S. HENDILI (Électricité de France, France) and O. ASSERIN (CEA, France)

MS207 MODELLING AND SIMULATION FOR ADDITIVE MANUFACTURING
Organized by: A. Lundbäck (Luleå University of Technology, Sweden), S. Kollmannsberger (Technical University of Munich, Germany), M. Chiumenti (CIMNE/UPC, Spain), C. Meier (Technical University of Munich, Germany), A. To (University of Pittsburgh, United States) and J. Hattel (Technical University of Denmark, Denmark)

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Organized by: E. Li (Teesside University, United Kingdom), B. Li (Northwestern Polytechnical University, China), Q. Li (Changsha University of Science and Technolog, China) and Z. HE (Hunan University, China)

MS036 SMART SOFT MATERIALS: ADDITIVE MANUFACTURING, MODELING, DESIGN, AND EXPERIMENTATION
Organized by: G. Scalet (University of Pavia, Italy), O. Weeger (Technical University of Darmstadt, Germany), A. Zolfagharian (Deakin University, Australia), M. Bodaghi (Nottingham Trent University, United Kingdom) and M. Hossain (Swansea University, United Kingdom)

MS059 RECENT TRENDS IN ELASTIC AND ACOUSTIC METAMATERIALS
Organized by: G. Failla (University of Reggio Calabria, Italy), A. Marzani (University of Bologna, Italy), A. Palermo (University of Bologna, Italy) and A. Russillo (University of Reggio Calabria, Italy)

MS241 ACTIVE PROGRAMMABILITY AND ARTIFICIAL INTELLIGENCE IN MECHANICAL METAMATERIALS
Organized by: S. Naskar (University of Southampton, United Kingdom) and T. Mukhopadhyay (University of Southampton, United Kingdom)

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Organized by: J. YVONNET (Gustave Eiffel University, France), K. Terada (Tohoku University, Japan), P. Wriggers (Leibniz Universität Hannover, Germany), M. Geers (Eindhoven University of Technology, Netherlands), K. Matous (University of Notre Dame, United States) and P. Steinmann (Universität Erlangen-Nurnberg, Germany)

MS024 MULTISCALE COMPUTATIONAL METHODS FOR CEMENT AND CONCRETE RESEARCH
Organized by: M. Thiedeitz (Technical University of Munich, Germany) and J. Timothy (Technical University of Munich, Germany)

MS044 MULTISCALE MODELING OF COMPLEX MICROSTRUCTURES
Organized by: S. Hellebrand (University of Duisburg-Essen, Germany), T. Kaiser (TU Dortmund University, Germany) and J. Waimann (RWTH Aachen University, Germany)

MS066 LATEST ADVANCEMENTS AND TRENDS IN MULTI-PHYSICS RESEARCH FOR CIVIL ENGINEERING APPLICATIONS
Organized by: R. Ramirez (University of Minho, Portugal), A. Jimenez Rios (Oslo Metropolitan University, Norway) and B. Ghiassi (University of Birmingham, United Kingdom)

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Organized by: M. Hossain (Swansea University, United Kingdom), D. Garcia-Gonzalez (Carols III Universidad de Madrid, Spain), M. Keip (University of Stuttgart, Germany), S. Rudykh (University of Wisconsin-Madison, United States) and F. Xu (Fudan University, China)

MS092 MACHINE LEARNING-BASED LATENT-SPACE MODELS FOR MULTISCALE SIMULATIONS
Organized by: W. Edeling (CWI Amsterdam, Netherlands), M. Vassaux (CNRS Rennes, France) and P. Coveney (University College London, United Kingdom)

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Organized by: E. Bosco (Eindhoven University of Technology, Netherlands), L. Poh (National University of Singapore, Singapore) and E. Martinez-Paneda (Imperial College London, United Kingdom)

MS099 SIMULATIONS OF MULTIFUNCTIONAL MATERIALS BRIDGING METHODS, SCALES, AND DISCIPLINES
Organized by: M. Ries (FAU Erlangen-Nürnberg, Germany), F. Weber (FAU Erlangen-Nürnberg, Germany), W. Zhao (FAU Erlangen-Nürnberg, Germany), M. Vassaux (Université de Rennes, France), F. Bedoui (Université de Technologie de Compiègne, France), F. Detrez (Université Gustave Eiffel, France) and S. Pfaller (FAU Erlangen-Nürnberg, Germany)

MS118 SIMULATIONS OF POLYMERS AND POLYMER COMPOSITES FROM PETROL AND BIOLOGICAL SOURCES
Organized by: S. Pfaller (FAU Erlangen-Nürnberg, Germany), L. Laubert (FAU Erlangen-Nürnberg, Germany), F. Detrez (Université Gustave Eiffel, France), A. Rios de Anda (Université Paris Est Créteil, France) and P. Camanho (University of Porto, Portugal)

MS168 ADVANCES IN THE DESIGN OF ARCHITECTURED METAMATERIALS
Organized by: R. Del Toro (University of Chieti-Pescara, Italy), M. De Bellis (University of Chieti-Pescara, Italy), F. Fantoni (University of Brescia, Italy) and A. Bacigalupo (University of Genova, Italy)

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Organized by: I. Rodrigues Lopes (INEGI, Portugal), F. Andrade Pires (FEUP, Portugal), E. de Souza Neto (Swansea University, United Kingdom) and S. Proença (Escola de Engenharia de São Carlos, USP, Brazil)

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Organized by: T. Matschei (RWTH Aachen University, Germany), B. Pichler (TU Wien (Vienna University of Technology), Austria), M. Vořechovský (Brno University of Technology, Czechia) and R. Chudoba (RWTH Aachen University, Germany)

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Organized by: D. Del Rey Fernandez (University of Waterloo, Canada) and J. Chan (Rice University, United States)

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Organized by: A. Prieto (CITMAga, University of A Coruña, Spain) and L. Godinho (ISISE, ARISE, University of Coimbra, Portugal)

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Organized by: P. Meyer (Stellenbosch University, South Africa)

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Organized by: M. Bukac (University of Notre Dame, United States), T. Hoang (Auburn University, United States) and I. Yotov (University of Pittsburgh, United States)

MS050 COUPLING COMPUTATIONAL FLUID DYNAMICS WITH MACHINE LEARNING
Organized by: E. Ferrer (Universidad Politécnica de Madrid, Spain), S. LE CLAINCHE (Universidad Politécnica de Madrid, Spain) and A. Beck (University of Stuttgart, Germany)

MS056 NUMERICAL SIMULATIONS OF WIND TURBINES AND WINDFARMS
Organized by: E. Ferrer (Universidad Politécnica de Madrid, Spain), A. de Montlaur (Universidad Politécnica de Cataluña, Spain), B. Mendez (CENER - National Renewable Energy Center, Spain), L. Ramírez (Universidade da Coruña, Spain), X. Nogueira (Universidade da Coruña, Spain) and R. Stevens (University of Twente, Netherlands)

MS065 FFT-BASED HOMOGENISATION METHODS: ADVANCES AND APPLICATIONS
Organized by: C. Bellis (CNRS, France), R. Lebensohn (LANL, United States), H. Moulinec (CNRS, France), S. Reese (RWTH Aachen University, Germany) and F. Willot (Mines ParisTech, France)
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Organized by: A. Idesman (Texas Tech University, United States)

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Organized by: B. Sanderse (CWI, Netherlands), H. Rosenberger (CWI, Netherlands), G. Stabile (University of Urbino, Italy) and I. Tezaur (Sandia, United States)

MS085 ADVANCES IN NUMERICAL METHODS ON POLYTOPAL GRIDS FOR COUPLED PROBLEMS
Organized by: S. Bonetti (Politecnico di Milano, Italy), A. Borio (Politecnico di Torino, Italy), F. Marcon (Politecnico di Torino, Italy) and I. Mazzieri (Politecnico di Milano, Italy)

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Organized by: A. Chakraborty (UT Austin, United States), M. Croci (UT Austin, United States), J. Munoz-Matute (Basque Center for Applied Mathematics, Bilbao, Spain) and E. Valseth (The Norwegian University of Life Sciences, Norway)

MS090 ADVANCES IN MESH REDUCTION METHODS FOR MULTI-SCALE, MULTI-INTERACTION, AND SOLID-FLUID PROBLEMS: EXPLORING BOUNDARY ELEMENTS, MESH-FREE, AND PARTICLE-BASED TECHNIQUES
Organized by: A. Galvis (University of Portsmouth, United Kingdom) and E. Patiño (Institute for Technological Research in SP, Brazil)

MS091 RECENT DEVELOPMENTS IN MODEL ORDER REDUCTION FOR CARDIOVASCULAR MODELING
Organized by: P. Africa (SISSA, Trieste, Italy), M. Girfoglio (SISSA, Trieste, Italy), S. Rathore (SISSA, Trieste, Italy) and G. Rozza (SISSA, Trieste, Italy)

MS097 MATHEMATICAL AND NUMERICAL ASPECTS OF ALGORITHMS RELATED TO COMPUTATIONAL ELECTROMAGNETISM
Organized by: D. TAGAMI (Kyushu University, Japan), H. Kawai (Toyo University, Japan), M. OGINO (Daido University, Japan), S. SUGIMOTO (Hachinohe Institute of Technology, Japan) and A. TAKEI (University of Miyazaki, Japan)

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Organized by: A. Stück (German Aerospace Center (DLR), Germany), J. Müller (Queen Mary University of London, United Kingdom) and M. Meyer (Rolls Royce Deutschland, Germany)

MS108 FACING THE CHALLENGES OF HIGH ORDER METHODS FOR HYPERBOLIC PDES
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MS111 ADVANCES IN NUMERICAL METHODS FOR ATMOSPHERE AND OCEAN DYNAMICS SIMULATIONS
Organized by: M. Girfoglio (SISSA, Italy), A. Quaini (University of Houston, United States) and G. Rozza (SISSA, Italy)

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Organized by: A. Chiozzi (University of Ferrara, Italy), N. Nodargi (University of Rome Tor Vergata, Italy) and L. Silva (Politecnico di Milano, Italy)

MS116 NUMERICAL METHODS FOR THE MULTIPHYSICS MODELING OF BRAIN FUNCTION
Organized by: P. Antonietti (Politecnico di Milano, Italy), F. Bonizzoni (Politecnico di Milano, Italy), I. Fumagalli (Politecnico di Milano, Italy) and K. Mardal (University of Oslo, Norway)

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Organized by: F. Bertrand (TU Chemnitz, Germany) and J. Both (University of Bergen, Norway)

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Organized by: H. Barucq (Project-team Makutu, Inria, France), H. Calandra (Project team Makutu, TotalEnergies, France), R. Djellouli (California State University Northridge, United States), S. Frambati (Project team Makutu, TotalEnergies, France) and M. N'diaye (Université Polytechnique Hauts-de-France, France)

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Organized by: P. Areias (Instituto Superior Técnico, Portugal)

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Organized by: X. Álvarez-Farré (SURF, Netherlands), À. Alsalti-Baldellou (Technical University of Catalonia, Spain), M. Torres Rodrigues (SURF, Netherlands), V. Codreanu (SURF, Netherlands), T. Aoki (Tokyo Institute of Technology, Japan) and F. Trias (Technical University of Catalonia, Spain)

MS149 ADVANCED AND EFFICIENT NUMERICAL STRATEGIES IN CONTACT MECHANICS
Organized by: D. Ryckelynck (Mines Paris PSL, France) and I. Ramière (CEA Cadarache, France)

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Organized by: L. Heltai (International School for Advanced Studies, Italy), L. Muller (Università di Trento, Italy), A. Popp (University of the Bundeswehr Munich, Germany) and P. Zunino (Politecnico di Milano, Italy)

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Organized by: S. Perotto (Politecnico di Milano, Italy), D. Conte (Università di Salerno, Italy), A. Luè (Poliedra-Politecnico di Milano, Italy) and M. Casillo (Università di Salerno, Italy)

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Organized by: K. Mardal (University of Oslo, Norway) and P. Zunino (Politecnico di Milano, Italy)

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Organized by: M. Weiser (Zuse Institute Berlin, Germany), R. Krause (Università della Svizzera italiana, Switzerland), S. Scacchi (Università di Milano, Italy) and S. Pezzuto (Università di Trento, Italy)

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Organized by: E. Bachini (University of Padua, Italy) and M. Fois (Politecnico di Milano, Italy)

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Organized by: A. Festa (Politecnico di Torino, Italy), C. Giverso (Politecnico di Torino, Italy) and S. Scialò (Politecnico di Torino, Italy)

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Organized by: S. Turek (TU Dortmund University, Germany) and A. Klawonn (University Cologne, Germany)

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Organized by: P. Africa (SISSA, Italy), N. Barnafi (Pontificia Universidad Católica de Chile, Chile) and N. Huynh (Università degli Studi di Pavia, Italy)

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Organized by: A. Manzoni (Politecnico di Milano, Italy), M. Guo (University of Twente, Netherlands) and S. Brunton (University of Washington, United States)

MS070 DEEP LEARNING AND REDUCED ORDER MODELING FOR DIFFERENTIAL EQUATIONS
Organized by: N. Franco (Politecnico di Milano, Italy), F. Pichi (EPFL, Switzerland) and S. Fresca (Politecnico di Milano, Italy)

MS117 ENGINEERING DESIGN OPTIMIZATION WITH THE OPEN-SOURCE SOFTWARE SU2
Organized by: N. Gauger (University of Kaiserslautern-Landau (RPTU), Germany), L. Chen (University of Kaiserslautern-Landau (RPTU), Germany), L. Kusch (University of Kaiserslautern-Landau (RPTU), Germany) and N. Beishuizen (Bosch Netherlands, Netherlands)

MS126 OPEN-SOURCE SOFTWARE IN MECHANICS
Organized by: Ł. Kaczmarczyk (University of Glasgow, United Kingdom), A. McBride (University of Glasgow, United Kingdom), A. Shvarts (University of Glasgow, United Kingdom), T. Kolev (Lawrence Livermore National Laboratory, Canada), G. Wells (University of Cambridge, United Kingdom) and V. Yastrebov (MINES Paris, PSL University, CNRS, France)

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Organized by: M. Manucci (University of Stuttgart, Germany), J. Nicodemus (University of Stuttgart, Germany) and B. Unger (University of Stuttgart, Germany)

MS220 BRIDGING MACHINE LEARNING AND PHYSICS: ADVANCEMENTS IN CONTINUUM MECHANICS AND TRANSPORT PHENOMENA
Organized by: M. Fernández-Godino (LLNL, United States), D. O'Malley (LLNL, United States), C. Gogu (ISAE-SUPAERO, France) and G. Karniadakis (Brown University, United States)

1900 Structural Mechanics, Dynamics and Engineering

MS031 ADAPTIVE AND COMPLIANT ENGINEERING STRUCTURES
Organized by: M. von Scheven (University of Stuttgart, Germany) and A. Sychterz (University of Illinois, United States)

MS125 MODELLING, MONITORING AND RETROFITTING STRATEGIES OF MASONRY STRUCTURES IN SEISMIC AREAS
Organized by: A. Formisano (University of Naples Federico II, Italy), F. Clementi (Polytechnic University of Marche, Italy) and G. Milani (Polytechnic of Milan, Italy)

MS131 MODELLING AND OPTIMIZATION OF FUNCTIONALLY GRADED COMPOSITES AND STRUCTURES
Organized by: M. Loja (Instituto Superior de Engenharia de Lisboa, Portugal) and A. Carvalho (Instituto Superior de Engenharia de Lisboa, Portugal)

MS182 COMPUTATIONAL METHODS FOR SOFT ROBOTICS
Organized by: R. Sachse (Technical University of Munich, Germany), J. Hughes (École Polytechnique Fédérale de Lausanne, Switzerland) and E. Milana (University of Freiburg, Germany)

MS203 ADVANCED DISCRETIZATION SCHEMES AND SOLUTION STRATEGIES FOR COMPUTATIONAL STRUCTURAL DYNAMICS
Organized by: B. Oesterle (Hamburg University of Technology, Germany), A. Reali (University of Pavia, Italy), S. Eisenträger (Otto von Guericke University Magdeburg, Germany), M. Bischoff (University of Stuttgart, Germany) and R. Wüchner (Technische Universität Braunschweig, Germany)

MS212 VEHICLE-BRIDGE INTERACTION DYNAMICS
Organized by: Y. Yang (Chongqing Universsity, China), J. Yang (National Yang Ming Chiao Tung University, Taiwan) and Z. Wang (Chongqing University, China)

LIST OF MINISYMPOSIA

2000 Verification and Validation, Uncertainty Quantification and Error Estimation

MS040 VERIFICATION, VALIDATION AND UNCERTAINTY QUANTIFICATION IN MODELING AND SIMULATION
Organized by: L. Eca (IST, Portugal), M. Pagano (ASME, United States), F. Pereira (Los Alamos National Laboratory, United States) and K. Dowding (Sandia National Laboratories, United States)

MS079 UNCERTAINTY QUANTIFICATION IN MATERIALS SCIENCE AND COMPUTATIONAL MECHANICS
Organized by: F. Pled (Université Gustave Eiffel, France), C. Desceliers (Université Gustave Eiffel, France), M. Arnst (Université de Liège, Belgium) and C. Soize (Université Gustave Eiffel, France)

MS094 ADVANCES IN UQ AND DATA-DRIVEN METHODS FOR SCALE-RESOLVING TURBULENCE SIMULATIONS
Organized by: S. Rezaeiravesh (The University of Manchester, United Kingdom), P. Schlatter (Friedrich–Alexander Universität Erlangen–Nürn, Germany) and M. Salvetti (Università di Pisa, Italy)

MS110 RELIABILITY ANALYSIS AND RARE EVENT SIMULATION
Organized by: M. Ehre (Technichal University of Munich, Germany), D. Giovanis (Johns Hopkins University, United States), I. Papaioannou (Technichal University of Munich, Germany), E. Patelli (University of Strathclyde, United Kingdom), D. Straub (Technichal University of Munich, Germany) and B. Sudret (ETH Zürich, Switzerland)

MS124 NUMERICAL METHODS FOR OPTIMISATION, INVERSE PROBLEM, CALIBRATION AND UNCERTAINTY QUANTIFICATION IN NONLINEAR DYNAMICS
Organized by: E. Denimal (Inria, France), A. Batou (University of Liverpool, United Kingdom), T. Ritto (Universidade Federal do Rio de Janeiro, Brazil) and P. Congedo (Inria, France)

MS136 RECENT ADVANCES IN COMPUTATIONAL STOCHASTIC MECHANICS
Organized by: M. Kamiński (Politechnika Łódzka, Poland) and G. Stefanou (Aristotle University of Thessaloniki, Greece)

2100 Young Investigators Initiative

EYC EYIC JUNIOR WORKSHOP

MS089 COMPUTATIONAL CARDIOLOGY: MODELING AND SIMULATING THE HEART
Organized by: M. Bucelli (Politecnico di Milano, Italy), S. Pagani (Politecnico di Milano, Italy), R. Piersanti (Politecnico di Milano, Italy), F. Regazzoni (Politecnico di Milano, Italy), M. Schuster (RWTH Aachen, Germany), E. Zappon (Politecnico di Milano, Italy) and A. Zingaro (ELEM Biotech, Spain)

MS106 NOVEL COMPUTATIONAL TECHNIQUES FOR MASONRY MECHANICS
Organized by: F. Nerilli (University Niccolò Cusano, Italy), A. D'Altri (Unviersity of Bologna, Italy) and F. Messali (Delft University of Technology, Netherlands)

MS139 EYIC MINISYMPOSIUM
Organized by: S. Morganti (University of Pavia, Italy), E. Nadal (Universitat Politècnica de València, Spain), B. Oesterle (Technical University Hamburg, Germany), K. Perzynski (AGH University of Krakow, Poland), C. Schwarz (University of Duisburg-Essen, Germany) and L. Tamellini (CNR-IMATI, Italy)

2200 Other

MS032 MECHANICS OF WOOD AND BIOCOMPOSITES IN ENGINEERING
Organized by: A. Khaloian (Technical University of Munich, Germany), M. Lukacevic (TU Wien, Austria), M. Königsberger (TU Wien, Austria) and J. van de Kuilen (Technical University of Munich, TU Delft, Germany)

MS137 NEW TRENDS IN COMPUTATIONAL MODELLING OF MASONRY MATERIAL AND STRUCTURES
Organized by: D. Addessi (University of Rome Sapienza, Italy), M. Cervera (Polytechnic University of Catalonia, Spain), R. Esposito (Delft University of Technology, Netherlands), D. Oliveira (University of Minho, Portugal), J. Rots (Delft University of Technology, Netherlands) and E. Sacco (University of Naples Federico II, Italy)

MS187 COMPUTATIONAL ANALYSIS OF ADVANCED MATERIALS AND STRUCTURES
Organized by: E. Theotokoglou (NATIONAL TECHNICAL UNIVERSITY OF ATHENS, Greece)

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

Monday	10:30 - 12:30	14:30 - 16:30	17:00 - 19:00
Auditorium I	MS017A	MS017B	MS017C
Auditorium II	MS016A	MS016B	MS016C
Auditorium III	MS022A	MS022B	MS022C
Auditorium IV	MS083A	MS083B	MS083C
Auditorium VI	MS207A	MS207B	MS207C
Auditorium VII	MS100A	MS100B	MS100C
Auditorium VIII	MS007A	MS007B	MS007C
Terrace	MS049A	MS049B	MS049C
Room 3A	MS170A	MS170B	MS170C
Room 3B	MS181A	MS181B	MS181C
Room 3C	MS057A	MS057B	MS057C
Room 5A	MS198A	MS198B	MS198C
Room 5B	MS010A	MS010B	MS010C
Room 5C	MS210A	MS210B	MS210C
Room 0.06	MS138A	MS138B	MS095A
Room 0.07	OLY001A	OLY001B	OLY001C
Room 0.08	MS041A	MS041B	MS041C
Room 1.02	MS149A	MS149B	MS176A
Room 1.03	MS002A	MS002B	MS195A
Room 1.04	MS045A	MS045B	MS045C
Room 1.05	MS108A	MS108B	MS108C
Room 1.06	MS164A	MS164B	MS164C
Room 1.07	MS070A	MS070B	MS070C
Room 1.08	MS065A	MS065B	MS065C
Room 1.09	MS107A	MS107B	MS107C
Room 1.10	MS148A	MS148B	MS148C
Room 1.11	MS193A	MS193B	MS104A
Room 1.12	MS127A	MS127B	MS014A
Room 1.13	MS085A	MS085B	MS085C
Room 1.14	MS200A	MS200B	MS187A
Room 1.15	MS044A	MS044B	MS044C
Room 2.01	MS208A	MS208B	MS137A
Room 2.02	MS204A	MS050A	MS021A
Room 2.03	MS142A	MS042A	GS001A
Room 2.04	MS024A	MS052A	MS155A
Room 2.05	MS114A	MS113A	MS048A

Monday, June 3rd

03/06/2024 | 08:30 - 09:15
OC Opening Ceremony

OC
Room: Auditorium I

ECCOMAS Awards:
PhD Awards
Olgierd Cecil Zienkiewicz Award
Jacques Louis Lions Award

ECCOMAS Medals:
The Ritz-Galerkin Medal
The Prandtl Medal
The Euler Medal

03/06/2024 | 09:15 - 10:00
Plenary Session I

PL01
Room: Auditorium I
Chaired by:
Prof. Harald van Brummelen (Eindhoven University of Technology, Netherlands)

Deep Learning Architectures for Science and Engineering
*J. Kutz**

10:00 - 10:30
Coffee Break

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

10:30 - 12:30 | TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30 **Phase Field Modeling and Computation I**	MS017A Room: Auditorium I Chaired by: Dr. Marco ten Eikelder (TU Darmstadt, Germany)

An Interface and Geometry Preserving Phase-Field Method for Multiphase FSI
*X. Mao**

Study of a conservative Allen-Cahn equation for multiphase flows and other phase field problems
*T. Gebäck**

Higher order two-step time discretization methods for numerical simulations of a Navier–Stokes–Cahn–Hilliard diffuse interface model
T. van Sluijs, P. Behnoudfar, S. Stoter, H. van Brummelen*

A Phase-Field Model of Elastic Surfaces in Flow
M. Kloppe, S. Aland*

Generalized FSI Contact in a Phase-field based Fully Eulerian Framework
B. Rath, X. Mao, R. Jaiman*

Isogeometric Analysis of Vesicle Hydrodynamics: A Study on Single Vesicles and Vesicle-Vesicle Interactions using Phase-Field Models
N. Valizadeh, M. Ashour, T. Rabczuk*

03/06/2024 | 10:30 - 12:30 **Coarse Graining Turbulence: Modeling and Data-Driven Approaches and Their Applications I**	MS016A Room: Auditorium II Chaired by: Dr. Fernando Grinstein (Los Alamos National Laboratory, United States)

On Coarse Graining Turbulence Simulations (Keynote Lecture)
F. Grinstein, V. Chiravalle, B. Haines, R. Greene, F. Pereira*

Three-dimensional multi-physics ILES simulations of material mixing and thermalization in separated reactants inertial confinement fusion implosions
B. Haines, T. Murphy, R. Olson, Y. Kim, B. Albright, B. Appelbe, T. Day, M. Gunderson, C. Hamilton, T. Morrow, B. Patterson*

Modeling the velocity gradient dynamics in turbulent flows using physics-assisted neural networks.
D. Shikha, S. Sinha*

LES of MHD Taylor-Couette flow for control of wind turbines
H. Kobayashi, T. Hasebe, T. Fujino, H. Takana*

03/06/2024 | 10:30 - 12:30 **Advances in structural and multidisciplinary optimization I**	MS022A Room: Auditorium III Chaired by: Dr. Lino J. Alvarez-Vazquez (University of Vigo, Spain), Mr. Francisco Vieira (IDMEC, Instituto de Engenharia Mecânica, Portugal)

Multi-Mode Passive Shunted Damping Configurations for Vibration Attenuation
*J. Madeira, A. Araújo**

Application of Structural Optimization on Lattice Structure Design using Superelastic Material
M. Kofler, M. Schasching, O. Cervinek, F. Zwicke, D. Koutny, H. Pettermann, M. Todt*

Combined Optimisation of the Layout and Topology of Stiffeners for Thin-Walled Structures using FE-Based Parameterisations
M. Kamper, F. Naets*

Level set-based topology optimization for variable thickness coated structures
N. Hermann, M. Langelaar, L. Noël*

Exploring Plasticity Material Models in Level-Set Topology Optimization
M. Pozzi, A. Guibert, A. Kim, F. Braghin*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30 **Mechanics of Soft, Multifunctional Materials: experiment, modeling and simulation I**	MS083A Room: Auditorium IV Chaired by: Prof. Mokarram Hossain (Swansea University, United Kingdom), Prof. Ajeet Kumar (IIT Delhi, India)

Nonlinear Electro-Elastic Finite Element Analysis with Neural Network Constitutive Models (Keynote Lecture)
D. Klein, R. Ortigosa, M. Hossain, O. Weeger*

An interface finite element for modeling debonding in magneto-active elastomers
W. Klausler, M. Kaliske*

Hard-Magnetic Soft Mechanical Metamaterials: Design and Wave Manipulation
Q. Zhang, S. Rudykh*

Programming shape-morphing magneto-active polymer composites through multi-physics informed topology optimization
R. Ortigosa, J. Martínez, D. García-González*

A Computational Model for Elasto-Capillary Phenomena in Elastomers
X. Zhang, Y. Yang, F. Xu*

03/06/2024 | 10:30 - 12:30 **Modelling and Simulation for Additive Manufacturing I**	MS083A Room: Auditorium VI Chaired by: Dr. Andreas Lundbäck (Luleå University of Technology, Sweden), Prof. Jesper Hattel (Danmarks Tekniske Universitet (DTU), Denmark)(IIT Delhi, India)

Coupling grain growth and anisotropic mechanical behavior at track scale by thermal-metallurgical-mechanical simulations (Keynote Lecture)
*Z. Li**

Grain structure based mechanical simulation for laser beam melting at part scale
T. Vo, M. Bellet, C. Gandin, Y. Zhang*

Modeling the Evolution of Grain Texture during Solidification of Additive Manufactured Alloy 625
C. Andersson, A. Lundbäck*

Neural cellular automata for accelerating microstructure simulations of additive manufactured alloys
J. Tang, M. S Mohebbi, L. De Lorenzis, E. Hosseini*

Microstructure Monitoring for Additive Manufacturing using Coupled Deep Neural Operators and Neural-Cellular-Automata
S. Kasiri Habibabadi, H. Safari, H. Wessels*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30
Computational Kinetic Theory I

MS100A
Room: Auditorium VII
Chaired by:
Dr. Michael Abdemalik (Eindhoven University of Technology, Netherlands), Dr. Torsten Keßler (TU Eindhoven, Germany)(Danmarks Tekniske Universitet (DTU), Denmark)(IIT Delhi, India)

Model Order Reduction and Moment Models for Rarefied Gases
*J. Koellermeier**

Variational Multiscale Moment Methods for the Boltzmann Equations
F. Baidoo, I. Gamba, L. Caffarelli, T. Hughes, M. Abdelmalik*

Derivation of L^2-Stable Regularized 13-Moment Equations for Rarefied Gases
Z. Cai, B. Lin, H. Wang, S. Yang*

Entropy dissipative systems of quadratures
*T. Pichard**

Moment models based on a Hilbert expansion for the kinetic equation of electrons in a weakly-ionized plasma
A. Alvarez Laguna, T. Pichard*

Electron Probe Microanalysis: An Inverse Problem for the Radiative Transfer Equation
*M. Torrilhon**

On the systematic treatment of boundary conditions in PN-approximations of radiative transfer
H. Egger, M. Schlottbom*

03/06/2024 | 10:30 - 12:30
Machine Learning Methods for Multiscale and Multiphysics Material Modeling I

MS007A
Room: Auditorium VIII
Chaired by:
Prof. Fadi Aldakheel (Leibniz Universität Hannover, Germany), Prof. Miguel Bessa (Brown University, United States)

Machine Learning for the Inverse Design of Architected Materials (Keynote Lecture)
*L. Zheng, J. Bastek, K. Karapipersi, S. Kumar, D. Kochmann**

Parameterized hyperelastic material modeling and multiscale topology optimization with physics-augmented neural networks
O. Weeger, D. Klein, F. Roth, F. Püsch, K. Maute*

Deep learning-aided inverse design of porous metamaterials
T. Nguyen, Y. Heider, F. Aldakheel*

Experiment-informed Finite-strain Inverse Design of Spinodal Metamaterials
P. Thakolkaran, M. Espinal, S. Dhulipala, S. Kumar, C. Portela*

Unifying the design space and optimizing linear and nonlinear truss metamaterials by generative modeling
L. Zheng, K. Karapiperis, S. Kumar, D. Kochmann*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30
Recent Trends in Scientific Computing for Computational Fluid Dynamics and Solid Mechanics in the Exascale Range I

MS049A
Room: Terrace
Chaired by:
Prof. Axel Klawonn (Universität zu Köln, Germany), Prof. Stefan Turek (TU Dortmund University, Germany)

Massively Parallel & Low Precision Accelerator Hardware as Trends in HPC and its Application to CFD (Keynote Lecture)
*S. Turek**

Augmented Lagrangian Acceleration of Global-In-Time Fluid Solvers
C. Lohmann, S. Turek*

Optimizing FE-Multigrid Methods for Convection-Diffusion Equations via Space-Time Parallelization
W. Drews, S. Turek*

Space-time Multigrid Methods for Convection-diffusion Equations Arising from Flow Problems
J. Dünnebacke, S. Turek*

Numerical Investigation of a Local Schur-Complement Based Space-Time Preconditioner for the Incompressible Navier-Stokes Equations
M. Esser, S. Turek*

03/06/2024 | 10:30 - 12:30
Recent Advances in Unfitted Finite Element Methods: Analysis, Algorithms, and Applications I

MS170A
Room: 3A
Chaired by:
Dr. Andre Massing (Norwegian University of Science and Technology, Norway), Prof. Mats G. Larson (Umea University, Sweden)

Analysis of Divergence-Preserving Unfitted FEM for the Mixed Poisson Problem
*C. Lehrenfeld, T. van Beeck, I. Voulis**

Parameter-robust unfitted finite element methods for a Maxwell interface problem
T. Haubold, C. Lehrenfeld*

A Reduced Lagrange Multiplier Approach for Coupling Mixed-Dimensional Problems
*L. Heltai, P. Zunino**

Unique continuation for an elliptic interface problem using unfitted isoparametric finite elements
*E. Burman, J. Preuss**

A Finite Element Method for the Simultaneous Analysis of Implicitly Defined Reissner-Mindlin Shells
M. Kaiser, T. Fries*

Implicit-Explicit Time Integration for Immersed Boundary Wave Equations
*C. Fassbender, T. Bürchner, P. Kopp, S. Kollmannsberger, E. Rank**

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30 **Phase-field and gradient damage models for fracture in complex materials I**	MS181A Room: 3B Chaired by: Ms. Martha Kalina (TU Dresden, Germany), Prof. Haim Waisman (Columbia University, United States)

On the Energy Decomposition in Variational Phase-Field Models for Brittle Fracture Under Multi-Axial Stress States
F. Vicentini, C. Zolesi, P. Carrara, C. Maurini, L. De Lorenzis*

Bifurcation Theory of Plasticity, Damage and Failure
*A. Umantsev**

Phase-Field Fatigue Modeling in Ductile Materials
V. Dunić, M. Živković, V. Milovanović*

Accelerating Phase-Field Fatigue Computations with an Adaptive Cycle Jumping Scheme
J. Heinzmann, P. Carrara, L. De Lorenzis*

Fatigue Characterization in (Quasi-)brittle Materials Using the Micromechanics-based Phase-field Method
M. Sarem, N. Deresse, J. Ulloa, E. Verstrynge, S. François*

Neural networks as PDE solvers within FEM: expediting the non-local gradient damage propagation with I-FENN
P. Pantidis, D. Abueidda, H. Eldababy, M. Mobasher*

03/06/2024 | 10:30 - 12:30 **Microstructure-based Modeling of Biomechanical Systems I**	MS057A Room: 3C Chaired by: Prof. Gerhard Holzapfel (Graz University of Technology, Austria), Dr. Michele Terzano (Graz University of Technology, Austria)

Region- and Rate-dependent Microscale Properties of Human Brain White Matter
M. Terzano, G. Holzapfel*

Microstructure-based Modelling Reveals Macroscale Transport Property of Brain Tissues
*T. Yuan, W. Zhan, L. Shen, D. Dini**

Exploring the role of different cell types in cortical folding through a physical multifield computational model.
M. Zarzor, S. Budday*

A Continuum Human Brain Model with Embedded Vasculature to Investigate In-Vivo Testing
Y. Verma, E. Griffiths, J. Schattenfroh, C. Belponer, A. Caiazzo, I. Sack, S. Budday, L. Heltai, P. Steinmann*

Numerical Modeling of Brain Multiphysics Flow Dynamics and Waste Clearance by a Polytopal Discontinuous Galerkin Method
I. Fumagalli, M. Corti, N. Parolini, P. Antonietti*

Polytopal discontinuous Galerkin methods for the prionic proteins' spreading in neurodegeneration
M. Corti, F. Bonizzoni, A. Dall'Olio, P. Antonietti*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30
Shape and topology optimization: theoretical advances and numerical methods I

MS198A
Room: 5A
Chaired by:
Prof. François Jouve (Université Paris Cité, France),
Mr. Charles Dapogny (CNRS, Laboratoire Jean Kuntzmann, Université Grenoble Alpes, Saint Martin d'Hères, France)

Topology optimization for thermal conductivity problems with an approximated thermal radiation boundary conditions depending on design variables
S. ONODERA, T. YAMADA*

Synthesis Approach for Multi-Input/Multi-Output Link Mechanisms Based on Micropolar Elasticity Model and Topology Optimization Method
Y. Sayo, T. Yamada*

Minimum Length and Overhang Constraints for both Level Set and Density Approaches via Perimeter Minimization
J. Torres, A. Ferrer, F. Otero*

Homotopy for Shape Optimization
B. Endtmayer, P. Gangl*

Integration of Topology Optimization and Sizing Optimization Techniques for Advanced Orthotic Design
D. Patel, T. Rockenbauer, T. Antretter, S. Schloegl, M. Lang*

Morphing Lattice Structures via Hybrid Level-Set/Density Topology Optimization using Morfeo
P. Beaufort, J. Leclerc, E. Kuci*

03/06/2024 | 10:30 - 12:30
Isogeometric Methods I

MS010A
Room: 5B
Chaired by:
Prof. Alessandro Reali (University of Pavia, Italy),
Prof. Giancarlo Sangalli (University of Pavia, Italy, Italy)

Discretizing de Rham complexes with spline differential forms and applications to problems in fluid mechanics (Keynote Lecture)
*D. Toshniwal**

Isogeometric Analysis based mesh adaptation for time dependent problems
B. MUSTAPHA, H. Abderrahmane, R. Ahmed*

Floating Isogeometric Analysis for Extrusion Simulation in Three Dimensions
H. Hille, S. Kumar, L. De Lorenzis*

The Shifted Boundary Method (SBM) in Isogeometric Analysis (IGA)
N. Antonelli, R. Rossi, R. Zorrilla, R. Aristio, R. Wuchner, G. Scovazzi*

CAD-Integrated Isogeometric Analysis of Trimmed Multipatch Shells in Embedded Fluid-Structure Interaction
R. Aristio, R. Wüchner*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30 **Fluid-Structure Interaction in Multiphysics Systems I**	MS210A Room: 5C Chaired by: Prof. Marco D. de Tullio (Politecnico di Bari, Italy), Mr. Alessandro Nitti (Polytechnic University of Bari, Italy)

Numerical Study of Penguin Wing Propulsion Using Immersed Boundary Method
B. Yin, S. Huang, D. Guo, G. Zheng, G. Yang*

Collective locomotion of two force-driven flexible flapping foils
F. Deng, C. Wang, H. Tang*

3D Simulation of Air-Structure Interaction in Dragonfly Hindwings
D. Di Cristofaro, M. Cremonesi, A. Frangi*

Transition from jet propulsion to rowing propulsion in biologic swimmers
A. Nitti, M. Torre, A. Reali, M. de Tullio*

Computational Modelling of Nature-Inspired Magnetic Soft Robots: Swimming Modes and Swarming Behavior
R. Pramanik, P. Onck, R. Verstappen*

Coupled Immersed Boundary and Level-Set Method to Study the Water Exit of Flying Fish
*B. Yin, S. Huang, D. Guo, G. Yang, G. Zheng**

03/06/2024 | 10:30 - 12:30 **Numerical Methods for Interface-Resolved Multiphase Flows I**	MS138A Room: 0.06 Chaired by: Prof. Arthur Veldman (University of Groningen, Netherlands), Phd. Nicolas Valle (Technische Universiteit Delft, Netherlands)

Regularization errors in the one-fluid formulation
D. Fuster, Y. Mimoh*

A Novel Weakly Compressible Solver for Incompressible Two-Phase Flows
A. Melvin, J. Mandal*

An HLLC Solver for Incompressible Two-Phase Flow Problems using Conservative Level Set Method
S. Parameswaran, S. Bhat, J. Mandal*

Divergence Free Velocity Interpolation For Surface Marker Tracking
E. Aulisa, G. Barbi, A. Cervone, A. Chierici, F. Giangolini, S. Manservisi, L. Sirotti*

Characterizing numerical surface tension in the conservative volume-of-fluid method
T. Huang, A. Lidtke, K. Hendrickson, T. van Terwisga, G. Weymouth*

Conditions for the Conservative Discretization of Surface Tension in Interface-Capturing Methods.
N. Valle, R. Verstappen, F. Trias*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30 **PhD Olympiad I**	OLY001A Room: 0.07 Chaired by: Dr. Konrad Perzyński (AGH University of Krakow, Poland), Ms. Paulina Stempin (Poznan University of Technology, Poland)

The Continuous Adjoint Method with Consistent Discretization Schemes for Transitional Flows and the Use of Deep Neural Networks in Shape Optimization in Fluid Mechanics
*M. Kontou**

A New Updated Reference Lagrangian Smoothed Particle Hydrodynamics Framework for Large Strain Solid Dynamics
P. Refachinho de Campos, A. Gil, C. Hean Lee, J. Bonet*

Structure-preserving deep learning
O. Hernández, A. Badías, E. Cueto*

Gradient-based optimization of non-linear structures and materials
*A. Dalklint**

Fuel and operational flexibility of micro Gas Turbines: assessment of combustor performances, emissions, and stability
*A. Pappa**

Friction and Fracture: Richness and Complexity in Dynamic Rupture
*T. Roch**

03/06/2024 | 10:30 - 12:30 **Physics-Informed Machine Learning for Structural Health Monitoring: Emerging Trends and Open Issues I**	MS041A Room: 0.08 Chaired by: Dr. Alberto Barontini (University of Minho, ISISE, ARISE, Italy)

v-informed machine learning surrogate for applications in structural health monitoring and development of digital twins of wind turbines
S. Baisthakur, B. Fitzgerald*

Federated Physics-Informed Machine Learning for Ultrasonic Structural Health Monitoring of Aircraft Structures
L. Jilke, F. Raddatz, N. Hosters, M. Behr, G. Wende*

Efficient Active Learning for Sparse Gaussian Process Classifiers in SHM
J. Mclean, N. Dervilis, T. Rogers*

Virtual Concrete Lab: A Multiscale Computational Framework for Early Damage Assessment through Coda Signal Analysis
G. Vu, J. Timothy, G. Meschke*

Physics-Augmented Neural Networks for Constitutive Modeling: Toward an Application for Structural Health Monitoring
A. Benady, S. Farahbaksh, E. Baranger, L. Chamoin*

Enhancing Offshore Wind Turbine Health Monitoring through a Hybrid Approach of Reduced Order Modelling and Machine Learning
A. Pastor Sanchez, J. Garcia Espinosa, D. Di Capua*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30 **Advanced and efficient numerical strategies in Contact Mechanics I**	MS149A Room: 1.02 Chaired by: Prof. David Ryckelynck (Mines Paris PSL - Armines, France), Dr. Isabelle RAMIERE (CEA Cadarache, France)

Displacement-driven Approach for Frictional Contact Problem between Rigid and Deformable Bodies
D. Rahmi, R. Fleischhauer, M. Kaliske*

A Fundamentally New Coupled Approach to Contact Mechanics via the Dirichlet-Neumann Schwarz Alternating Method
A. Mota, D. Koliesnikova, I. Tezaur, J. Hoy*

Modeling Mechanical Contact with an Eulerian-based Finite-Element Method
D. Kammer, F. Lorez, M. Pundir*

Accelerating Finite Element Contact Simulations Using H-Matrices
V. Yastrebov, Z. Fend*

High Performance Computing Strategy for 3D Contact Mechanics Problems with Adaptive Mesh Refinement
A. Epalle, I. Ramière, G. Latu, F. Lebon*

Scalability of the time-to-solution of mortar-based contact problems
C. Steimer, M. Mayr, A. Popp*

03/06/2024 | 10:30 - 12:30 **Machine learning and data-driven approaches for optimization and uncertainty quantification in aerodynamics I**	MS149A Room: 1.03 Chaired by: Dr. Esther Andrés Pérez (INTA, Spain), Dr. Domenico Quagliarella (CIRA, Italy)

Aerodynamic predictions under uncertainty using Autoencoders
E. Saetta, R. Tognaccini, G. Iaccarino*

Registration-based Model Order Reduction for Aerospace Propulsion Systems
A. Ferrero, L. Stumpo, T. Taddei*

Inverse airfoil design considering uncertainties of GAN models
K. Yonekura, R. Aoki, K. Suzuki*

Multi-Fidelity Surrogate Model for Efficient Aerodynamic Predictions
J. Nieto-Centenero, A. Martinez-cava, E. Andrés*

Comparison of data -driven methods for the prediction of flows about a wing
*J. PETER**

03/06/2024 | 10:30 - 12:30 **Modelling and Simulations of Additively Manufactured Metamaterials I**	MS045A Room: 1.04 Chaired by: Prof. Ferdinando Auricchio (University of Pavia, Italy), Dr. Massimo Carraturo (University of Pavia, Italy)

Analysis of fatigue strength for AM lattice components using FCM based on strain energy density approach
O. Oztoprak, R. De Biasi, M. Benedetti, E. Rank, S. Kollmannsberger*

Investigation on the Mechanical Response of Gyroid-Based Structures With Application to Airless Tires
D. D'Aprile, F. Auricchio, P. Wriggers, S. Morganti*

Effect of randomly distributed imperfections on the buckling response of soft lattice metamaterials
D. Addessi, C. Gatta, P. Di Re, L. Parente, E. Sacco*

Investigating Auxetic Structures to Enhance Energy Absorption in Flexible Structures: An Integrated Experimental and Numerical Approach
B. Pi Savall, S. Seyedpour, T. Ricken*

Multiscale Design Method for 3D-printable Periodic Lightweight Lattice Structures by Architectured 3D Micro-Cells
O. Schwahofer, A. Ferrer, J. Torres, K. Drechsler*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30 **Facing the challenges of high order methods for hyperbolic PDEs I**	MS108A Room: 1.05 Chaired by: Dr. Maria Han Veiga (Ohio State University, United States), Mr. Lorenzo Micalizzi (North Carolina State University, United States)

Discrete fully well balanced WENO finite difference schemes via a global-flux quadrature method (Keynote Lecture)
M. Kazolea, C. Parés, M. Ricchiuto*

Structure preserving methods via Global Flux quadrature: divergence-free preservation with continuous Finite Element
D. Torlo, W. Barsukow, M. Ricchiuto*

An arbitrarily high-order fully well-balanced hybrid finite element-finite volume method for one-dimensional blood flow models
*R. Abgrall, W. Barsukow, Y. Liu**

Efficient Tsunami Modeling with Hyperbolic-Dispersive Systems in GeoClaw
C. Muñoz, M. Berger, D. Ketcheson, R. LeVeque, K. Mandli*

A General Procedure To Construct High-Order Well-Balance Finite Volume Schemes For 1D Hyperbolic Balance Laws With Singular Source Terms
M. Castro, I. Gómez Bueno, C. Parés Madroñal*

03/06/2024 | 10:30 - 12:30 **Digital Twins for Predictive Decision-Making of Engineering Systems I**	MS164A Room: 1.06 Chaired by: Dr. Marco Tezzele (University of Texas at Austin, United States), Mr. Matteo Torzoni (Politecnico di Milano, Italy)

Structural Integrity Management at Scale through Deep Reinforcement Learning (Keynote Lecture)
*C. Andriotis**

Belief Deep Markov Models for inference in complex partially observable decision-making problems
G. Arcieri, A. Kamariotis, K. Papakonstantinou, D. Straub, E. Chatzi*

A Probabilistic Neural Twin for Treatment Planning in Peripheral Pulmonary Artery Stenosis
*J. Lee, J. Richter, M. Pfaller, J. Szafron, K. Menon, A. Zanoni, M. Ma, J. Feinstein, J. Kreutzer, A. Marsden, D. Schiavazzi**

Predictive digital twins of engineering structures using neural networks and probabilistic graphical models
M. Torzoni, M. Tezzele, S. Mariani, A. Manzoni, K. Willcox*

03/06/2024 | 10:30 - 12:30 **Deep learning and reduced order modeling for differential equations I**	MS070A Room: 1.07 Chaired by: Phd. Stefania Fresca (Politecnico di Milano, Italy), Dr. Federico Pichi (SISSA, Italy)

Time Integration of Parametrized Partial Differential Equations with Neural Network Surrogate Models (Keynote Lecture)
M. Kast, J. Hesthaven*

A Novel Reduced-Order Model for Advection-Dominated Problems Based on the Radon-Cumulative-Distribution Transform
G. Stabile, T. Long, R. Barnett, R. Jefferson-Loveday, M. Icardi*

Data-driven Reduced Order Models for Mold-based Processes
R. Pohlmann, R. Rao, S. Elgeti*

Neural Galerkin Schemes That Can Preserve Hamiltonians and Other Quantities
P. Schwerdtner, P. Schulze, J. Berman, B. Peherstorfer*

A Deep Learning Surrogate Model for Reservoir Characterization
C. Millevoi, C. Zoccarato, M. Ferronato*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30
FFT-based homogEnisation methods: advances and applications I

MS065A
Room: 1.08
Chaired by:
Mr. Hervé Moulinec (Laboratoire de Mecanique et d'Acoustique / CNRS, France)

Spectral Solvers for Multi-Physics Simulations (Keynote Lecture)
M. Diehl, Y. Hu, S. Roongta, F. Roters*

Fast Fourier Transform Methods for computing the moduli and fields in composites
G. Milton, H. Moulinec, P. Suquet*

Accurate Algebraic Error Estimation in FFT-based Computational Homogenization
M. Ladecký, J. Papež, L. Gaynutdinova, P. Tichý, I. Pultarová, J. Zeman*

Application of the FFT-based Homogenization Method to estimate the Linear Viscoelasticity of Transversely Isotropic Unidirectional Composites
T. Merlette, J. Diani*

Micromechanical modeling of the viscoplastic behavior of irradiated bainitic steels
L. Chaix, M. Garajeu, M. Idiart, G. Monnet, P. Vincent*

03/06/2024 | 10:30 - 12:30
Optimization under Uncertainty I

MS107A
Room: 1.09
Chaired by:
Dr. Oindrila Kanjilal (Engineering Risk Analysis Group, Germany), Dr. Iason Papaioannou (Technical University of Munich, Germany)

Robust design optimization using adaptive Kriging and extreme value distributions.
A. Persoons, D. Moens*

Reliability-based Optimization of Regional Building Retrofit Subsidy Support Strategy Using Buffered Failure Probability
U. Seok, J. Byun, J. Song*

Multi-level informed robust optimization of energy systems
E. Ampellio, P. Gabrielli, B. Gjorgiev, G. Sansavini*

Comparison of the optimal risk-based design of planar RC frames with different aspect-ratios under progressive collapse
L. da Rosa Ribeiro, A. Teófilo Beck, F. Parisi, H. Machado Kroetz*

Robust Optimization of Wave Energy Converter Parks
*M. Gambarini**

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30
Advances in machine learning for composite materials I

MS148A
Room: 1.10
Chaired by:
Dr. Mohsen Mirkhalaf (University of Gothenburg, Sweden), Dr. Iuri Rocha (Delft University of Technology, Netherlands)

Machine-Learning-Based Surrogate Material Models For Elasto-Plasticity And Elasto-Damage
C. Fricke, M. Luxner, L. Peyker, L. Mitrovic, H. Pettermann*

Effective application of hybrid material modeling for topology optimization of multiphase hyperelastic composites
H. Vijayakumaran, J. Russ, G. Paulino, M. Bessa*

A Microstructure-based Graph Neural Network for Accelerating Multiscale Simulations
J. Storm, I. Rocha, F. van der Meer*

Improving the Production Accuracy of the Tailored Fiber Placement Process Through a Machine-Learning Algorithm
L. Bittrich, E. de Menezes, M. Woestmann, A. Miene, L. Echer, A. Spickenheuer*

Machine learning model for correlating microstructural features and macroscopic properties of heterogeneous composites
C. Shen, H. Zhao, R. Mu, A. Wang, K. Wang*

03/06/2024 | 10:30 - 12:30
Multi-Scale Modelling of Generalised Continua and Metamaterials I

MS193A
Room: 1.11
Chaired by:
Dr. Igor A. Rodrigues Lopes (INEGI - Institute of Science and Innovation in Mechanical and Industrial Engineering, Portugal), Dr. Stefanos Papanicolopulos (University of Edinburgh, United Kingdom)

Second-order homogenization with body-forces for non-linear cellular- and meta-materials
L. Wu, J. Segurado, M. Mustafa, L. Noels*

Homogenisation of Locally Resonant Acoustic Metamaterials Including Dissipation
R. Liupekevicius, H. Van Dommelen, M. Geers, V. Kouznetsova*

Multi-Scale Modelling of Metamaterials via Second-Order Computational Homogenisation
W. Santos, I. Lopes, F. Andrade Pires, S. Proença*

Computational homogenization and efficient solution of higher-order continua
C. Hesch, F. Schmidt, S. Schuß*

An Efficient Localized Model Order Reduction Framework for the Shape Optimization of Additively Manufactured Lattice Structures
P. Diercks, K. Veroy, A. Robens-Radermacher, J. Unger*

Fractal continuum approach for self-similar beam bending
A. Kryvko, D. Samayoa-Ochoa, L. Damián-Adame*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

**03/06/2024	10:30 - 12:30** **Robust discretization and solution of coupled problems in porous media I**	MS127A Room: 1.12 Chaired by: Prof. Fleurianne Bertrand (TU Chemnitz, Germany), Dr. Jakub Both (University of Bergen, Norway)

Structure preserving approximation of dynamic poroelasticity
M. Bause, M. Anselmann, N. Margenberg*

a locally conservative continuous Galerkin method using interior penalty and inspired Nitsche mechanisms
*G. Etangsale, V. Fontaine**

A Least-Squares Finite Element Method for TPM
*F. Bertrand, M. Brodbeck, T. Ricken, H. Schneider**

An Eigenvalue Problem in Poromechanics
*F. Bertrand, Ö. Türk**

Convergence Analysis of Fixed-Stress Split with Contact Mechanics
T. Almani, K. Kumar*

**03/06/2024	10:30 - 12:30** **Advances in numerical methods on polytopal grids for coupled problems I**	MS085A Room: 1.13 Chaired by: Ms. Francesca Marcon (Politecnico di Torino, Italy), Mr. Stefano Bonetti (Politecnico di Milano, Italy)

Virtual Element Mesh Refinement Methods for Large-Scale Flow Simulations in DFNs (Keynote Lecture)
S. Berrone, F. Vicini*

A Hybrid High-Order Method for Phase-Field Modeling of Fracture Propagation
J. Coatleven, A. Crippa, D. Di Pietro, N. Guy, S. Yousef*

A VEM-fully discrete polytopal scheme with bubble stabilisation for mixed-dimensional models with frictional contact at matrix--fracture interfaces
J. Droniou, G. Enchery, I. Faille, A. Haidar, R. Masson*

Hybrid high-order methods for elasto-acoustic wave propagation in the time domain
R. Mottier, A. Ern, L. Guillot*

A lowest order stabilization-free mixed Virtual Element Method
*A. Borio, C. Lovadina, F. Marcon, M. Visinoni**

**03/06/2024	10:30 - 12:30** **Advances in natural hazards simulation I**	MS200A Room: 1.14 Chaired by: Prof. Massimiliano Cremonesi (Politecnico di Milano, ITALY, Italy), Prof. Antonia Larese (University of Padua, Italy)

Semi-implicit Material Point Method with Fractional-step Method for Unsaturated Soil
S. Hidano, Y. Yamaguchi, S. Takase, S. Moriguchi, K. Kaneko, K. Terada*

On boundary condition for modelling infiltration and potential seepage with material point method
L. Aviles, G. Di Carluccio, J. A. Freixa, N. Pinyol*

MPM analyses of impacts of dry and saturated granular masses against rigid obstacles
M. Zerbi, P. Marveggio, C. di Prisco*

Stabilized mixed formulation for an implicit Material Point Method for viscoplastic fluids
L. Moreno, A. Larese, A. Contri, R. Wuechner*

Multiscale Approach for the Simulation of Natural Hazards on Structures
A. Katili, V. Singer, M. Fois, K. Bletzinger, A. Larese*

SPH-DEM Modeling of Superelevation in Debris and Mud Flows
P. Friess, H. Vicari, B. McArdell, A. Åberg, J. Gaume*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30 **Multiscale Modeling of Complex Microstructures I**	MS044A Room: 1.15 Chaired by: Prof. Johanna Waimann (Ruhr-Universität Bochum, Germany), Ms. Sonja Hellebrand (University of Duisburg-Essen, Germany)

On the Identification of Best Fitting Probability Density Functions for Fiber Orientation in Paper Network Modelling
G. Kloppenburg, X. Li, A. Dinkelmann, H. Finckh, J. Neumann, J. Simon*

Multi-phase-field Modeling and Development of High-performance Computing Scheme for Realistic Prediction of Sintered Microstructures
A. Nakazawa, S. Sakane, T. Takaki*

Harnessing Generative AI for Modelling Mesoporous Materials: An Aerogel Use Case
P. Pandit, S. Kanagasenthinathan, A. Rege*

Modeling Fiber Orientation in Microstructures Using Statistical Information From Paper Samples
J. Pfeifer, G. Kloppenburg, S. Kochersperger, S. Schabel, I. Kirsten, A. Dinkelmann, H. Finckh, J. Neumann, J. Simon*

Generation of representative volume elements from grain boundary networks in MCRp
A. Safi, P. Seibert, T. Schwartz, M. Kästner, B. Klusemann*

Realistic RVEs by microstructure reconstruction: quasi-Newton optimization vs. sequential gradient projection
P. Seibert, A. Raßloff, K. Kalina, M. Kästner*

03/06/2024 | 10:30 - 12:30 **Hemodynamics Models for the Design of Mechanical Circulatory Support (MCS) Technologies I**	MS208A Room: 2.01 Chaired by: Prof. Rosaire Mongrain (McGill University, Canada), Prof. Lisa Prahl Wittberg (FLOW, Dept. Engineering Mechanics, Royal Institute of Technology (KTH), Sweden)

Software Implementation to Simulate the Hemodynamics in Patient-Specific Coronary Arteries: A Review from the Past to the Present
*S. Pinto**

Stabilized Finite Element Simulation of the Left Ventricle Under LVAD Support
M. Schuster, N. Hosters, M. Behr*

Simulation of Synthetic Mitral Valve Mechanics Using an Experimentally Validated Finite Element Model
*S. Javadpour, F. O'Brien, C. Conway**

Optimization of a Roller Pump Using a 2D Numerical Simulation Model
E. Knoche, M. Heinrich, R. Schwarze*

Computational Fluid Dynamics Analysis of Femoro-Femoro Cannulation Performance for Extracorporeal Membrane Oxygenation
H. Hörwing, L. Parker, L. Broman, L. Prahl Wittberg*

Extra Corporeal Membrane Oxygenation Support For Perfusion In Cardiac Shock: A Computational Analysis
E. Vignali, E. Gasparotti, M. Mazzoli, D. Haxhiademi, S. Celi*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

**03/06/2024	10:30 - 12:30** **Mechanics and Physics of Layer-like, Fibrous Materials and Structures Based Thereon I**	MS204A Room: 2.02 Chaired by: Eng. Pedro Miguel Godinho (Vienna University of Technology, Austria), Prof. Jaan Simon (University of Wuppertal, Germany)

The elastic stiffness tensor of cellulosic fibers
C. Czibula, M. Ulz, U. Hirn, K. Koski*

A Continuum Model for Layered Two-dimensional Materials
H. Liu, Y. Chen, Y. Liu*

Non-ageing, Linear Viscoelasticity of Paper Sheets: A Continuum Micromechanics Approach
*P. Jesus de Sousa Godinho**

Thermal Conductivity of Nanopaper Films: A Continuum Micromechanics Approach
*P. Jesus de Sousa Godinho**

Elastoplasticity of Paper Sheets: A Continuum Micromechanics Approach
P. Jesus de Sousa Godinho, M. Eghbalian*

**03/06/2024	10:30 - 12:30** **Multiphase flow and non-Newtonian fluid - modelling and applications I**	MS142A Room: 2.03 Chaired by: Prof. Chenfeng Li (Swansea University, United Kingdom)

LMP vs SPH Solver Comparison in Dispersed Flows of Discrete Particles Solutions
G. Davi, T. Fabbri, S. Holzknecht, A. Muscio*

CFD and Experimental Analysis of Sedimentation Velocity of Anaerobic Granules from an EGSB Reactor
C. D'Bastiani, D. Kennedy, A. Reynolds*

Thinning-induced breakup of a gravitational liquid jet driven by varicose perturbations
A. Della Pia, M. Chiatto, L. de Luca*

Water-Gas-Oil Flows Including Foam in Heterogeneous Porous Media
F. de Paula, I. Igreja, G. Chapiro*

Power-law model for wind-driven flows in homogeneous semienclosed basins
V. Llorente, E. Padilla, M. Díez-Minguito*

**03/06/2024	10:30 - 12:30** **Multiscale Computational Methods for Cement and Concrete Research I**	MS024A Room: 2.04 Chaired by: Dr. Jithender Timothy (Technical University of Munich, Germany), Ms. Mareike Thiedeitz (ETH Zurich, Switzerland)

Materials Engineering using Generative Models and Multiscale Simulations
*J. Timothy**

Modeling the Early-Age Properties of Cement Paste using Thermodynamics and Multi-Scale Homogenization
E. Jägle, J. Timothy, D. Jansen, A. Machner*

Use of Stochastic Fields and Mesoscale to Model the Effect of Material Heterogeneity on the Thermomechanical Response of Concrete
M. Gimenes, P. Cleto, O. Manzoli*

Impact of Interparticle Forces on the Rheological Behavior of Micro Particle Suspensions with Unresolved Coupled CFD-DEM Simulations
D. Ivanov, M. Eslami Pirharati, I. Mai, C. Schilde*

Simulation of time-dependent cement paste flow: Analysis of transient phenomena during slow flow
M. Thiedeitz, J. Timothy*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 10:30 - 12:30 **Computer Methods in Cell-Scale Biomechanics and Mechanobiology I**	MS114A Room: 2.05 Chaired by: Dr. Alexander Ehret (Empa, Swiss Federal Laboratories for Materials Science and Technology, Switzerland)

CFD-based design and performance analysis of a nose-on-chip device
E. Fasil, R. Lamioni, A. Mariotti, E. Brunazzi, C. Galletti, M. Salvetti, S. Danti*

Investigation of Mechanisms Underlying Stiffness Change in Prostate Cancer Cells
L. Jadrna, J. Gumulec, J. Bursa*

Interplay of active self-organization in dense nematic cytoskeleton structure and cellular shape changes
W. Mirza, A. Torres-Sánchez*

Stability and instability of catch-bonded polymer networks
J. van der Gucht, J. Ruiz Franco*

Endothelial Deformation and Fracture Analysed by Fibre Network Models
*R. Jakob, Y. Choi, C. Giampietro, E. Mazza, A. Ehret**

Microstructure-Based Constitutive Modelling Of Soft Biological Tissues
*C. Sheridan, J. Concannon**

13:45 - 14:30 | SEMI-PLENARY SESSIONS

03/06/2024 | 13:45 - 14:30 **Particle Based Methods for Additive Manufacturing and Fracture**	SPL01 Room: Auditorium I Chaired by: Prof. Javier Oliver (Technical University of Catalonia (Barcelona/Tech), Spain)

Particle Based Methods For Additive Manufacturing And Continuum Fracture
M. Geers, S. Sperling, B. Dorussen, J. Hoefnagels, J. Remmers*

03/06/2024 | 13:45 - 14:30 **The Fluid Mechanics of the Human Nose: Where Surgery Meets Flow Control**	SPL02 Room: Auditorium VIII Chaired by: Prof. Pedro Diez (CIMNE/UPC, Spain)

The fluid mechanics of the human nose: Where surgery meets flow control
*M. Quadrio**

03/06/2024 | 13:45 - 14:30 **Predictive Digital Twins**	SPL03 Room: Auditorium II Chaired by: Prof. Alexander Popp (University of the Bundeswehr Munich, Germany)

Predictive Digital Twins
*T. Kvamsdal**

03/06/2024 | 13:45 - 14:30 **Energy Efficiency - A key lever for Sustainable Flight**	SPL04 Room: Auditorium VI Chaired by: Prof. Jacques Periaux (cimne, Spain)

Energy Efficiency - A key lever for Sustainable Flight
*D. Reckzeh**

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

14:30 - 16:30 | TECHNICAL SESSIONS

03/06/2024 | 14:30 - 16:30 **Phase Field Modeling and Computation II**	MS017B Room: Auditorium I Chaired by: Prof. Laura De Lorenzis (ETH Zurich, Switzerland)

New horizons in corrosion modelling: phase field models for pitting and stress corrosion cracking
*E. Martinez-Paneda**

Virtual element methods for high-order phase-field modeling of dynamic fracture
*Y. Leng**

Dual-Mesh Discretization For Phase-Field Fracture Method
T. Jarak, K. Jukić, Z. Tonković, A. Lorenzana Iban*

A combined volumetric-deviatoric and spectral decomposition-based phase-field model for brittle fracture
M. Rahaman, A. Behera, A. Pillai*

Phase-Field Modelling of Hydraulic Fracturing in Porous Media
S. Shahoveisi, M. Vahab, S. Eisenträger, B. Shahbodagh, N. Khalili*

An Adaptive Time-Discretization Method Suitable for Phase-Field Models of Brittle Fracture
F. Rörentrop, J. Mosler*

03/06/2024 | 14:30 - 16:30 **Coarse Graining Turbulence: Modeling and Data-Driven Approaches and Their Applications II**	MS016B Room: Auditorium II Chaired by: Dr. Andrea Ferrero (Politecnico di Torino, Italy)

The Merging of Symmetries and the Germano Identity - a Path to Physics-based SGS Models (Keynote Lecture)
M. Oberlack, D. Klingenberg*

Mixed Averaging Procedures
M. Errante, M. Klein, A. Ferrero, F. Larocca, G. Scovazzi, M. Germano*

Coarse Grain Prediction of Transition
*D. Israel**

Investigation of length scale definition influence in LES models
E. Di Lavore, J. Ruano, A. Oliva, X. Trias*

03/06/2024 | 14:30 - 16:30 **Advances in structural and multidisciplinary optimization II**	MS022B Room: Auditorium III Chaired by: Dr. Aurelio Araujo (IDMEC, Portugal), Dr. Erin Kuci (CENAERO, Belgium)

Investigating the Merits of Double-Double and Quad Composites Structural Optimization for Aeronautic Structures
A. Garcia Pis, C. Gogu, S. Grihon, L. Michel, S. Coniglio*

Aero-Structural Design of a Medium-Altitude Medium-Endurance Fixed Wing UAV
P. Cardoso, A. Marta, N. Matos*

Multidisciplinary Node-Based Shape Optimization of Automotive Parts for Manufacturability
G. Barrón Loeza, K. Bletzinger, M. Hojjat*

Levelset XFEM Topology Optimization for Additively Manufactured Morphing Wing Structures
E. Kuci, J. Leclerc*

Optimization of Grid-Stiffened Composite Cylindrical Panels for Buckling and Free Vibration
M. Mobasheri Zafarabadi, A. Araujo, M. Aghdam*

03/06/2024 | 14:30 - 16:30 **Mechanics of Soft, Multifunctional Materials: experiment, modeling and simulation II**	MS083B Room: Auditorium IV Chaired by: Prof. Daniel Garcia-Gonzalez (Universidad Carlos III de Madrid, Spain), Dr. Sergey Kozinov (Ruhr University Bochum, Germany)

A Dynamic Finite Element Framework for Modeling Hard-Magnetic Soft Materials
D. Sharma, A. Sharma*

Viscoelastic Magnetorheological Elastomer-Based Laminate for Tuneable Vibration Absorber
M. Ruggieri, J. Ciambella, S. Rudykh, G. Tomassetti*

An electroelastic Kirchhoff rod theory incorporating free space electric energy
*D. Barreto, A. Kumar**

Bayesian Inference For Anisotropic Soft Tissue Characterization Using Full-Field Optical Data
A. Elouneg, H. Rappel, A. Lejeune, J. Chambert, S. Bordas, E. Jacquet*

Dynamic Actuation Modes in Magneto-Responsive Bistable Structures: A Rate-Dependent Approach
C. Perez-Garcia, J. Aranda-Ruiz, M. Lopez-Donaire, R. Zaera, D. Garcia-Gonzalez*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 14:30 - 16:30 **Modelling and Simulation for Additive Manufacturing II**	MS207B Room: Auditorium VI Chaired by: Prof. Jesper Hattel (Danmarks Tekniske Universitet (DTU), Denmark), Dr. Andreas Lundbäck (Luleå University of Technology, Sweden)

Original Eigenstrain Framework Combined with Machine Learning for Fast Residual Stress and Distortion Prediction in LPBF Parts (Keynote Lecture)
P. Markovic, E. Mazza, E. Hosseini*

Reduced Order Model for Temperature Field Simulation of Wire Arc Additive Manufacturing
D. Strobl, J. Unger, C. Ghnatios, A. Pittner, M. Rethmeier, A. Robens-Radermacher*

Fast Thermal History Prediction During Additive Manufacturing Processes Using Deep Learning Methodologies
L. Salesses, L. Arbaoui, A. François, C. Sainvitu*

Accelerated Additive Manufacturing Simulation Through Inherent Strains Meta-Models Trained With Generic Databases
H. Hernandez, N. Poletz, T. Van Hoof*

Data-driven surrogate modelling of residual stresses in Laser Powder-Bed Fusion
L. Lestandi, J. Wong, G. Dong, M. Jhon*

03/06/2024 | 14:30 - 16:30 **Computational Kinetic Theory II**	MS100B Room: Auditorium VII Chaired by: Mr. Teddy Pichard (École polytechnique, France), Dr. Michael Abdemalik (Eindhoven University of Technology, Netherlands)

Exploiting Tensor Structure in Kinetic Equations: General Framework
*M. Abdelmalik, R. Hiemstra, T. Keßler**

Exploiting Tensor Structure in Kinetic Equations: High Performance Aspects
M. Abdelmalik, R. Hiemstra, T. Kessler*

Magnetized Plasma Simulations with High-Order Implicit-Explicit Time Integrators
D. Ghosh, M. Dorf, M. Dorr*

A Grad-Like Expansion of the Hyperbolic Quadrature Method of Moments for Multidimensional Kinetic Equations
R. Fox, F. Laurent*

Reduced models for parietal fluxes in hypersonic rarefied flows: from bridging functions to machine learning models
*M. Schouler, Y. Prévereaud, L. Mieussens**

Interpolative-Based Maximum-Entropy Moment Closures for Predicting Non-Gray Radiative Heat Transfer with Application to Sooting Flames
*J. Sarr, C. Groth**

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 14:30 - 16:30 **Machine Learning Methods for Multiscale and Multiphysics Material Modeling II**	MS007B Room: Auditorium VIII Chaired by: Dr. Yousef Heider (Leibniz Universität Hannover, Germany), Prof. Oliver Weeger (TU Darmstadt, Germany)

Physically enhanced neural networks: Application to nonlinear viscoelasticity
L. Maurer, S. Eisenträger, D. Juhre*

A Neural Network Strategy for the Modelling of Inelastic Solid Materials via Gradient-Free Optimisation
E. Muttio, R. Alhayki, W. Dettmer, D. Perić*

Microstructural Characterization in Aerogel Modeling through Deep Symbolic Regression
R. Abdusalamov, R. Chandrasekaran, M. Itskov*

Exploring CNN Based Architectures for Structure to Property Mapping of 2D Micro-Architected Materials
J. Bowbrick Smith, M. Whiting, T. Chatterjee, K. Bandara, M. Weismann, H. Attar, A. Harris, I. Mohagheghian*

Concurrent Multiscale Modelling of Boundary Lubrication, Enabled by Machine Learning
H. Holey, P. Gumbsch, L. Pastewka*

03/06/2024 | 14:30 - 16:30 **Recent Trends in Scientific Computing for Computational Fluid Dynamics and Solid Mechanics in the Exascale Range II**	MS049B Room: Terrace Chaired by: Prof. Stefan Turek (TU Dortmund University, Germany), Prof. Axel Klawonn (Universität zu Köln, Germany)

Nonlinear domain decomposition methods combined with deep learning (Keynote Lecture)
A. Klawonn, M. Lanser, J. Weber*

Parallel implementation of nonlinear Schwarz domain decomposition methods
K. Ho, A. Klawonn, M. Lanser*

Parallel Scalable Domain Decomposition Methods for Incompressible Fluid Flow Problems
*A. Heinlein, A. Klawonn, J. Knepper, L. Saßmannshausen**

Fast and Robust Overlapping Schwarz methods in FEATFLOW
*S. Köhler, O. Rheinbach**

Fast Semi-Iterative Finite Element Poisson Solvers for Tensor Core GPUs
D. Ruda, S. Turek, D. Ribbrock*

03/06/2024 | 14:30 - 16:30 **Recent Advances in Unfitted Finite Element Methods: Analysis, Algorithms, and Applications II**	MS170B Room: 3A Chaired by: Prof. Mats G. Larson (Umea University, Sweden), Prof. Guglielmo Scovazzi (Duke University, United States)

Analysis of an Eulerian finite element method for a fluid problem in a deforming volume (Keynote Lecture)
*M. Neilan, M. Olshanskii**

Geometrically higher order unfitted space-time methods for PDEs on moving domains
F. Heimann, C. Lehrenfeld, J. Preuß*

Unfitted finite element methods for axisymmetric two-phase flow
H. Garcke, R. Nürnberg, Q. Zhao*

A conservative cut finite element discretization of the surfactant transport equation
S. Myrbäck, S. Zahedi*

Towards DWR Adaptivity and Multigrid Methods for Flow Simulation on Evolving Domains
*M. Anselmann, M. Bause, M. Bruchhäuser, N. Margenberg**

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 14:30 - 16:30 **Phase-field and gradient damage models for fracture in complex materials II**	MS181B Room: 3B Chaired by: Prof. Fadi Aldakheel (Leibniz Universität Hannover, Germany), Ms. Martha Kalina (TU Dresden, Germany)

Modeling of damage in fiber-reinforced high-performance concrete at low cycle fatigue using a phase-field regularization (Keynote Lecture)
J. Schröder, M. Pise, D. Brands*

Phase-field modeling of the cracking behavior of concrete at the mesoscale
A. Mishra, P. Carrara, G. Michele, L. De Lorenzis*

Cracking in Reinforced Concrete Elements: a Phase Field Approach
L. Mingazzi, F. Freddi*

Investigation of Microscale Fracture Opening in Host Inclusion Systems
B. Puhan, M. Alvaro, A. Patton, M. Mazzucchelli, A. Reali, S. Morganti*

A Finite Strain Gradient-Enhanced Micropolar Hyperelasto-Plasticity Continuum Approach for Localized Failure in Cohesive-Frictional Materials
M. Neuner, S. Abrari Vajari, P. Arunachala, C. Linder, G. Hofstetter*

03/06/2024 | 14:30 - 16:30 **Microstructure-based Modeling of Biomechanical Systems II**	MS057B Room: 3C Chaired by: Dr. Michele Terzano (Graz University of Technology, Austria), Prof. Gerhard Holzapfel (Graz University of Technology, Austria)

Local Micromorphic Non-affine Anisotropy with Applications to Biological Tissue (Keynote Lecture)
S. Skatulla, C. Sansour, G. Limbert*

Constitutive Foundation of Nonlinear Elasticity in Soft Tissue
S. Cardona, B. Fereidoonnezhad, M. Peirlinck*

Fourier Transform-Based Algorithm for the Quantification of the Spatial Orientation Distribution of 3D Fiber Networks
R. Alberini, A. Spagnoli, M. Sadeghinia, B. Skallerud, M. Terzano, G. Holzapfel*

A New Way to Look at Elastic Problems : a Visco-hypoelastic Model to Describe Nano-mechanics of Collagen Fibrils
Y. Chiang, C. Hellmich, P. Thurner*

A Nonlinear Viscoelastic Model for Soft Fibre-Reinforced Biological Tissues with Anisotropic Evolution of Viscous Strain
G. Lucci, J. Ciambella, P. Nardinocchi*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 14:30 - 16:30 **Shape and topology optimization: theoretical advances and numerical methods II**	MS198B Room: 5A Chaired by: Mr. Alex Ferrer (CIMNE, Barcelona, Spain), Dr. Samuel Amstutz (Avignon Université, France)

Multiscale(FE-FFT) Phase-field Topology Optimization for Architected Cellular Materials
B. Yaraguntappa, A. Krischok, M. Keip*

Shape Optimization with CutFEM with a Novel Level-Set Reinitialization Technique
A. El Bachari, S. Claus, J. Rannou, V. Yastrebov, P. Kerfriden*

Topological Derivative-Based Heat Sink Design with Temperature Constraints
G. Andrade, A. Novotny, A. Laurain*

One-Shot Optimization for the Inverse Design of a Quasi 1-D De Laval Nozzle
V. Georgopoulos, L. Zampini, G. Coussement, T. Verstraete*

Topology Optimization Assisted by Automatic Level Set-Fitted Polygonal Meshes
N. Ferro, S. Micheletti, N. Parolini, S. Perotto, M. Verani, P. Antonietti*

One-Shot Optimization for the Inverse Design of a 2D de Laval Nozzle
L. Zampini, G. Coussement, T. Verstraete*

03/06/2024 | 14:30 - 16:30 **Isogeometric Methods II**	MS010B Room: 5B Chaired by: Prof. Trond Kvamsdal (Norwegian University of Science and Technology (NTNU), Norway), Prof. Giancarlo Sangalli (University of Pavia, Italy, Italy)

Thermo- and Chemo-elastic Beam Modeling and Simulation with Isogeometric Collocation Methods
J. Alzate Cobo, O. Weeger*

An efficient isogeometric formulation for the analysis of geometrically exact viscoelastic beams
G. Ferri, D. Ignesti, E. Marino*

Topology optimization of curved thick shells using level set method and multi-patch isogeometric analysis
F. Hubner, A. Constantinescu, M. Zarroug, H. Naceur*

An isogeometric nonlinear formulation for shear- and torsion-free rods using outlier removal and robust time integration
*T. Nguyen**

An Objective FE-Formulation for Cosserat Rods based on the Spherical Bézier Interpolation
L. GRECO, A. CAMMARATA, D. CASTELLO, M. CUOMO*

03/06/2024 | 14:30 - 16:30 **Fluid-Structure Interaction in Multiphysics Systems II**	MS210B Room: 5C Chaired by: Mr. Alessandro Nitti (Polytechnic University of Bari, Italy), Prof. Marco D. de Tullio (Politecnico di Bari, Italy)

Multiphysics, multiscale, and computational models for simulating the cardiac function
*L. Dede'**

A new method to compute the fluid-structure interaction of neutrally-buoyant particles of arbitrary shape
M. Schenk, M. Garcia-Villalba, M. Uhlmann, M. Moriche*

Numerical investigation on the aerodynamic performance of a bioinspired micro-scale wind turbine
J. Catalán, G. Arranz, M. Moriche, M. Guerrero-Hurtado, M. García-Villalba, O. Flores*

Aereodynamics of Bioinspired Flying Seeds
A. Lolli, G. Corsi, A. DeSimone*

Self-sustained flapping of wall-mounted valve leaflets in a three-dimensional channel
J. Wang, A. Nitti, M. de Tullio*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 14:30 - 16:30 **Numerical Methods for Interface-Resolved Multiphase Flows II**	MS138B Room: 0.06 Chaired by: Prof. F.Xavier Trias (Technical University of Catalonia, Spain), Phd. Nicolas Valle (Technische Universiteit Delft, Netherlands)

A Spectral Difference Discretisation of the Five-equation Model for the Simulation of Compressible Two-Phase Flows
N. Tonicello, G. Lodato, M. Ihme*

Computation of low Mach number multiphase flows using five-equation model
G. Bharate, J. MANDAL*

Simulating Two-Phase Flow with a Sharp, Structure-Preserving Two-Velocity Model
A. Veldman, R. Remmerswaal*

Wave growth rate estimations using diffusive interface simulations
M. Loft, T. Rung*

A Synthetic Bubble Model as Inlet for Fluid-Structure Interaction Simulations with Two-Phase Flow
H. Dolfen, J. Degroote*

Dynamics of a Taylor bubble in counter-current flow: transition from laminar to turbulent
B. Mikuž, J. Kren, E. Frederix, I. Tiselj*

03/06/2024 | 14:30 - 16:30 **PhD Olympiad II**	OLY001B Room: 0.07 Chaired by: Dr. Konrad Perzyński (AGH University of Krakow, Poland)

Influence of rate-dependence on unstable material response in large strain thermoplasticity
*M. Mucha**

Numerical Simulation of Ice Melting in Fluid Flows
R. Yang, R. Verzicco, D. Lohse*

Mechanical properties of heart failure with preserved ejection fraction: phenotypic analysis and therapeutic device investigation
*J. Weissmann**

A high-order continuous Lagrange--Galerkin method for compressible flows
M. Colera, J. Carpio, R. Bermejo*

Mathematical and Numerical Modeling of the Heart Function: Integrating Electrophysiology, Mechanics and Fluid Dynamics
*M. Bucelli**

Interaction between a submarine and a far-field underwater explosion with a transient iterative FEM-BEM coupling
A. Nassor, M. Bonnet, S. Chaillat*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 14:30 - 16:30 **Physics-Informed Machine Learning for Structural Health Monitoring: Emerging Trends and Open Issues II**	MS041B Room: 0.08 Chaired by: Dr. Enrique García-Macías (Universidad de Granada, Spain), Dr. Alberto Barontini (University of Minho, ISISE, ARISE, Italy)

Surrogate models as the key to inject digital twins within the statistical pattern recognition SHM paradigm (Keynote Lecture)
*E. García Macías**

Meta-Model Assisted Pattern Recognition for Real-Time Identification of Roadway Bridges: a Preliminary Study
E. Tomassini, E. García-Macías, I. Venanzi, F. Ubertini*

Leveraging advanced numerical calibration to filter out temperature effects on vibration-based monitoring data: application to the Mogadouro clock tower
A. Barontini, D. Pellegrini, F. Testa, M. Girardi, M. Masciotta, N. Mendes, C. Padovani, L. Ramos, P. Lourenço*

Combination of FEM and machine learning models for enhanced dam safety assessment
F. Salazar, J. Irazábal, N. Silva-Cancino, D. Vicente*

03/06/2024 | 14:30 - 16:30 **Advanced and efficient numerical strategies in Contact Mechanics II**	MS149B Room: 1.02 Chaired by: Dr. Isabelle RAMIERE (CEA Cadarache, France), Prof. David Ryckelynck (Mines Paris PSL - Armines, France)

A Comprehensive Study on the Benefits of a Multiscale Approach in Model-Order Reduction for Frictional Contact Problems
D. Zeka, P. Guidault, D. Néron, M. Guiton*

Efficient Hyper-Reduced Order Modelling of Mixed Contact Problems defined on Non-matching grids
*I. Ramière, S. Le Berre, D. Ryckelynck**

Development of a Simplified Model for the Analysis of Bolted Assemblies under Extreme Loadings
Q. Lançon, P. Guidault, P. Boucard, N. Vallino*

A Small Sliding Beam-to-beam Contact Element for the Simulation of Overhead Conductors Under Tension and Bending
K. Aït Ammar, P. Guidault, P. Boucard, J. Said, F. Hafid*

Micro-scale Analysis of Rough Surfaces Accounting for the Presence of a Tribolayer
M. Oliveira, D. Neto, L. Menezes*

03/06/2024 | 14:30 - 16:30 **Machine learning and data-driven approaches for optimization and uncertainty quantification in aerodynamics II**	MS002B Room: 1.03 Chaired by: Dr. Domenico Quagliarella (CIRA, Italy), Dr. Esther Andrés Pérez (INTA, Spain)

Latent Regression of Transonic Wing Pressure distributions
V. Francés, A. Solera-Rico, C. Sanmiguel Vila, E. Andrés, R. Castellanos*

Physics-informed Machine Learning for Surrogate Modelling and Design Optimization
*Y. Sun**

A Multi-Fidelity Aerodynamic Shape Design Optimization Procedure Using Physically Informed Machine Learning
*D. Quagliarella**

Integrating Dimensionality Reduction and Bayesian Regression in a Reduced-Order Modeling Framework for Atmospheric Boundary Layer Flows Simulations
H. Li, L. Cotteleer, A. Gambale, A. Parente*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 14:30 - 16:30 **Modelling and Simulations of Additively Manufactured Metamaterials II**	MS045B Room: 1.04 Chaired by: Prof. Simone Morganti (University of Pavia, Italy), Dr. Massimo Carraturo (University of Pavia, Italy)

Potential and limits of modelling as-designed AlSi10Mg lattice structures in 4 different loading conditions
U. Gebhardt, T. Gustmann, L. Giebeler, F. Hirsch, J. Hufenbach, M. Kästner*

A Game for Multi-Scale Topology Optimization of Static and Dynamic Compliances of Schwarz-D Lattice Structures
*N. Strömberg**

Efficient Mechanical Design of Lattice Metamaterials: a Multiscale Homogenization-based Approach
L. Cibrario, C. Gastaldi, I. Cozza, C. Delprete*

Accelerating the simulation of Mechanical Metamaterials with Reduced Order Modeling and Domain Decomposition Methods
F. Betti, P. Antolin Sanchez, A. Buffa*

03/06/2024 | 14:30 - 16:30 **Facing the challenges of high order methods for hyperbolic PDEs II**	MS108B Room: 1.05 Chaired by: Dr. Davide Torlo (Università di Roma La Sapienza, Italy), Dr. Maria Han Veiga (Ohio State University, United States)

Matrix-Free Finite Element Methods for Lagrangian Hydrodynamics
*N. Morgan, S. Tokareva, S. Walton**

Active flux for triangular meshes for compressible flows problems
R. Abgrall, J. Lin, Y. Liu*

Novel well-balanced continuous interior penalty stabilizations
*L. Micalizzi**

Hybrid-Trefftz Finite Elements for Non-Homogeneous Wave Propagation Problems
I. Moldovan, S. Silva Pinto, D. Bendea*

Semi-Implicit Numerical Scheme for Hyperbolic Problems
R. Abgrall, S. Del Pino, A. Drouard, E. Labourasse*

Implicit High-Order Shock Tracking using an Extended Discontinuous Galerkin method
J. Vandergrift, F. Kummer*

03/06/2024 | 14:30 - 16:30 **Digital Twins for Predictive Decision-Making of Engineering Systems II**	MS164B Room: 1.06 Chaired by: Mr. Matteo Torzoni (Politecnico di Milano, Italy), Dr. Marco Tezzele (University of Texas at Austin, United States)

Markov Chain Monte Carlo on Matrix Manifolds for Probabilistic Model Order Reduction
A. Vizzaccaro, M. Likkeggard, T. Dodwell*

Graph Neural Network with a physics-inductive bias for Multi-body Dynamical Systems
V. Sharma, O. Fink*

PDE-Constrained manifold Gaussian Processes for High-Dimensional Problems
W. Yan, M. Guo*

Neural Networks Based Surrogate Modeling for Sensitivity Estimation of MEMS Accelerometers Using Electric Stimuli
F. Zacchei, A. Manzoni, A. Frangi*

Multi-fidelity Modelling for Digital Twins of Fast Processes
M. Dodt, S. Marelli, A. Persoons, M. Faes, B. Sudret, D. Moens*

03/06/2024 | 14:30 - 16:30 **Deep learning and reduced order modeling for differential equations II**	MS070 Room: 1.07 Chaired by: Dr. Federico Pichi (SISSA, Italy), Dr. Nicola Rares Franco (MOX, Politecnico di Milano, Italy)

Factorized Fourier neural operator (F-FNO) metamodel of 3D seismic elastic wave propagation, improved by transfer learning.
F. Lehamnn, F. Gatti, M. Bertin, D. Clouteau*

Entropy Stable Model Reduction of Hyperbolic Systems on Nonlinear Manifolds
R. Klein, B. Sanderse, R. Pecnik, P. Costa, R. Henkes*

A continuous geometry-aware DL-ROM for nonlinear PDEs in parametric domains
S. Brivio, S. Fresca, A. Manzoni*

Optimal Transport-Inspired Model Order Reduction: Leveraging Wasserstein-Based Kernel and Shifted POD
M. Khamlich, G. Rozza, F. Pichi*

Real-Time Simulation of Plastic Deformation Using Long Short-Term Memory Multi-Task Neural Networks
R. Schmeitz, J. Remmers, O. Mula, O. van der Sluis*

An adaptive finite elements - neural network method applied to a parametric Stefan problem
A. Caboussat, M. Girardin, M. Picasso*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 14:30 - 16:30 **FFT-based homogEnisation methods: advances and applications II**	MS065B Room: 1.08 Chaired by: Dr. Ricardo Lebensohn (Los Alamos National Laboratory, United States)

Is FFT-based Homogenization Limited to Regular Meshes?
M. Kabel, M. Schneider*

Numerical homogenization by an adaptive Fourier spectral method on non-uniform grids using optimal transport
C. Bellis, R. Ferrier*

Fourier Transform approach to boundary domain integral equations with domain decomposition and adaptive reference parameters
*Q. To**

The elastic properties of fiber-reinforced materials with imperfect interfacial bondings: analytical approximations versus full-field simulations
*V. Gallican**

FFT-based Model of Hydroelectric Dams under Alkali-Silica Reaction
L. Fourel, J. Molinari*

03/06/2024 | 14:30 - 16:30 **Optimization under Uncertainty II**	MS107B Room: 1.08 Chaired by: Dr. Iason Papaioannou (Technical University of Munich, Germany), Dr. Oindrila Kanjilal (Engineering Risk Analysis Group, Germany)

Life-Cycle Maintenance Optimization of Bridge Networks Against Seismic Risks Through Hierarchical Deep Reinforcement Learning
Z. Metwally, C. Andriotis*

Structural design optimization under uncertainty by cross entropy-based importance sampling
O. Kanjilal, I. Papaioannou, D. Straub*

Resilience-Informed Design Optimization of Dolphin Structures of Long-Span Bridges under Ship-Collision Hazards
S. Lim, J. Song, H. Kim*

03/06/2024 | 14:30 - 16:30 **Advances in machine learning for composite materials II**	MS148B Room: 1.10 Chaired by: Dr. Iuri Rocha (Delft University of Technology, Netherlands), Dr. Ramin Bostanabad (UCI, United States)

Data augmentation for deep-learning modelling of composite materials
P. Uvdal, H. Cheung, M. Mirkhalaf*

Data-driven Permeability Prediction of 3D Fibrous Microstructures
D. Natarajan, T. Schmidt, S. Cassola, M. Nuske, M. Duhovic, D. May, A. Dengel*

Keynote Machine Learning-Accelerated Predictions of Design Allowable of Composite Laminates
*L. Fonseca, J. Ferreira, I. Lopes, J. Esteves, F. Danzi, C. Furtado**

03/06/2024 | 14:30 - 16:30 **Multi-Scale Modelling of Generalised Continua and Metamaterials II**	MS193B Room: 1.11 Chaired by: Dr. Igor A. Rodrigues Lopes (INEGI - Institute of Science and Innovation in Mechanical and Industrial Engineering, Portugal), Prof. Christian Hesch (University of Siegen, Germany)

Shared Degrees of Freedom for Strain-gradient Mixed Elements
*S. Papanicolopulos**

Modelling of Nonlocal Truss Structures in the Framework of Space-Fractional Continuum Mechanics
P. Stempin, W. Sumelka*

Non-Local Natural Vibration Behavior of 3D Nanostructures
A. Rodriguez-Herrera, F. Ramirez*

A parallel and staggered framework for the finite strain Cosserat-phase-field theory: application to microstructure evolution
C. Bovet, J. Doghman, A. Ask*

On modeling micro-scale strain gradient elastic adhesively bonded joints
M. Serpilli, R. Rizzoni, F. Lebon, M. Raffa, R. Rodrìguez-Ramos*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 14:30 - 16:30
Robust discretization and solution of coupled problems in porous media II

MS127B
Room: 1.12
Chaired by:
Dr. Jakub Both (University of Bergen, Norway), Prof. Fleurianne Bertrand (TU Chemnitz, Germany)

Higher-Order Iterative Decoupling for Poroelasticity
*R. Altmann, A. Mujahid, B. Unger**

Solution Techniques for Poroelasticity that Preserve Linear and Angular Momentum
W. Boon, N. Franco, A. Fumagalli, P. Zunino*

Solution strategies to solve poroelasticity for complex grids
*W. Boon, A. Fumagalli**

A decoupled solver for a novel stabilization scheme for Biot's model
A. Pe de la Riva, F. Gaspar, C. Rodrigo, J. Adler, X. Hu, L. Zikatanov*

Optimal control strategies to mitigate the intensity of the urban heat island in porous urban environments
*M. Louaked**

Assessment of geological fault reactivation by CO2 injection using sequential coupling strategies
C. Mejia, J. Rueda, R. Quevedo, D. Roehl*

03/06/2024 | 14:30 - 16:30
Advances in numerical methods on polytopal grids for coupled problems II

MS085B
Room: 1.13
Chaired by:
Mr. Stefano Bonetti (Politecnico di Milano, Italy), Ms. Francesca Marcon (Politecnico di Torino, Italy)

Isoparametric Virtual Element Methods
A. Cangiani, A. Dedner, M. Hubbard, H. Wells*

New results on adaptive virtual element methods
*S. Berrone, C. Canuto, D. Fassino**

Virtual Element Method for large deformations of Single Layer Plates
R. Nochetto, G. Vacca, S. Yang*

A Hybrid Method for the Variable-density Navier-Stokes Equations
M. Dauphin, D. Di Pietro, J. Droniou*

A stabilization-free Virtual Element Method: main features and an application to a convection-diffusion eigenvalue problem
S. Berrone, A. Borio, F. Marcon, D. Mora*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 14:30 - 16:30 **Advances in natural hazards simulation II**	MS200B Room: 1.14 Chaired by: Prof. Antonia Larese (University of Padua, Italy), Prof. Massimiliano Cremonesi (Politecnico di Milano, ITALY, Italy)

Finite Element Simulation of a Rainfall Induced Shallow Landslide in an Experimental Hillslope with a Multiphase Porous Media Model
*M. Lazari, M. Camporese, L. Sanavia**

Shallow Water Equations versus Zero-Inertia Approximation within a Geometrically Intrinsic Framework
E. Bachini*, M. Camporese, A. Larese, M. Putti
A Two-Fluid finite element formulation for solving hydraulic flows in high mountain areas
U. Chasco Goñi, R. Zorrilla, R. Rossi*

Modelling of Volcanic Plumes and Clouds: Implementation of Wind-caused Bending Effects and Coarse Particles in a Multi-GPU Accelerated LBM-WENO Code
R. Simionato, J. Lemus, C. Coreixas, J. Latt, C. Bonadonna*

Development of a multi-GPU Accelerated Code to Model the Complex Dynamics of Volcanic Plumes using the Lattice Boltzmann Method
J. LEMUS, R. Simionato, C. Coreixas, J. Lätt, C. Bonadonna*

Topography effects on landslide dynamics, generated tsunamis and seismic waves
A. Mangeney, M. Peruzzetto, F. Bouchut, G. Grandjean, C. Levy, Y. Thiery, A. Lucas, A. Marboeuf, A. Le Friant, E. Fernandez-Nieto, M. Castro-Diaz*

03/06/2024 | 14:30 - 16:30 **Multiscale Modeling of Complex Microstructures II**	MS044B Room: 1.15 Chaired by: Ms. Sonja Hellebrand (University of Duisburg-Essen, Germany), Prof. Johanna Waimann (Ruhr-Universität Bochum, Germany)

Multiscale modelling of T1 precipitation in Al-Cu-Li alloys (Keynote Lecture)
*A. Safi, E. Mathew, R. Chafle, B. Klusemann**

A fully coupled multiscale model of cancellous bone considering mechanical, electric and magnetic effects
M. Blaszczyk, K. Hackl*

A Thermodynamic Approach to Modelling Shape Memory Alloys
C. Erdogan, T. Bode, P. Junker*

Variable Scale Separations in Morphology-Based Homogenization of Phase Transforming Solids
V. von Oertzen, B. Kiefer*

Micromechanical constitutive multiscale modeling of rate-dependent dissipation and switching effects in ferroelectrics
A. Warkentin, A. Ricoeur*

03/06/2024 | 14:30 - 16:30 **Hemodynamics Models for the Design of Mechanical Circulatory Support (MCS) Technologies II**	MS208B Room: 2.01 Chaired by: Prof. Lisa Prahl Wittberg (FLOW, Dept. Engineering Mechanics, Royal Institute of Technology (KTH), Sweden), Prof. Richard Leask (Mcgill University, Canada)

Relationship between Growth Rate and Shear Rate in Platelet Aggregation Using Microfluidics (Keynote Lecture)
*S. Kobayashi**

An Efficient and Robust Computational Model for Strain-Based Hemolysis Prediction in Eulerian Frame
N. Dirkes, M. Behr*

Shear-Induced Platelet Aggregation is Mediated by αIIbβIII Integrin Function in a Stenotic Model
*C. Watson, K. Manning**

Simulating the Effect of Hemolysis on Thrombosis in Ventricular Assist Devices
H. Valtchanov, L. Atkinson, R. Cecere, R. Mongrain*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 14:30 - 16:30 **Coupling computational fluid dynamics with machine learning I**	MS050A Room: 2.02 Chaired by: Dr. Esteban Ferrer (Universidad Politécnica de Madrid, Spain), Dr. Gonzalo Rubio (UPM, Spain)

Accelerating High Order Discontinuous Galerkin solvers using neural networks
E. Ferrer, O. Mariño, D. huergo*

Enhancing Computational Fluid Dynamics through Unsupervised Machine Learning
G. Rubio, K. Otmani, K. Tlales, A. Mateo-Gabín, G. Ntoukas, O. Mariño, E. Valero, E. Ferrer*

A POD-based reduced order finite volume model for solving shallow water equations with parameterized source terms
P. Solán-Fustero, J. Gracia, A. Navas-Montilla, P. García-Navarro*

A Reinforcement Learning Strategy for Mesh Adaptation in High-order CFD Solvers
D. Huergo, M. De Frutos, Ó. Mariño, G. Rubio, E. Ferrer*

Application of PINNs to the modelling of secondary waves in vessels for transient blood flow
J. Orera, J. Ramírez, P. García-Navarro, J. Murillo*

Application of an Automated Machine Learning Framework for the Preliminary Design of Engine Combustion Systems
M. Centini, I. Cozza, R. McAlpine*

03/06/2024 | 14:30 - 16:30 **Mini-Synposium on Surrogate Models in Microwave and Antenna Engineering I**	MS042A Room: 2.03 Chaired by: Prof. Petrie Meyer (Stellenbosch University, South Africa)

Design of High-performance Reflector Antenna Systems for Radio Astronomy
D. de Villiers, R. Lehmensiek*

Robust Exponential Analysis in One and More dimensions
A. Cuyt, W. Lee*

Globalized Trust-Region Optimization: An Unassuming Approach
Y. Lindemans, A. Bekasiewicz, I. Couckuyt, T. Dhaene*

Swarm Intelligence Parametric Yield Optimization of Microwave Devices using the Non-Linear Partial Least-Squares Polynomial Chaos Expansion Technique
K. Nfanyana, L. Johnson, P. Meyer*

Developments in Macro Basis Function Methods for Electromagnetic Analysis
M. Botha, K. Sewraj, P. Cilliers, A. Conradie, W. Dommisse, T. Rylander*

03/06/2024 | 14:30 - 16:30 **Efficient SciML Techniques With Applications to CFD I**	MS052A Room: 2.04 Chaired by: Dr. Alexander Heinlein (TU Delft, Netherlands), Prof. Sashikumaar Ganesan (Indian Institute of Science, India)

Analysis of hybrid finite element / neural network discretization schemes
T. Richter, C. Lessig, R. Jendersie, U. Kapustsin, M. Nils*

Improving the Convergence of Pseudo-Time Stepping for CFD Simulations With Neural Networks.
A. Zandbergen, A. Heinlein, T. van Noorden*

Deep learning-based high-order entropy stable schemes for conservation laws
D. Ray, P. Charles*

Learning Discretization Invariant Closure Models for Large Eddy Simulation of Turbulent Flows
S. Agdestein, B. Sanderse*

Hybrid Finite Volume-Neural Network Method Applied to Fluid Flow Problems
*O. Bublík**

Optimizing Groundwater Heat Pump Placement: Modelling Heat Transport with CNNs
J. Pelzer, M. Schulte*

03/06/2024 | 14:30 - 16:30 **Recent advances in computational geomechanics I**	MS113A Room: 2.05 Chaired by: Dr. Yunteng Wang (Universitat fur Bodenkultur Wien, Austria), Dr. Juan Marcelo Gimenez (CIMNE, Spain)

Modelling the Hydration of Bentonites Under Isothermal and Non-Isothermal Conditions Using a Double Porosity Model
R. Vasconcelos, C. Rodríguez, A. Gens, J. Vaunat*

Variational modeling of drying induced complex fracture initiation in granular geomaterials
S. OMMI, G. SCIARRA*

Non-associative plasticity with the bipotential approach and semi-smooth Newton methods
L. Guillet, V. Acary, F. Bourrier, O. Goury*

Unsaturated Hydromechanics and Cracking in Opalinus Clay
T. Cajuhi, G. Ziefle, J. Maßmann, T. Nagel, K. Yoshioka*

A Fully Coupled Analysis Procedure for Liquefaction of Unsaturated Sands
M. Muraleetharan, B. Zhang*

Enhanced finite element modeling of deep earthquake nucleation including phase transformation and thermal effects
C. Foster, S. Chi, F. Sindhusuta, A. Panse, J. Mofidi Rouchi*

Validation of a Numerical Model of Seismic Newtonian Noise for the Einstein Telescope
P. Reumers, S. François, G. Degrande*

17:00-19:00 | TECHNICAL SESSIONS

03/06/2024 | 17:00 - 19:00 **Phase Field Modeling and Computation III**	MS017C Room: Auditorium I Chaired by: Dr. Yu Leng (Los Alamos National Laboratory, United States)

Consistent Lagrangean Formulation of Phase Separation in Chemoelastic Polymer Solutions at Large Strains
A. Gomero Soria, A. Stracuzzi, A. Ehret*

Phase Field Modelling of CuCrZr Alloy for Nuclear Fusion
D. Kell, T. Haynes*

Phase Field Modeling of Non-cooperative Eutectoid Growth in Multicomponent Steels
*K. Ankit**

Chemo-elastic benchmark for a multiphase-field model
T. Kannenberg, Y. Bai, K. Umate, D. Schneider, B. Svendsen, B. Nestler*

Multiphase-Field modeling of microstructure evolution incorporating crystal plasticity
A. Prahs, L. Schöller, T. Kannenberg, D. Schneider, B. Nestler*

03/06/2024 | 17:00 - 19:00 **Coarse Graining Turbulence: Modeling and Data-Driven Approaches and Their Applications III**	MS016C Room: Auditorium II Chaired by: Dr. Filipe Pereira (Los Alamos National Laboratory, United States)

SRS Models for Practical Flows: A Review
*F. Pereira**

LES and URANS Modelling of Richtmyer-Meshkov Instability with Anisotropic Strain
*B. Pascoe, M. Groom, B. Thornber**

Advances in kinetic turbulence modeling via lattice Boltzmann simulations
F. Marson, O. Malaspinas*

Large Eddy Simulations of Heat Transfer in Additively Manufactured Surfaces with Varied Roughness
H. Garg, C. Fureby*

On the Evaluation of Large Eddy Simulation of a Wind-turbine Array Boundary Layer
D. Folch, F. Trias, A. Oliva*

On the Dynamic Stall of Flapping Foils using a High-Order DG Scheme and Hybrid RANS/LES Models
L. Alberti, E. Carnevali, A. Crivellini, G. Noventa*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 17:00 - 19:00 **Advances in structural and multidisciplinary optimization III**	MS022C Room: Auditorium III Chaired by: Phd. Nastaran Shahmansouri (Autodesk Canada, Canada), Mr. Francisco Vieira (IDMEC, Instituto de Engenharia Mecânica, Portugal)

Design Optimization based on the Redundancy Matrix
M. von Scheven, D. Forster*

Improving Accuracy in Shape Generation of Motors Using Generative Models
M. Tamura, K. Suzuki, Y. Kondo, K. Suzuki, K. Yonekura*

Approximate calculation of changes in local and global quantities due to design modifications
*D. Materna**

Multidisciplinary Modular Approach to Kinematic Mechanism Synthesis
N. Shahmansouri, H. Cheong, A. Tessier, A. Butscher*

Optimal Design of an Ecological Corridor Surrounding Restricted Urban Areas
L. Alvarez-Vazquez, N. Garcia-Chan, A. Martinez, M. Vazquez-Mendez*

03/06/2024 | 17:00 - 19:00 **Mechanics of Soft, Multifunctional Materials: experiment, modeling and simulation III**	MS083C Room: Auditorium IV Chaired by: Prof. Stephan Rudykh (UW-Madison, United States)

Finite element solution of flexoelectricity and flexo-photovoltaics at finite deformations
S. Pérez-Escudero, I. Arias, S. Fernàndez-Méndez*

Mixed FE for numerical modeling of size-dependent effects in ferroelectric materials
S. Kozinov, P. Serrao*

Knowledge-Constrained Splines for the Prediction of Instabilities of Magnetorheological Elastomers
C. Haag, M. Keip, F. Fritzen*

Data-driven analysis of structural instabilities in dielectric elastomers based on a variational saddle-point principle
S. Sriram, E. Polukhov, M. Keip*

A numerical framework for the simulation of coupled electromechanical growth
M. Hossain, Z. Li, C. Kadapa, J. Wang*

03/06/2024 | 17:00 - 19:00 **Modelling and Simulation for Additive Manufacturing III**	MS207C Room: Auditorium VI Chaired by: Dr. Andreas Lundbäck (Luleå University of Technology, Sweden), Prof. Jesper Hattel (Danmarks Tekniske Universitet (DTU), Denmark)

A multi-physical material point method for simulating the metal additive manufacturing process
*Y. Jiang**

Modelling and Simulation of High Velocity Impact of Particles in Cold Spray Additive Manufacturing
J. QI, R. RAOELISON, M. RACHIK*

Numerical Simulation of Fluid Flow and Track Formation in a WLAM Process
Z. Kong, D. Solas, M. Brehier, G. Guillemot, C. Gandin, M. Bellet*

Numerical Simulation of the Multi-Strand Deposition in Fused Deposition Modeling
F. Gonzalez, S. Elgeti, M. Behr*

ALE-based FEM formulation for free-surface viscoelastic flows in extrusion-based bioprinting
F. Chirianni, G. Vairo, M. Marino*

03/06/2024 | 17:00 - 19:00 **Computational Kinetic Theory III**	MS100C Room: Auditorium VII Chaired by: Dr. Julian Koellermeier (University of Groningen, Netherlands), Prof. Harald van Brummelen (Eindhoven University of Technology, Netherlands)

Globally Hyperbolic One-Dimensional Moment Closures\\Based on the Orthogonality of Polynomials
*W. Morin, E. Rice, J. McDonald**

Zooming into Kinetic Equations using the Characteristic Mapping Method
P. Krah, X. Yin, J. Bergmann, J. Nave, K. Schneider*

Approaches for distribution function inference in a gas dynamics context
G. Oblapenko, M. Torrilhon*

Scaling of a Coupled Electron-Ion-Neutral Boltzmann System for Hall Thrusters
Z. Tazakkati, T. Pichard, A. Alvarez Laguna, M. Massot*

An Asymptotic Preserving Kinetic Scheme for the M1 Model of Non-local Thermal Transport
*J. Feugeas, J. Mathiaud, L. Mieussens, T. Vigier**

03/06/2024 | 17:00 - 19:00 **Machine Learning Methods for Multiscale and Multiphysics Material Modeling III**	MS007C Room: Auditorium VIII Chaired by: Prof. Miguel Bessa (Brown University, United States), Prof. Oliver Weeger (TU Darmstadt, Germany)

Deep learning for accelerating computational homogenization schemes: application to flows in porous media
M. Shakoor, V. Itier, J. Mennesson*

Symmetry-enforcing neural networks for constitutive modeling
*K. Garanger, J. Rimoli**

A physical-informed FE-NN methodology for predicting highly nonlinear thermomechanical response of thermoset and thermoplastic polymers
N. Tang, P. Hao, F. Gilabert Villegas*

Evaluating Filled Rubber Viscoelasticity: A Comparative Analysis between NODEs and Classical Phenomenological Models
F. Califano, J. Ciambella*

A data-driven framework to establish surrogate constitutive models of porous elastomers
M. Bozkurt, V. Tagarielli*

03/06/2024 | 17:00 - 19:00 **Recent Trends in Scientific Computing for Computational Fluid Dynamics and Solid Mechanics in the Exascale Range III**	MS049C Room: Terrace Chaired by: Prof. Axel Klawonn (Universität zu Köln, Germany), Prof. Stefan Turek (TU Dortmund University, Germany)

Bringing Scientific Software, Exascale Computing and Cutting Edge Technology to the Industry
*J. Paul, M. Geveler**

GPU Optimisation of a Finite Element Code for Incompressible Flow
H. Owen, D. Ernst, O. Lehmkuhl, G. Hager, G. Wellein*

Lattice-Boltzmann methods for the efficient simulation of wind turbines in atmospheric flows
H. Schottenhaml, A. Anciaux-Sedrakian, F. Blondel, U. Rüde*

Lineal: An Efficient, Hybrid-Parallel Linear Algebra Library
K. Böhm, O. Ippisch*

Efficient numerical methods for seismic wave propagation in fractured porous media
M. Favino, R. Krause*

03/06/2024 | 17:00 - 19:00 **Recent Advances in Unfitted Finite Element Methods: Analysis, Algorithms, and Applications III**	MS170C Room: 3A Chaired by: Dr. Maxim Olshanskii (University of Houston, United States), Prof. Santiago Badia (Monash University, Australia)

Unfitted Finite Elements for Explicit Boundary Representations
P. Martorell, S. Badia*

Hybridized CutFEM for Problems on CAD Surfaces with Gaps
M. Larson, K. Larsson, T. Jonsson*

Geometry smoothing and local enrichment of the finite cell method with applications to cemented granular materials
M. Gorji, M. Komodromos, E. Hadjiloo, J. Grabe, A. Düster*

EigenValue Stabilization in Explicit Immersed Simulations
S. Eisenträger, L. Radtke, A. Düster, D. Juhre, D. Schillinger*

Towards a cut finite element method based simulation platform for curvature-driven interface evolution problems
*N. Berre, E. Neiva, A. Massing**

03/06/2024 | 17:00 - 19:00 **Phase-field and gradient damage models for fracture in complex materials III**	MS181C Room: 3B Chaired by: Prof. Lampros Svolos (University of Vermont, United States), Prof. Fadi Aldakheel (Leibniz Universität Hannover, Germany)

A novel phase field method for modeling brittle fracture in functionally graded materials under thermal shock
G. Moutsanidis, M. Rahimi, L. Svolos*

A novel approach for a thermo-mechanically coupled and gradient-enhanced damage model
F. Liu, D. Jantos, P. Junker*

Phase-field ductile fracture simulations of thermal cracking in additive manufacturing
*H. Ruan**

Variational Phase-field Modeling of Dynamic Hydraulic Fracture in Saturated Porous Media
M. Abdolkhani, M. Mollaali, K. Yoshioka*

On the importance of strength in phase-field models of dynamic, brittle fracture
*Y. Liu, O. Lopez-Pamies, J. Dolbow**

Estimation of the cracking threshold using damage gradient models: application to composite glass-ceramic materials with swelling inclusion
G. Feugueur, L. Gélébart, C. Maurini, S. Miro*

03/06/2024 | 17:00 - 19:00 **Microstructure-based Modeling of Biomechanical Systems III**	MS057C Room: 3C Chaired by: Dr. Michele Terzano (Graz University of Technology, Austria), Prof. Gerhard Holzapfel (Graz University of Technology, Austria)

MicroCT-inspired multiscale modeling of arterial tissue
M. Pétré, L. Maes, G. Hanon, M. Dalbosco, G. Holzapfel, L. Delannay, G. Kerkchofs, N. Famaey*

MRI-based Computational Modeling of Human Cortical Folding
A. Kerachni, M. Alenyà, O. Camara, J. Lefèvre, F. Rousseau*

A Modelling Approach for Micro Crack Healing in Bones by Flexoelectricity-induced Surface Growth
C. Witt, T. Kaiser, A. Menzel*

Multi-vertebrae finite element models: the effect of the discs' constitutive modelling on vertebrae deformation
A. Aldieri, S. Mallia, C. Garavelli, M. Palanca, M. Viceconti*

03/06/2024 | 17:00 - 19:00 **Shape and topology optimization: theoretical advances and numerical methods III**	MS198C Room: 5A Chaired by: Dr. Samuel Amstutz (Avignon Université, France), Mr. Charles Dapogny (CNRS, Laboratoire Jean Kuntzmann, Université Grenoble Alpes, Saint Martin d'Hères, France)

Topology optimization in the design of stress-constrained compliant mechanisms
D. Villalba, M. Gonçalves, J. Dias-de-Oliveira, A. Andrade-Campos, R. Valente, J. París, F. Navarrina*

Maximization of Eigenfrequencies using Shape- and Topology Optimization
*K. Jensen**

Multi-Material Topology Optimization for Shape-Morphing Electroactive Polymers
J. Martínez-Frutos, R. Ortigosa, A. Gil*

Anisotropic perimeter approximation for topology optimization
S. Amstutz, B. Bogosel*

Phase-field Topology Optimization of Elasto-plastic Contact Structures
*A. Myśliński**

Multiscale Structure of Optimally Designed Robust Composites
E. Cherkaev, J. Baker, A. Cherkaev*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 17:00 - 19:00 **Isogeometric Methods III**	MS010C Room: 5B Chaired by: Prof. Giancarlo Sangalli (University of Pavia, Italy, Italy), Prof. Trond Kvamsdal (Norwegian University of Science and Technology (NTNU), Norway)

Numerical modeling of the cardiac tissue via an isogeometric collocation approach (Keynote Lecture)
M. Torre, S. Morganti, F. Pasqualini, A. Reali*

Large rotation isogeometric shell model for alternating stiff/soft curved laminates including warping and thickness strain with minimal dofs
L. Leonetti, D. Magisano, G. Garcea*

AT1 high-order Isogeometric phase-field modeling for brittle fracture
L. Greco, A. Patton, E. Maggiorelli, M. Negri, A. Reali*

Neural-Networks and Hierarchical Matrices for Automatic Stabilization of Navier-Stokes IGA Solver
*T. Służalec, M. Dobija, M. Łoś, A. Paszynska, M. Paszynski**

Isogeometric Galerkin Method for Equilibrium-Based Interlaminar Stress Recovery of Laminated Composite Plates
S. Jangravi, P. Khaneh Masjedi, A. Reali*

03/06/2024 | 17:00 - 19:00 **Fluid-Structure Interaction in Multiphysics Systems III**	MS210C Room: 5C Chaired by: Mr. Manuel Garcia-Villalba (TU Wien, Austria), Mr. Alessandro Nitti (Polytechnic University of Bari, Italy)

A Local and Explicit Forcing Correction to the Moving-Least-Squares IBM
G. Vagnoli, M. Scarpolini, R. Verzicco, F. Viola*

Simulations and analysis of the fracturing of porous media in laminar flow
F. Dalla Barba, F. Picano*

Recent Advances of Simplex Space-Time Finite Elements For Multi-Physics Problems
N. Hosters, P. Antony, M. Billen, M. von Danwitz, T. Spenke, M. Behr*

Performance and Stability Assessment of a Coupled Three-Field Thermal Fluid-Structure Interaction Simulation of a Simplified Thin-Walled Skin Heat Exchanger
L. Kreuzeberg, M. Haupt, D. Hahn, I. Antonau, S. Heimbs*

Fluid-Structure Interaction Framework for the Design of Extrusion Dies using the Immersed Boundary Surface Method in foam-extend
J. Sasse, M. Schön, C. Hopmann*

Exploring FSI modeling approach on Multi-Mode Behavior in Full-Span Conductors
S. Elmisaoui, J. Redford*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 17:00 - 19:00 **Fracture And Damage In Multiphysics Problems Across Multiple Scales I**	MS095A Room: 0.06 Chaired by: Dr. Emanuela Bosco (Eindhoven University of Technology, Netherlands), Prof. Emilio Martinez-Pañeda (University of Oxford, United Kingdom)

Data-driven modelling of anisotropic damage from RVE fracture simulations
J. Yvonnet, P. Li, Q. He*

Hydro-mechanical model for subsurface erosion with analyses of soil piping and void formation
I. Scheperboer, A. Suiker, E. Bosco, F. Clemens*

Phase-Field-Based Chemo-Mechanical Modelling of Corrosion-Induced Cracking in Reinforced Concrete
E. Korec, M. Jirásek, H. S. Wong, E. Martínez-Paneda*

03/06/2024 | 17:00 - 19:00 **PhD Olympiad III**	OLY001C Room: 0.07 Chaired by: Dr. Konrad Perzyński (AGH University of Krakow, Poland), Ms. Paulina Stempin (Poznan University of Technology, Poland)

Characterization and modeling of polymer nanocomposites across the scales - A comprehensive approach covering the mechanical behavior of matrix, filler, and interphase
*M. Ries**

Computational modelling and simulation of heart and their possible clinical application
*D. Martonová**

Universality and scaling relations for turbulent/non-turbulent interfaces in free shear flows
*M. Zecchetto**

New Approach to Composite Materials Modeling under Extreme Mechanical and Thermal Loads
*S. Suljevic**

The Phase-Field Modeling of Fracture Evolution in Ductile Materials with Application to Paperboard Mechanics
*A. Marengo**

03/06/2024 | 17:00 - 19:00 **Physics-Informed Machine Learning for Structural Health Monitoring: Emerging Trends and Open Issues III**	MS041C Room: 0.08 Chaired by: Dr. Alberto Barontini (University of Minho, ISISE, ARISE, Italy)

Simulation of ground penetrating radar data for railway condition assessment via Physics-Informed Neural Networks
*T. Rigoni, G. Arcieri, M. Haywood-Alexander, D. Haener, E. Chatzi**

Structural Stress Estimation using Digital Image Correlation and Machine Learning
W. Mucha, G. Kokot*

Dynamic identification of structures by means of stochastic subspace identification method.
S. Scalisi, M. Cuomo*

Sensor Integrity Assessment and Spatio-Temporal Interpolation using Graph Neural Networks for Radioactive Waste Repository Monitoring
P. Hembert, C. Ghnatios, J. Cotton, F. Chinesta*

Comparative Analysis of SHM Features Leveraging Observational Bias for Ageing Damage Detection
F. Marafini, G. Zini, A. Barontini, M. Betti, G. Bartoli, N. Mendes, A. Cicirello*

03/06/2024 | 17:00 - 19:00 **Nonlinear Computational Aspects in Structural Dynamics and Engineering Science I**	MS176A Room: 1.02 Chaired by: Prof. Antonio Bilotta (University of Calabria, Italy), Dr. Evangéline Capiez-Lernout (Université Gustave Eiffel, France)

New concepts for nonlinear analysis of turbine blade-damper systems to support better decision making on design
*C. Gastaldi, M. GOLA**

Geometrically Nonlinear Dynamics of Graphene-based Waveguides via Second Strain Gradient Formulation
B. Yang, M. Mousavi*

Computational Update of a Statistical Surrogate Model for Nonlinear Stochastic Dynamics using Partial Target Dataset in the Context of Aerospace Nozzle Analysis
E. Capiez-Lernout, O. Ezvan, C. Soize*

Back-Analysis of Multi-Drum Columns to Estimate Information about Past Earthquakes
L. Papaloizou, P. Polycarpou, E. Sarris, M. Kyriakides*

Coupled Thermoelasticity and Non-Local Radiation Modelling for Cryogenic Storage Vessels
S. Blakseth, M. Gjennestad, A. Massing*

03/06/2024 | 17:00 - 19:00 **Bridging Disciplines and Scales for Sustainable Cement and Concrete I**	MS195A Room: 1.03 Chaired by: Prof. Miroslav Vořechovský (Brno University of Technology, Czechia), Prof. Rostislav Chudoba (RWTH Aachen University, Germany)

Combining material and structural design to reduce the global warming potential of concrete structures
J. Unger, E. Tamsen, A. Agrawal, P. Koutsourelakis*

Computational approach to the bond behaviour between FRP rebars and concrete
*C. Lopes, G. Lesiuk, S. Duda, M. Smolnicki, P. Zielonka, B. Pedrosa, W. Błażejewski, T. Socha, A. Denisiewicz, K. Kula, S. Seitl, M. Vořechovský**

Discrete model for monotonic, cyclic and fatigue loading of concrete
M. Vořechovský, V. Sadílek, J. Eliáš, J. Mašek*

Stress development of blended concretes at elevated temperatures at multiple scales
S. Peters, G. Meschke*

Modeling of time- and temperature-dependent cyclic behavior of material interfaces with visoelastic-viscoplastic cumulative sliding constitutive hypothesis
*A. Baktheer, R. Chudoba**

Universal hydration features of white cement pastes identified by means of the degree of precipitation
N. Jiménez Segura, B. Pichler, C. Hellmich*

03/06/2024 | 17:00 - 19:00 **Modelling and Simulations of Additively Manufactured Metamaterials III**	MS045C Room: 1.04 Chaired by: Dr. Massimo Carraturo (University of Pavia, Italy), Prof. Simone Morganti (University of Pavia, Italy)

Unraveling Tension-Compression Asymmetry in Additively Manufactured NiTi TPMS Structures
Z. Yan, M. Hermans, J. Jovanova, V. Popovich*

Geometrically nonlinear shear-deformable beam for modelling lattice metamaterials
C. Bonvissuto, E. La Malfa Ribolla, M. Horàk, M. Jirásek*

Programming Instabilities in Curved-Beam Metamaterials via Deep Generative Models
G. Felsch, V. Slesarenko*

03/06/2024 | 17:00 - 19:00 **Facing the challenges of high order methods for hyperbolic PDEs III**	MS108C Room: 1.05 Chaired by: Mr. Lorenzo Micalizzi (North Carolina State University, United States), Dr. Davide Torlo (Università di Roma La Sapienza, Italy)

Hyperbolic viscous flow using quaternion fields (Keynote Lecture)
*S. Chiocchetti**

Runge-Kutta discontinuous Galerkin methods with compact stencils for hyperbolic conservation laws
*Q. Chen, Z. Sun, Y. Xing**

High-order ADER Discontinuous Galerkin schemes for compressible two-phase flows in elastic media
L. del Rio Martin, M. Dumbser*

Dissipation-based WENO Stabilization of High-order Continuous and Discontinuous Galerkin Methods for Hyperbolic Problems
J. Vedral, D. Kuzmin*

Spectral-Difference method for magneto-hydro-dynamics
D. Velasco-Romero, R. Teyssier, M. Han-Veiga*

03/06/2024 | 17:00 - 19:00 **Digital Twins for Predictive Decision-Making of Engineering Systems III**	MS164C Room: 1.06 Chaired by: Dr. Marco Tezzele (University of Texas at Austin, United States), Mr. Matteo Torzoni (Politecnico di Milano, Italy)

Digital Twins: a lifecycle-long journey with examples (Keynote Lecture)
L. Mainini, M. Diez*

Generative strategies to empower physics-based wave propagation with deep learning. Applications to earthquake engineering and structural health monitoring.
F. Gatti, H. Gabrielidis, G. Granados, G. Jacquet, F. Lehmann, L. Rosafalco, S. Mariani, R. Miorelli, A. Corigliano, D. Clouteau*

Combining experimental and synthetic data in Deep Learning for damage detection
A. Fernandez-Navamuel, D. Pardo, F. Magalhaes, D. Zamora-Sanchez, A. Omella, D. Garcia-Sanchez*

Ensemble Data Assimilation Method Applied to Meshless Simulations
M. Duvillard, L. Giraldi, O. Le Maître*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 17:00 - 19:00 **Deep learning and reduced order modeling for differential equations III**	MS070C Room: 1.07 Chaired by: Dr. Nicola Rares Franco (MOX, Politecnico di Milano, Italy), Phd. Stefania Fresca (Politecnico di Milano, Italy)

Trajectory generation and control of dynamical systems via Conditional Denoising Diffusion Probabilistic Models
N. Botteghi, F. Califano*

A Hybrid Approach with Reduced Order Modelling and Graph Neural Networks for Non-Parametric Problems
V. Matray, F. Amlani, F. Feyel, D. Néron*

Adaptive model based on machine learning for the numerical simulation of flow dynamics
R. Abadía-Heredia, M. Lopez-Martín, S. Le Clainche*

03/06/2024 | 17:00 - 19:00 **FFT-based homogEnisation methods: advances and applications III**	MS065C Room: 1.08 Chaired by: Prof. François Willot (Mines Paris/Armines, France)

An Accelerated Version of the Adaptive Eyre-Milton Solution Scheme for FFT-based Homogenization of Composites
*M. Dolbeau, J. Bleyer, K. Sab**

Recent Advances in FFT-based Methods for Polycrystalline Materials
R. Lebensohn, M. Zecevic*

Simulation of the Viscoplasticity of Porous Polycrystals with FFT-Based Methods
L. Védrine, P. Hagenmuller, H. Löwe, M. Montagnat, L. Gélébart*

A Field Dislocation Mechanics model, using FFT based methods, applied to the viscoplastic compression of a Uranium Dioxide polycrystalline aggregate
É. Castelier, H. Bouizem, V. Taupin*

03/06/2024 | 17:00 - 19:00 **Optimization under Uncertainty III**	MS107C Room: 1.09 Chaired by: Dr. Oindrila Kanjilal (Engineering Risk Analysis Group, Germany), Dr. Iason Papaioannou (Technical University of Munich, Germany)

Robust topology optimisation of lattice structures with spatially correlated uncertainties
A. Yuksel, I. Ben-Yelun, F. Cirak*

A Study on Reliability-Based Design Optimization Considering Stress Constraints Including Multiple Types of Random Parameters
M. Kranz, B. Kriegesmann*

Bayesian Optimal Design of a Photolysis Flow Reactor
*J. Oreluk, L. Sheps, H. Najm**

Optimal well distance selection for Aquifer Thermal Energy Storage (ATES) under geological uncertainty
E. Petrova, S. Kranz, B. Norden, M. Cacace, A. Saadat, G. Bloecher*

Modeling Sand Ripples in Mine Countermeasure Simulations by means of Stochastic Optimal Control
P. Blondeel, F. Van Utterbeeck, B. Lauwens*

03/06/2024 | 17:00 - 19:00 **Advances in machine learning for composite materials III**	MS148C Room: 1.10 Chaired by: Dr. Ramin Bostanabad (UCI, United States), Dr. Mohsen Mirkhalaf (University of Gothenburg, Sweden)

Efficient Multiscale Analysis of Woven Composites Using Physics-based Hierarchical Neural Networks
E. Ghane, M. Maia, I. Rocha, M. Fagerström, M. Mirkhalaf*

Bayesian design of recycled composite polymers with predictable uncertain behavior
J. Yi, M. Sluiter, B. Ferreira, M. Bessa*

Mechanical performance of architected interpenetrating phase composites: experimental, numerical and machine learning analysis results
*A. Singh, N. Karathanasopoulos**

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

**03/06/2024	17:00 - 19:00** **Modeling Failure in Composite Materials I**	MS104A Room: 1.11 Chaired by: Dr. José Gonilha (Instituto Superior Técnico, Portugal), Prof. Nuno Silvestre (Instituto Superior Tecnico, University of Lisbon, Portugal)

Exploring Various Composite Material Options for the Battery Enclosure of an Electric Vehicle
*E. Acar**

Investigation of the Damage Mechanisms in Glass Fiber Reinforced Epoxy Resin
K. Roetsch, L. Bittrich, T. Horst, M. Stommel*

Investigation of Interlaminar Fatigue Damage Behaviour of Composite Structures via Two-Way Coupling Global-Local Analysis
B. Değerliyurt, M. Şahin*

Buckling and Stress Analysis for Composite Pipes under Thermomechanical Loading
O. Menshykov, S. Uguzo, M. Menshykova, M. Kashtalyan*

Computational analysis of the crushing response in full-section pultruded composites stub columns
J. Gonilha, J. Lazzari, N. Silvestre, J. Correia*

**03/06/2024	17:00 - 19:00** **Accelerating scientific discovery for dynamical systems with physics-informed machine learning I**	MS014A Room: 1.12 MS Corresponding Organizer: Dr. Romit Maulik (Argonne National Laboratory)

Integrating Curriculum Learning into hybrid modeling for improved predictive maintenance
M. Suhas, E. Abisset-Chavanne, P. Rey*

An Ontological Description of Physics-Enhanced Machine Learning
M. Haywood-Alexander, E. Chatzi*

Temporal Normalizing Flows and The Continuous Perron-Frobenius Operator
*N. Panda**

Inverse identification of dynamically important regions in turbulent flows using 3D Convolutional Neural Networks
S. Verma, E. Jagodinski, X. Zhu*

**03/06/2024	17:00 - 19:00** **Advances in numerical methods on polytopal grids for coupled problems III**	MS085C Room: 1.13 Chaired by: Ms. Francesca Marcon (Politecnico di Torino, Italy), Mr. Stefano Bonetti (Politecnico di Milano, Italy)

Multiphysics Simulation of CO2 Geological Storage by Mimetic Finite Differences and Virtual Elements
A. Borio, N. Castelletto, T. Gazzola, F. Hamon, X. Ju, M. Karimi-Fard, R. Settgast, J. White*

Robust discontinuos Galerkin-based approximation of the fully-coupled thermo-poroelastic problem
S. Bonetti, M. Botti, P. Antonietti*

Numerical experiments on an HHO method without stabilization
A. Borio, M. Cicuttin, F. Marcon*

NAVEM: the Lowest-Order Neural Approximated Virtual Element Method
S. Berrone, D. Oberto, M. Pintore, G. Teora*

**03/06/2024	17:00 - 19:00** **Computational Analysis of Advanced Materials and Structures I**	MS187A Room: 1.14 Chaired by: Prof. Efstathios Theotokoglou (NATIONAL TECHNICAL UNIVERSITY OF ATHENS, Greece), Dr. Kyungil Kong (University of Bristol, United Kingdom)

Computational Analysis of Pentamode Structures Under Compressive Loading
*P. Lymperopoulos, E. Theotokoglou**

Predictive Mechanical Modelling for Polybenzoxazine Nanocomposite Blends for Space Applications
K. Kong, I. Hamerton*

Development of Mixed Finite Element Formulation for Laminated Composite Cylindrical Shells Incorporating Refined Zigzag Theory
Y. Bab, A. Kutlu, M. Dorduncu*

Finite Element Modeling of Joints in Tensegrity Sandwich Plate
*J. Pełczyński, A. Al Sabouni-Zawadzka, K. Martyniuk-Sienkiewicz**

03/06/2024 | 17:00 - 19:00 **Multiscale Modeling of Complex Microstructures III**	MS044C Room: 1.15 Chaired by: Prof. Johanna Waimann (Ruhr-Universität Bochum, Germany), Ms. Sonja Hellebrand (University of Duisburg-Essen, Germany)

Investigation of Glass above the Glass Transition Temperature by means of a Thermo-Mechanically Coupled Material Model
S. Bögershausen, H. Holthusen, T. Brepols, S. Reese*

Constraint-conforming discretizations of evolution equations
T. Bode, M. Soleimani, C. Erdogan, P. Wriggers, P. Junker*

Immersed methods for modelling fibre composite mesoscale structures
E. Börjesson, C. Verhoosel, J. Remmers, M. Fagerström*

One-point quadrature for second-order elements with viscoelastic material behavior
Y. Choi, T. Bode, J. Philip*

Multiscale Modelling of Bituminous Mixtures: A Finite Element and Machine Learning Approach
M. Khadijeh, A. Varveri, C. Kasbergen*

Data driven multiscale modeling of lattice materials: assessment of uncertainties related to manufacturing defects
C. Court, E. MARENIC, J. Passieux*

03/06/2024 | 17:00 - 19:00 **New Trends in Computational Modelling of Masonry Material and Structures I**	MS137A Room: 2.01 Chaired by: Prof. Daniela Addessi (Sapienza University of Rome, Italy), Prof. Daniel Oliveira (University of Minho, Portugal)

Masonry Modelling for Multi-Level Assessment of Masonry Arch Bridges (Keynote Lecture)
M. El-Ashri, S. Grosman, L. Macorini, B. Izzuddin*

Experimental and Numerical Investigations for the Assessment of Historical Masonry Arches over Piers
B. Nela, M. Pingaro, E. Reccia, P. Trovalusci*

Damage Modelling of Unreinforced Masonry Structures Subjected to Climate-Induced Settlements
G. Cera, J. Rots, A. Slobbe, C. Geurts*

Analytical-Based Multiscale Modeling of Masonry
P. Rios Silveira, R. Esposito*

In-Plane and Out-of-Plane Modelling of Masonry through Nonlinear Macroelement Based on a Modified Bouc-Wen Formulation
A. Paoloni, D. Addessi, D. Liberatore*

03/06/2024 | 17:00 - 19:00 **Cutting-Edge Computational Design, Optimization, and Additive Manufacturing of Revolutionary Materials and Structures I**	MS021A Room: 2.02 Chaired by: Prof. Eric Li (Teesside University, United Kingdom)

Phase-Field Simulations of γ'' Precipitations in the Annealing Process of IN 625
*R. Darabi, A. Reis, J. Cesar de Sa**

Generating support structures for Additive Manufacturing using topology optimization and AM-guidelines
J. Castro, P. Duysinx, E. Fernández, C. Medina, P. Flores*

Modeling Size-Dependent Bending and Buckling of Miniaturized Cracked Beams
H. Darban, A. Hassanpour, M. Basista*

Stochastic 3D microstructure modeling of twinned polycrystals
P. Rieder, M. Neumann, L. Monteiro Fernandes, S. Blusseau, H. Proudhon, F. Willot, V. Schmidt*

A Pragmatic Overhang Minimization Approach Within a Hybrid Level-set and Density-based Topology Optimisation
J. Leclerc, E. Kuci*

Computational Design of High-Energy Absorption Materials and Structures for Impact Loading
E. Li, Z. He*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

03/06/2024 | 17:00 - 19:00 **Advances in Solid Mechanics I**	GS001A Room: 2.03 Chaired by: Dr. Giovanni Zucco (University of Limerick, Ireland)

A Novel FEM Approach for the Analysis of Type-IV Hydrogen Storage Tanks Based on the Enhanced Refined Zigzag Theory
F. Valoriani, G. Credo, M. Gherlone*

Interpolation of orthotropic fourth-order fiber orientation tensors in virtual composite process chains
C. Krauß, J. Mitsch, L. Kärger*

A Virtual Environment Based on the Frenet Frame for Manufacturing Variable Angle Tow Composite Structures with LATP
G. Ferreira, D. Jones, A. Bandaru, G. Zucco, P. Weaver*

Characterization in Mode I Fracture of Interfaces in Printed Circuit Boards
C. ZIOUANI, G. GIRARD, S. MERCIER*

A variationally consistent membrane wrinkling model based on tension-compression decomposition of the strain tensor
D. ZHANG, J. Kiendl*

Almost Periodic Fourier Transforms for the Analysis of Periodic Phenomena in Turbomachinery
J. Wellner, G. Ashcroft, D. Schlüß*

03/06/2024 | 17:00 - 19:00 **Magnetohydrodinamic Numerical Modeling of Magnetised Plasmas. I**	MS155A Room: 2.04 MS Corresponding Organizer: Prof. Boniface Nkonga (Univ. Côte d'Azur & Inria)

Numerical simulation of Tokamak plasma equilibrium evolution
G. Gros, B. Faugeras, C. Boulbe, R. Nouailletas, J. Artaud, F. Rapetti*

Parameter Identification for Turbulent Transport of Fusion Plasmas
L. Lamerand, F. Rapetti, D. Auroux*

Discontinuous Galerkin methods for hyperbolic system that preserve exactly a curl or a divergence constraint
*J. Jung, V. Perrier**

Towards Efficient and Accurate Modelling of Inductionless MHD Flows in Breeding Blankets
J. Principe, S. Badia, J. Manyer, F. Roca, F. Verdugo*

An electromagnetic model for SOLEDGE3X
R. Düll, H. Bufferand, E. Serre, G. Ciraolo, V. Quadri, N. Rivals, P. Tamain*

Beyond MHD
D. Balsara, D. Bhoriya, V. Florinski*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

**03/06/2024	17:00 - 19:00** **Methods for Identification / Machine Learning and Uncertainty Quantification of Reduced Order Models of Coupled Systems I**	MS048A Room: 2.05 Chaired by: Prof. Hermann Matthies (Institute of Scientific Computing / TU Braunschweig, Germany), Dr. Christopher Wentland (Sandia National Laboratories, United States)

Integrating Transformers with Data Assimilation for Efficient Time Series Prediction in Inverse Heat Conduction Problems
K. Bakhshaei, G. Stabile, G. Rozza*

Creation of hybrid full order-reduced order models via domain decomposition and the Schwarz alternating method
I. Tezaur, C. Wentland, F. Rizzi, J. Barnett*

Conditional Expectation and ROMs
*H. Matthies**

Machine Learning based Approximation of Plastic Deformation during Ditching
H. Schwarz, J. Zemke, T. Rung*

Integrating Complex Mechanical Models Into the Bioprinters Control Loop
J. Urrea-Quintero, T. Wick, H. Wessels*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

Tuesday	10:30 - 12:30	14:30 - 16:30	17:00 - 19:00
Auditorium I	MS017D	MS017E	MS017F
Auditorium II	MS016D	MS016E	MS016F
Auditorium III	MS022D	MS018A	MS018B
Auditorium IV	MS083D	MS089A	MS089B
Auditorium VI	MS207D	MS207E	MS207F
Auditorium VII	MS110A	MS126A	MS126B
Auditorium VIII	MS007D	MS007E	MS009A
Terrace	MS049D	MS192A	MS192B
Room 3A	MS170D	MS170E	MS158A
Room 3B	MS181D	MS181E	MS064A
Room 3C	MS057D	MS057E	MS032A
Room 5A	MS198D	MS198E	MS039A
Room 5B	MS010D	MS010E	MS010F
Room 5C	MS079A	MS056A	MS056B
Room 0.06	MS095B	MS139A	MS116A
Room 0.07	STS233A	STS237A	STS267A
Room 0.08	STS272A	STS271A	STS271B
Room 1.02	MS176B	MS106A	MS106B
Room 1.03	MS195B	MS096A	MS096B
Room 1.04	MS008A	MS008B	MS220A
Room 1.05	MS046A	MS046B	MS046C
Room 1.06	MS159A	MS159B	MS029A
Room 1.07	MS023A	MS023B	MS023C
Room 1.08	MS065D	MS103A	MS103B
Room 1.09	MS118A	MS118B	MS118C
Room 1.10	MS209A	MS209B	MS209C
Room 1.11	MS104B	MS031A	MS031B
Room 1.12	MS014B	MS180A	MS019A
Room 1.13	MS203A	MS203B	MS203C
Room 1.14	MS187B	MS015A	MS015B
Room 1.15	MS112A	MS112B	MS112C
Room 2.01	MS137B	MS088A	MS175A
Room 2.02	MS036A	MS033A	MS020A
Room 2.03	GS001B	GS001C	GS001D
Room 2.04	MS161A	MS066A	
Room 2.05	MS157A	MS167A	
Room 0.01		EJWA	EJWB

Tuesday, June 4rth

04/06/2024 | 08:30 - 09:15 **Plenary Session II**	PL02 Room: Auditorium I Chaired by: Prof. Manuel Doblaré Castellano (Universidad de Zaragoza, Spain)
Microstructural reconstruction of fibrous tissue with corresponding modeling and application to patients *G. Holzapfel**	

04/06/2024 | 09:15 -10:00 **Plenary Session III**	PL03 Room: Auditorium I Chaired by: Prof. Marc Geers (Eindhoven University of Technology, Netherlands)
Multiscale modeling by combining data-driven approaches and Fourier transforms *S. Reese**	

10:00 - 10:30
Coffee Break

10:30 - 12:30 | TECHNICAL SESSIONS

04/06/2024 | 10:30 - 12:30 **Phase Field Modeling and Computation IV**	MS017D Room: Auditorium I Chaired by: Prof. Laura De Lorenzis (ETH Zurich, Switzerland)

Configurational forces in a phase field model for the cyclic fatigue under complex situation
S. Yan, A. Schlüter, E. Faust, R. Müller*

Phase-Field Fracture and Peridynamic for the simulation of wave propagation and spalling
K. Weinberg, K. Partmann, M. Thimm, C. Wieners*

Phase Field Modelling of Precipitation Hardening in Ferroelectric Material
M. Bohnen, R. Müller*

A Fully Anisotropic Degradation Tensor for Phase Field Modeling of Damage and Fracture
*C. Esteves, J. Boldrini, M. Bittencourt**

Phase filed modelling for brittle fracture of incompressible hyperelastic materials
D. George, I. Masters, M. Hossain*

Modelling Moisture-assisted Fracture and Liquid-Solid Impact in Composite Materials Using Phase Field Method
*K. Au-Yeung, L. Webb, E. Martinez-paneda, W. Tan**

04/06/2024 | 10:30 - 12:30 **Coarse Graining Turbulence: Modeling and Data-Driven Approaches and Their Applications IV - Honoring Professor Cesar Dopazo Garcia**	MS016D Room: Auditorium II Chaired by: Prof. Javier Jimenez (Aeronauticos U Politécnica Madrid, Spain)

Scalar-gradients: the cornerstones of turbulent premixed flame (Keynote Lecture)
*C. Dopazo**

Turbulent Flame Topology and Propagation in Ammonia/Hydrogen Premixed Combustion
H. Im, R. Khamedov, F. Hernandez Perez, R. Malik, R. Malpica Galassi, M. Valorani*

Revisiting the modelling framework for the unresolved scalar variance
Z. NIKOLAOU, L. VERVISCH, P. DOMINGO*

Recent progress using quadrature-based moment methods to simulate multiphase turbulent reacting flows
*R. Fox**

Reynolds-Averaged, Large-Eddy Simulations, and Experiments of the Strut Fuel Injector in Hypersonic Flow Conditions
T. Drozda, R. Baurle, C. Ground, K. Cabell*

04/06/2024 | 10:30 - 12:30 **Advances in structural and multidisciplinary optimization IV**	MS022D Room: Auditorium III Chaired by: Prof. Helder Rodrigues (Instituto Superior Tecnico, Portugal)

A Novel Peridynamic Topology Optimization Formulation for Fractured Structures (Keynote Lecture)
F. Vieira, A. Araújo*

Topology optimization of vibro-acoustic sandwich panel cores for sound transmission minimization
V. Cool, F. Naets, E. Deckers*

Multi-Material Topology Optimization of Smart Structures with Embedded Piezoelectric Stack Actuators using Geometry Projection
B. de Almeida, R. Pavanello, M. Langelaar*

Benefits of multi-material optical mounts to mitigate thermal deformations - a topology optimization study
J. van der Zwet, C. Ayas, M. Langelaar*

04/06/2024 | 10:30 - 12:30 **Mechanics of Soft, Multifunctional Materials: experiment, modeling and simulation IV**	MS083D Room: Auditorium IV Chaired by: Dr. Rogelio Ortigosa (Technical University of Cartagena, Spain, Spain), Dr. Chennakesava Kadapa (Edinburgh Napier University, United Kingdom)

On the physics of ultra-soft hydrogels: magneto-mechanically induced diffusion processes (Keynote Lecture)
*J. Gonzalez-Rico, S. Garzon-Hernandez, C. Landis, D. Garcia-Gonzalez**

A Higher-Order Finite Element Framework for Problems with Material Interfaces and Incompressible Models
*C. Kadapa**

Modelling of magneto-elastic membranes: Maxwell stress and instability analysis
A. Mishra, S. Santapuri*

Symmetry based analysis of instabilities in a plate with stiffened edge
D. Das, B. Sharma*

Magnetically reconfigurable multistable metamaterials
A. Pal, M. Sitti*

04/06/2024 | 10:30 - 12:30 **Modelling and Simulation for Additive Manufacturing IV**	MS083D Room: Auditorium VI Chaired by: Prof. Jesper Hattel (Danmarks Tekniske Universitet (DTU), Denmark), Dr. Andreas Lundbäck (Luleå University of Technology, Sweden)

Towards Cyber-Physical Systems in Metal L-PBF for Part Qualification
G. Vastola, S. Joash, U. Kizhakkinan, J. Mikula, Y. Zhang*

Simulation-driven additive manufacturing within the aerospace industry
A. Moretti, J. Liljemark-Mattsson*

Multiscale Simulation of DED Additive Manufacturing with an Arlequin-based Method
M. Picos, P. Barral Rodiño, P. Quintela Estévez, J. Rodríguez García*

From G-Code to virtual model: a framework for reconstructing the actual 3D printed geometry
F. Rotini, S. Marconi, A. Cattenone, S. Serioli, F. Auricchio, G. Alaimo*

Part-Scale Simulation of Ti-6Al-4V Microstructure Evolution during Laser Powder Bed Fusion (LPBF) Process
Y. Yang, F. van Keulen, C. Ayas*

04/06/2024 | 10:30 - 12:30 **Reliability Analysis and Rare Event Simulation I**	MS110A Room: Auditorium VII Chaired by: Dr. Iason Papaioannou (Technical University of Munich, Germany)

Quantified active learning Kriging-based Bayesian updating for high-dimensional models using convolutional autoencoders
I. Prentzas, M. Fragiadakis*

Copula-based adaptive importance sampling for sensitivity-informed reliability analysis
E. Fekhari, V. Chabridon, B. Iooss, J. Muré*

Sequential directional importance sampling for structural reliability analysis of complex systems
K. Cheng, I. Papaioannou, D. Straub*

Combining Rao-Blackwellization and Importance Sampling for Connectivity Reliability Analysis of Networks with Dependent Components
D. Lee, J. Byun, J. Song*

Efficient multi-time joint probability density function modeling and reliability estimation of exposed structures under critical wind loads
M. Bittner, Z. Huang, M. Broggi, M. Beer*

Reliability of a Load-Path Dependent Structure using Autoregressive Models
H. Machado Kroetz, L. da Rosa Ribeiro, A. Jacomel Torii*

Multiple limit-states reliability analysis for continuous reinforced concrete beams
M. Achhab, P. Jehel, F. Gatuingt*

04/06/2024 | 10:30 - 12:30 **Machine Learning Methods for Multiscale and Multiphysics Material Modeling IV**	MS083D Room: Auditorium VIII Chaired by: Prof. Fadi Aldakheel (Leibniz Universität Hannover, Germany), Prof. Miguel Bessa (Brown University, United States)

Accounting for elasto-plasticity in constitutive artificial neural networks
B. Boes, J. Simon, H. Holthusen*

Surrogate Elements for Nonlinear Microstructures using Physics-enhanced Machine Learning
W. Li, O. Weeger*

An automated dual-stage approach for constitutive modeling of hyperelastic solids
L. Linden, K. Kalina, J. Brummund, M. Kästner*

Physics-enhanced neural networks for hyperelastic beam modeling
J. Schommartz, J. Alzate Cobo, D. Klein, O. Weeger*

Graph Neural Networks with Embedded Symmetries for Robust Computational Homogenization of Metamaterials
F. Hendriks, V. Menkovski, M. Doškář, M. Geers, O. Rokoš*

A physically recurrent neural network for rate dependent composite materials
M. Maia, I. Rocha, D. Kovačević, F. van der Meer*

04/06/2024 | 10:30 - 12:30 **Recent Trends in Scientific Computing for Computational Fluid Dynamics and Solid Mechanics in the Exascale Range IV**	MS049D Room: Terrace Chaired by: Prof. Stefan Turek (TU Dortmund University, Germany), Prof. Axel Klawonn (Universität zu Köln, Germany)

Synergy of Adaptive Coarse Space and Krylov Subspace recycling for the BDDC method
M. Hanek, J. Papež, J. Šístek*

Simulating Advection on a Quantum Computer
P. Brearley, S. Laizet*

A multiple search vector conjugate gradient method with additive Schwarz preconditioner
*A. SUZUKI**

Neko: A Modern, Portable, and Scalable Framework for High-Fidelity Computational Fluid Dynamics
N. Jansson, M. Karp, S. Markidis, P. Schlatter*

Performance Portable Design of an Exascale Multiphysics Simulator
R. Settgast, N. Castelletto*

04/06/2024 | 10:30 - 12:30 **Recent Advances in Unfitted Finite Element Methods: Analysis, Algorithms, and Applications IV**	MS170D Room: 3A Chaired by: Prof. Santiago Badia (Monash University, Australia), Prof. Guglielmo Scovazzi (Duke University, United States)

Towards a scalable domain decomposition solver for immersed boundary finite element method (Keynote Lecture)
*F. Cirak, E. Febrianto, M. Kecman, P. Kůs, J. Musil, J. Šístek**

High-Performance GMG Solver for the Finite Cell Method
P. Saberi, G. Meschke, A. Vogel*

Accelerated Finite Element Solvers for Fluid, Solid, and Radiation Problems on a Unfitted Boundary Mesh
L. Yang, A. Buchan, J. Yang*

A Phi-FEM approach to train a FNO for variable geometries
*M. Duprez, V. Lleras, A. Lozinski, V. Vigon, K. Vuillemot**

04/06/2024 | 10:30 - 12:30
Phase-field and gradient damage models for fracture in complex materials IV

MS181D
Room: 3B
Chaired by:
Prof. Lampros Svolos (University of Vermont, United States), Dr. Pietro Carrara (ETH Zurich - Computational Mechanics Group, Switzerland)

A phase field fracture approach coupled with a multiscale anisotropic polymer network model
C. Linder, P. Kammardi Arunachala*

A computational multi-scale framework for fracture mechanics
F. Schmidt, C. Hesch*

Incorporating Molecular Dynamics Simulation into Phase-Field Fracture Modeling in Porous Materials
P. Newell, B. He*

Simulation of Damage at Finite Strains based on Rank-One Convexified Incremental Stress Potentials
D. Balzani, M. Köhler*

Numerical Relaxation for Isotropic Damage
D. Balzani, M. Köhler, T. Neumeier, M. Peter, D. Peterseim, D. Wiedemann*

Strong approximation of SBV functions with prescribed jump direction
G. Lazzaroni, P. Wozniak, C. Zeppieri*

04/06/2024 | 10:30 - 12:30
Microstructure-based Modeling of Biomechanical Systems IV

MS057D
Room: 3C
Chaired by:
Prof. Gerhard Holzapfel (Graz University of Technology, Austria), Dr. Michele Terzano (Graz University of Technology, Austria)

A Multiscale and Multiphase Digital Twin of Function-perfusion Processes in the Human Liver (Keynote Lecture)
T. Ricken, S. Gerhäusser, L. Lambers, L. Mandl, A. Mielke*

A Hybrid Framework To Model Growth and Remodeling in Multi-Constituent Soft Tissues
L. Maga, L. Noël, M. Peirlinck*

Mechanobiological Implications in Liver Mechanics
L. Lambers, S. Gerhäusser, L. Mandl, J. Humphrey, T. Ricken*

Numerical Study of Stent-induced Arterial Remodeling
A. Lisac, L. Virag, I. Karšaj*

Modelling tumor growth response to mechanical stimulus
M. Carvalho, M. Parente, J. Ferreira*

04/06/2024 | 10:30 - 12:30
Shape and topology optimization: theoretical advances and numerical methods IV

MS198D
Room: 5A
Chaired by:
Prof. François Jouve (Université Paris Cité, France),
Mr. Alex Ferrer (CIMNE, Barcelona, Spain)

A Weak Formulation for Manufacturability Constraint in Topology Optimization of Minimum Mean Compliance Problem
*T. Yamada**

Length Scale Control for Binary Topology Optimization
R. Cortez, M. Setta, R. Picelli, E. Wadbro*

A Projected Mirror Descent for Topology Optimization: Bregman Divergence and Adaptive Step Size
D. Kim, B. Lazarov, T. Surowiec, B. Keith*

Accelerating risk averse topology optimization via importance sampling
B. Keith, B. Lazarov, A. Malandii, S. Uryasev*

Topology optimization of supports for metal powder bed additive manufacturing
C. Nardoni, F. Bordeu, J. Cortial, X. Betbeder-Lauque, C. Ploscaru, C. Mang, D. Danan*

04/06/2024 | 10:30 - 12:30
Isogeometric Methods IV

MS010D
Room: 5B
Chaired by:
Prof. Alessandro Reali (University of Pavia, Italy),
Prof. Trond Kvamsdal (Norwegian University of Science and Technology (NTNU), Norway)

Isogeometric Space-time solvers
*G. sangalli**

Strang splitting isogeonetric analysis for nonlinear systems of convection-diffusion-reaction in developmental biology
I. Asmouh, A. Ostermann*

A Stabilized Space—Time Isogeometric Method for the Acoustic Wave Equation
S. Fraschini, G. Loli, A. Moiola, G. Sangalli*

Mixed Isogeometric Methods for Hodge–Laplace Problems induced by Second-Order Hilbert Complexes
J. Arf, B. Simeon*

Nonlinear space-time isogeometric analysis with matrix-free and fast diagonalization methods
J. Cornejo, G. Sangalli, M. Tani, T. Elguedj, D. Dureisseix, A. Duval*

Adjoint-based Isogeometric Shape Optimization of Microstructured Geometries
M. Riegler, S. Elgeti, D. Wolff, J. Zwar*

04/06/2024 | 10:30 - 12:30 **Uncertainty Quantification in Materials Science and Computational Mechanics I**	MS079A Room: 5C Chaired by: Dr. Florent Pled (Univ Gustave Eiffel, France)

On the Stochastic Modeling and Inverse Identification of a Phase-Field Fracture Model in Random Heterogeneous Elastic Materials Exhibiting Isotropic Symmetry Properties
F. Pled, C. Desceliers*

Dendrite growth data assimilation by combining phase-field simulation and X-ray imaging
A. Yamamura, S. Sakane, H. Yasuda, T. Takaki*

Identification of Cracks from Experimental Modal Data Using Sparsifying Priors
D. Tyagi, M. Weiser, P. Koutsourelakis, P. Benner, J. F. Unger*

Bayesian Estimation and Uncertainty Quantification of a Temperature-Dependent Thermal Conductivity
R. Lima de Souza e Silva, C. Verhoosel, E. Quaeghebeur*

Plastic Design of Frame Structures under Uncertainty Conditions by A Stochastic Model
*M. Staat, T. Tran Ngoc**

Random Field Modeling of the Bending Stiffness of Composite Materials
*P. Gavallas, E. Tsivolas, G. Stefanou**

04/06/2024 | 10:30 - 12:30 **Fracture And Damage In Multiphysics Problems Across Multiple Scales II**	MS095B Room: 0.06 Chaired by: Prof. Emilio Martinez-Pañeda (University of Oxford, United Kingdom), Dr. Emanuela Bosco (Eindhoven University of Technology, Netherlands)

A Novel Multi-Scale Thermo-Hydro-Mechanical Model for Hydro-Fracture through Ice-Sheets
T. Hageman, E. Martínez-Pañeda*

Model Assisted Non-destructive Evaluation of Defects using Terahertz Time Domain Analysis
*S. Karmarkar, M. Singh, A. Jung, V. Tomar**

Implementation of micro-mechanical models for micro-structural based characterization of Cohesive Zone Modeling (CZM) parameters for diffusion bonded components
V. Logvinov, S. Samocha, J. Bortman, E. Priel*

A phase-field-based corrosion model for bioabsorbable metals
S. Kovacevic, W. Ali, E. Martinez-Paneda, J. LLorca*

04/06/2024 | 10:30 - 12:30 **Advanced Computational Physics / Computational Mathematics methods and tools for improving a Climate Neutral Digitalized Transport I**	STS233A Room: 0.07 Chaired by: Prof. Jacques Periaux (cimne, Spain), Prof. Gabriel Bugeda (CIMNE/UPC, Spain)

Innovative Technologies for Aviation in Support of Europe's Green Deal
*M. Kyriakopoulos**

Simulation of Radiative Transfer in Variable 3D Atmosphere for Contrails
*O. Pironneau, P. Tournier**

Multi-fidelity Propeller Design for Low Reynolds Number Operating Regimes
D. Quagliarella, A. Pagano, D. De Rosa, A. Carozza*

Gradient-based optimization of turbomachinery to reach climate neutrality
T. Tran, L. Zampini, N. Razaaly, L. Mueller, M. Aissa, A. Châtel, T. Verstraete*

Evolutionary multidisciplinary shape design optimization" of a disruptive aircraft configuration with distributed propulsion: challenges for climate neutrality
Z. Tang, S. Luo, H. Li, J. Periaux, G. Bugeda*

04/06/2024 | 10:30 - 12:30 **Towards Next-Generation Aircraft Design with High-Fidelity Simulation Technologies I**	STS272A Room: 0.08 Chaired by: Dr. Yoshiaki Abe (Tohoku University, Japan), Prof. Shigeru Obayashi (Tohoku University, Japan)

Influences of Multiple Winglets on the Aerodynamic Performance and Flow Field of a Civil Aircraft
E. Kobayashi, K. Chiba, M. Kanazaki*

Identification of losses from engine-airframe interaction for a passenger aircraft through integrated simulation
J. Mueller, K. Chiba, Y. Oba*

Upper Surface Morphing for Drag Minimization in NACA 641–612 Airfoil
G. Vigneswar, S. Faruque Ali, A. Arunachalakasi*

Multi-objective design of CFRP composite aircraft wing with next generation fibers and resins
Y. Liu, T. Yamazaki, S. Date, T. Nagashima, Y. Abe*

Structural cohesive element for the modelling of delamination between thin shells without cohesive zone limit
X. Ai, B. Chen, C. Kassapoglou*

Laminarization of Supersonic Three-dimensional Boundary Layer by Sinusoidal Roughness Elements
M. Hirota, S. Niwano, Y. Ide, Y. Hattori, S. Obayashi*

On the Extension of the CFD Solver CODA for Turbomachinery Applications
G. Ashcroft, A. Bleh, H. Birliker, P. Post*

04/06/2024 | 10:30 - 12:30 **Nonlinear Computational Aspects in Structural Dynamics and Engineering Science II**	MS176B Room: 1.02 Chaired by: Prof. Mazdak Tootkaboni (University of Massachusetts, United States), Dr. Evangéline Capiez-Lernout (Université Gustave Eiffel, France)

A Potential of Mean Force-Based Lattice Element Method for Modeling Structural Response
S. Razi, A. Louhghalam, M. Tootkaboni*

Nonlinear Dynamic Analysis of Bars and Trusses with the Generalized Finite Element Method
C. Brockved Krutsch, M. Arndt*

3D Analysis of the behaviour of a foreign object in electromagnetic relays
M. Saeki, Y. Saitou, K. Takahashi, Y. Wakabayashi, M. Kaneko, N. Sakai*

04/06/2024 | 10:30 - 12:30 **Bridging Disciplines and Scales for Sustainable Cement and Concrete II**	MS195B Room: 1.03 Chaired by: Prof. Miroslav Vořechovský (Brno University of Technology, Czechia), Prof. Bernhard Pichler (TU Wien, Austria)

Multiscale Finite Element Study of the Effects of the Water Retention Curve Hysteresis on Chloride Ingress in Recycled Aggregates Concrete.
A. Fanara, L. Courard, F. Collin*

Concrete Failure Modelling and Proper Choice of Parameters with Stochastic Identification
M. Nikolic, M. Šodan, A. Stanic, N. Friedman, H. Matthies*

Weak Coupling Between A Discrete Element Mechanics Model And A Numerical Fluid Mechanics Model For The Assessment Of Air Leaks In Cracked Reinforced Concrete Walls
O. Najjar, C. Oliver-Leblond, T. Heitz, F. Ragueneau*

Simulation of Tri-Axial Stress Redistribution Effect in Concrete Under Fatigue Loading: Lattice Discrete Model vs. Microplane Model
M. Aguilar, A. Baktheer, M. Vořechovský, R. Chudoba*

Modeling of structural compressive fatigue propagation in concrete using the microplane sliding model MS1
A. Baktheer, S. Esfandiari, M. Aguilar, H. Becks, M. Classen, R. Chudoba*

**04/06/2024	10:30 - 12:30** **Computational mechanics in high-strain rate and impact dynamics I**	MS008A Room: 1.04 Chaired by: Prof. Patrice Longère (ISAE-SUPAERO, France)

On advanced lightweight materials modeling in orbital debris impact simulations
A. Cherniaev, A. Gudisey*

On the Use of Representative Inhomogeneous Poisson-Voronoi Tessellations for Brittle Fragmentation Modelling
*J. Lhonneur**

Process-Dependent Initial Mesh Pattern in Conjunction With Kinematic ALE Mesh Constraints Stabilize 2D FE Simulation of Chip Formation and Avoid Premature Termination
*A. Nemetz**

Total Lagrangian Material Point Method: Material Response in Extreme Loading Conditions
S. Singh, H. Singh, P. Mahajan*

**04/06/2024	10:30 - 12:30** **Cutting-edge model order reduction techniques for computational fluid dynamics I**	MS046A Room: 1.05 Chaired by: Dr. Giovanni Stabile (Sant'Anna School of Advanced Studies, Italy), Dr. Davide Torlo (Università di Roma La Sapienza, Italy)

Error Analysis of a Residual-based Stabilization-motivated POD-ROM for incompressible flows (Keynote Lecture)
T. Chacón Rebollo, S. Rubino, M. Oulghelou, C. Allery*

Approximate Deconvolution Leray Reduced Order Model for Convection-Dominated Flows
A. Sanfilippo, I. Moore, F. Ballarin, T. Iliescu*

A Reduced Order Model for Deforming Domain Problems in a Time-Continuous Space-Time Setting
F. Key, M. von Danwitz, F. Ballarin, G. Rozza*

Efficient Numerical Resolution of Parametric Partial Differential Equations on Solution Manifolds Parametrized by Neural Networks
*F. Romor**

Structure-Preserving Adaptive Hyper-Reduction of Parametric Hamiltonian Systems
F. Vismara, C. Pagliantini*

**04/06/2024	10:30 - 12:30** **Novel Kinetic Approaches in Optimization and Uncertainty Quantification I**	MS159A Room: 1.06 Chaired by: Mr. Andrea Medaglia (University of Pavia, Italy), Mr. Giacomo Borghi (RWTH Aachen University, Germany)

Neural network multi fidelity methods for uncertainty quantification in kinetic theory
*G. Dimarco**

Micro-macro stochastic Galerkin methods for nonlinear Fokker-Plank equations with random data
*M. Zanella**

Reversible Random Number Generators for Adjoint Monte Carlo Simulation of Kinetic Equations
E. Løvbak, S. Vandewalle, G. Samaey*

Control plasma instabilities via an external magnetic field in a Vlasov-Poisson system.
G. Albi, G. Dimarco, F. Ferrarese, L. Pareschi*

Asymptotic-preserving neural network for the Boltzmann equation with uncertainties
L. LIU, Z. Zhu, Y. Wang*

The Collisional Particle-In-Cell Method for the Vlasov-MaxwellLandau Equation
A. Medaglia, R. Bailo, J. Carrillo, J. Hu*

04/06/2024 | 10:30 - 12:30
Robust and accurate discretizations for nonlinear PDEs I

MS023A
Room: 1.07
Chaired by:
Prof. David Del Rey Fernandez (University of Waterloo, Canada), Dr. Anita Gjesteland (University of Waterloo, Canada)

Maximum principle preserving time implicit DGSEM for scalar hyperbolic conservation laws
*F. Renac**

Entropy-stable hydrostatic reconstructions for shallow water systems
P. Ersing, A. Winters*

Efficient Entropy-Stable Tensor-Product Spectral-Element Methods on Simplices
T. Montoya, D. Zingg*

Entropy-Stable Numerical Methods for Systems of Nonlinear Dispersive Wave Equations
J. Lampert, H. Ranocha*

Angular momentum conserving limiters for the Euler equations
*L. Krivodonova**

04/06/2024 | 10:30 - 12:30
FFT-based homogEnisation methods: advances and applications IV

MMS065D
Room: 1.08
Chaired by:
Dr. Cedric Bellis (CNRS, France)

A Linear Algebra Perspective on FFT-accelerated Finite Element Solvers for Periodic Homogenization (Keynote Lecture)
*M. Ladecký, I. Pultarová, J. Zeman**

Spectrum of the Lippmann-Schwinger Operator and Homogenization Schemes
H. Moulinec, C. Bellis*

On the interpretation of laminate composite voxels in computational micromechanics: assumed strain methods and level sets
J. Lendvai, M. Schneider*

FFT-based simulations of heterogeneous materials with combined non-uniform Neumann, Periodic and Dirichlet boundary conditions
*L. Gélébart**

A FFT-based method with Dirichlet and/or Neumann boundary conditions based on discrete sine-cosine transforms
J. Paux, L. Morin*

04/06/2024 | 10:30 - 12:30
Simulations of Polymers and Polymer Composites from Petrol and Biological Sources I

MS118A
Room: 1.09
Chaired by:
Dr. Sebastian Pfaller (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany), Mx. Lukas Laubert (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany)

Multiscale modelling of the network formation in cellulose (aero)gels (Keynote Lecture)
A. Rege, J. Jarms, N. Borzecka*

Elastoplastic quasi-static and Dynamic Mechanical Analysis of Short Glass Fibre-reinforced Bio-based Polyamide through Micromechanical and Experimental Evaluation
O. Schwahofer, M. Budnik, F. Otero, Z. Al-Qadhi, G. Stoll, K. Drechsler*

Multiscale Modeling of Recycled Glass Fiber-Reinforced Thermoplastic Polyamide 6 (PA6) Composites Towards Sustainable Composite Recycling
S. Sekkal, F. Meraghni, G. Chatzigeorgiou, N. Durand*

Comparative study of generation frameworks of polymer networks for bio-sourced epoxy resins
M. Lamamra, F. Detrez*

Comparing a novel analytical tool with an established numerical method for use in the initial laminate design of crash structures
D. Dalli, P. Silva Campos, D. Mateus, D. Moreira, T. Duarte, A. Arteiro*

04/06/2024 | 10:30 - 12:30
New Trends In The Mathematical And Numerical Aspects Of Fluid-Structure Interaction I

MS209A
Room: 1.10
Chaired by:
Dr. Miguel A. Fernández (Inria, France), Ms. Marina Vidrascu (INRIA & LJLL (Sorbonne Université CNRS), France)

Mechanically Consistent Modelling and Simulation of Fluid-Structure Interactions with Contact
S. Frei, E. Burman, M. Fernández*

Mechanically Consistent Modeling of Fluid-Structure-Contact Interaction without Collision Paradox
M. Champion, M. Fernandez, C. Grandmont, F. Vergnet, M. Vidrascu*

A monolithic Eulerian framework for fluid structure interactions with contacts
*M. BERGMANN**

Eulerian models for fluid-structure interaction: discretization and applications
M. Ciallella, T. Milcent*

A mixed-dimensional computational framework for fluid-beam interaction: Embedding slender 1D beams into 3D fluid flow
A. Popp, M. Mayr, N. Hagmeyer*

Regularity for fluid-structure interactions and its relation to uniqueness
*S. Schwarzacher**

04/06/2024 | 10:30 - 12:30 **Modeling Failure in Composite Materials II**	MS104B Room: 1.11 Chaired by: Prof. Nuno Silvestre (Instituto Superior Tecnico, University of Lisbon, Portugal), Dr. José Gonilha (Instituto Superior Técnico, Portugal)

Strain Rate Sensitive Delamination Modelling in Fibre Reinforced Polymer Composites
J. Ratković, D. Ivančević*

Numerical and Experimental investigation of thin-ply laminate under fatigue loading
M. Tariq, S. Scheffler, A. Nair, R. Rolfes*

Numerical and Experimental Investigation of the Mechanical Behavior of Short Fiber Reinforced Adhesives
M. Hematipour, A. Dean, S. Scheffler, R. Rolfes*

Mechanical damage from a simulated lightning strike in protected carbon fibre-reinforced polymer laminates (Keynote Lecture)
A. Arteiro, J. Pedro, D. Alonso, R. Honke, C. Karch*

Computational Modeling and Experimental Validation of Web-Crippling Behavior of Pultruded GFRP Profiles Under Localized One-Flange Loading
Y. Ye, J. R. Correia, N. Silvestre, J. Gonilha*

Progressive Failure Analysis of Composite Laminates Under High-Cycle Fatigue
P. Hofman, F. Van der Meer, L. Sluys*

04/06/2024 | 10:30 - 12:30 **Accelerating scientific discovery for dynamical systems with physics-informed machine learning II**	MS014B Room: 1.12 MS Corresponding Organizer: Dr. Romit Maulik (Argonne National Laboratory)

ψ – flow: A Novel Physics-Constrained Architecture to Enforce Incompressibility and Boundary Conditions for Fast and Accurate Flow Predictions
M. Cabral, B. Font, G. Weymouth*

Physics-Informed Neural Network with Turbulent Flow over Fluid Saturated Porous Media
S. Jang, M. Jadidi, Y. Larimi*

Operator Learning via Neural Networks with Kernel-Weighted Corrective Residuals
*R. Bostanabad **

Data-Driven Structural Health Monitoring of Beam Elements Using Machine Learning Techniques
A. Reza Elahi, A. Cardoni, R. Tarantini, G. Cimellaro*

04/06/2024 | 10:30 - 12:30 **Advanced Discretization Schemes and Solution Strategies for Computational Structural Dynamics I**	MS203A Room: 1.13 Chaired by: Prof. Bastian Oesterle (Hamburg University of Technology, Germany), Dr. Sascha Eisenträger (Otto von Guericke University Magdeburg, Germany)

Numerical Modelling of Fragment and Blast Loaded Concrete Structures Using Massively-Parallel Coupled CFD-CSD Techniques (Keynote Lecture)
O. Soto, J. Baum, R. Lohner, M. Giltrud*

An Extended Generalised-α Method with Enhanced Accuracy for Applications in Fluid and Structural Dynamics
E. Alhayki, W. Dettmer*

Adaptive Refinement Techniques using Multiresolution Wave Propagation Simulations Guided by Inherent Convergence Indicators
D. Dimitriou, K. Samara, D. Saravanos*

Development of a Novel Riemann Solver for Solid Dynamics
K. Alhamwi Alshaar, J. Mandal*

Asynchronous time integrator applicable to explicit and implicit problems with explicitly integrated isolated interfaces
R. Dvořák, R. Kolman, O. Jiroušek, J. Gonzalez Perez*

04/06/2024 | 10:30 - 12:30 **Computational Analysis of Advanced Materials and Structures II**	MS187B Room: 1.14 Chaired by: Prof. Efstathios Theotokoglou (NATIONAL TECHNICAL UNIVERSITY OF ATHENS, Greece), Mr. Quirin Hoesch (Fraunhofer Institute for Industrial Mathematics ITWM, Germany)

Modeling of fiber-reinforced, pressurised and preformed hoses
Q. Hoesch, M. Roller, F. Schneider-Jung, J. Linn, R. Müller*

Vibration of Laterally Restrained Short-Fiber-Reinforced Beam
B. Uzun, A. Tariq, M. Yaylı, B. Deliktaş*

04/06/2024 | 10:30 - 12:30 **Optimization Problems in Computational Mechanics: from Material Design to Structural Analysis I**	MS112A Room: 1.15 Chaired by: Prof. Andrea Chiozzi (University of Ferrara, Italy), Dr. Nicola A. Nodargi (University of Rome Tor Vergata, Italy)

Grammar-based Generation of Highly Constrained Trusses
K. Yu, M. Kraus, W. Kaufmann, E. Chatzi*

Physics-Informed Neural Networks as surrogate for Robust Design Optimization
A. Khedkar, J. Stöcker, M. Kaliske*

A Variational-Based Non-Smooth Contact Dynamics Approach for Historical Masonry Structures
N. Nodargi, P. Bisegna*

Limit analysis of masonry structures: upper bound approach based on homogenization and local mesh refinement
N. Grillanda, V. Mallardo*

On the Optimal Survey of Masonry Texture for the Seismic Assessment of Historic Masonry Structures
S. Szabó, M. Funari, P. Lourenço*

Bayesian Optimization on the Compliant Floor Design Under Complex Loading and Uncertainty
W. Ge, I. Mohagheghian*

04/06/2024 | 10:30 - 12:30 **New Trends in Computational Modelling of Masonry Material and Structures II**	MS137B Room: 2.01 Chaired by: Prof. Lorenzo Macorini (Imperial College London, United Kingdom), Prof. Stefano de Miranda (University of Bologna, Italy)

Large Displacement Analysis Of Masonry Structures Accounting For Damage And Friction
D. Addessi, E. Benvenuti, C. Gatta, M. Nale, E. Sacco*

Prediction of residual drift capacity in cracked masonry walls based on machine learning and numerical modelling
A. D'Altri, M. Pereira, S. de Miranda, B. Glisic*

Brick Masonry Constituent Material Property Characterization Through Impact Excitation and Ultrasonic Pulse Velocity Test.
A. Owoeye, T. De Larrard, Z. Djamai, F. Duprat*

Surface Stress Model for Coated Masonry Walls
S. Di Nino, G. Rosi, F. D'Annibale*

VIscoelasticity Models In Applications
*S. Carillo**

04/06/2024 | 10:30 - 12:30 **Smart Soft Materials: Additive Manufacturing, Modeling, Design, and Experimentation I**	MS036A Room: 2.02 Chaired by: Prof. Oliver Weeger (TU Darmstadt, Germany), Dr. Mahdi Bodaghi (Nottingham Trent University, United Kingdom)

Design and 4D Printing of Metamaterials with Repairability
*M. Bodaghi**

A Thermo-mechanical and Phenomenological Model for Shape-memory Semi-crystalline Polymer Networks
M. Arricca, N. Inverardi, S. Pandini, M. Toselli, M. Messori, F. Auricchio, G. Scalet*

Simulation of SMPs for the Bonding Process of a Gyroid-Core with a CFRP Aerodynamic Profile
F. Cerbe, A. Junge, C. Hühne, M. Sinapius*

Design Optimization for the Active Response of Liquid Crystal Elastomers
J. Barrera, C. Krikorian, E. Lee, R. Telles, J. Mancini, D. Tortorelli*

04/06/2024 | 10:30 - 12:30 **Advances in Solid Mechanics II**	MS187B Room: 2.03 Chaired by: Ms. Sonja Hellebrand (University of Duisburg-Essen, Germany)

Wavelet Analysis for the Vertical Isolation Ratio of RC Hospital Structures Subjected to Near-Fault Earthquakes
*F. Mazza, A. Braile, R. Labernarda**

A Displacement-Based Design Procedure of Hysteretic Dissipative Steel Exoskeletons for the Seismic Retrofitting of RC Hospital Buildings
F. Mazza, D. Rizzo*

Seismic Damage Estimation of Reinforced Concrete Buildings Modeled with Solid Finite Elements
*E. Tanaka**

A comparative study on sea ice dynamics modeling based on a mixed least-squares FEM
S. Hellebrand, C. Schwarz, J. Schröder*

Open-Pit Slope Design Using a Dirichlet-to-Neumann FEM Procedure
E. Godoy, P. Toledo, M. Durán*

Dynamic Analysis of Multilink-Multiphysics PZT Based Beam Networks
P. Asdaque, R. Kumar*

04/06/2024 | 10:30 - 12:30 **Unravelling Neural Networks with Structure-Preserving Computing I**	MS161A Room: 2.04 Chaired by: Prof. Barry Koren (TU Eindhoven, Netherlands), Prof. Wil Schilders (TU Eindhoven, Netherlands)

Turbulence Subgrid Closure for the Lattice Boltzmann Method via Artificial Neural Networks
G. Ortali, N. Demo, A. Gabbana, G. Rozza, F. Toschi*

Learning Parameter-Dependent Hamiltonian Systems with Structure-Preserving Neural Networks
P. Horn, B. Koren*

Energy-Conserving Neural Network for Turbulence Modeling
T. van Gastelen, W. Edeling, B. Sanderse*

Unravelling Architectures of Continuous-Time Recurrent Neural Networks
C. Datar, A. Datar, F. Dietrich, W. Schilders*

Variationally Mimetic Operator Networks
D. Patel, D. Ray, M. Abdelmalik, T. Hughes, A. Oberai*

04/06/2024 | 10:30 - 12:30 **Advancing Biomedical Research: Exploring Inverse Methods for Soft Tissue Material Characterization I**	MS157A Room: 2.05 MS Corresponding Organizer: Dr. Elisabete Silva (LAETA/INEGI)

Determining the stiffness of the human eardrum: from optical measurements to constitutive parameter identification
P. Livens, J. Dirckx*

Effect of Attenuation on Nonlinear Shear Wave in the Brain
*B. Tripathi**

Characterizing heterogeneous elastic property distribution of soft tissues based on an explicit inverse method
*Y. Mei**

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

13:45 - 14:30 | SEMI-PLENARY SESSIONS

**04/06/2024	13:45 - 14:30** **GraFEA: A Thermodynamically-Consistent Computational Approach for Damage and Failure**	SPL05 Room: Auditorium I Chaired by: Prof. Nuno Silvestre (Instituto Superior Tecnico, University of Lisbon, Portugal)

GraFEA: A Thermodynamically-Consistent Computational Approach for Damage and Failure
*J. Reddy**

**04/06/2024	13:45 - 14:30** **Advancing Spectral/HP Element High Fidelity Simulation of Incompressible and Compressible Flows**	SPL06 Room: Auditorium VIII Chaired by: Prof. Antonio Huerta (Universitat Politècnica de Catalunya, Spain)

Advancing spectral/hp element high fidelity simulation of incompressible and compressible flows
*S. Sherwin**

**04/06/2024	13:45 - 14:30** **Modeling Neurodegenerative Diseases**	SPL07 Room: Auditorium II Chaired by: Prof. Gerhard Holzapfel (Graz University of Technology, Austria)

Modeling neurodegenerative diseases
*P. Antonietti**

**04/06/2024	13:45 - 14:30** **GENERIC-Based Structure-Preserving Numerical Methods for Coupled Problems**	SPL08 Room: Auditorium VI Chaired by: Prof. Jorge Ambrosio (IDMEC - Instituto Superior Tecnico, Portugal)

GENERIC-based structure-preserving numerical methods for coupled problems
*P. Betsch**

14:30 - 16:30 | TECHNICAL SESSIONS

**04/06/2024	14:30 - 16:30** **Phase Field Modeling and Computation V**	MS017E Room: Auditorium I Chaired by: Dr. Yu Leng (Los Alamos National Laboratory, United States)

Phase-field modeling of chemo-durotactic cell motility in enzyme-sensitive hydrogels
P. Gaziano, M. Marino*

Variational Quantitative Phase-field Modeling and Simulation of Powder Bed Fusion Additive Manufacturing
T. Oyedeji, Y. Yang, H. Egger, B. Xu*

Amplitude Phase-Field Quasicrystal
M. De Donno, L. Angheluta, K. Elder, M. Salvalaglio*

Phase-field modeling of the cyclic viscoelastic-viscoplastic fracture behavior of epoxy nanocomposites
B. Arash, S. Zakavati*

Computations with heterologous continua: mesoscale phase field model for sintering
*S. Kovacevic, S. Mesarovic**

04/06/2024 | 14:30 - 16:30 **Coarse Graining Turbulence: Modeling and Data-Driven Approaches and Their Applications V - Honoring Professor Cesar Dopazo Garcia**	MS016E Room: Auditorium II Chaired by: Dr. Luis Valiño (ICB - CSIC, Spain)

Faking it may be all right
*J. Jimenez**

Effects of thermal boundary conditions on scalar statistics during flame-wall interaction of premixed combustion within turbulent boundary layers
*S. Ghai, U. Ahmed, N. Chakraborty**

Tensor Train Representation for Efficient Modeling of High-Dimensional Flamelet-Based Manifolds in High-Speed Propulsion Simulations
S. Demir, P. Guthrey, R. Johnson, B. Bojko*

Bridging Experiment and Simulation in the Analysis of High Swirl Ratio In-cylinder Flow from Data-driven Sparse Identification of Non-linear Dynamics
*Z. Zhou, F. Zhao, D. Hung**

Mori-Zwanzig Modal Decomposition: Applications and Analysis
M. Woodward, Y. Tian, Y. Lin, C. Hader, H. Fasel, D. Livescu*

Reduced-Order Modeling of FDF Transport Equation Using Time-Dependent Subspaces
*A. Aitzhan, P. Givi, H. Babaee**

04/06/2024 | 14:30 - 16:30 **Computational Methods for Inverse Problems I**	MS018A Room: Auditorium III Chaired by: Prof. Dan Givoli (Technion - Israel Institute of Technology, Israel), Prof. Haim Waisman (Columbia University, United States)

Adaptive Spectral Inversion For Inverse Medium Problems (Keynote Lecture)
*Y. Gleichmann, M. Grote**

Fréchet derivatives based approach for ROM bases update to improve FWI cost efficiency
J. Besset, H. Barucq, H. Calandra, R. Djellouli, S. Frambati*

Direct point cloud-based full waveform inversion
T. Bürchner, P. Kopp, S. Kollmannsberger, E. Rank*

Accelerating full waveform inversion by transfer learning
D. Singh, L. Herrmann, Q. Sun, F. Dietrich, S. Kollmannsberger*

04/06/2024 | 14:30 - 16:30 **Computational Cardiology: Modeling and Simulating the Heart I**	MS089A Room: Auditorium IV Chaired by: Mr. Maximilian Roman Schuster (RWTH Aachen University, Germany)

Probabilistic learning of the Purkinje network from the ECG (Keynote Lecture)
S. Pezzuto, F. Álvarez-Barrientos, F. Sahli Costabal*

End-to-End Segmentation of Mitral Valve in 4D Transesophageal Echocardiography Using Time-Encoded Convolutional Neural Networks
R. Munafo, S. Saitta, E. Votta*

Multi-Fidelity Modeling and Uncertainty Quantification of the Coagulation Cascade in Patient-Specific Left Atrial Flows
M. Guerrero-Hurtado, M. García-Villalba, E. Durán, A. Gonzalo, P. Martinez-Legazpi, A. Kahn, J. Bermejo, J. del* Alamo, *O. Flores*

Gaussian Process Emulators --- A Powerful Tool for Scaling the Generation of Cardiac Digital Twins
E. Karabelas, F. Caforio, K. Kapper, F. Mantegazza, B. Viti, G. Plank, S. Niederer, G. Haase*

Parameter estimation in cardiac models using physics-informed neural networks
F. Caforio, F. Regazzoni, S. Pagani, E. Karabelas, G. Plank, G. Haase, A. Quarteroni*

04/06/2024 | 14:30 - 16:30 **Modelling and Simulation for Additive Manufacturing V**	MS207E Room: Auditorium VI Chaired by: Dr. Andreas Lundbäck (Luleå University of Technology, Sweden), Prof. Jesper Hattel (Danmarks Tekniske Universitet (DTU), Denmark)

A phase transformation model for multiphase alloys applied to laser powder bed fusion processes
I. Noll, T. Bartel, A. Menzel*

Extension of Classical Grain Nucleation Models for the Application in PBF-LB/M Microstructure Simulations
H. Panzer, O. Boeckuen, W. Zhao, L. Reichert, D. Roehrer, M. Zaeh*

On the time-dependent material properties during material extrusion (MEX) process simulation using orientation tensors
F. Frölich, M. Di Nardo, C. Krauß, F. Wittemann, P. Carlone, L. Kärger*

Phase-field modelling of elastic properties of Polylactic acid depending on the thermally driven microstructure
A. Elmoghazy, D. Schneider, B. Nestler*

Analytical description and investigation of crystallisation kinetics in Large-Scale Material Extrusion Processes
D. Leubecher, F. Zimmer, B. Musil, P. Höfer*

Multi-phase-field lattice Boltzmann modeling of thermal fluid flow and microstructural evolution in powder bed fusion
K. Ikeda, S. Sakane, T. Takaki*

04/06/2024 | 14:30 - 16:30 **Open-Source Software in Mechanics I**	MS126A Room: Auditorium VII Chaired by: Prof. Lukasz Kaczmarczyk (University of Glasgow, United Kingdom), Dr. Vladislav Yastrebov (MINES Paris, PSL University, CNRS, France)

DRDMannTurb: An open-source, GPU-accelerated, nonlocal turbulence model for the atmospheric boundary layer with scalable fluctuation field generation
A. Izmailov, M. Meeker, G. Deskos, B. Keith*

FEMS – Designing a finite element code with computational homogenization in mind
*M. Shakoor**

FEniCS-based Biomechanical Framework for 3D Human Brain Folding Simulation
A. Kerachni, M. Alenyà, O. Camara, J. Lefèvre, F. Rousseau*

Siconos, An Open Source Library For Nonsmooth Mechanical Systems Involving Contact, Impact, Friction, Plasticity And Fracture.
V. Acary, F. Pérignon*

Backend-agnostic Parallel Programs for Studying Transitions in Fluid Flows in Python
S. Baars, F. Wubs, H. Dijkstra*

Unfitted finite element discretisations with ngsxfem - an Add-on to NGSolve
C. Lehrenfeld, F. Heimann, J. Preuss, H. von Wahl*

04/06/2024 | 14:30 - 16:30 **Machine Learning Methods for Multiscale and Multiphysics Material Modeling V**	MS007E Room: Auditorium VIII Chaired by: Prof. Oliver Weeger (TU Darmstadt, Germany), Prof. Fadi Aldakheel (Leibniz Universität Hannover, Germany)

Multiscale modeling with physics-augmented neural networks
K. Kalina, J. Brummund, W. Sun, M. Kästner*

Multiscale Modeling of Viscoelastic Shell Structures with Artificial Neural Networks
J. Geiger, W. Wagner, S. Freitag*

Approximating Fine-Scale Features in Time-Dependent Multiscale PDEs with Neural Networks
M. Elasmi, F. Krumbiegel, R. Maier*

Combining FE and Multiscale Thermodynamics Informed Neural Networks towards Fast and Frugal Inelastic Simulations for Woven Composite Structures
M. El Fallaki Idrissi, G. Chatzigeorgiou, F. MERAGHNI, F. Praud, F. Chinesta*

04/06/2024 | 14:30 - 16:30
Kinetic-based Computational Fluid Dynamics for Continuum and Rarefied Flows I

MS192A
Room: Terrace
Chaired by:
Prof. Diogo Nardelli Siebert (Universidade Federal de Santa Catarina, Brazil), Dr. Huidan Yu (Purdue University, United States)

Unified Lattice Boltzmann Modelling and GPU Accelerated Computation for Image-based Complex Flows
*H. Yu**

A General Algorithm for Multiscale Analysis of Lattice-Boltzmann Models
D. Nardelli Siebert*, E. de Carli da Silva, L. Emerich dos Santos, J. de Lima Costa Salazar, R. Leite Martins Bazarin
Quantum Boltzmann Methods
M. Schalkers, M. Möller*

A discrete kinetic scheme for modeling and simulation of dendrite growth under multiscale thermal flows
C. Qin, Z. Deng, D. Sun*

A Model for growth and motion of dendrites during the non-equilibrium solidification of binary alloys with the lattice Boltzmann method
S. Mao, D. Sun*

04/06/2024 | 14:30 - 16:30
Recent Advances in Unfitted Finite Element Methods: Analysis, Algorithms, and Applications V

MS170E
Room: 3A
Chaired by:
Prof. Ernst Rank (Technical University of Munich, Germany), Dr. Maxim Olshanskii (University of Houston, United States)

CutFEM 3D Shape Optimization in Acoustics taking Viscothermal Losses into Account
M. Berggren, A. Bernland, A. Massing, D. Noreland, E. Wadbro*

The Shifted Boundary Method for Nonlinear Elasticity and Thermo-elasticity
G. Scovazzi, N. Atallah, K. Li, C. Canuto*

Finite Cell Method simulation of bone tissues: complexity in internal and external morphologies
M. Shahmohammadi, I. Fiedler, B. Busse, A. Düster*

A Cartesian Extended Discontinuous Galerkin Solver for Conjugate Heat Transfer
N. Levaux, A. Bilocq, P. Schrooyen, V. Terrapon, K. Hillewaert*

Application of the non-negative moment fitting approach in the finite cell analysis of phase-field fracture
S. Hosseini, M. Gorji, R. Sartorti, L. Radtke, A. Düster*

Error assessment for cgDG scattering problems
H. Navarro-García, P. Díez, J. Navarro-Jiménez, A. Huerta, E. Nadal*

04/06/2024 | 14:30 - 16:30 **Phase-field and gradient damage models for fracture in complex materials V**	MS192A Room: 3B Chaired by: Prof. Lampros Svolos (University of Vermont, United States), Prof. Fadi Aldakheel (Leibniz Universität Hannover, Germany)

Modelling anisotropic emergence and memory effects in fibrous materials: a phase-field perspective
A. Rodella, A. Favata, S. Vidoli*

A Phase-Field Approach to Model Ductile Quasi-Static and Fatigue Fracture in Short Fiber Reinforced Polymer Composites
A. Dean, P. Kumar, E. Mahdi, R. Rolfes*

Phase-field ductile fracture in orthotropic fiber-based materials
A. Marengo, K. Robertsson, U. Perego, E. Borgqvist, J. Tryding, M. Ristinmaa*

A Fourth-order Phase-Field Model of Fracture in Anisotropic Materials: Simulations and Experiments on 3D Printed Samples
L. Svolos, H. Mourad*

Identification of a Phase-Field Model for Brittle Fracture in Transversely Isotropic Elastic Materials with Application to Spruce Wood Specimens under Compression
M. Noel, F. Pled, L. Chevalier, F. Wilquin*

Fracture Predictions Using Phase Field Models for Tuned Random Heterogeneous Surrogate Microstructures
P. Eisenhardt, U. Khristenko, B. Wohlmuth, A. Constantinescu*

04/06/2024 | 14:30 - 16:30 **Microstructure-based Modeling of Biomechanical Systems V**	MS057E Room: 3C Chaired by: Dr. Michele Terzano (Graz University of Technology, Austria), Prof. Gerhard Holzapfel (Graz University of Technology, Austria)

Sensitivity Analysis and Experimental Insights in Computational Modeling of Articular Cartilage: A Biphasic Approach
F. Egli, S. Seyedpour, T. Ricken*

Multiscale Modelling of Fluid Flow in a Lymph Node
A. Girelli, G. Giantesio, A. Musesti, R. Penta*

A Stress-based Finite Element Formulation for Linear Poroelasticity Biomechanics Problems
S. Lo Franco, F. Parrinello, G. Borino*

A Multi-Compartment Perfusion Model of Blood Flow Through Deformed Hierarchical Vessel Networks
J. Hohl, A. Ebrahem, E. Jessen, D. Schillinger*

Coupling of a perfusion model to a poroelastic-growth model for liver tissue regrowth
A. Ebrahem, E. Jessen, J. Hohl, D. Schillinger*

04/06/2024 | 14:30 - 16:30 **Shape and topology optimization: theoretical advances and numerical methods V**	MS198E Room: 5A Chaired by: Mr. Charles Dapogny (CNRS, Laboratoire Jean Kuntzmann, Université Grenoble Alpes, Saint Martin d'Hères, France), Dr. Samuel Amstutz (Avignon Université, France)

Multiscale Topology Optimization of modulated fluid microchannels based on asymptotic homogenization
*F. Feppon**

Large Scale Topology Optimization Subjected to Local Constraints with Null Space Optimizer
H. Lin, F. Feppon*

Optimization of Geometry for Turbulent Flow Using the Continuous Adjoint Method
C. Ruiz-Sánchez, A. Martínez-Cava, M. Chávez-Modena, E. Valero*

Body-fitted topology optimization with the Equivalent Radiated Power criterion
D. Danan, C. Mang, L. Dall'Olio, C. Nardoni*

Level Set-based Topology Optimization of Turbulent Flows
L. Noël, K. Maute*

Topology optimization of contact-aided thermo-mechanical regulators
A. Dalklint, J. Alexandersen, A. Frederiksen, K. Poulios, O. Sigmund*

04/06/2024 | 14:30 - 16:30 **Isogeometric Methods V**	MS010E Room: 5B Chaired by: Prof. Trond Kvamsdal (Norwegian University of Science and Technology (NTNU), Norway), Prof. Alessandro Reali (University of Pavia, Italy)

Benefits and Challenges of IGA Application on Crashworthitness CAE Analysis in the Automotive Industry (Keynote Lecture)
L. Martorell, A. Dominguez, L. Barbu, R. Rossi*

Advancing Aero-Engine Simulations Through Isogeometric Analysis
Z. Naveed, B. Beirow, K. Singh*

deal.t: An implementation of T-splines within the deal.II framework
S. Beuchler, R. Hiniborch, P. Morgenstern*

Vibration analysis of FGM sandwich panel with cut-outs using refined HSDT based on isogeometric analysis
*L. Barik, A. Swain**

04/06/2024 | 14:30 - 16:30 **Numerical simulations of wind turbines and windfarms I**	MS056A Room: 5C Chaired by: Dr. Esteban Ferrer (Universidad Politécnica de Madrid, Spain), Dr. Richard Stevens (University of Twente, Netherlands)

Two-Way-Coupled Simulation of Vortex-Induced Vibrations in a Full-Scale Wind Turbine Tower (Keynote Lecture)
K. Ebstrup, N. Sørensen, F. Bertagnolio, C. Grinderslev, S. Horcas*

Maximization of Wind Turbine Energy Generation Constrained to Noise Reduction Using Reinforcement Learning
M. de Frutos, D. Huergo, Ó. Mariño, E. Ferrer*

Wind Farm Detached-Eddy Simulations Using an Immersed Boundary Method-Actuator Surface Model Solver
J. Park, B. Thornber*

The effect of support structure modelling on the prediction of wind turbine wakes
M. Zormpa, C. Vogel, R. Willden*

Numerical Predictions of Wind Turbine Noise for Non-axisymmetric Loaded Rotor
O. Marino, L. Botero, E. Ferrer*

04/06/2024 | 14:30 - 16:30 **EYIC Minisymposium I**	MS139A Room: 0.06 Chaired by: Prof. Simone Morganti (University of Pavia, Italy)

Towards adaptive phase-field modeling for high-order brittle fracture
L. Greco, M. Torre*

On a novel least squares finite-element method for non-linear poroelasticity
M. Brodbeck, H. Schneider, F. Bertrand, T. Ricken*

Two view points on numerical simulation of porous media
*J. Both, T. Dagli**

Numerical Methods of Buckling Load Investigation for Complex Gyroid Beams with Variable Inertia
D. D'Aprile, F. Auricchio, S. Morganti*

Computational modeling of piezoelectric actuators for surface sound generation
L. Ciccarelli, E. Bodo, V. Bello, S. Merlo, S. Morganti*

Issues in System Development for Animating Still Pictograms
N. Okatani, R. Shioya, Y. Nakabayashi*

04/06/2024 | 14:30 - 16:30 **Multi-Disciplinary Design & Optimization of Novel HEX (Heat-Exchangers) for Green Aviation**	STS237A Room: 0.07 Chaired by: Prof. shahrokh Shahpar (Rolls-Royce plc, United Kingdom), Mr. Alessandro Alaia (Optimad Engineering srl, Italy)

Multi-disciplinary Optimization of Gyroid Structures for a Cold Plate Heat Exchanger Design
E. Daifalla, S. Shahpar, I. Tristanto, M. Carta*

Multidisciplinary Optimisation of Additive Manufactured Heat Exchangers for Aeronautical Applications
A. Chiodi, A. Alaia, E. Lombardi, K. Gkaragkounis, S. Shahpar*

Aerothermal Topology Optimisation of a Compact Heat Exchanger
*S. Shahpar**

Multidisciplinary optimization of a heat exchanger using lattice structures accounting for additive manufacturing constraints
N. Roussouly, F. Gallard, A. Batikh, J. Fradin, G. Chaumont*

Towards dynamic modelling of thermal management systems for greener aviation
I. Tristanto, A. Burns, P. Malgieri, J. Chetwynd-Chatwin*

04/06/2024 | 14:30 - 16:30 **High Aspect Ratio Wing Design and Development for Short- and Medium Range Aircraft I**	STS271A Room: 0.08 Chaired by: Dr. Jos VANKAN (NLR, Netherlands), Dr. Bruno Stefes (Airbus Operations GmbH, Germany)

Introduction to High Aspect Ratio Wing Design and Development for Short- and Medium Range Aircraft
J. VANKAN, B. Stefes*

Aerodynamic design of a high aspect ratio strut-braced wing
D. Losada Costoso, E. Nguyen Van, O. Atinault, M. Méheut*

Structural Topology Optimization of a High Aspect-ratio Dry-wing for H2-powered Aircrafts
C. JULIEN, L. VERTONGHEN, L. COELHO, F. IRISARRI*

High-Lift Challenges of high performances wing
G. Mingione, N. Bier, L. Marino, T. Trautmann, M. Vellekoop, P. Vitagliano, J. Wild, M. Minervino*

UPWing Gust Load Alleviation Wind Tunnel Experiment: Overview on Controller Design Activities, Pt. 1
T. Kier, F. Stalla, H. Timmermans, A. Jurisson, P. Vuillemin*

UPWing Gust Load Alleviation Wind Tunnel Experiment: Overview on Controller Design Activities, Pt. 2
F. Stalla, T. Kier, P. Vuillemin, X. Wang, R. Senger Franco*

04/06/2024 | 14:30 - 16:30 **Novel Computational Techniques for Masonry Mechanics I**	MS106A Room: 1.02 Chaired by: Dr. Antonio Maria D'Altri (University of Bologna, Italy), Dr. Francesco Messali (Delft University of Technology, Netherlands)

A mechanism-based damage model for the analysis of masonry structures
G. Bertani, M. Cervera, S. de Miranda*

A multisurface contact constitutive model for masonry structures based on the distinct element method
Y. Oktiovan, F. Messali, B. Pulatsu, J. Lemos, J. Rots*

Swarm Intelligence Based Calibration of Discrete Element Models for Masonry Structures
G. Kibriya, Á. Orosz, J. Botzheim, K. Bagi*

Reduced-Scale Testing of Masonry Structures Subjected to Blast Loads
*A. Morsel**

Image-Based Kinematic Limit Analysis for Irregular Masonry with Lumped Joint Representation
Y. Hermans, N. Grillanda, K. Ehab Moustafa Kamel, G. Milani, T. Massart*

04/06/2024 | 14:30 - 16:30 **Active and Passive Mechanics in Patient-Specific Modelling of Soft Biological Tissues I**	MS096A Room: 1.03 Chaired by: Mr. Luca Dede (Politecnico di Milano, Italy), Prof. Anna Pandolfi (Politecnico di Milano, Italy)

Computational Modelling of the Stomach with Patient-Specific Geometries
M. Henke, S. Brandstaeter, S. Fuchs, C. Cyron*

Macromolecular processes motivated constitutive models for soft biomaterials
G. Vitucci, F. Trentadue, D. De Tommasi*

Enhancing in silico cardiac simulations: the crucial role of detailed activation models and accurate fiber architectures
R. Piersanti, F. Regazzoni, L. Dede', A. Quarteroni*

Nonlinear Poroelastic Model Describing the Lamina Cribrosa IOP-induced Cupping in the Optic Nerve
F. Recrosi, A. Tatone, R. Repetto, M. Vasta, A. Pandolfi*

04/06/2024 | 14:30 - 16:30 **Computational mechanics in high-strain rate and impact dynamics II**	MS008B Room: 1.04 Chaired by: Prof. Patrice Longère (ISAE-SUPAERO, France)

Gradient-enhanced models in blast simulations of concrete structures
S. Rosenbusch, D. Balzani, J. Unger*

Implementation of Modified RHT Material Model For Boulders And Concrete In Multi-Layered Composite Target Under Projectile Impact
S. Kapoor, S. Ray*

Mathematical Modeling Of Damage-Plasticity Concrete Material Model Subjected To High-Strain Rate Loading
S. Pattajoshi, S. Ray*

Progressive Failure Analysis of Long-Span Composite Cable-Stayed Bridges Under Blast Loads
R. Mudragada, B. Mishra, P. Bhargava*

Impact induced spall damage analysis in a layered media
S. Pratap Singh, H. Singh, P. Mahajan*

04/06/2024 | 14:30 - 16:30 **Cutting-edge model order reduction techniques for computational fluid dynamics II**	MS046B Room: 1.05 Chaired by: Phd. Maria Strazzullo (Politecnico di Torino, Italy), Dr. Giovanni Stabile (Sant'Anna School of Advanced Studies, Italy)

Incremental Reduced-Order Modeling of Smoothed Particle Hydrodynamics
E. Di Costanzo, J. Marongiu, T. Rung*

Coupling Physics Informed Neural Networks with External CFD Solvers
R. HALDER, G. Stabile, G. Codega, G. Rozza*

Combining model order reduction and Lagrangian fluid solvers
M. Beckermann, A. Barbarulo, M. Cremonesi*

Energy-stable ROM-based closure modelling for discretely filtered fluid flows
H. Rosenberger, B. Sanderse, G. Stabile*

Reduced order model for interface-capturing of two-phase flow using neural-network shift based pre-processing technique
H. Gowrachari, N. Demo, G. Stabile, G. Rozza*

Regularization Techniques for Data-driven Reduced Order Models
A. Ivagnes, M. Strazzullo, G. Stabile, T. Iliescu, G. Rozza*

04/06/2024 | 14:30 - 16:30 **Novel Kinetic Approaches in Optimization and Uncertainty Quantification II**	MS159B Room: 1.06 Chaired by: Mr. Giacomo Borghi (RWTH Aachen University, Germany), Mr. Andrea Medaglia (University of Pavia, Italy)

Clustered Federated Learning Through Consensus-based Optimization
*J. Carrillo, S. Li, N. Trillos, Y. Zhu**

Consensus-Based Rare Event Estimation
K. Althaus, I. Papaioannou, E. Ullmann*

Mean-field limits for Consensus-Based Optimization and Sampling
*N. Gerber, F. Hoffmann, U. Vaes**

Theoretical Insights of Practical Interest for Consensus-Based Optimization
*K. Riedl**

Multiobjective optimization via filtering methods
E. Iacomini, M. Herty*

Kinetic Description and Convergence Analysis of Genetic Algorithms for Global Optimization
G. Borghi, L. Pareschi*

04/06/2024 | 14:30 - 16:30 **Robust and accurate discretizations for nonlinear PDEs II**	MS023B Room: 1.07 Chaired by: Prof. Brendan Keith (Brown University, United States), Dr. Francis Aznaran (University of Notre Dame, United States)

Nonlinearly stable open boundary conditions imposed via numerical flux functions
A. Winters, D. Kopriva, J. Nordström*

Stabilized Finite Element Methods as Physics-Compatible Discretizations for Dissipative Euler Flows
*N. Fehn**

Strongly imposed boundary conditions for the compressible Navier-Stokes equations
A. Gjesteland, D. Del Rey Fernández, M. Svärd*

Unraveling the Origin and Identification of Oscillatory Modes in Numerical Low Mach Number Flow Solutions
J. Jung, I. Lannabi, V. Perrier*

04/06/2024 | 14:30 - 16:30 **Computational Challenges in Industry and Sustainable Development: Sampling, Surrogate and Multi-fidelity Models for Inverse Analysis, Uncertainty Quantification and Optimisation I**	MS103A Room: 1.08 Chaired by: Dr. Lorenzo Tamellini (CNR, Italy), Dr. Matteo Giacomini (CIMNE - Universitat Politècnica de Catalunya, Barcelona, Spain)

Domain Decomposition for Local Surrogate Models of Parametric Elliptic Problems
M. Giacomini, B. Evans, M. Discacciati*

A Multi-fidelity Strategy for Optimization under Uncertainty with Robust Constraints
T. Dixon, A. Gorodetsky*

Analysis and Optimization of a Distributed Propulsion System for a Regional Transport Aircraft
A. Mateo-Gabín, T. Wagenaar, S. Mancini, J. Florenciano Merino, S. Lanzan Ferran*

Scale-up Bioreactors for the Bioeconomy: A Similarity Criteria Based on Representative Elementary Volumes from CFD
*S. Izquierdo**

Coupled Reduced Order Models for Turbulent Flow
V. Tsiolakis, T. Kvamsdal, A. Rasheed, E. Fonn, H. van Brummelen*

UM-Bridge: Enabling Advanced Uncertainty Quantification from Prototype to HPC
L. Seelinger, A. Reinarz*

04/06/2024 | 14:30 - 16:30 **Simulations of Polymers and Polymer Composites from Petrol and Biological Sources II**	MS118B Room: 1.09 Chaired by: Dr. Fabrice Detrez (University Gustave Eiffel, France), Dr. Sebastian Pfaller (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany)

An uncoupled two-scale finite element model to investigate air entrapment during PET polymer thin film lamination
V. Rezazadeh, H. van Dommelen, M. G.D. Geers*

Sequential Parameter Calibration for a Finite-Strain Viscoelastic-Viscoplastic Material Model for Biobased Thermosets
L. Laubert, S. Pfaller*

A Finite Strain Quasi-Non-Linear Thermoviscoelastic Model for Semi-Crystalline Thermoplastic Polymers subjected to Cyclic Loading
U. Jinaga, K. Zulueta, A. Burgoa, L. Noels*

Numerical Study of the Mechanical and Creep Behaviour of a Sustainable Modular System for Hydroponics
B. Sousa, J. Antunes, A. Gomes, F. Carneiro*

04/06/2024 | 14:30 - 16:30 **New Trends In The Mathematical And Numerical Aspects Of Fluid-Structure Interaction II**	MS209B Room: 1.10 Chaired by: Ms. Marina Vidrascu (INRIA & LJLL (Sorbonne Université CNRS), France), Dr. Miguel A. Fernández (Inria, France)

Finite element approximation of FSI: a distributed Lagrange approach (Keynote Lecture)
*L. Gastaldi**

High-order Discontinuous Galerkin methods on polytopal grids for fluid-structure interaction problems
P. Antonietti, M. Verani, C. Vergara, S. Zonca*

Enhanced mass conservation in low-order fictitious domain methods for immersed FSI
D. Corti, G. Delay, M. Fernández, F. Vergnet, M. Vidrascu*

Stable, Efficient, and Higher-order Mesh Movement in Large-displacement Fluid-structure Interaction
T. Schwentner, D. Bošnjak, T. Fries*

Immersed Boundary Method for Fluid-Structure Interaction in Compressible Flows with the Lattice-Boltzmann Method
H. Lerogeron, J. Favier, P. Boivin, V. Faucher*

04/06/2024 | 14:30 - 16:30 **Adaptive and Compliant Engineering Structures I**	MS031A Room: 1.11 Chaired by: Dr. Malte von Scheven (University of Stuttgart, Germany), Prof. Ann Sychterz (University of Illinois Urbana-Champaign, United States)

Design-oriented Modeling of SMA Actuated Bistable Tape Spring Rolamite (BTSR) Hinges
A. Mukherjee, L. Bono, M. Vogel, P. Ermanni*

Synergistic Design of Compliant Mechanisms by Coupled Topology and Actuator Optimization
A. Nowak, A. Hasse*

Nonlinear synthesis of shape-adaptive compliant structures with selective compliance
S. Seltmann, A. Hasse*

Design Optimisation of Shape-morphing Endoluminal Tools
S. Koppen, A. Sakes, L. Noel*

Analytical Dynamic Behavior of a Meter-Scale Adaptive Origami Pill Bug Structure
*A. Sychterz**

04/06/2024 | 14:30 - 16:30 **Predictive AI Modelling for Multi-Physics Problems: Methods, Algorithms and Challenges I**	MS180A Room: 1.12 Chaired by: Phd. Francisco Bruno Souza Oliveira (Universidade Estadual de Santa Cruz - UESC, Brazil), Dr. Jefferson Gomes (University of Aberdeen, United Kingdom)

A Reduced Order Model Discretisation of the Space-Angle Phase-Space Dimensions of the Boltzmann Transport Equation with application to Nuclear Reactor Eigenvalue Problems
A. Buchan, I. Navon, L. Yang*

Convolutional Neural Network Coupled with a Constrained CP-decomposition Model for Predicting Upscaled Permeability
*T. Onimisi, L. Akanji, J. Gomes**

Application of Dimensionality Reduction Techniques for Classification in Multidimensional Data Sets
F. Souza Oliveira, C. Nascimento Neves, P. Ambrósio*

Extended Diamond Difference Constant Nodal an Innovative Hybrid Method for Two-Dimensional Fixed Source Discrete Ordinates Problems
I. B. R. Ortiz, D. S. Dominguez, S. M. Iglesias, G. Hughes, P. E. Ambrosio*

Machine Learning (ML) Application for the Investigation of Nucleation Boiling in Pressurised Water Reactor (PWR).
S. Ajah, L. Akanji, J. Gomes*

04/06/2024 | 14:30 - 16:30 **Advanced Discretization Schemes and Solution Strategies for Computational Structural Dynamics II**	MS203B Room: 1.13 Chaired by: Prof. Roland Wüchner (Technische Universität Braunschweig, Germany)

Simultaneous, Dynamical Analysis of Structural Ropes and Membranes on all Level-sets
T. Fries, M. Kaiser*

A fully explicit formulation for the dynamics of geometrically exact beams
G. Ferri, J. Kiendl, A. Reali, E. Marino*

Hierarchic Formulations for Explicit Dynamic Analyses of Thin-walled Structures
B. Oesterle, R. Thierer, L. Krauß, M. Bischoff*

On a Novel Class of Selective Mass Scaling Methods for Explicit Dynamics of Thin Continua
M. Hoffmann, A. Tkachuk, M. Bischoff, B. Oesterle*

Highly Accurate Mass Lumping in Explicit Dynamics: Application to Isogeometric Analysis
S. Held, S. Eisenträger, W. Dornisch*

04/06/2024 | 14:30 - 16:30 **Advances in Computational Mathematics I**	MS015A Room: 1.14 Chaired by: Dr. Célio Fernandes (University of Porto, Portugal), Dr. Nelson Gonçalves (INEGI, Portugal)

Deep Reinforcement Learning implementation with Physics-Informed Neural Network for Heat Conduction Control
N. Gonçalves, J. Rodrigues*

Graph theoretical analysis in phase behavior of binary liquids
*J. Seo, R. Singh, J. Choi**

Efficient and Accurate Numerical Computation of Oscillatory Integrals
D. Dhiman, A. Anand*

Appling GMRES and conjugate gradient(C.G.) methods to non-linear optimal control problem
*N. Rabiei**

Bayesian Classification For Gene Expressions in Survival Data Using Accelerated Failure Time Model Accounting Frailty Effect
*P. Kumari**

04/06/2024 | 14:30 - 16:30 **Optimization Problems in Computational Mechanics: from Material Design to Structural Analysis II**	MS112B Room: 1.15 Chaired by: Dr. Nicola A. Nodargi (University of Rome Tor Vergata, Italy), Dr. Luis Carlos M. da Silva (Politecnico di Milano, Portugal)

A novel multi-material topology optimization approach for the design of large scale 3D-printed non-periodic architected structures (Keynote Lecture)
A. Chiozzi, A. Nale, G. Paulino, F. Senhora*

Plastic Analysis of Truss Structures under Random Strength by Chance Constrained Programming
*T. Tran Ngoc**

Design of an auxetic and standard soft material for additive manufacturing using a heuristic RBSM approach
L. M. da Silva, S. Casolo*

Enhancing Flexoelectric Metamaterials Design: A Topological Optimization Approach
J. Tarin, D. Codony, F. Greco, S. Fernández, I. Arias*

A plugin framework for large-scale multi-formulation topology optimization
M. Neiva, A. Nale, I. Menezes, A. Chiozzi*

04/06/2024 | 14:30 - 16:30 **State-of-the-art Machine Learning Techniques For Computational Fluid Dynamics I**	MS088A Room: 2.01 Chaired by: Ms. Anna Schwarz (University of Stuttgart, Germany), Mr. Jens Keim (University of Stuttgart, Germany)

Improving weak PINNs for Hyperbolic Conservation Laws: Dual Norm Computation, Boundary Conditions and Systems
A. Chaumet, J. Giesselmann*

Combining Reinforcement Learning and Physics-Informed Neural Networks for Optimizing the Shape of Flow Channels in Profile Extrusion Dies
D. Wolff, C. Fricke, S. Tillmann, S. Elgeti, A. Popp*

Leveraging Conservation Form of Hyperbolic PDEs to Enhance the Solution Learning by PINNs for Phenomena with Moving Shocks.
M. Rajvanshi, D. Ketcheson*

Spatio-temporal Parallel Physics-informed Neural Networks: A Framework to Solve Inverse Problems in Fluid Mechanics
Z. Sun, S. Xu, D. Guo, G. Yang*

Progressive augmentation of RANS turbulence models by simulation-driven surrogate optimisation
M. Rincón, A. Amarloo, X. Yang, M. Reclari, M. Abkar*

Enhancing Numerical Discretization of Nonlinear PDEs With Q-learning
P. Costa, M. Raissi, D. Albuquerque*

04/06/2024 | 14:30 - 16:30 **Advanced Methods for the Geometrically Nonlinear Analysis and Optimisation of Lightweight Composite Structures I**	MS033A Room: 2.02 Chaired by: Prof. Antonio Madeo (University of Calabria, Italy), Dr. Giovanni Zucco (University of Limerick, Ireland)

Post-buckling behaviour and delamination growth in defected variable angle tow composite laminates
D. Gaetano, F. Greco, L. Leonetti, A. Pranno, G. Zucco*

A one-dimensional model of naturally curved composite ribbons
A. Haldar, M. Dias, P. Weaver*

Hierarchic Large Rotation Shell Model with Warping: Isogeometric Formulation and Modeling of Alternating Stiff/Soft Laminates
D. Magisano, A. Corrado, L. Leonetti, J. Kiendl, G. Garcea*

A Hybrid Hexahedral Solid-shell Element with Self-equilibrated Stresses for the Geometrically Nonlinear Static Analysis of Composite Laminated Structures
G. Zucco, F. Liguori, A. Madeo*

Efficient Modeling of Geometrically Nonlinear Structures via Semi-analytical Harmonic Balancing
R. Boukadia, E. Deckers, W. Desmet*

Recent advances in the postbuckling analysis of composite laminated structures
*F. Liguori, G. Zucco, A. Madeo**

Simultaneous Optimization of Composite Plates, Metallic Components and their Joints
B. Kriegesmann, O. Ambrozkiewicz*

04/06/2024 | 14:30 - 16:30 **Advances in Solid Mechanics III**	GS001C Room: 2.03 Chaired by: Dr. Zuzana Dimitrovová (FCT NOVA and IDMEC, Portugal)

Investigating macroscopic geometrical and physical properties of solid oxide fuel cell electrodes
E. Langner, A. Makradi, S. Gouttebroze, S. Belouettar, T. Wallmersperger*

On The Instability of One Versus Two Proximate Masses Moving on an Infinite Beam Supported by Viscoelastic Layers
*Z. Dimitrovová**

Comparative study of turbulent channel flows through thermal large-eddy simulations under different temperature gradients
M. Garcia-Berenguer, L. Gasparino, O. Lehmkhul, I. Rodriguez*

Optimizing Halide Solid-State Batteries to Meet Automotive and Aeronautic Standards
T. van Steenis, A. Sudharshan*

Numerical Analysis of Creep in Plastic Pallets
I. Gomes, A. Żmijewska-Rocha, P. Gomes, B. Sousa, F. Carneiro*

Medstraum: Innovative Development of the World's First Zero Emission Fast Catamaran, GA 760303 TrAM
*A. PAPANIKOLAOU1, M. AUNG, E. BOULOUNGOURIS, I. Leren**

04/06/2024 | 14:30 - 16:30 **Latest Advancements and Trends in Multi-Physics Research for Civil Engineering Applications I**	MS066A Room: 2.04 Chaired by: Dr. Rafael Ramirez (University of Minho, Portugal), Dr. Alejandro Jiménez Rios (Oslo Metropolitan University, Norway)

Thermal and Transfer Behaviour Modelling in Concrete Incorporating Seashell Co-products
C. Martin-Cavaillé, A. Bourdot, N. Sebaibi, R. Bennacer*

A Chemo-Mechanical Model For Biogenic Sulphide Corrosion Of Concrete
*F. Rooyackers, A. Suiker, F. Clemens, E. Bosco**

Hygro-Thermo-Mechanical Analysis of Brick Masonry Walls: One-Way Coupling and Modelling Approaches
R. Ramirez, A. Jiménez-Ríos, B. Ghiassi, P. Lourenço*

04/06/2024 | 14:30 - 16:30 **Modeling and Computations of Flow through Network-based Porous Media I**	MS167A Room: 2.05 Chaired by: Prof. Lou Kondic (New Jersey Institute of Technology, United States), Dr. Pejman Sanaei (Georgia State University, United States)

Optimizing the internal morphology of pleated membrane filters
P. Sanaei, D. Fong*

Network and Stochastic Modeling of Membrane Filtration with Multiple Fouling Modes
B. Gu, P. Sanaei, L. Kondic, L. Cummings*

Topological data analysis applied to networks modeling porous media transport
*M. Illingworth, B. Gu, L. Cummings, L. Kondic**

A novel DEM-based coupled 3D thermo-hydromechanical mesoscopic approach for modelling fluid flow in porous materials
M. Krzaczek, J. Tejchman*

A Computational Model for Colloid Accumulation in Flow Through Porous Media
A. Chaudhari, E. Immonen, F. Ardaneh*

Modelling the Thermal Conductivity of Nano-Porous Materials
S. Aney, B. Milow, A. Rege*

04/06/2024 | 14:30 - 16:30 **EYIC Junior Workshop I**	EJWA Room: 0.01

Mechanics applied to living systems: issues and hopes for predictability
*A. Pandolfi**

Introduction to quantum computing and non-linear finite-element (re)formulation for quantum annealing
*L. Noels**

17:00-19:00 | TECHNICAL SESSIONS

04/06/2024 | 17:00 - 19:00 **Phase Field Modeling and Computation VI**	MS017F Room: Auditorium I Chaired by: Dr. Marco ten Eikelder (TU Darmstadt, Germany)

Phase-field Simulation for Microstructure Evolution in Metal Additive Manufacturing: Forward Prediction and Inverse Control
T. Xue, J. Choi, F. Hu, J. Cao, S. Liao*

Phase-field modelling of ductile fatigue fracture
M. Kalina, M. Kästner*

Phase-field modelling of elastic microphase separation
H. OUDICH, P. Carrara, L. De Lorenzis*

Chemo-Mechanical Vacancy Diffusion at Finite Strains Using a Phase-Field Model of Voids as Pure Vacancy Phase
K. Pendl, T. Hochrainer*

Multiscale analysis of short fiber reinforced polymers through an anisotropic phase-field model
A. Fajardo Lacave, F. Welschinger, L. De Lorenzis*

FE based micromagnetic simulations of heterogeneous structures
M. Reichel, J. Schröder*

04/06/2024 | 17:00 - 19:00 **Coarse Graining Turbulence: Modeling and Data-Driven Approaches and Their Applications VI - Honoring Professor Cesar Dopazo Garcia**	MS016F Room: Auditorium II Chaired by: Prof. Peyman Givi (University of Pittsburgh, United States)

Onset of Turbulence in Boundary Layer
*L. Cunbiao**

Filtered Turbulent Flame Model in Non-premixed Combustion Simulation
*L. Wang**

Transported velocity-composition PDF scalar-flux modelling: contribution of different mixing models
B. Naud, D. Roekaerts*

Forcing Schemes for The Direct Numerical Simulation of Atmospheric Cloud Microphysics
*F. Ladeinde**

Deposition of Aerosols Conveyed by a Turbulent Channel Flow: Asymptotic Analysis Coupled to DNS
P. Garcia-Ybarra, A. Pinelli*

Eulerian MonteCarlo methods for the joint statistics of velocity and scalar fields
K. Letaiev, L. Valiño, J. Hierro, R. Mustata, R. Soriano*

04/06/2024 | 17:00 - 19:00 **Computational Methods for Inverse Problems II**	MS018B Room: Auditorium III Chaired by: Prof. Haim Waisman (Columbia University, United States), Prof. Dan Givoli (Technion - Israel Institute of Technology, Israel)

A Novel Trefftz-Based Computational Strategy for Solving Wave Propagation Problems
H. Barucq, R. Djelouli, I. Djiba, S. Tordeux*

All-at-Once and Reduced Calibration Approach in Computational Solid Mechanics
J. Tröger, S. Hartmann, D. Anton, H. Wessels, U. Römer*

Bayesian identification of constitutive laws using full-field displacements
A. Jafari, K. Vlachas, E. Chatzi, J. Unger*

Bayesian inference of the model parameters of a microfluidic acoustic flow
J. Lorente-Macias, M. Juniper*

FRF based ROM for Lamb Wave based damage localization with multiple defects
P. Sieber, K. Agathos, R. Soman, W. Ostachowicz, E. Chatzi*

04/06/2024 | 17:00 - 19:00 **Computational Cardiology: Modeling and Simulating the Heart II**	MS089B Room: Auditorium IV Chaired by: Mr. Michele Bucelli (Politecnico di Milano, Italy)

A computational approach to assess atrial flow patterns in patients with atrial fibrillation (Keynote Lecture)
J. Dueñas-Pamplona, S. Rodríguez-Aparicio, C. Ferrera, J. Sierra-Pallares, J. García*

On The Numerical Simulation Of Left Ventricle Models
E. Lazpita, M. Nagargoje, S. Le Clainche, J. Garicano-Mena*

Patient-Specific Image Reconstruction and CFD Modeling of the Right Heart for the Repaired Tetralogy of Fallot
F. Renzi, M. Fedele, G. Puppini, G. Luciani, C. Vergara*

Effects of wall motion reconstruction in patient-specific CFD simulations of left atrial blood flow
Y. Stöcker, C. Augustin, M. Guerrero-Hurtado, E. Durán, A. Gonzalo, P. Martinez-Legazpi, J. Bermejo, N. Akoum, P. Boyle, O. Flores, J. del Alamo, M. García-Villalba*

Myocardial infarction risk assessment by numerical approximation of haemodynamic–based indices in coronary arteries
F. Marcinno', J. Hinz, A. Buffa, S. Deparis*

04/06/2024 | 17:00 - 19:00 **Modelling and Simulation for Additive Manufacturing VI**	MS207F Room: Auditorium VI Chaired by: Prof. Jesper Hattel (Danmarks Tekniske Universitet (DTU), Denmark), Dr. Andreas Lundbäck (Luleå University of Technology, Sweden)

Numerical Based Optimisation of Preheating and Powder Sintering in Electron Beam Powder Bed Fusion
J. Böhm, C. Breuning, M. Markl, C. Körner*

Development of Optimal L-PBF Process Parameters using an Accelerated Discrete Element Simulation Framework
M. Aarab, J. Remmers, S. Poelsma*

Numerical Analysis of In-Situ Cooling Strategies in Wire Arc Additive Manufacturing for Enhanced Process Efficiency
T. Reindl, N. Hempel, P. Mayr*

Weight Optimization Using Design Topology And Multi-Materials for AM Application in MULTHEM Project
E. Pei, A. Azeem Islam, M. Alvarez-Leal, J. Ureña, V. Modi, J. Soler, J. Solleiro Rodriguez*

Identifying Material Parameters in Spark Plasma Sintering Simulation Using a Two-Stage Approach
A. Kumar, M. Afrasiabi, M. Bambach*

Predicting Extrusion Rate to Investigate Multiscale Mechanical Size Effects of 3D-Printed Polymer
X. Zhang, M. Lesueur*

04/06/2024 | 17:00 - 19:00 **Open-Source Software in Mechanics II**	MS126B Room: Auditorium VII Chaired by: Dr. Tzanio Kolev (Lawrence Livermore National Laboratory, United States), Dr. Andrei Shvarts (James Watt School of Engineering, University of Glasgow, United Kingdom

Cast3M, a problem-solving software for structural and fluid analysis
S. Gounand, P. Verpeaux, S. Pascal, F. Di Paola, C. Berthinier*

Streamlining Your Data-driven Process with f3dasm
M. van der Schelling, B. Ferreira, D. Toshniwal, M. Bessa*

Tamaas, a High-Performance Open-Source Library for Rough Contacts
*L. Frérot**

FreeFEM: a high-level DSL for multi-physics simulations
*F. Hecht, P. Jolivet, F. Nataf, P. Tournier**

An open-source framework for physics-based algebraic multigrid block preconditioners in MueLu
M. Firmbach, M. Mayr*

Scalable High Order Finite Elements with MFEM
*T. Kolev**

04/06/2024 | 17:00 - 19:00 **Multiscale Computational Homogenization for bridging scales in the mechanics and physics of complex materials I**	MS009A Room: Auditorium VIII Chaired by: Prof. Julien Yvonnet (Universite Gustave Eiffel, France)

Towards Quantum Computational Mechanics
F. Cirak, B. Liu, M. Ortiz*

Training Efficiency and Accuracy Improvement Strategies for Reduced Order Homogenization
*A. Nasirov, C. Oskay**

Multiscale hyperreduced-order modeling of heterogeneous structures using the Empirical Interscale Finite Element Method (EIFEM)
J. HERNÁNDEZ, A. GIULIODORI, E. SOUDAH*

Applications of a general framework for the data-driven multiscale simulation of complex flow problems
J. Gimenez, A. Franci, R. Rangel, E. Oñate, S. Idelsohn*

A Machine Learning Based Multiscale Approach to the Prediction of the Anisotropic Damage of Structures
Z. Chafia, J. Yvonnet, J. Bleyer*

Self-Supervised Physics-Informed Surrogate Model for Elastic Local Fields in Polycrystals
L. Monteiro Fernandes, S. Blusseau, P. Rieder, H. Proudhon, M. Neumann, V. Schmidt, F. Willot*

04/06/2024 | 17:00 - 19:00 **Kinetic-based Computational Fluid Dynamics for Continuum and Rarefied Flows II**	MS192B Room: Terrace Chaired by: Prof. Sharath Girimaji (Texas A&M University, United States), Prof. A Sameen (Indian Institute of Technology Madras, India)

Kinetic theory based methods for instability and turbulence computations at different speed regimes
*S. Girimaji**

Scale-Space Interactions in Shock Dominant Flows
A. P, S. A, K. Endale Haile, V. Mohan, A. S*

Effect of compressibility and rarefaction on Kelvin-Helmholtz instability
V. Mohan, A. Sameen, B. Srinivasan, S. Girimaji*

Estimating Relative Permeability Curves Using The Single-Phase Lattice Boltzmann Method
L. dos Santos, D. Siebert, R. Bazarin*

Discrete Unified Gas Kinetic Scheme for MHD Flows - an Implementation in OpenFOAM
J. de Lima Costa Salazar, D. Nardelli Siebert, E. de Carli da Silva, L. Emerich dos Santos*

04/06/2024 | 17:00 - 19:00 **Computational Biomechanics and Applications I**	MS158A Room: 3A Chaired by: Prof. Paulo Fernandes (IDMEC, Instituto Superior Técnico, Universidade de Lisboa, Portugal)

Examining the Influence of Dependent Parameters on Biomechanical Models with Global Sensitivity Analysis
S. Brandstaeter, A. Popp*

Phase Field Methods: Application to Bone Remodeling
O. Bhandari, L. Silva, G. Legrain, H. Digonnet*

Human Exhaled Breath Physics Based User Identification
M. Karunanethy, R. Tripathi, M. Panchagnula, R. Rengaswamy*

A Holistic Mechanical Perspective of Pregnancy Before The Onset of Labor
D. Fidalgo, R. Jorge, M. Parente, E. Louwagie, E. Malanowska, K. Myers, D. Oliveira*

Localised Antimicrobial Treatment for Implant Infection
P. Mandal, N. Mottram, S. McGinty*

Predicting Pelvic Floor Stretch during Childbirth: a Machine Learning Framework
R. Moura, D. Oliveira, M. Parente, R. Natal Jorge*

04/06/2024 | 17:00 - 19:00 **Efficient CAD-based discretization methods I**	MS064A Room: 3B Chaired by: Prof. Mattia Tani (, Italy)

On Dual-Primal Tearing and Interconnecting for 3-D Magnetostatics
M. Mally, B. Kapidani, M. Merkel, S. Schöps*

Unlocking Schemes Independent of the Discretization Method
T. Vinod Kumar Mitruka, E. Ramm, M. Bischoff*

Optimal Macroscopic Structural Designs based on Microstructures
K. Key, J. Zwar, A. Synek, D. Pahr, G. Elber, S. Elgeti*

Low-order preconditioner of matrix-free solver for isogeometric analysis of lattices
C. Guillet, T. Hirschler, P. Jolivet, R. Bouclier*

Tearing and interconnecting reduced order models for the efficient shape optimization of lattice structures
T. Hirschler, M. Chasapi, P. Antolin, A. Buffa*

04/06/2024 | 17:00 - 19:00 **Mechanics of Wood and Biocomposites in Engineering I**	MS032A Room: 3C Chaired by: Dr. Markus Königsberger (TU Wien, Austria), Dr. Ani Khaloian (Technical University of Munich, Germany)

A thermo-hygro-mechanically coupled material model for paper and paperboard
N. Kopic-Osmanovic, H. Schubert, S. Rief, J. Orlik, H. Andrä, M. Hauptmann, J. Simon*

Hygro-mechanical Model for Bamboo to Simulate its Swelling Behaviour
L. Molari, L. do Amaral, H. Savastano Jr.*

X-ray Computed Tomography-based Multi-phase Model for Moisture Transport in Wood and analysis of cell wall deformations
R. Dsouza, S. Fortino, A. Miettinen, T. Harjupatana*

PEG Treatment of Archaeological Wood Studied by Molecular Dynamics
A. Shomali, J. Carmeliet, D. Derome*

04/06/2024 | 17:00 - 19:00 **Recent Advances of Computational Methods in Cardiovascular and Cerebrovascular Biomechanics I**	MS039A Room: 5A Chaired by: Prof. Sónia Pinto (Engineering Faculty of University of Porto (FEUP), Portugal), Prof. Rosaire Mongrain (McGill University, Canada)

Numerical Simulations of new DES: non-Newtonian and Time Dependent Analysis
R. Mongrain, J. poulton, H. Valtchanov, R. Leask*

Mesh Morphing in Computational Fluid Dynamics and Fluid-Structure Interaction Comparison in Ascending Thoracic Aortic Aneurysms
R. Valente, A. Mourato, M. Brito, J. Xavier, S. Avril, A. Tomás, J. Fragata*

Fluid-Structure Interaction Analysis of Ascending Thoracic Aortic Aneurysms: a Comparison of Prestressing Algorithms
A. Mourato, R. Valente, M. Brito, J. Xavier, S. Avril, A. Tomás, J. Fragata*

Skeleton-based Block-structured Mesh Generation of Vascular Domains
D. Bosnjak, T. Fries*

Computationally enhanced processing of 4D flow MRI for intracardiac diagnostics
*A. Singh, B. Meyers, Y. Loke, P. Vlachos**

Perfusion Analysis Of Bio-Fluid Mechanics Of Cerebrovascular Disease And Stroke
*A. SHRIVASTAVA**

04/06/2024 | 17:00 - 19:00 **Isogeometric Methods VI**	MS010F Room: 5B Chaired by: Prof. Giancarlo Sangalli (University of Pavia, Italy, Italy), Prof. Alessandro Reali (University of Pavia, Italy)

An Embedded Mesh Approach for Coupling Tailored Isogeometric and Finite Element Meshes for Contact Problems
E. Loera Villeda, I. Steinbrecher, A. Popp*

Efficient Quadratures for Potential Problems in Boundary Element Method
*T. Kanduc**

Hierarchical matrices for fast multi-patch IgA--BEMs
*L. Desiderio, G. D'Inverno, M. Sampoli, A. Sestini**

An extended isogeometric boundary element formulation for three-dimensional crack growth analysis
M. Rocha, E. Leonel, J. Trevelyan*

Broken-FEEC schemes on multipatch spline spaces with non-conforming refinement
F. Schnack, M. Campos Pinto*

04/06/2024 | 17:00 - 19:00 **Numerical simulations of wind turbines and windfarms II**	MS056B Room: 5C Chaired by: Prof. Xesús Nogueira (Universidade da Coruña, Spain), Dr. Esteban Ferrer (Universidad Politécnica de Madrid, Spain)

Multi-fidelity Bayesian Optimisation for Wind Farms
A. Mole, S. Laizet*

Investigating the usability of physics informed machine learning approaches for wind farm planning
Z. Lakdawala, W. Nadeem, M. Doerenkaemper*

Enhancing Wind Farm Efficiency in Complex Terrain: A Bayesian Optimisation based on Large Eddy Simulations
C. Jane-Ippel, N. Bempedelis, R. Palacios, S. Laizet*

On the improvement of closure models in Reynolds-averaged simulations of wind farms
*N. Zehtabiyan-Rezaie**

Numerical Investigation of the Effect of Ground Obstacles on Wind Turbine Wakes
*B. Carmo**

04/06/2024 | 17:00 - 19:00 **Numerical Methods for the Multiphysics Modeling of Brain Function I**	MS116A Room: 0.06 Chaired by: Dr. Ivan Fumagalli (Politecnico di Milano, Italy), Prof. Kent-Andre Mardal (University of Oslo / Simula Research Laboratory, Norway)

Multiphysics Models of Cerebral Blood Flow Regulation
*S. Payne**

Finite Element Approximation of Reaction-Diffusion Equations on Metric Graphs and its Application to the Modeling of Tau Propagation in Alzheimer's Disease
*A. Weller**, A. Kunoth

Efficient and scalable solvers for a cell-by-cell dual-poroelasticity problem
*M. Causemann**, M. Kuchta

Mathematical modeling of axonal morphoelasticity: Cytoskeletal disruption and active elasticity in neurological disorders
*D. Riccobelli**

A high-order Discontinuous Galerkin method for the numerical modeling of epileptic seizures
*C. Leimer Saglio**, S. Pagani, M. Corti, P. Antonietti

Modelling of Signal Processing in Neurons
*G. Wittum**

04/06/2024 | 17:00 - 19:00 **The impact of Multi-Disciplinary Optimization, Artificial Intelligence and Uncertainty Quantification for a Greener Aviation and Transport system I**	STS267A Room: 0.07 Chaired by: Dr. Alberto Clarich (Esteco SpA, Italy), Eng. Luca Battaglia (ESTECO, Italy)

Regularized Reduced Order Models for Convection-Dominated Flow Simulation: Stabilization, Prediction, Sensitivity and Control
*M. Strazzullo**

Bayesian multidisciplinary optimization of transonic strut-braced wing aircraft based on multi-fidelity reduced order surrogate model
*S. Mori**, *M. Balesdent, L. Brevault, S. Dubreuil, C. Liauzun*

Uncertainty Quantification Method Based On Reduced Order Models For Aeronautics
*L. Battaglia**, *A. Clarich, R. Russo*

Modeling of 3D Printed Soft Pneumatic Actuators
*L. Torzini, L. Governi, L. Puggelli, F. buonamici**

Fundamental Thermoelastic Behavior Modeling for L-PBF Additive Manufacturing
*J. Jeronen**, *T. Tuovinen, M. Kurki*

04/06/2024 | 17:00 - 19:00 **High Aspect Ratio Wing Design and Development for Short- and Medium Range Aircraft II**	STS271B Room: 0.08 Chaired by: Dr. Jos VANKAN (NLR, Netherlands), Dr. Bruno Stefes (Airbus Operations GmbH, Germany)

Multifunctional active vortex generators
*P. Vitagliano, B. Galasso, F. Capizzano, P. Catalano, F. D'Aniello, D. de Rosa, G. Mingione**, *C. Izzo, A. Concilio, S. Ameduri, L. Marino, J. Sodja*

Ultra-Performing Wing And Virtual Product Integration
*V. Schmitz**, *M. Krengel*

Enhanced damage tolerance allowables for improved composite wing sizing
*T. Wille**, *R. Bogenfeld, A. Schuster, S. Dähne, T. Wunderlich*

Integration of advanced propulsion and future energy carriers for sustainable aviation
*J. Friedrichs**, *S. Karpuk*

UNICADO – an Academic Conceptual Aircraft Design Environment for Research and Education
*E. Stumpf**, *M. Hornung, A. Bardenhagen, V. Gollnick, I. Staack, A. Strohmayer*

04/06/2024 | 17:00 - 19:00 **Novel Computational Techniques for Masonry Mechanics II**	MS106B Room: 1.02 Chaired by: Dr. Francesco Messali (Delft University of Technology, Netherlands), Prof. Francesca Nerilli (University Niccolò Cusano, Rome, Italy)

Nonlinear analysis of in-plane loaded masonry walls using an assumed-stress finite element and a single surface strength domain
G. Bertani, A. Bilotta, A. D'Altri, S. de Miranda, F. Liguori, A. Madeo*

On the Simulation of Rocking Blocks by means of Algorithmic Dissipation
A. D'Altri, G. Vlachakis, S. de Miranda, P. Lourenço*

Challenges in the dynamic analysis of masonry walls using block-based Finite Element interface models
A. Ghezelbash, F. Messali, A. D'Altri, J. Rots*

2D Discrete Numerical Modelling of a Masonry Wall under Cyclic Shear Loading: Incorporating Plasticity in a Frictional Cohesive Zone Model
A. Boukham, T. Parent, S. Morel, F. Dubois, J. Mindeguia*

Lagrangian- and NURBS-based finite element analysis of masonry domes
F. Nerilli, F. Roscini, E. Sacco*

04/06/2024 | 17:00 - 19:00 **Active and Passive Mechanics in Patient-Specific Modelling of Soft Biological Tissues II**	MS096B Room: 1.03 Chaired by: Prof. Anna Pandolfi (Politecnico di Milano, Italy), Mr. Luca Dede (Politecnico di Milano, Italy)

Modeling fibrotic Remodeling in Desmoplakin Cardiomyopathy
*J. Jilberto, A. Helms, D. Nordsletten**

A revisit of a viscoelasticity theory
*J. Liu**

Inference of growth pattern from experimental measurements
J. Munoz, C. Olivesi*

Modelling the active and passive behavior of fiber reinforced biological tissues
A. Pandolfi, A. Bonfanti, K. Lucon*

04/06/2024 | 17:00 - 19:00 **Bridging Machine Learning and Physics: Advancements in Continuum Mechanics and Transport Phenomena I**	MS220A Room: 1.04 MS Corresponding Organizer: Phd. M. Giselle Fernández-Godino (Lawrence Livermore National Laboratory)

Neural Galerkin schemes for model reduction of transport-dominated problems
*J. Berman, P. Schwerdtner, Y. Wen, B. Peherstorfer**

Physics-Informed Data-Driven Discovery of Quantities of Interest and Their Governing Equations
J. Bakarji, J. Callaham, N. Kutz, S. Brunton*

3D Volumetric Temporal Super-Resolution Models for Transport Phenomena
M. Fernández-Godino, W. Chung, D. Lucas, M. Ihme*

Inverse Problems for Shallow-Water Equations solved by Physics-Informed Machine Learning methods
H. Boulenc, J. Monnier, P. Garambois, R. Bouclier*

04/06/2024 | 17:00 - 19:00 **Cutting-edge model order reduction techniques for computational fluid dynamics III**	MS220A Room: 1.05 Chaired by: Dr. Davide Torlo (Università di Roma La Sapienza, Italy)

Towards an Arbitrary Lagrangian Eulerian MOR framework for advection dominated problems (Keynote Lecture)
M. Nonino, D. Torlo, G. Rozza*

Analysis of turbulent flows via robust spectral proper orthogonal decomposition
A. Colanera, O. Schmidt, M. Chiatto*

Numerical Analysis of Evolve Filter Relax Reduced Order Models (ERF-ROMs)
J. Reyes, M. Strazzullo, T. Iliescu, C. Canuto*

Accurate and robust predictions via an adaptive, hybrid FOM/ROM approach
*S. Riffaud**

04/06/2024 | 17:00 - 19:00 **Computational & Data-Driven Approaches for Turbulent Dynamical Systems I**	MS029A Room: 1.06 Chaired by: Dr. Fernando Garcia (Universitat Politècnica de Catalunya, Spain)

Data-Driven fast urban flow predictions featuring extreme events
J. Calafell, J. Bustillo, S. Gómez, F. Ramírez, O. Lehmkuhl*

Information-Theoretic Characterization of Turbulence Intermittency
R. Das, S. Sarkar*

Data-Driven Calibration of RANS Transition Models with Deep Learning
J. Capel Jorquera, M. Chávez Módena, L. González Gutiérrez, E. Valero Sánchez*

Spatio-Temporal Analysis of the Structures in High-Pressure Transcritical Fluid Flows
G. Barea, L. Jofre*

Data-Driven Acceleration of Statistical Convergence in Turbulent Flows
N. Masclans, L. Jofre*

Dynamics of Secondary Motions in Buoyant High-Pressure Transcritical Duct Flows
C. Monteiro, L. Jofre*

04/06/2024 | 17:00 - 19:00 **Robust and accurate discretizations for nonlinear PDEs III**	MS023C Room: 1.07 Chaired by: Prof. Andrew Winters (Linköping University, Sweden), Mr. Patrick Ersing (Linköping University, Sweden)

Proximal Galerkin: A structure-preserving finite element method for pointwise bound constraints
B. Keith, T. Surowiec*

A uniformly hp-stable element for the stress complex
F. Aznaran, K. Hu, C. Parker*

A finite volume scheme accurate at low Mach number on quadrangular mesh by space velocity enrichment
J. Jung, V. Perrier*

Anisotropic quad dominant mesh adaptations for high-order Discontinuous Galerkin methods
D. Kain, G. Venugopal, A. Balan, A. Rangarajan, G. May*

High-Fidelity Film-Cooled Rotor High Pressure Turbine Simulation using Metric-Based Anisotropic Mesh Adaptation
F. Alauzet, E. Parente, A. Remigi*

04/06/2024 | 17:00 - 19:00 **Computational Challenges in Industry and Sustainable Development: Sampling, Surrogate and Multi-fidelity Models for Inverse Analysis, Uncertainty Quantification and Optimisation II**	MS103B Room: 1.08 Chaired by: Dr. Matteo Giacomini (CIMNE - Universitat Politècnica de Catalunya, Barcelona, Spain), Dr. Lorenzo Tamellini (CNR, Italy)

Probabilistic Forecast of the Day-Ahead Electricity Consumption Profile with Stochastic Differential Equations
R. Saporiti, F. Nobile, C. Pareja*

Modeling and Uncertainty Quantification of Velocity Fluctuations for Derivation of Automotive Component Loads
P. Strähle, S. Wolff-Vorbeck, T. Leyendecker, C. Proppe*

Using Bayesian Optimization for Cavity Shape Optimization in Injection Molding to Compensate for Shrinkage and Warpage
S. Tillmann, S. Elgeti*

Sustainable Manufacturing via Robust Optimization and Tailored Scatter
*O. Nejadseyfi**

Application of NURBS-based Metamodel to Fused Deposition Modeling 3D Printing Process
M. Zani, M. Carraturo, E. Panettieri, P. Marin, F. Auricchio, M. Montemurro*

Data-informed uncertainty quantification for laser-based powder bed fusion additive manufacturing by multi-fidelity surrogate modeling
M. Chiappetta, C. Piazzola, L. Tamellini, A. Reali, F. Auricchio, M. Carraturo*

04/06/2024 | 17:00 - 19:00 **Simulations of Polymers and Polymer Composites from Petrol and Biological Sources III**	MS118C Room: 1.09 Chaired by: Mx. Lukas Laubert (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany), Dr. Fabrice Detrez (University Gustave Eiffel, France)

Fast Estimation of Intralaminar Fracture Properties and Shear Hardening Law for Fibre-Reinforced Composites
E. Dinler, I. Lopes, C. Furtado, P. Camanho*

Microscale Modeling of Fatigue in Thermoplastic Composites
*D. Kovacevic, P. Hofman, I. Rocha, F. van der Meer**

Modelling the Microscopic Behaviour of Fibre-reinforced Composites with Strain Gradient Plasticity
I. Rodrigues Lopes, N. Klavzer, C. Furtado, F. Pires, P. Camanho, T. Pardoen*

Crashworthiness design using novel composite materials and an innovative analytical tool
P. Silva Campos, D. Dalli, D. Mateus, D. Moreira, I. Rodrigues Lopes, T. Duarte, A. Arteiro, L. Vigna, A. Calzolari*

Numerical Modelling of Multi-ply Polymeric Cords
L. Pires da Costa, M. Moscatelli, P. Caracino, G. Novati, C. Comi*

04/06/2024 | 17:00 - 19:00 **New Trends In The Mathematical And Numerical Aspects Of Fluid-Structure Interaction III**	MS209C Room: 1.10 Chaired by: Dr. Miguel A. Fernández (Inria, France), Ms. Marina Vidrascu (INRIA & LJLL (Sorbonne Université CNRS), France)

A Combined Linear Poroelastic Model With Diffusion Optics for Photoplethysmography Simulations of Skin Perfusion
A. Lefieux, F. Vergnet, M. Vidrascu, A. Bendjoudi, M. Willemet, J. Daraize, D. Lombardi, M. Fernández*

A numerical study of fluid-structure interactions for a flexible flap in turbulent flow
T. Bano, M. Heinrich, R. Schwarze*

Numerical Simulation of Fluid-Structure Interaction in the Left Heart with Reduced Valve Modeling
O. Ruz, J. Diaz, M. Vidrascu, D. Chapelle, P. Moireau, M. Fernández*

04/06/2024 | 17:00 - 19:00 **Adaptive and Compliant Engineering Structures II**	MS031B Room: 1.11 Chaired by: Prof. Ann Sychterz (University of Illinois Urbana-Champaign, United States), Dr. Malte von Scheven (University of Stuttgart, Germany)

Adaptive Exoskeleton Systems for High - Rise Buildings
F. Virgili, A. Zeller, M. Böhm, G. Senatore*

Offline and Online Performance Contrast of Optimal Control
M. Miah, W. Lienhart*

Retrofitting a tied-arch bridge with adaptive elements
A. Trautwein, M. Bischoff*

Data-Centric Approaches for Adaptive Vibration Control Systems Incorporating Superelastic Shape Memory Alloys
N. Lenzen, O. Altay*

04/06/2024 | 17:00 - 19:00 **High-Fidelity Modelling of Flows in Manufacturing Processes I**	MS019A Room: 1.12 Chaired by: Prof. Julien Bruchon (Mines Saint-Étienne, France), Prof. Luisa Silva (Ecole Centrale de Nantes, France)

Multi-scale Interface Tracking in Two-phase Fluid Flow in the Porous Media
S. Kperegueni, C. PARK, M. Shakoor*

Numerical Simulation Of Dual-Scale Flow In 3D Interlock Fabrics With Consideration Of Capillary Effects
M. Cataldi, N. Moulin, Y. Wielhorski, A. Parret-Fréaud, M. Pucci, P. Liotier*

Modeling and Numerical Simulation of the Rotomolding Process for Pressurized Hydrogen Storage Tank Liners
G. Barakat, L. Silva, C. Binetruy, H. Digonnet, J. Cabillic*

Understanding Continuous Mixing Using Advanced DEM Simulations
M. Trogrlic, P. Boehling, D. Jajcevic, J. Khinast, P. Doshi, J. Pasko, J. Meyer, K. Iyer, S. Lathorp, D. Blackwood, P. Liu*

Evaluation of the Extrusion Process of a Part by Numerical Computer Simulation
D. Serrão, F. Carneiro, Â. Marques, P. Sousa, J. Ribeiro, M. Nóbrega*

04/06/2024 | 17:00 - 19:00 **Advanced Discretization Schemes and Solution Strategies for Computational Structural Dynamics III**	MS203C Room: 1.13 Chaired by: Prof. Manfred Bischoff (University of Stuttgart), Prof. Bastian Oesterle (Hamburg University of Technology, Germany)

Mixed-dimensional beam-to-solid contact interaction
I. Steinbrecher, C. Meier, A. Popp*

Stress-displacement stabilised finite element analysis of thin structures using solid-shell elements
R. Codina, A. Aguirre, J. Baiges, I. Castañar*

Interlaminar stress analysis in a simple multi-layer Kirchhoff-Love shell element: An equilibrium based approach
*G. Gomes, P. Pimenta**

An objective formulation for the analysis of elastic articulated structures
M. Cuomo, L. Greco, D. Castello*

Seismic Performance Assessment of Bouçã Arch Dam. Non-Linear Analysis Considering Joint Movements and Concrete Damage Under Tension and Compression
A. Alegre, S. Oliveira, C. Serra, R. Ramos*

04/06/2024 | 17:00 - 19:00 **Advances in Computational Mathematics II**	MS015B Room: 1.14 Chaired by: Dr. Nelson Gonçalves (INEGI, Portugal), Dr. Célio Fernandes (University of Porto, Portugal)

A modified FC-Gram based on two point Hermite polynomial
P. Nainwal, A. Anand*

Entropy stable subcell shock capturing scheme for high-order discontinuous Galerkin methods on moving meshes
A. Schwarz, A. Beck*

ManiFEM, a C++ library for mesh generation and finite elements
C. Barbarosie, A. Toader*

Quasi Gasdynamic Heterogeneous Model for Modeling a Mixture of Compressible Fluids
I. Khaytaliev, E. Shilnikov, T. Elizarova*

04/06/2024 | 17:00 - 19:00 **Optimization Problems in Computational Mechanics: from Material Design to Structural Analysis III**	MS112C Room: 1.15 Chaired by: Dr. Luis Carlos M. da Silva (Politecnico di Milano, Portugal), Prof. Andrea Chiozzi (University of Ferrara, Italy)

Multiscale Optimization for Programming Material Behavior
A. Leichner, C. Chu, H. Andrä, F. Wenz, C. Eberl*

On the embedding of nonlinear multipoint constraints in the finite element method
J. Wackerfuß, J. Boungard*

Alternative Reduced-Dimension Strategy for Obtaining Adaptive Constraints in FETI-DP
T. Medřický, A. Heinlein, M. Doškář*

An equilibrium finite element formulation for reinforced concrete
M. Ferradi, A. Fliscounakis, M. Arquier*

Simulation of pushout tests with defects and modelling using response surface methodology
M. Debuisne, L. Davenne, L. Jason*

04/06/2024 | 17:00 - 19:00 **Discrete Element Method Simulations of Pharmaceutical Processes I**	MS175A Room: 2.01 MS Corresponding Organizer: Dr. Peter Böhling (RCPE GmbH)

Modeling of Pharmaceutical Agitated Filter Drying: DEM Simulations of Particle Mixing and Heat Transfer
*P. Chaksmithanont, C. Hartmanshenn, C. Leung, J. Khinast, B. Glasser**

Tailored Characterization Testing: A DEM Case Study for Bin Blending
F. Mostafaei, J. Khinast, T. Forgber*

Exploring A Continuous Film Coating Proces with Advanced Simulations
P. Böhling, J. Khinast, D. Jacevic, M. Trogrlic, P. Doshi, D. Blackwood, P. Liu, M. Moreno-Benito*

04/06/2024 | 17:00 - 19:00 **Advancements in Offshore Wind Structures I**	MS020A Room: 2.02 Chaired by: Dr. Andreas Kampitsis (Aristotle University of Thessaloniki, Greece), Ms. Olga Sapountzaki (National Technical University of Athens, Greece)

Innovative Pentamode Bearings with Polymer Matrix Composites – Application to Wind Turbines
O. Sapountzaki, N. Lagaros*

Advancements in Offshore Wind Turbine Structural Monitoring: A Semi-Supervised Methodology for Efficient Damage Detection
J. Leon Medina, N. Parés, F. Pozo*

Offshore Wind Turbines with Optimised Vibration Control Systems
A. Kampitsis, K. Kapasakalis, A. Gkikakis, E. Sapountzakis*

Raindrop Impact Modeling on Wind Turbine Blades: Predicting Erosion and Debonding in Multi-Layered Structures
N. Kuthe, P. Mahajan, L. Mishnaevsky Jr, S. Ahmad*

A Fluid-Solid Coupled Micromechanical Simulation of Piping Erosion During the Installation of a Suction Bucket for the Foundation of an Offshore Wind Turbine
S. Kemmler, P. Cuéllar, H. Köstler*

Numerical Simulations of Dynamic Stall for Wind Turbine Applications
A. Adeel Ur Rehman, J. Peinke, J. Theron, H. Kassem, B. Stoevesandt*

04/06/2024 | 17:00 - 19:00 **Advances in Solid Mechanics IV**	GS001D Room: 2.03 Chaired by: Dr. Andres Galvis (University of Portsmouth, United Kingdom)

A Beam Model for the Elastoplastic Analysis of Metal Structures Considering Normal Stress-Shear Stress Interaction and Warping
*D. Magisano, G. Garcea**

3d Reconstruction and Finite Element Modeling of Additively Manufactured Lattice Architectures
F. Han, K. Krishnan, H. AlQaydi, J. Oyebanji, N. Aboulkhair*

Homogeneity Measurement of Sn-Mg Alloy Using Image Processing
N. Tomar, P. S*

Modelling of calendering process in Li-ion batteries via continuum-discrete approach
A. Galvis, J. Foster*

Investigating cold compaction of Al-TiB2 and Al-SiC powder mixtures using finite element modeling validated by compaction experiments
A. Cohen, M. Goldenberg, Y. Gelbstein, N. Trabelsi, E. Priel*

Numerically Efficient Solution Methods Applied to Highly Nonlinear Variational Thermomechanical Models
H. Goldbeck, S. Wulfinghoff*

A hybrid quantum annealer-classical computer variational framework for elasto-plastic materials
*V. Nguyen, L. Wu, F. Remacle, L. Noels**

04/06/2024 | 17:00 - 19:00 **EYIC Junior Workshop ll**	EJWB Room: 0.01

Neural Topology Optimization: the future of inverse deesign
*M. Bessa**

Extracorporeal life support: Fluid dynamics for Life
*L. Prahl Wittberg**

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

Tuesday	10:30 - 12:30	14:30 - 16:30	17:00 - 19:00
Auditorium I	MS017G	MS005A	MS005B
Auditorium II	MS162A	MS162B	MS162C
Auditorium III	MS018C	MS018D	MS102A
Auditorium IV	MS089C	MS089D	MS040A
Auditorium VI	MS207G	MS059A	MS059B
Auditorium VII	MS126C	MS126D	MS068A
Auditorium VIII	MS009B	MS009C	MS009D
Terrace	MS192C	MS202A	MS202B
Room 3A	MS158B	MS158C	MS158D
Room 3B	MS064B	MS064C	MS064D
Room 3C	MS032B	MS032C	MS032D
Room 5A	MS039B	MS039C	MS039D
Room 5B	MS166A	MS166B	MS166C
Room 5C	MS056C	MS056D	MS035A
Room 0.06	MS013A	MS013B	MS186A
Room 0.07	STS239A	STS269A	STS269B
Room 0.08	STS234A	STS240A	STS240B
Room 1.02	MS069A	MS069B	MS069C
Room 1.03	MS026A	MS026B	MS160A
Room 1.04	MS220B	MS080A	MS080B
Room 1.05	MS163A	MS163B	MS163C
Room 1.06	MS029B	MS178A	MS178B
Room 1.07	MS012A	MS012B	MS012C
Room 1.08	MS103C	MS144A	MS144B
Room 1.09	MS047A	MS047B	MS047C
Room 1.10	MS165A	MS165B	MS133A
Room 1.11	MS043A	MS043B	MS105A
Room 1.12	MS121A	MS121B	MS081A
Room 1.13	MS168A	MS168B	MS168C
Room 1.14	MS205A	MS205B	MS154A
Room 1.15	MS119A	MS119B	MS199A
Room 2.01	MS131A	MS131B	MS099A
Room 2.02	MS067A	MS111A	MS115A
Room 2.03	GS001E	GS002A	GS002B
Room 2.04	MS184A	MS122A	MS147A
Room 2.05	MS034A		
Room 0.01	MS016G		

Wednesday, June 5th

05/06/2024 | 08:30 - 09:15 **Plenary Session IV**	PL04 Room: Auditorium I Chaired by: Prof. Trond Kvamsdal (Norwegian University of Science and Technology (NTNU), Norway)
Digital Representation of Blood in Biomedical Applications *M. Behr**	

05/06/2024 | 09:15 -10:00 **Plenary Session V**	PL05 Room: Auditorium I Chaired by: Prof. Carlos Silva (Instituto Superior Técnico/ University of Lisbon, Portugal)
Time Parallel Time Integration *M. Jakob Gander**	

10:00 - 10:30
Coffee Break

10:30 - 12:30 | TECHNICAL SESSIONS

05/06/2024 | 10:30 - 12:30
Phase Field Modeling and Computation VII

MS017G
Room: Auditorium I
Chaired by:
Prof. Harald van Brummelen (Eindhoven University of Technology, Netherlands), Dr. Marco ten Eikelder (TU Darmstadt, Germany)

A Bulk-Surface Continuum Theory for Fluid Flows and Phase Segregation
A. Boschman, L. Espath, K. van der Zee*

Diffuse-interface mixture flows: modeling and divergence-conforming discretization
M. ten Eikelder, K. van der Zee, D. Schillinger*

An immersed isogeometric Navier-Stokes-Cahn-Hilliard method based on a dissipation analysis as a guiding principle
S. Stoter, T. van Sluijs, H. van Brummelen, C. Verhoosel*

Triple junction benchmark for multiphase-field models combining capillary and bulk driving forces
S. Daubner, P. Hoffrogge, M. Minar, J. Eiken, D. Schneider, B. Nestler*

Multi-phase-field modeling and simulation of semi-solid solidification
*T. Takaki**

On Coupling between Gradient Elasticity and Cahn-Hilliard Type of Diffusion
A. Morozov, O. Kranzosch, S. Khakalo*

05/06/2024 | 10:30 - 12:30
Novel Methods and Algorithms in Topology Optimization: Bridging Design, Materials, Simulations, and Manufacturing I

MS162A
Room: Auditorium II
Chaired by:
Prof. Marco Montemurro (Arts et Métiers Sciences and Technologies, France), Prof. Julián Norato (University of Connecticut, United States)

Contact Problems In Topology Optimization By Third Medium Approaches (Keynote Lecture)
*A. Frederiksen, A. Dalklint, J. Alexandersen, K. Poulios, O. Sigmund**

Topology optimization of assembled structures by sequential density-based approach
D. Jantos, M. Kick, P. Junker*

Topology optimization of structures with stress and eigenvalues constraints. A minimun weight approach.
M. Rey, I. Couceiro, J. París, L. Ramirez*

Multi-component Topology Optimization Considering Self-locking Joints Using Interfacial Tensile Stress and Dimensional Constraints in Two Dimensions
*Y. FENG, T. YAMADA**

Reducing Residual Stresses in Additive Manufacturing by Space-time Topology Optimization
K. Wu, F. van Keulen, J. Wu*

05/06/2024 | 10:30 - 12:30 **Computational Methods for Inverse Problems III**	MS018C Room: Auditorium III Chaired by: Prof. Dan Givoli (Technion - Israel Institute of Technology, Israel), Prof. Haim Waisman (Columbia University, United States)

Conformal Geometry-Based Dimension Reduction for Shape and Topology Optimization on Free-Form Surfaces
*X. Xu, X. Gu, S. Chen**

Inverse design and physical realization of soft active materials
*X. Zhang, C. Wang**

Topology Optimization of Cross-Sectional Properties Considering Torsional and Warping Behavior
*C. Kostopoulos, A. Marzok, H. Waisman**

Applying Adjoints Twice: an Efficient Gradient Implementation for Models with Linear Structure with Applications in Reconstruction for Electron Probe Microanalysis
T. Claus, G. Achuda, S. Richter, M. Torrilhon*

Parameter Identification in Boundary Value Problems for Fiber Spinning
L. Kannengießer, N. Marheineke, R. Wegener*

05/06/2024 | 10:30 - 12:30 **Computational Cardiology: Modeling and Simulating the Heart III**	MS089C Room: Auditorium IV Chaired by: Dr. Elena Zappon (Medical University of Graz, Austria)

Electrophysiological mechanisms underlying ranolazine effects on the arrhythmic substrate in hypertrophic cardiomyopathy
J. Coleman, R. Doste, B. Raman, A. Bueno-Orovio*

Cardiac Electrophysiology at Microscopic Level: Scalable Preconditioners and Parallel Solvers
*N. Huynh**

The Role of Computational Methods in Understanding Cardiac Electrogram Genesis on a Cell-by-Cell Scale
J. Steyer, F. Chegini, M. Potse, T. Starý, A. Loewe, M. Weiser*

In-Silico study on the Dynamics of Atrial Fibrillation: Evaluating the Effects of Different Fibrotic Remodelling in Low Voltage Areas.
C. Vidal Horrach, O. Jaffery, R. Hunter, S. Honarbakhsh, C. Roney*

A 3D multi-scale cardiac electromechanical model for the investigation of Heart Failure
*E. Casoni, B. Trenor, A. Zingaro, M. Vazquez, J. Aguado-Sierra, S. Picó Cabiró**

05/06/2024 | 10:30 - 12:30 **Modelling and Simulation for Additive Manufacturing VII**	MS207G Room: Auditorium VI Chaired by: Dr. Andreas Lundbäck (Luleå University of Technology, Sweden), Prof. Jesper Hattel (Danmarks Tekniske Universitet (DTU), Denmark)

Machine Learning for The Qualification of Direct Energy Deposition Processes (Keynote Lecture)
M. Chiumenti, T. Herzog2, C. Moreira, A. Molotnikov, M. Caideco, R. Ramma, M. Cervera*

A highly efficient computational approach for fast scan-resolved simulations of metal additive manufacturing processes on the scale of real parts
S. Proell, P. Munch, M. Kronbichler, W. Wall, C. Meier*

Efficient multi-phase-field simulation method for predicting material microstructures in various scanning strategies of additive manufacturing
Y. Takahashi, S. Sakane, T. Takaki*

Fast Photopolymerization Simulation using the Laplace Transform Finite Element Method
N. Sanchez Martinez, O. van der Sluis, J. Remmers*

Simulation of additively manufactured glasses based on the Hamilton principle using Neigbor Element Methode (NEM)
T. Rudolf, M. Soleimani, T. Bode, P. Junker*

Multiphysics and Multiscale Computational Modelling and Experimental Studies on the Influence of Powder Size Distribution to Ti-6Al-4V Material Deposited by Cold Spray Additive Manufacturing
Z. Zhang, T. Ba, D. Seng, J. Pan, Z. Zhang, Z. Liu*

05/06/2024 | 10:30 - 12:30 **Open-Source Software in Mechanics III**	MS126C Room: Auditorium VII Chaired by: Dr. Vladislav Yastrebov (MINES Paris, PSL University, CNRS, France), Dr. Tzanio Kolev (Lawrence Livermore National Laboratory, United States)

AMITEX_FFTP, a Massively Parallel Solver for the Mechanical Simulation of Heterogeneous Materials.
*L. GELEBART**

Gridap.jl and PartitionedArrays.jl: Towards a fully-fledged high-performance finite element software stack in Julia
F. Verdugo, A. Andersen, J. Frazier, J. Meijer, Y. Tu*

DuoDIC and MultiDIC: Open-Source Software for 3D Digital Image Correlation and their Applications in Solid Mechanics
*D. Solav**

An Open Source Project for Dissemination of Computational Solid Mechanics (DCSM)
*G. Anciaux**

Ikarus and dune-iga: Easy-To-Use C++ Libraries With Python Bindings for Structural Analysis Within DUNE
H. Jakob, T. Vinod Kumar Mitruka, A. Müller*

Akantu: a finite element code for fracture and contact mechanics
N. Richart, G. Anciaux, J. Molinari*

05/06/2024 | 10:30 - 12:30 **Multiscale Computational Homogenization for bridging scales in the mechanics and physics of complex materials II**	MS009B Room: Auditorium VIII Chaired by: Prof. Caglar Oskay (Vanderbilt University, United States)

Cooperative data-driven modeling
M. Bessa, A. Dekhovich*

An Unsupervised Machine Learning Approach to Reduce Nonlinear FE2 Multiscale Calculations Using Macro Clustering
S. Chaouch, J. Yvonnet*

Leveraging Data-driven Modeling for Fast Computation of Cluster Interaction Tensors
B. Ferreira, M. Kukkola, M. Bessa*

RBF-based Surrogate Model for Computational Homogenization of Inelastic Composites at Finite Strain
A. Nakamura, Y. Yamanaka, K. Terada*

Effective MD-FEM Coupling Simulation Using Clustering Method
M. Kobayashi, Y. Terashima, M. Muramatsu*

Non-linear computational modeling of multilayered bending plates: The 2D+ multiscale approach
P. Wierna, D. Yago, O. Lloberas-Valls, A. Huespe, J. Oliver*

05/06/2024 | 10:30 - 12:30 **Kinetic-based Computational Fluid Dynamics for Continuum and Rarefied Flows III**	MS192C Room: Terrace Chaired by: Prof. Luoding Zhu (Indiana University - Purdue University Indianapolis, United States), Dr. Luiz Hegele (Santa Catarina State University, Brazil)

Outlet Boundary Conditions Using a Regularized lattice Boltzmann Method
*L. Hegele**

A general formulation for the slip velocity boundary condition in lattice Boltzmann methods
*G. Silva**

Computational models for osteocyte-interstitial-fluid interaction in bone
*J. Barber, N. Karimli, I. Manring, S. Boileau, R. Zigon, S. Na, H. Yokota, L. Zhu**

Gas Kinetic Simulations of Rayleigh-Taylor Instability
S. Majumder, D. Livescu, S. Girimaji*

05/06/2024 | 10:30 - 12:30 **Computational Biomechanics and Applications II**	MS158B Room: 3A Chaired by: Prof. Marco Parente (INEGI / FEUP, Portugal)

Theoretical and Computational Modeling to Investigate Buckling Characteristics of Epithelial Tissue
P. BAL, N. Chahare, M. Arroyo*

Finite Element Simulation of the Pseudophakic Eye
B. Raposo, R. Ruben, F. Ribeiro, A. Castro, P. Fernandes*

Primary stability of stemless shoulder implants: Influence of age-induced changes in bone density
H. Monteiro, J. Folgado, M. Antunes, M. Sarmento, C. Quental*

Optimization Strategies in 3D-Printed Cranial Bone Samples: Toward Accurate Identifcation of Viscoelastic Material Properties
L. Taenzer, P. Tiso, M. Leblond, L. Zambila, B. Van Damme*

The Influence of the Detection Method on the Results of Morphometric Analysis of Trabecular bone structure
*A. Gądek-Moszczak**

Computational modelling of biodegradable meshes for pelvic organ prolapse
F. Vaz, E. Silva, M. Parente, A. Augusto*

05/06/2024 | 10:30 - 12:30 **Efficient CAD-based discretization methods II**	MS064B Room: 3B Chaired by: Dr. Benjamin Marussig (, Austria)

phi-FEM: a fictitious domain finite element method on geometries defined by level-sets (Keynote Lecture)
M. Duprez, V. Lleras, A. Lozinski, K. Vuillemot*

Comparison of Integration Methods for Trimmed Elements
G. Teixeira, B. Marussig*

Immersed isogeometric analysis with boundary conformal quadrature for finite deformation problems
Y. Elbadry, P. Antolín, O. Weeger*

IGA linear static analysis of embedded shell structures through the Immersed Boundary-Conformal Method
G. Guarino, P. Antolin, A. Milazzo, A. Buffa*

IsoGeometric LaTIn Method: Efficient Simulation of Composite Microstructures with Multiple Non-linear Interfaces
*E. Lapina, P. Oumaziz, R. Bouclier**

05/06/2024 | 10:30 - 12:30 **Mechanics of Wood and Biocomposites in Engineering II**	MS032B Room: 3C Chaired by: Dr. Markus Königsberger (TU Wien, Austria), Dr. Ani Khaloian (Technical University of Munich, Germany)

Fast estimation of the moisture induced stress in glulam beam and identification of growth-ring influenc
T. Yu, A. Khaloian, J. van de kuilen*

Finite-Element-Based Prediciton of Moisture Uptake and Dry-Out in CLT caused by End-Grain Surface Infiltration
F. Brandstätter, M. Autengruber, M. Lukacevic, J. Füssl*

Finite Element Analysis of Bending Behaviour of Glulam Beams Reinforced with CFRP Plates
I. Glišović, M. Todorović, N. Simović, M. Pavlović*

Innovative metallic connectors for enhancing the structural performance of wooden beam-to-column joints
Y. Yeh, P. Yang*

Estimation of the Orthotropic Elastic Properties of Reinforced Laminated Vener Lumber Panels Through Vibration-Based Model Updating Techniques
A. Opazo-Vega, M. Nuñez-Decap, F. Benedetti*

Fire Performance of Wood–Steel Hybrid Elements: Finite Element Analysis and Experimental Validation
M. Abdelrahman, A. Khaloian-Sarnaghi, J. Van de Kuilen*

05/06/2024 | 10:30 - 12:30 **Recent Advances of Computational Methods in Cardiovascular and Cerebrovascular Biomechanics II**	MS039B Room: 5A Chaired by: Prof. Sónia Pinto (Engineering Faculty of University of Porto (FEUP), Portugal), Prof. Adélia Sequeira (CEMAT and Department of Mathematics, Instituto Superior Técnico, University of Lisbon, Av. Rovisco PaisAv. Rovisco Pais, 1, Portugal)

Multiscale Modeling and Simulation of Cardiovascular Flows (Keynote Lecture)
*A. Sequeira**

Fsi Modelling Of The Heart Valves In A Patient Specific Geometry By Smoothed Particle Hydrodynamics
*S. Laha, G. Fourtakas, P. Das, A. Keshmiri**

Fractional Flow Reserve Prediction Using In-House Computational Methods - Validation With Several Patient Cases
M. Fernandes, L. Sousa, C. António, S. Pinto*

Enhancing Coronary Artery Segmentation for Hemodynamic Simulations: A Semi-Automatic Approach
*J. Festas, L. Sousa, C. António, S. Pinto, S. Silva**

05/06/2024 | 10:30 - 12:30 **Advancing SCiML Surrogates via Numerical Methods and Vice Versa I**	MS166A Room: 5B Chaired by: Dr. Alexander Heinlein (TU Delft, Netherlands), Dr. Alena Kopanicakova (Brown University, United States)

Learning Adaptive Coarse Basis Functions of FETI-DP
*A. Klawonn, M. Lanser, J. Weber**

Training Deep Neural Networks Using Multilevel and Domain Decomposition Methods
*A. Kopanicakova**

Iterative algorithms for partitioned neural network approximation to partial differential equations
H. Kim, H. Yang, D. Jang, K. Kim, Y. Jeon*

Towards ExaScale Training: Domain Decomposition Methods for the Efficient Training of Neural Networks
R. Krause, S. Cruz, A. Kopanicakova, H. Kothari, K. Trotti*

Algorithm Switching for Multiobjective Derivative Free Optimization
*Z. Li, A. Kannan**

05/06/2024 | 10:30 - 12:30 **Numerical simulations of wind turbines and windfarms III**	MS056C Room: 5C Chaired by: Dr. Richard Stevens (University of Twente, Netherlands), Dr. Esteban Ferrer (Universidad Politécnica de Madrid, Spain)

Exploring the use of metamaterials to mitigate vortex induced vibrations of wind turbine blades
S. Gonzalez Horcas, D. Roca, E. Ortega, J. Cante*

Investigation of blockage effect in large wind farms using URANS and LES models
M. Avila, H. Owen, O. Lehmkuhl*

A Systematic Approach to Simulate Atmospheric Gravity Waves in Wind Farm Studies
M. Khan, M. Churchfield, S. Watson, D. Allaerts*

Towards a very high-order fluid-structure interaction framework based on the Chimera method
L. Edreira Marzoa, A. Fernández San Miguel, X. Nogueira Garea, I. Colominas Ezponda, L. Ramírez Palacios*

Investigation on wall-resolved and wall-modeled Large-Eddy Simulations of daytime Atmospheric Boundary Layers
T. Ridwan, J. Mellado, D. Pino, A. Montlaur*

05/06/2024 | 10:30 - 12:30 **Optimization Under Uncertainty of Nonlinear and/ or Transient Problems in Structural and Fluid Mechanics I**	MS013A Room: 0.06 Chaired by: Prof. Benedikt Kriegesmann (Hamburg University of Technology, Germany), Prof. Thomas Rung (Hamburg Univ. of Technology, Germany)

Investigations in Robust Topology Optimization of Assemblies Connected via Unilateral Contact-Constraints
T. Schmidt, R. Seifried*

Efficient Optimization of Crash-Loaded Structural Components with Uncertain Impact Position using Spatial Sensitivity Interpolation
T. Franke, L. von Corvin-Wiersbitzki, R. Bartz*

Structural representation methods in multi-material topology optimization of unsteady heat transfer problems
S. Ogawa, K. Yonekura, K. Suzuki*

Robust design optimization using a non-intrusive second-order fourth-moment method
J. Krüger, B. Kriegesmann*

Topology Optimization subject to Constraints on the Interface Stiffness Matrix
T. Wanninger, E. Gündoğan, M. Zimmermann*

Shape Optimization of the Thermoelastic Body Under Thermal Uncertainties
*M. Dambrine, G. Gargantini, H. Harbrecht, V. Karnaev**

05/06/2024 | 10:30 - 12:30 **Cold transportation I**	STS239A Room: 0.07 Chaired by: Prof. Pekka Neittaanmäki (LUT University, Finland)

Cold transportation systems and their impact on the environment
R. Tuovinen, K. Akimov, V. Akimova, P. Neittaanmäki*

Optimisation of Temperature-Controlled Transportation
K. Akimov, P. Neittaanmäki, V. Akimova, R. Tuovinen*

Artificial Intelligence in Temperature-Controlled Transportation
V. Akimova, P. Neittaanmäki, K. Akimov, R. Tuovinen*

The Role of Innovation in Adapting to Legal and Regulatory Changes as Europe Goes Green
I. Usvakangas, R. Tuovinen, P. Neittaanmäki*

Passive Cold Transportation Method
*J. Harjula, J. Proskin, V. Vähälä**

05/06/2024 | 10:30 - 12:30 **Drag Reduction for Transport Aircraft I**	STS234A Room: 0.08 Chaired by: Dr. Geza Schrauf (, Germany), Dr. Arne Seitz (DLR - German Aerospace Center, Germany)

Natural Laminar Flow at Cruise Mach Number 0.78: First Results of ETW Concept Verification Tests
*A. Seitz**

Aerodynamic design of a high-aspect ratio natural laminar wing for a new short and medium range aircraft
*J. Ruberte Bailo, A. Büscher, T. Streit, G. Schrauf**

Aernnova laminar technology demonstrators
*M. Castillo Acero**

Multidisciplinary optimization of load adaptive wings for highly efficient long-haul airliners
T. Wunderlich, S. Dähne*

Fuel Burn Efficiency Potential of Load Alleviation and Wing Planform Optimization in Conceptual Overall Aircraft Design
*M. Krengel**

05/06/2024 | 10:30 - 12:30 **Predictive Data-Driven Model Reduction and Discovery for Dynamical Systems I**	MS069A Room: 1.02 Chaired by: Prof. Andrea Manzoni (Politecnico di Milano, Italy)

Machine Learning for Scientific Discovery: with Examples in Fluid Mechanics (Keynote Lecture)
*S. Brunton**

Veni, VINDy, Vici: a variational method to build ROMs with embedded uncertainty quantification
P. Conti, J. Kneifl, A. Manzoni, A. Frangi, J. Fehr, S. Brunton, N. Kutz*

Trustworthy Scientific Machine Learning with SINDy and Ensemble Learning
*U. Fasel**

Data-Driven Sparse Sensing and Modeling Under Uncertainty
*K. Manohar**

Neural Operator-based symbolic model discovery
S. Garmaev, O. Fink*

05/06/2024 | 10:30 - 12:30 **Novel Advances in Numerical Methods for Wave Propagation Phenomena in Complex Media I**	MS026A Room: 1.03 Chaired by: Prof. Andrés Prieto (CITMAga - Universidade da Coruña, Spain), Prof. Luís Godinho (Universidade de Coimbra, Portugal)

Simulation of guided-waves propagation in 3D visco-elastic structures coupled with fluids using semi-analytical isogeometric analysis
*F. Seyfaddini, A. Chaboty, H. Nguyen-Xuan, P. Bélanger, G. Haiat, V. NGUYEN**

Efficient and accurate numerical modeling of ultrasonic wave scattering in polycrystalline materials using a space-discontinuous Galerkin framework
J. Victoria Giraldo, B. Tie*

Variational derivation of a mixed formulation of the linear viscoelastic model
R. Codina, F. Fantin, F. Piazzon, M. Putti*

Viscoelastic Wave Propagation in Heterogeneous Media: a Spectral Approach
N. Crescenzio, A. Larese, F. Piazzon, M. Putti*

Dispersion Characteristics of Fiber-Reinforced Prestretched Materials: A SAFE Approach
A. Patra, R. Sapru, M. Joglekar*

05/06/2024 | 10:30 - 12:30 **Bridging Machine Learning and Physics: Advancements in Continuum Mechanics and Transport Phenomena II**	MS220B Room: 1.04 MS Corresponding Organizer: Phd. M. Giselle Fernández-Godino (Lawrence Livermore National Laboratory)

From Theory to Practice: Harnessing PIML for Enhanced PHM Capabilities
T. Nguyen, W. Deng, K. Medjaher, C. Gogu, J. Morio*

Attention-based global field reconstruction from sparse observations
J. E. Santos, D. O'Malley, H. Viswanathan, N. Lubbers*

Energy based diffusion generator for efficient sampling of Boltzmann distributions
*L. Guo**

05/06/2024 | 10:30 - 12:30 **Scientific Machine Learning - A catalyst for algorithmic performance in industrial computer aided engineering I**	MS163A Room: 1.05 Chaired by: Dr. Dirk Hartmann (Siemens Industry Software GmbH, Germany), Prof. Thomas Richter (Otto-von-Guericke Universität Magdeburg, Germany)

Towards Simulation Intelligence Testbeds: Enabling the industrial realisation of data-driven models and AI-first capabilities, and driving the evolution of computational engineering
A. Lavin, J. Marecki, J. Van de Meent*

Recent Advances in PINNs
*G. Karniadakis**

Solving partial differential equations with neural network bases
*F. Dietrich**

Learning of integration time steps of stiff ordinary differential equations
*U. Iben**

Dynamic neural networks for mimetic scientific machine learning
W. Schilders, C. Datar, F. Dietrich*

Learning reduced-order models with Bayesian inference and Gaussian processes
*M. Guo**

05/06/2024 | 10:30 - 12:30 **Computational & Data-Driven Approaches for Turbulent Dynamical Systems II**	MS029B Room: 1.06 Chaired by: Prof. Lluis Jofre (Universitat Politecnica de Catalunya, Spain)

Global Bifurcations of Three-Tori in the Magnetised Spherical Couette Problem
*F. Garcia**

On the Turbulent Flow Around Rectangular Cylinders: Effect of the Aspect Ratio
J. Garicano-Mena, A. Chiarini, M. Quadrio*

An Augmented Shadowing Method for Sensitivity Analysis of Turbulent Flows
L. Fang, G. Papadakis*

Dynamical System analysis of irregular flow around two square cylinders
S. Sahu, G. Papadakis*

Linear stability exploration of transcritical non-isothermal Poiseuille flows
M. Bernades, F. Capuano, L. Jofre*

05/06/2024 | 10:30 - 12:30 **Complex Fluid Flows in Engineering: Modeling, Simulation, and Optimization I**	MS012A Room: 1.07 Chaired by: Prof. Stefanie Elgeti (TU Wien, Austria), Prof. Marek Behr (RWTH Aachen University, Germany)

A face-centered finite volume method for laminar and turbulent incompressible flows
*M. Giacomini, L. Vieira, D. Cortellessa, R. Sevilla, A. Huerta**

An optimized PFEM fluid solver based on a hybrid Lagrangian-Eulerian approach and a PFEM-VEM agglomeration technique
M. Cremonesi, C. Fu, U. Perego*

Isogeometric analysis-suitable parameterization for complex fluid simulations
Y. Ji, M. Möller*

Towards High-Fidelity Injection Molding Simulations for Semi-Crystalline Polymers using the Level-Set Method and a Space-Time Discretization
B. Ferrer Fabón, M. Behr*

Coupling CFD with 1D Model for the Prediction of Performance of a Hemodialysis Module with Undulated Fibers
A. Giordano, N. Cancilla, M. Ciofalo, D. Donato, G. Marotta, A. Tamburini, G. Micale*

A new model of blood RHEOLOGY and HEMOLYSIS based on the population balance of rbc AGGLOMERATES
K. Jędrzejczak, W. Orciuch, K. Wojtas, P. Piasecki, B. Ciszek, Ł. Makowski*

05/06/2024 | 10:30 - 12:30
Computational Challenges in Industry and Sustainable Development: Sampling, Surrogate and Multi-fidelity Models for Inverse Analysis, Uncertainty Quantification and Optimisation III

MS103C
Room: 1.08
Chaired by:
Dr. Matteo Giacomini (CIMNE - Universitat Politècnica de Catalunya, Barcelona, Spain), Dr. Lorenzo Tamellini (CNR, Italy)

A Sequential Data-Integration Approach for Uncertainty Reduction in Hydro-Poromechanical Geoscience Models
M. Ferronato, L. Gazzola, P. Teatini, C. Zoccarato*

Full waveform inversion with quantified uncertainty in stratified media
*A. Carpio, G. Oleaga, E. Cebrián, C. Abugattas**

Approximative optimal experimental design in Bayesian inversion
*D. Duong**

Multilevel Quasi-Monte Carlo for interval analysis of non-linear numerical models
R. Callens, D. Moens, M. Faes*

Machine learned thermodynamically consistent material models with uncertainty quantification
R. Patel, R. Villarreal, M. Jiang, R. Jones, S. Kramer*

Arterial section analysis for patient-specific support of medical decision making
P. Diez, S. Gahima, M. Stefanati, J. Rodriguez-Matas, A. Garcia-Gonzalez*

05/06/2024 | 10:30 - 12:30
Computational Methods for Enabling Digital Twins I

MS047A
Room: 1.09
Chaired by:
Dr. Dimitrios Loukrezis (Siemens AG, Germany), Dr. Diana Manvelyan (Siemens AG, Germany)

A Multi-Fidelity Surrogate Modeling Approach for Efficient Multi-Motor Loss Estimations
S. Guo, S. Schoenborn, P. Muszynski*

Surrogate models as Digital Twins to model EMC of Buck-Boost Converters for Automotive Applications
A. ., S. Nukala, D. Gope, J. Hansen*

Generic and Semantic Data Structure for Digital Twins on the Example of the EMC Domain
J. Wagner, P. Thoma*

Implementation of a digital twin for electrical machines
K. Cherifi, P. Schulze, V. Merhmann*

Surrogate-Based Bayesian Updating of Finite Element Solutions for State Monitoring
L. Hermann, V. Narouie, U. Römer, H. Wessels*

05/06/2024 | 10:30 - 12:30
Scientific Machine Learning for Modelling and Simulation I

MS165A
Room: 1.10
Chaired by:
Dr. Michael Abdemalik (Eindhoven University of Technology, Netherlands), Dr. Idoia Cortes Garcia (Eindhoven University of Technology, Netherlands)

Fast Solution of Partial Differential Equations with Neural Green's Operators
J. Prins, M. Abdelmalik, J. Proll, M. Pueschel, J. Citrin*

A data-driven learned discretization approach in finite volume schemes for compressible fluid dynamics
G. de Romémont, F. Renac, J. Nunez, D. Gueyffier, P. Mirowski*

Index-Aware Learning of Circuits
I. Cortes Garcia, P. Förster, L. Jansen, W. Schilders, S. Schöps*

A Comprehensive Error Modeling Approach in Multi-Fidelity Metamodels of Simulators with Functional Outputs
L. Brunel, M. Balesdent, L. Brevault, R. Le Riche, B. Sudret*

MeshGraphNets as NeuralODE to Simulate Physical Systems in Industrial Applications
J. Trommer, L. Mikelsons*

Accelerating Phase Field Modeling Through Hybrid Simulations using Fourier Neural Operators and UNets
*C. Safta**

Accelerating Phase Field Modeling Through Hybrid Simulations using Fourier Neural Operators and UNets
C. Bonneville, C. Safta, A. Hegde, L. Capolungo, H. Najm, N. Bieberdorf, M. Asta*

05/06/2024 | 10:30 - 12:30
Domain Decomposition and Time-Splitting Methods for Multiscale Multiphysics Problems I

MS043A
Room: 1.11
Chaired by:
Dr. Ivan Yotov (, United States)

Refinement of a Schur Complement Method for Fluid-Structure Interaction through Reduced Order Modeling
A. de Castro, H. Lee, M. Wiecek*

A conforming finite element method for a nonisothermal fluid-membrane interaction
J. Camaño, R. Oyarzúa, M. Serón, M. Solano*

A posteriori error estimates and local adaptive steering for nonoverlapping domain decomposition in saddle-point mixed formulations
M. Bastidas Olivares, A. Beni Hamad, M. Vohralík, I. Yotov*

A Space-Time Multiscale Mortar Mixed Finite Element Method for Parabolic Equations
T. Hoang, M. Jayadharan, M. Kern, M. Vohralík, I. Yotov*

Nonlinear solution of frictional contact poromechanics
J. Both, M. Nevland, E. Keilegavlen, I. Berre*

05/06/2024 | 10:30 - 12:30
In-Silico vs. In-Vivo: Accuracy and Reliability of Patient-Specific Cardiac Modeling I

MS121A
Room: 1.12
Chaired by:
Dr. Pavlos Vlachos (Purdue University, United States)

Advancing TAVR precision: validation of fluid-structure interaction models against 4D flow MRI data
A. Zingaro, I. Burba, D. Oks, M. Fontana, C. Samaniego, U. Gulan, M. Vazquez*

A Comparison of Image-Driven, Patient-Specific Direct Numerical Simulations of the Right Ventricle to 4D Flow MRI
*I. Yildiran, F. Capuano, Y. Loke, L. Olivieri, E. Balaras**

Personalized cardiovascular simulations: accuracy and performance of lifex-cfd
P. Africa, I. Fumagalli, M. Bucelli, A. Zingaro*

A novel validated computational pipeline for patient specific deployment of the Amulet Amplatzer in the left atrial appendage
R. Md, M. Lee, A. Cook, L. Menezes, R. Torii, G. Burriesci, G. Bosi*

05/06/2024 | 10:30 - 12:30 **Advances In The Design Of Architectured Metamaterials I**	MS168A Room: 1.13 Chaired by: Phd. Rosaria Del Toro (University of Chieti-Pescara, Viale Pindaro 42, Pescara, Italy, Italy), Prof. Maria De Bellis (Maria Laura De Bellis, Dr, University of Chieti-Pescara, Italy)

A New Metamaterial Plate With Tunable Thermal Expansion
*M. Latella, D. Faraci, C. Comi**

Analysis of Effective Thermoelastic Properties of Metamaterials Designed by Topology Optimization
C. Almeida, P. Coelho, F. Conde, R. Silva*

Data-driven inverse design of bimaterial lattice structures
X. Peng, B. Xu*

Desing and Optimization of Components made of Heterogeneous Lattice Structures: Software Package METAMAT
F. De Canio, M. Pingaro, P. Trovalusci*

Additive manufacturing of clay material reinforced with hemp and wood fibers
I. Abidi, M. Gaff, B. Carboni, N. Fantuzzi, P. Trovalusci*

05/06/2024 | 10:30 - 12:30 **Phase Field Formulation for Fracture and Its Applications I**	MS205A Room: 1.14 Chaired by: Prof. Yongxing Shen (Shanghai Jiao Tong University, China), Prof. Bin Li (Guangdong Technion-Israel Institute of Technology, China)

A scheme for crack nucleation in the phase field approach to fracture (Keynote Lecture)
*Y. Chen, Y. Shen**

Crack nucleation in the phase-field fracture within the representative crack element framework
B. Li, B. Yin*

An acceleration scheme for the phase field fatigue fracture simulation
S. Yang, Y. Shen*

Phase-Field Modeling of Fatigue Failure With Orthogonal Decomposition of Constitutive Models Under Anisotropic Crack Propagation
A. Unnikrishna Pillai, M. Rahaman*

An Open-Source Phase Field Model for Fracture in Orthotropic FGM With Adaptive Mesh Refinement
S. PC, R. B. N*

05/06/2024 | 10:30 - 12:30 **Agent-Based Modelling to simulate cell- and multiscale problems in Biology I**	MS119A Room: 1.15 Chaired by: Dr. Vasileios Vavourakis (University of Cyprus, Cyprus), Ms. Cayla Harris (University of Surrey, United Kingdom)

On a theory of cell-decision making in multicellular systems
*H. Hatzikirou**

Lung digital twin COVID-19 infection through multiphysics and multiscale HPC-modelling
B. Eguzkitza, A. Novell, A. Gargallo-Peiró, T. Ntiniakou, M. Vázquez, G. Houzeaux, I. Burba, A. Montagud, A. Valencia*

Agent-Based Modelling of Biofilms on Complex Surfaces
R. Bournes, R. Bauer, M. Chambers, B. Guo, S. Hingley-Wilson*

An Agent-based Model (ABM) to Reproduce the Boolean Logic Behaviour of Neuronal Self-Organised Communities through Pulse Delay Modulation and Generation of Logic Gates
L. Irastorza-Valera, J. Benítez, F. Montáns, L. Saucedo-Mora*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

05/06/2024 | 10:30 - 12:30
Modelling and Optimization of Functionally Graded Composites and Structures I

MS131A
Room: 2.01
Chaired by:
Dr. M.A.R. Loja (Instituto Superior de Engenharia de Lisboa, Portugal), Dr. André Carvalho (CIMOSM, ISEL – Centro de Investigação em Modelação e Optimização de Sistemas Multifuncionais, Instituto Politécnico de Lisboa, Portugal)

Vibration analysis of side-cracked functionally graded material rectangular plates using a family of five-variable plate theories
C. Huang, C. Shao*

Higher Order Theories for the Structural Analysis of Doubly-Curved Shells with Three-Dimensional Variation of the Material Properties
F. Tornabene, M. Viscoti, R. Dimitri*

Linear Static and Free Vibration of Functionally Graded Non-Symmetrical I-Shaped Beams
M. Loja, A. Carvalho, I. Barbosa*

Evaluation of Material Models Used in Multi-Material Topology Optimization
A. Ali, P. Gangl, M. Gföhler, M. Kapl*

Optimal Topology and Material Property Gradation in Plane Structures to Minimize the Maximum Von Mises Stress
R. Silva, P. Coelho, F. Conde*

05/06/2024 | 10:30 - 12:30
Enriched finite-element formulations for fracture I

MS067A
Room: 2.02
Chaired by:
Prof. Bert Sluys (Delft University of Technology, Netherlands), Dr. Jorge Alfaiate (Universidade de Lisboa, Portugal)

Large strain cohesive XFE formulation for ductile fracture
*A. Kaniadakis, J. Crété, P. Longère**

Assessment of Geological Fault Reactivation Using a Fully Coupled Hydromechanical Embedded Finite Element Approach
D. Cavalcanti, C. Mejia, D. Roehl, I. de-Pouplana, G. Casas, L. Martha*

On static crack propagation analysis of quasi-brittle micropolar plates using extended finite element method
M. Tuna, P. Trovalusci, N. Fantuzzi*

Ductile Fracture Analysis Using an Evolving TSL Along The Crack Path
S. Bhattarai, B. Sluys*

Multiple Strong Transverse and Rotation Discontinuities in Closed Form Thick Beam Elements to Model Damage
Á. Martínez Miranda, G. Juárez Luna*

Modelling corrosion in reinforced concrete using a total iterative approach
J. Alfaiate, B. Sluys*

05/06/2024 | 10:30 - 12:30 **Advances in Solid Mechanics V**	GS001E Room: 2.03 Chaired by: Prof. Jean-Mathieu Mencik (INSA Centre Val de Loire, France)

Identification of Material Hardening Parameters of Advanced High-Strength Steels Using Recurrent Neural Networks and Three-Point Bending Tests
D. J. Cruz, M. R. Barbosa, A. D. Santos, R. L. Amaral, J. Cesar de Sa*

Neural Architecture Search for Vibration-Based Damage Detection
S. Salmani Pour Avval, V. Yaghoubi, N. Eskue*

Fatigue S-N curve parameters prediction of Steels based on Machine learning models
A. Costa, M. Seabra, A. de Jesus, J. César de Sá, A. Santos*

Structural strain method for the fatigue evaluation of rib-deck joints with insufficient weld penetration
B. Villoria, S. Siriwardane*

Model-Order Reduction and Dynamical Behaviour of One-Dimensional Poroelastic Media
M. Padhy, T. Ricken, A. Armiti-Juber*

Parametric model reduction for broad-band frequency analysis of nearly periodic structures
*J. Mencik**

05/06/2024 | 10:30 - 12:30 **Predictive Digital Twins I**	MS184A Room: 2.04 Chaired by: Prof. Trond Kvamsdal (Norwegian University of Science and Technology (NTNU), Norway), Prof. Kjell Magne Mathisen (Norwegian University of Science and Technology, Norway)

A minimally intrusive nonlinear model order reduction technique for structural mechanics
M. Tannous, C. Ghnatios, E. Fonn, T. Kvamsdal, F. Chinesta*

A spectral bias solution with augmented neural networks.
J. Mounayer, C. Ghnatios, J. Tomezyk, F. Chinesta*

Walking parameter inference from strain data for a footbridge
A. Humphry, A. Bakar, J. Zhang, F. Javid, P. Nadeau, M. Ebrahimi, A. Butscher, A. Tessier, J. rodriguez, M. Azzi, C. Farhat*

Reducing Uncertainty in Digital Twin Models by Leveraging Data from a Population of Related Assets
T. Wildey, R. White, J. Jakeman, T. Butler*

Data Driven Uncertainty Quantification with Neural Networks
V. Halonen, M. Wolfmayr, I. Pölönen*

Digital Twin For Direct-Use Geothermal Project On The TU Delft Campus
D. Voskov, H. Abels, Y. Chen, A. Daniilidis, D. Bruhn, S. Geiger, G. Song, P. Vardon*

05/06/2024 | 10:30 - 12:30 **Recent Advances On The Numerical Modeling Of Polymer Mixing I**	MS034A Room: 2.05 Chaired by: Prof. Nicola Parolini (Politecnico di Milano, Italy)

A numerical model for fracture propagation in elastomeric membranes
*J. Ciambella, G. Lancioni, N. Stortini**

A Large Eddy Simulation for the mixing of miscible liquids with high viscosity contrasts in a turbulently stirred vessel
S. Mirfasihi, W. Basu, C. Fonte, P. Martin, A. Keshmiri*

Numerical Modelling Of Polymer Mixing Processes: Towards Multiphase Simulation
*E. Capuano**

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

05/06/2024 | 10:30 - 12:30 **Coarse Graining Turbulence: Modeling and Data-Driven Approaches and Their Applications VII - Honoring Professor Cesar Dopazo Garcia**	MS016G Room: 0.01 Chaired by: Dr. Filipe Pereira (Los Alamos National Laboratory, United States)

From Fire Research to High-Speed Propulsion Systems – Fundamental Combustion Research Supported by National Science Foundation
*H. Chelliah**

Matrix Product State Simulation of Reactive Flows
R. Pinkston, N. Gourianov, J. Mendoza Arenas, P. Givi, D. Jaksch*

Tensor Networking for PDF Simulation
P. Givi, N. Gourianov, J. Mendoza Arenas, S. Pope, D. Jaksch*

13:45 - 14:30 | SEMI-PLENARY SESSIONS

05/06/2024 | 13:45 - 14:30 **Lattice Boltzmann Schemes for Solid Mechanics**	SPL09 Room: Auditorium I Chaired by: Prof. Pedro Camanho (FEUP/INEGI, Portugal)

Lattice Boltzmann schemes for solid mechanics
*L. de Lorenzis**

05/06/2024 | 13:45 - 14:30 **Exploring the Potential of Mathematical Methods for Sustainability: Mesh Adaptation and Model Reduction Towards a Greener Future**	SPL10 Room: Auditorium VIII Chaired by: Dr. Marco Tezzele (University of Texas at Austin, United States)

Exploring the potential of mathematical methods for sustainability: mesh adaptation and model reduction towards a greener future
*S. Perotto**

05/06/2024 | 13:45 - 14:30 **Bridging the Gap Between Isogeometric Analysis and Deep Operator Learning**	SPL11 Room: Auditorium II Chaired by: Prof. Gianluigi Rozza (SISSA, Italy)

Bridging the gap between isogeometric analysis and deep operator learning
*M. Moller**

05/06/2024 | 13:45 - 14:30 **Thermodynamics of learning physical phenomena**	SPL12 Room: Auditorium VI Chaired by: Prof. Jose Cesar de Sa (INEGI/FEUP, Portugal)

Thermodynamics of learning physical phenomena
*E. Cueto**

14:30 - 16:30 | TECHNICAL SESSIONS

05/06/2024 | 14:30 - 16:30 **Deep Learning Computing I**	MS005A Room: Auditorium I Chaired by: Dr. David Pardo Zubiaur (University of the Basque Country (UPV/EHU), Spain), Prof. Santiago Badia (Monash University, Australia)

Regularity-Conforming Neural Networks for PDEs
*J. Taylor**

Accurate Solution of Initial and Boundary-Value Problems using Multi-level Neural Networks (Keynote Lecture)
*Z. Aldirany, R. Cottereau, M. Laforest, S. Prudhomme**

High-order well-balanced numerical schemes for shallow-water systems with Coriolis terms
M. Castro, J. García-Rodríguez, V. Gonzalez-Tabernero, J. Lopez-Salas, J. Perez-Villarino*

Current Progress on the Appromation of Hyperbolic Balance Laws Using Physics-Informed Neural Networks (PINNs) and Weak PINNs (WPINNs)
L. Ávila León, M. Castro Díaz*

Wave Maximum Height Inferences with Neural Networks for Spanish Tsunami Early Warning System
J. Rodríguez Gálvez, J. Macías, B. Gaite, M. Castro, J. Cantavella, L. Puertas*

Robust Variational Physics-Informed Neural Networks
S. Rojas, M. Paszynski, P. Maczuga, J. Muñoz-Matute, D. Pardo*

05/06/2024 | 14:30 - 16:30 **Novel Methods and Algorithms in Topology Optimization: Bridging Design, Materials, Simulations, and Manufacturing II**	MS162B Room: Auditorium II Chaired by: Prof. Marco Montemurro (Arts et Métiers Sciences and Technologies, France), Dr. Nicola Ferro (Politecnico di Milano, Italy)

On thermomechanical problems in a topology optimisation method based on non-uniform rational basis spline entities
E. Urso, M. Montemurro, G. Giunta*

Topology optimization for micro-structure of all-solid-state batteries
N. Ishida, K. Furuta, M. Kishimoto, K. Izui, S. Nishiwaki*

Thermodynamically Consistent Formulation of Elastoplastic Microstructure Optimization Across Hierarchical Scales
T. Gangwar, D. Schillinger*

Homogenization based topology optimization of a coupled thermal fluid-structure problem
*G. Agyekum, L. Cangémi, F. Jouve**

On the effect of different time integration schemes in thermodynamic topology optimization for large deformations
M. von Zabiensky, D. Jantos, P. Junker*

Topology Optimization of Fluid Problems Considering Self-Supporting Property: 3D Design of Fluid Diodes
T. Sasaki, N. Ishida, K. Furuta, T. Kondoh, K. Izui, S. Nishiwaki*

05/06/2024 | 14:30 - 16:30 **Computational Methods for Inverse Problems IV**	MS018D Room: Auditorium III Chaired by: Prof. Haim Waisman (Columbia University, United States), Prof. Dan Givoli (Technion - Israel Institute of Technology, Israel)

Acoustic scattering off a cylinder: surrogate modeling and inversion via physics-informed neural networks
*S. Razi, D. Amini, Y. Chen, A. Amirkhizi, A. Louhghalam, M. Tootkaboni**

Graph Neural Networks for Stress Prediction in Structural Design
J. Ribeiro, B. Ribeiro, S. Tavares, F. Ahmed*

ViTO: Vision Transformer Operator
O. Ovadia, A. Kahana, P. Stinis, E. Turkel, D. Givoli, G. Karniadakis*

Semi-mechanistic Prediction of Residence Time and Mixing Dynamics using a Machine Learning-based Convection-Diffusion Model
*A. D, U. Patil, E. Olofsson, J. Hattel, R. Ramachandran**

Neural Fields for Inversion Problems
J. Torben, A. Brostrøm*

Automotive motor rotor design synthesis using conditional Wasserstein Generative Adversarial Networks with gradient penalty and distortion penalty
N. Kato, K. Suzuki, Y. kondo, K. Suzuki, K. Yonekura*

05/06/2024 | 14:30 - 16:30 **Computational Cardiology: Modeling and Simulating the Heart IV**	MS089D Room: Auditorium IV Chaired by: Dr. Alberto Zingaro (ELEM Biotech, Spain)

A numerical fluid-structure interaction analysis of patient-specific Ozaki Procedure to replace aortic valves
T. Fringand, L. Mace, I. Cheylan, M. Lenoir, J. Favier*

Modeling the Hemodynamic Impact of Aortic Root Enlargements in Aortic Valve Replacement
M. Bonini, S. Sanjay, A. Makkinejad, M. Balmus, N. Burris, B. Yang, D. Nordsletten*

Fluid-structure interaction modeling of mitral valve structures
J. Kronborg, J. Hoffman*

Multi-code and Multi-physics Coupling of Cardiac Electromechanics and Vascular Haemodynamics
S. Lo, A. Zingaro, M. Vázquez, P. Coveney*

High-fidelity Numerical Simulations of Ventricular Fibrillation.
F. Caruso Lombardi, A. Crispino, A. Gizzi, R. Verzicco, F. Viola*

Left Ventricular Expander for Various Phenotypes of Heart Failure with Preserved Ejection Fraction: An In-Silico Study
J. Weissmann, Y. Charles Benoliel, G. Maron*

05/06/2024 | 14:30 - 16:30
Recent trends in elastic and acoustic metamaterials I

MS059A
Room: Auditorium VI
Chaired by:
Prof. Giuseppe Failla (University of Reggio Calabria, Italy, Italy), Prof. Antonio Palermo (University of Bologna, Italy)

Design and Modelling of Metamaterials for Subwavelength Applications (Keynote Lecture)
V. Kouznetsova, X. Kuci, R. Liupekevicius, H. van Dommelen, M. Geersç*

Exploiting coupling mechanisms for the design of multiresonant layered acoustic metamaterials
D. Roca, G. Sal-Anglada, D. Yago, J. Cante, J. Oliver*

From Elementary Units Towards Optimized Large-Scale Structures: Design and Validation of a Finite-Size Labyrinthine Metamaterial for Elastic and Acoustic Wave Control
S. Hermann, K. Billon, A. Parlak, J. Orlowsky, M. Collet, A. Madeo*

Optimization Design of Ventilated Metamaterial Absorbers
Z. Zhang, A. Krushynska*

Adaptable Gradation Of Mechanical Properties In Tensegrity Lattices
A. Al Sabouni-Zawadzka, W. Gilewski, J. Pełczyński, K. Martyniuk-Sienkiewicz*

05/06/2024 | 14:30 - 16:30
Open-Source Software in Mechanics IV

MS126D
Room: Auditorium VII
Chaired by:
Dr. Andrei Shvarts (James Watt School of Engineering, University of Glasgow, United Kingdom), Prof. Lukasz Kaczmarczyk (University of Glasgow, United Kingdom)

Implementation of contact formulation for Mixed Finite Element
L. Kaczmarczyk, C. Runice, C. Pearce, A. Shvarts*

OOFEM: current status and future of open source multi-physics finite element code
B. Patzák, M. Horák, V. Šmilauer, P. Havlásek, M. Jirásek*

HORSES3D: a Machine Learning Accelerated High Order Discontinuous Galerkin Solver for CFD Simulations
G. Rubio, G. Ntoukas, W. Laskowski, O. Mariño, S. Colombo, A. Mateo-Gabin, H. Marbona, K. Otmani, F. Manrique* de *Lara, D. Huergo, J. Manzanero, A. Rueda-Ramirez, D. Kopriva, E. Valero, E. Ferrer*

dtool and dserver: A Flexible Ecosystem for Findable Data with Applications in Solid Mechanics, Molecular Dynamics and Multiscale Simulations
J. Hörmann, A. Sanner, L. Yanes, A. Vazhappilly, H. Holey, L. Pastewka, M. Hartley, T. Olsson*

High-performance Matrix-free Operator Evaluation for Tensor-product Elements with Unstructured Quadrature
M. Bergbauer, P. Munch, M. Kronbichler, W. Wall*

MSolve - A loosely coupled multiparadigm HPC computational simulation suite
G. Stavroulakis, G. Sotiropoulos, S. Pyrialakos, K. Atzarakis, V. Papadopoulos*

05/06/2024 | 14:30 - 16:30 **Multiscale Computational Homogenization for bridging scales in the mechanics and physics of complex materials III**	MS009C Room: Auditorium VIII Chaired by: Prof. Miguel Bessa (Brown University, United States)

A two-scale FE-FFT-based simulation framework to model polycrystalline phase-transforming materials
J. Waimann, A. Schmidt, C. Gierden, S. Reese*

A Microstructure Analysis During Phase Formation of Ni-Ti Alloy by Phase-field Model
M. Muramatsu, M. Suzuki*

Non-linear solution schemes within time-adaptive FE2 computations
S. Hartmann, M. Grafenhorst, P. Dileep*

Non-intrusive implementation of the Multiscale Finite Element Method
*F. Legoll**

Modelling of large deforming smart inflatable materials based on homogenization of incremental formulation
E. Rohan, V. Lukeš, J. Heczko*

Stochastic Time Homogenization Method for the Simulation of Time-Evolving Structures
*G. Puel**

05/06/2024 | 14:30 - 16:30 **Innovative Methods for Fluid-Structure Interaction I**	MS202A Room: Terrace Chaired by: Prof. Harald van Brummelen (Eindhoven University of Technology, Netherlands), Prof. Trond Kvamsdal (Norwegian University of Science and Technology (NTNU), Norway)

A Generalized Weighted Shifted Boundary Method for Fluid-Structure Interaction problems
O. Colomés, J. Modderman*

A monolithic Fluid-Structure-Interaction approach based on mixed least-squares finite elements with an inherent fulfillment of the coupling conditions
A. Schwarz, S. Averweg, C. Schwarz, J. Schröder*

Time Adaptive Waveform iterations for Thermal and Mechanical Fluid-Structure Interaction
N. Kotarsky, P. Birken*

Advanced Isogeometric Analysis for Fluid-Structure Interactions with Solid-solver G+Smo Coupled via preCICE
J. Li, H. Verhelst, M. Möller, H. den Besten*

A new approach towards assessing convergence of partitioned fluid-structure interaction simulations
N. Delaissé, T. Spenke, N. Hosters, J. Degroote*

Novel Methods to Model Fluid-Solid Interactions in Tribosystems
S. Ardah, F. Profito, D. Dini*

05/06/2024 | 14:30 - 16:30 **Computational Biomechanics and Applications III**	MS158C Room: 3A Chaired by: Prof. João Folgado (IDMEC, Instituto Superior Técnico, Portugal)

Finite Element Analysis of Oncological Mandibular Defects
*A. Costa, J. Marinho, A. Castro**

A Hybrid Flexible-Rigid Body Approach for the Simulation of Cross-Link in Short-Segment Fixations after Spinal Posterior Decompression
S. Borrelli, G. Putame, S. Marone, A. Ferro, A. Audenino, M. Terzini*

Comparative Analysis of Surface Coating Materials for A Topology-Optimized Dental Implant Using Design of Experiments
P. Soni, A. Bhattacharyya, P. Shrivastava, S. Rai*

Female-specific neck model: development and validation of a finite element model
*A. Silva, R. Alves de Sousa, F. Fernandes, J. R. Pinto **

Vaginal wall reinforcement with cog threads using numerical methods
N. Ferreira, E. Silva, A. Fernandes*

Finite Element Simulations of a Non-invasive Measurement Technique for In Vivo Stress in Human Skin
H. Conroy Broderick, W. Shu, M. Destrade, A. Ní Annaidh*

05/06/2024 | 14:30 - 16:30 **Efficient CAD-based discretization methods III**	MS064C Room: 3B Chaired by: Dr. Robin Bouclier (, France)

Isogeometric Analysis for 2D Magnetostatic Computations with Multi-level Bézier Extraction for Local Refinement
A. Grendas, M. Wiesheu, S. Schöps, B. Marussig*

Tree-Cotree Gauge for IGA Based on Hierarchical B-Splines
M. Merkel, B. Kapidani, R. Vázquez, S. Schöps*

CAD-based Adaptive Mesh Refinement
J. Fußbroich, S. Elsweijer, J. Holke, J. Kleinert, D. Reith, C. Ziller*

Efficient local reduced order models for CAD-based discretizations
M. Chasapi, P. Antolin, A. Buffa*

Multi-resolution Isogeometric Analysis -- Efficient adaptivity utilizing the multi-patch structure
S. Tyoler, S. Takacs*

05/06/2024 | 14:30 - 16:30 **Mechanics of Wood and Biocomposites in Engineering III**	MS032C Room: 3C Chaired by: Dr. Ani Khaloian (Technical University of Munich, Germany), Dr. Markus Königsberger (TU Wien, Austria)

An orthotropic 3D elasto-plastic damage model for wood
F. Seeber, A. Khaloian-Sarnaghi, E. Benvenuti, J. van de Kuilen*

Bond-based peridynamics for simulating fracture in wood
F. Feist, G. Baumann*

Simulating Failure in Plant Fiber Composites: Analyzing the Interplay of Fiber, Matrix, and Interface Mechanics
V. Senk, M. Königsberger, M. Lukacevic, J. Füssl*

Stress-based gradient-enhanced transient non-local damage for fiber composites
F. Seeber, A. Khaloian-Sarnaghi, E. Benvenuti, J. van de Kuilen*

A Numerical Method to Integrate Duration-of-load and Biological Deterioration for Long-standing Timber Piles
C. Yang, S. Khaloian, T. Yu, J. van de Kuilen*

Contribution to Virtual Testing of Robotic 3D Printed Structures from Biocomposites
J. Kovacikova, S. Ahmed, J. Pocorni, O. Zaida*

05/06/2024 | 14:30 - 16:30 **Recent Advances of Computational Methods in Cardiovascular and Cerebrovascular Biomechanics III**	MS039C Room: 5A Chaired by: Prof. Sónia Pinto (Engineering Faculty of University of Porto (FEUP), Portugal), Dr. Anna Corti (Politecnico di Milano, Italy)

Patient-Specific Multiscale Modeling of Restenosis Following Percutaneous Transluminal Angioplasty (Keynote Lecture)
*A. Corti, M. Marradi, C. Çelikbudak Orhon, F. Boccafoschi, P. Büchler, J. Rodriguez Matas, C. Chiastra**

On the Tuning of Patient-Specific Boundary Conditions in Coronary Artery Flow Simulations
G. Nannini, L. Mariani, S. Saitta, G. Pontone, A. Redaelli*

Mathematical Modeling and Numerical Simulation of Atherosclerosis
M. Soleimani, T. Gasser, P. Wriggers, A. Haverich, P. Junker*

Simulation of Healthy Patient-specific Mitral Valves using Fluid-Structure Interaction: Validation against in vivo Data
L. Christierson, P. Frieberg, H. Isaksson, J. Revstedt, P. Liuba, N. Hakacova*

Analyses of flow dynamics in the circulatory network using a closed-loop multi-scale model
H. Suito, J. Liu*

05/06/2024 | 14:30 - 16:30 **Advancing SCiML Surrogates via Numerical Methods and Vice Versa II**	MS166B Room: 5B Chaired by: Dr. Alena Kopanicakova (Brown University, United States

Neural and spectral operator surrogates for Gaussian random field inputs
*C. Marcati, C. Schwab, J. Zech**

Data-Driven Domain Decomposition: Predicting Responses in Diverse 3D Geometries using Neural Operator-Based Framework
V. Kumar, S. Goswami, G. Karniadakis*

Operator learning for systems with partially hidden physics
V. Kag, B. Pal, S. Goswami*

Multi-Resolution Learning of Partial Differential Equations with Deep Operators and Long Short-Term Memory Networks
K. Michalowska, S. Goswami, G. Karniadakis, S. Riemer-Sørensen*

Reduced Basis Approximations of Parameterized Dynamical Partial Differential Equations via Neural Networks
P. Sentz, E. Cyr, K. Beckwith, L. Olson, R. Patel*

05/06/2024 | 14:30 - 16:30 **Numerical simulations of wind turbines and windfarms IV**	MS056D Room: 5C Chaired by: Dr. Esteban Ferrer (Universidad Politécnica de Madrid, Spain), Prof. Xesús Nogueira (Universidade da Coruña, Spain)

Comparative Numerical Analysis of Flat and Round Tips on Aerodynamic Efficiency and Performance in IEA 10MW Wind Turbine Blades
R. Jeganathan, N. Manelil, J. Theron, L. Höning, B. Stoevesandt*

Synthetic Jets for Performance Enhancement of Vertical-Axis Wind Turbines with Actuator Line Model
A. Matiz-Chicacausa, O. Lopez Mejía*

Effect of Pitch Motion on the Aerodynamic Performance of a Floating Darrieus Wind Turbine
P. Balafa, A. Petry, S. Möller*

Wake interaction for Savonius-type wind turbine analysis using Hybrid RANS-LES model
I. Marinić-Kragić, Z. Milas, D. Vucina*

05/06/2024 | 14:30 - 16:30 **Optimization Under Uncertainty of Nonlinear and/ or Transient Problems in Structural and Fluid Mechanics II**	MS013B Room: 0.06 Chaired by: Prof. Kathrin Welker (TU Bergakademie Freiberg, Germany), Prof. Thomas Rung (Hamburg Univ. of Technology, Germany)

Robust Shape Optimization of an Idealized Bypass Graft for the Minimization of Hemolysis
G. Bletsos, T. Rung*

Adjoint-based Shape Optimization of a Ship Hull using Various Propeller Resolution Methods: Application
D. Andreev, A. Kritikos, G. Bletsos, D. Hafermann, N. Kühl, T. Rung*

Optimization on Shape Manifolds with Fluid-Mechanical Applications under Uncertainty
C. Geiersbach, T. Suchan, K. Welker*

Adjoint-based Shape Optimization of a Ship Hull Using Various Propeller Resolution Methods: Methodological Aspects
A. Kritikos, D. Andreev, G. Bletsos, D. Hafermann, N. Kühl, T. Rung*

Adjoint shape optimization for cardiovascular fluid-structure interaction
L. Radtke, G. Bletsos, J. Heners, T. Rung, A. Düster*

Limiting Descent Directions in p-Harmonic Shape Optimization
H. Wyschka, P. Müller, T. Rung, W. Wollner*

Computation of the Adjoint Navier-Stokes Equations using the Discontinuous Galerkin
P. Müller, H. Wyschka, T. Rung, W. Wollner*

05/06/2024 | 14:30 - 16:30 **Engineering the Future: Advancements in Industrial Aerodynamic Simulations I**	STS269A Room: 0.07 Chaired by: Dr. Oriol Lehmkuhl (Barcelona Supercomputing Center (BSC), Spain)

Cost-effective wall-modeled large eddy simulations for aeronautical flow analysis
A. Amatriain, C. Gargiulo, G. Rubio*

Efficient and Robust Implicit Solvers for Unsteady Flow Problems Using Harmonic Balance
C. Frey, G. Ashcroft, J. Backhaus*

Low Mach Preconditioning For Harmonic Balance Solvers
P. Sivel, C. Frey*

Parallel Performance of SOD2D: a High-Order Spectral Element Code
J. Muela, L. Gasparino, O. Lehmkuhl*

On the extension of the entropy viscosity method for scale resolving incompressible flows.
O. Lehmkuhl, L. Gasparino, J. Muela*

On a semi-implicit entropy viscosity SEM algorithm for wall-bounded compressible LES and DNS
L. Gasparino, O. Lehmkuhl*

05/06/2024 | 14:30 - 16:30 **STS: Advanced CFD applications for complex aircraft configurations I**	STS240A Room: 0.08 Chaired by: Prof. Jochen Wild (DLR German Aerospace Center, Germany), Dr. Dietrich Knoerzer (Aeronautics Consultant, Belgium)

Unsteady simulations of an aircraft in take-off conditions with installed engine and rotating fan
F. Sartor, F. Moens, O. Atinault*

About the Ability of Anisotropic Mesh Adaptation to Capture Complex Physics on a Transonic Tandem Compressor
E. Guilbert, A. Remigi, M. Philit, F. Alauzet*

Numerical Analysis of a Large Scale Distributed Propulsion Experiment at High Lift
J. Oldeweme, T. Lindner, C. Bode, P. Scholz, J. Friedrichs*

Aerodynamic Investigation of a Propeller-Driven Transport Aircraft with Distributed Propulsion within the IMOTHEP Project
D. Keller, A. Visingardi, L. Wiart, Y. Maldonado, F. Morlando, G. Andreutti*

05/06/2024 | 14:30 - 16:30 **Predictive Data-Driven Model Reduction and Discovery for Dynamical Systems II**	MS069B Room: 1.02 Chaired by: Prof. Steven Brunton (University of Washington, United States), Prof. Andrea Manzoni (Politecnico di Milano, Italy)

LaSDI: Latent space dynamics identification
Y. Choi, X. He, A. Tran, D. Bortz, S. Cheung, K. Springer, S. Chung, P. Roy, T. Moore, T. Roy, T. Lin, D. Nguyen, C. Hahn, E. Duoss, S. Baker*

Online Adaptation of SINDy Model Parameters via Extended Kalman Filter
L. Rosafalco, P. Conti, A. Manzoni, S. Mariani, A. Frangi, A. Corigliano*

On the Role of the Fiber in Model Reduction
S. Otto, S. Brunton, N. Kutz*

Sparsifying dimensionality reduction of PDE solution data with Bregman learning
T. Heeringa, C. Brune, M. Guo*

Attention is all you need - an interpretable artificial neural network architecture
N. Novelli, P. Belardinelli, S. Lenci, F. Hellmann*

05/06/2024 | 14:30 - 16:30 **Novel Advances in Numerical Methods for Wave Propagation Phenomena in Complex Media II**	MS026B Room: 1.03 Chaired by: Prof. Luís Godinho (Universidade de Coimbra, Portugal), Prof. Andrés Prieto (CITMAga - Universidade da Coruña, Spain)

Acoustic Wave Propagation in Periodic Media with Non-homogeneous Inclusions using a Meshless Approach
L. Godinho, N. Herrera-Leon, P. Amado-Mendes, J. Redondo*

Finite Element Procedure for Wave Propagation in Nearly Incompressible Hyperelasticity by Using Mixed Time Integrator
*T. Yamada**

Wave motion in acousto-elastic media via the Thin-Layer Method
A. Tsetas, A. Tsouvalas, A. Metrikine*

Numerical Quantification of the Biological Presence Buried in Granular Sediments in Coastal Environments
A. Prieto, P. Rubial*

High performance computation of wave propagation through elastic and piezoelectric media using dolfin-hpc
A. Bhole, J. Hoffman*

Regularized four-field variational formulation for thermo-elastodynamics and thermo-plasticity
S. Suljevic, A. Ibrahimbegovic, S. Dolarevic*

05/06/2024 | 14:30 - 16:30 **Advances in Turbulence Modeling using Nonlocal Derivatives, Implicit LES and Deep Learning I**	MS080A Room: 1.04 Chaired by: Mr. Pavan Pranjivan Mehta (SISSA, International School of Advanced Studies, Italy)

Implicit LES via spectral/hp methods: rationale and comparison to traditional LES
*D. Garcia-Ribeiro, A. Zanca, R. Moura, S. Sherwin**

Adaptively Tuned High-Order Methods for iLES
P. TSOUTSANIS, X. NOGUEIRA, L. FU*

Investigation of the capabilities of matrix-free stablized implicit large-eddy simulation on canonical turbulent benchmarks.
B. Blais, L. Prieto Saavedra, P. Munch*

Data-driven subgrid-scale models for machine-learned implicit large-eddy simulation (ML-ILES) using the differentiable JAX-Fluids framework
D. Bezgin, A. Buhendwa, S. Schmidt, N. Adams*

Large-Small Eddy Simulations: A Multi-Fidelity Method to Enable DNS of High Reynolds Number Turbulent Flows
A. Moitro, C. Chen, A. Poludnenko*

05/06/2024 | 14:30 - 16:30 **Scientific Machine Learning - A catalyst for algorithmic performance in industrial computer aided engineering II**	MS163B Room: 1.05 Chaired by: Prof. Thomas Richter (Otto-von-Guericke Universität Magdeburg, Germany), Dr. Dirk Hartmann (Siemens Industry Software GmbH, Germany)

Thermal Monitoring in Electric Machines using Physics-informed Neural Networks
H. Sauerland, S. Sreekumar*

Reduced Order Modelling in CFD: Geometry, Turbulence and Compressibility enhanced by Scinetific Machine Learning
*G. Rozza**

Domain decomposition for neural networks
*A. Heinlein**

An Operator Learning Framework for Mesh-Free Spatiotemporal Super-resolution
*V. Duruisseaux, A. Chakraborty**

Scientific Machine Learning for Closure Models of Multiscale Problems - a Differentiable Physics Approach
B. Sanderse, S. Agdestein, T. van Gastelen*

Data-driven identification of low-dimensional port-Hamiltonian Systems
J. Fehr, J. Rettberg, J. Herb, J. Kneifl, P. Buchfink, B. Haasdonk*

05/06/2024 | 14:30 - 16:30 **Numerical Modeling and Data Analysis for Advancing Sustainable Innovation I**	MS178A Room: 1.06 Chaired by: Ms. Dajana Conte (Università di Salerno, Italy), Prof. Simona Perotto (MOX, Department of Mathematics, Politecnico di Milano, Italy)

Stochastic numerics for sustainability (Keynote Lecture)
*R. D'Ambrosio**

Sparse Identification of Nonlinear Dynamics for Delay and Stochastic Differential Equations
D. Breda, D. Conte, R. D'Ambrosio, I. Santaniello, M. Tanveer*

Numerical Assessment of Fractional Order Modelling with Applications in Vegetation Pattern Dynamics
Z. Ahmad, A. Cardone, G. Toraldo, F. Giannino*

Integrating Light Quality and Crop Density Effects on Vegetative Growth: A Dynamic Model for Lettuce
S. Mirabella, S. Perotto, M. Matteucci, N. Ferro*

05/06/2024 | 14:30 - 16:30 **Complex Fluid Flows in Engineering: Modeling, Simulation, and Optimization II**	MS012B Room: 1.07 Chaired by: Prof. Marek Behr (RWTH Aachen University, Germany), Dr. Fabian Key (TU Wien, Austria)

Elastoviscoplastic Models and Experiments for Yield Stress Fluids Filling a Thin Mold
R. Rao, J. McConnel, W. Ortiz, A. Grillet*

Analysis of the extensional behavior of viscoelastic fluid through the DoS-CaBER based on Finite Element Method
W. Cho, Y. Kwon, J. Nam*

Particle Finite Element Method for the Simulation of Viscoelastic Free Surface Flows
G. Rizzieri, L. Ferrara, M. Cremonesi*

Numerical analysis of thixotropic fluid in slot coating die manifold
K. Min, J. Nam*

Implicit-explicit (IMEX) methods for the incompressible flows with variable viscosity
D. Ramalho Queiroz Pacheco, G. Barrenechea, E. Castillo*

Advancing two-phase flow Simulations: LSTM-Enhanced Reduced Order Modeling in CFD-DEM Applications
A. Hajisharifi, R. Halder, M. Girfoglio, G. Rozza*

05/06/2024 | 14:30 - 16:30 **HPC Simulations and AI for the Wide Industrial Realm I**	MS144A Room: 1.08 Chaired by: Prof. Makoto Tsubokura (Graduate School of System Informatics/Kobe University, Japan), Prof. Rahul Bale (RIKEN Center for Computational Science and Kobe Univeristy, Japan)

Application of physics-informed deep operator networks to solving unsteady flow problems
J. Onishi, S. Mori, M. Tsubokura*

Accelerating the FlowSimulator: Mesh Deformation Performance Enhancement through Mixed Precisions
M. Cristofaro, J. Wendler, I. Huismann, A. Rempke*

Ensemble LES Analysis of Gust Occurrence in an Urban Area During Typhoon Hagibis
T. Tamura, M. Kawaguchi*

Application of POD to turbulent flow field induced by building cluster
H. Kawai, T. Tamura*

BCM-LES on aeroelastic stability of a tall building with multi-degree of freedom
T. Shimada, M. Kawaguchi, T. Tamura, R. Bale*

Node-level performance analysis of the structural mechanics solver b2000++pro
N. Ebrahimi Pour, H. Klimach*

05/06/2024 | 14:30 - 16:30 **Computational Methods for Enabling Digital Twins II**	MS047B Room: 1.09 Chaired by: Dr. Diana Manvelyan (Siemens AG, Germany), Dr. Dimitrios Loukrezis (Siemens AG, Germany)

Non-intrusive Inference of Digital Twins from Multi-physical Simulation Data of Additive Manufacturing Processes
M. Kannapinn, F. Rutsch, O. Weeger*

An AI-based integrated framework for solving inversion problems in computational science
C. Heaney, D. Guo, Y. Li, B. Chen, C. Pain*

A Modified Dual Kalman Filter approach for damage detection using distributed optic fiber measurements
S. Farahbakhsh, L. Chamoin, M. Poncelet*

Uncertainty Quantification and Model Extension for Digital Twins of Bridges through Model Bias Identification
D. Andrés Arcones, M. Weiser, P. Koutsourelakis, J. Unger*

Cryotwin: Toward the Integration of a Predictive Framework for Thermal Drilling
D. Bhattacharya, L. Boledi, J. Kowalski*

05/06/2024 | 14:30 - 16:30 **Scientific Machine Learning for Modelling and Simulation II**	MS165B Room: 1.10 Chaired by: Dr. Idoia Cortes Garcia (Eindhoven University of Technology, Netherlands), Dr. Michael Abdemalik (Eindhoven University of Technology, Netherlands)

Parametric Physics-Informed Neural Networks for Material Model Calibration in Structural Health Monitoring
D. Anton, H. Wessels, A. Henkes, U. Römer*

Phase-Field Modeling Of Fracture Processes Using Physics-Informed Deep Learning
M. Manav, R. Molinaro, S. Mishra, L. De Lorenzis*

Physics-Informed Neural Networks for Probabilistic Mechanical Analysis: Potentials, Challenges, and Limitations
E. Hosseini, H. Xu*

Physics-Constrained NN-based Hyperelastic Constitutive Modeling of TPVs
H. Lobato, A. Burgoa, J. Matxain*

Physically Recurrent Neural Networks for Computational Homogenization of Composite Materials with Microscale Debonding
N. Kovacs, M. Maia, I. Rocha, C. Furtado, P. Camanho, F. van der Meer*

Why and how to incorporate physical information into artificial neural networks for mechanical problems
G. Geuken, P. Kurzeja, J. Mosler*

Physics-Informed Wavelet Neural Operator for Data-free Learning of Parametric Partial Differential Equations
T. Tripura, N. N, S. Chakraborty*

05/06/2024 | 14:30 - 16:30
Domain Decomposition and Time-Splitting Methods for Multiscale Multiphysics Problems II

MS043B
Room: 1.11
Chaired by:
Dr. Ivan Yotov (, United States)

A mass conservative finite element method for a nonisothermal Navier-Stokes/Darcy coupled system
J. Camaño, R. Oyarzúa, M. Serón, M. Solano*

A Domain Decomposition Method for Coupled Stokes-Darcy Problems with Generalised Interface Conditions
P. Strohbeck, M. Discacciati, I. Rybak*

Robin-Robin domain decomposition methods for fluid-poroelastic structure interaction
*A. Dalal, R. Durst, A. Quaini, I. Yotov**

New twofold saddle-point formulations for Biot poroelasticity with porosity-dependent permeability
*B. Lamichhane, R. Ruiz-Baier, S. Villa-Fuentes**

Computational framework for automatic mesh refinement in nonlinear quasi-static solid mechanics context: multilevel adaptive strategy with controlled accuracy
D. Koliensikova, I. Ramière, F. Lebon*

05/06/2024 | 14:30 - 16:30
In-Silico vs. In-Vivo: Accuracy and Reliability of Patient-Specific Cardiac Modeling II

MS121B
Room: 1.12
Chaired by:
Prof. Elias Balaras (George Washington University, United States), Prof. Francesco Capuano (Universitat Politècnica de Catalunya, Spain)

On the Reconstruction of Heart Motion from Medical Images: Accuracy and Compatibility with Flow-Related Measures
F. Capuano, Y. Loke, I. Yildiran, L. Olivieri, E. Balaras*

A Preliminary Study of Thrombus Modelling in Patient-Specific Left Atrial Appendage
A. Lo Presti, A. Monteleone, A. Viola, G. Musotto, A. Tamburini, E. Napoli, G. Burriesci*

Chemo-Fluidic Modeling of Occlusion in Cerebral Aneurysms Treated with Flow Diverter Stents
Z. Alamlah, R. Mittal, J. Seo, J. Caplan, A. Grewal*

Data-driven FSI simulation of ventricle and aorta integrating in vivo and in silico data
M. Scarpolini, S. Celi, F. Viola*

05/06/2024 | 14:30 - 16:30
Advances In The Design Of Architectured Metamaterials II

MS168B
Room: 1.13
Chaired by:
Prof. Maria De Bellis (Maria Laura De Bellis, Dr, University of Chieti-Pescara, Italy), Phd. Rosaria Del Toro (University of Chieti-Pescara, Viale Pindaro 42, Pescara, Italy, Italy)

A Novel Electrically Tunable Mechanical Metamaterial for Wave Propagation Control
P. Badino, A. Bacigalupo, F. Bosi, L. Gambarotta*

Continualization Method for Periodic Cauchy Materials in non-standard Thermoelasticity
R. Del Toro, M. De Bellis, A. Bacigalupo*

Machine Learning for Topology Optimization of Multi-Bandgap Elastic Metamaterials
B. Van Damme, C. Donner, S. Dedoncker*

Finite element analysis of a 3D printed flexible unit cell with intermediate locking mechanism
S. Bashmal, F. -*

05/06/2024 | 14:30 - 16:30
Phase Field Formulation for Fracture and Its Applications II

MS205B
Room: 1.14
Chaired by:
Prof. Chandu Parimi (BITS Pilani, Hyderabad Campus, India), Phd. Lucas Castro (University of Oviedo, Spain)

Qualitative Description of Fracture in Laminated Glass Using Phase-field
*J. Schmidt, M. Šejnoha**

The Impact of Phason Walls on the Dynamic Crack Propagation in Quasicrystals
K. Sivadas, C. Parimi, S. Natarajan, H. Hirshikesh*

Phase field modeling of brittle fracture in nacre inspired composites under dynamic loading
A. Chemenghat, A. Unnikrishna Pillai, M. Rahaman*

A Variational Phase-field Approach for Non-isothermal Hydraulic Fractures in Porous Media
Y. Liu, K. Yoshioka, H. Li, F. Zhang*

Anisotropic phase-field modeling of brittle fracture under thermo-mechanical loading
A. Behera, M. Rahaman*

05/06/2024 | 14:30 - 16:30
Agent-Based Modelling to simulate cell- and multiscale problems in Biology II

MS119B
Room: 1.15
Chaired by:
Prof. Haralampos Hatzikirou (Khalifa University, United Arab Emirates), Ms. Thaleia Ntiniakou (Barcelona Supercomputing Center, Spain)

Community Benchmark of Centre-Based Multiscale Modelling Tools
T. Ntiniakou, O. Hayoun-Mya, J. Carbonell-Caballero, M. Ruscone, R. Heiland, A. Fletcher, F. Cooper, T. Duswald, R. Bauer, N. Cogno, J. Zhao, L. Portell-Silva, S. Capella-Gutierrez, P. Van Liedekerke, P. Macklin, S. Höhme, D. Drasdo, A. Valencia, A. Montagud*

Emergent Dynamics of Cancer Cell Invasion and Colonization through Local Cell-to-Cell Communication: Insights from Agent-Based Modeling
E. Tzamali, G. Tzedakis, M. Tampakaki, V. Sakkalis*

Machine learning-aided in silico model quantification of drug-induced viral mimicry response in cervical cancer
J. Papadopoulos, C. Akasiadis, V. Vavourakis*

Machine-learning superpixels for 3D multiscale modelling of liver diseases
S. Hoehme, A. Friebel*

Agent-based Modelling of the Retina
C. Harris, T. Adel, R. Bauer, A. Tamaddoni-Nezhad*

PyChaste: Python Bindings for Chaste
K. Amponsah, J. Grogan, M. Leach, F. Cooper, J. Jennings, J. Pitt-Francis, A. Fletcher, G. Mirams*

05/06/2024 | 14:30 - 16:30
Modelling and Optimization of Functionally Graded Composites and Structures II

MS131B
Room: 2.01
Chaired by:
Dr. André Carvalho (CIMOSM, ISEL – Centro de Investigação em Modelação e Optimização de Sistemas Multifuncionais, Instituto Politécnico de Lisboa, Portugal), Dr. M.A.R. Loja (Instituto Superior de Engenharia de Lisboa, Portugal)

On the mechanics of functionally graded nanobeams based on surface stress-driven nonlocal model
R. Penna, A. Lambiase, G. Lovisi, L. Feo*

Focussing of bending waves in functionally graded composite structures
V. Rapine, N. Abuhemeida, M. Ouisse, S. Cogan, R. Lachat, P. Francescato, Y. Meyer*

Harmonic Behavior of Functionally Graded I-shaped Beams Using the Thermoelastic Model
*A. Carvalho**

Design of an Acoustic Luneburg Lens via Topology Optimization of Pentamode Lattice
M. Pozzi, S. Cominelli, F. Braghin*

Laminate-like functionally graded composites
*G. Serhat**

05/06/2024 | 14:30 - 16:30 **Advances in numerical methods for atmosphere and ocean dynamics simulations I**	MS111A Room: 2.02 Chaired by: Dr. Michele Girfoglio (SISSA, Trieste, Italy)

Strategies for Performing Large-Eddy-Simulations in Weather Models without Paying the Price
*S. Kang, J. Kelly, A. Austin, F. Giraldo**

Implicit Time Stepping for Atmospheric Transport
*H. Weller**

A Multigrid preconditioner for Discontinuous Galerkin Methods Applied to Numerical Weather Prediction
*P. Birken, A. Dedner, R. Klöfkorn**

Full and reduced order models for the numerical simulation of mesoscale atmospheric flows
M. Girfoglio, A. Quaini, G. Rozza*

Stabilized Quasi-monotone semi-Lagragian High-order Finite Element Method for a Nonhydrostatic Ocean Model
J. Gomes de Oliveira, P. Galán del Sastre*

Numerical Investigation of Quasi-geostrophic Turbulence on the Sphere
A. Franken, E. Luesink, S. Ephrati, B. Geurts*

Evaluation of WENO and TENO schemes for the simulation of atmospheric flows
A. Navas-Montilla, I. Echeverribar, J. Guallart, P. Solan, P. García-Navarro*

05/06/2024 | 14:30 - 16:30 **Advances in Computational Mechanics I**	GS002A Room: 2.03

Damage Diagnosis of Buildings via BI-LSTM and GRU Deep Learning Models with Attention Mechanism
S. Hung, Y. Lin*

Data-driven parametric reduced order modelling for fast forced vibration response predictions of metamaterial structures via continued fractions
F. Qu, L. Van Belle, W. Desmet, E. Deckers*

Multistep high-order adaptive coupling for multiphysics simulations involving coupled black-box solvers through an interface
*L. François, M. Massot**

Error Estimation for Model Order Reduction of Systems with many Inputs
M. Vierneisel, P. Eberhard*

A Parametric Investigation of the Train-Test Ratio for Machine Learning Algorithms in Structural Mechanics Applications
G. Markou, D. Rademan*

Investigating SFRC Jacketing for Seismic Retrofitting of Reinforced Concrete Multistorey Buildings
*D. Rademan, K. Braun, G. Markou**

05/06/2024 | 14:30 - 16:30 **Efficient simulation technology for multiphysics in complex porous media I**	MS122A Room: 2.04 Chaired by: Dr. Jakub Both (University of Bergen, Norway), Prof. Fleurianne Bertrand (TU Chemnitz, Germany)

Coupled Poromechanics and Earthquake Rupture Simulations for Induced Seismicity
M. Cusini, K. Kroll, N. Castelletto, R. Settgast, J. White*

Induced seismicity modelling for geothermal energy production
I. Saifullin, A. Novikov, D. Voskov*

Use Of Adaptative Hybrid Meshes For CO2 Storage Flow And Poromechanical Simulations
M. Raguenel, D. Lopez, C. Legentil, C. Borgese, W. Li*

Automatic Solver Selection for Multiphysics Porous-media Numerical Simulations
Y. Zabegaev, E. Keilegavlen, I. Berre, E. Iversen*

Solution Space Parametrization for Immiscible Compositional Problems using Neural Networks
*G. Hadjisotiriou, D. Voskov**

Influences on mass conservation within growth of porous materials utilising nondimensionalisation
M. Brodbeck, M. Suditsch, S. Seyedpour, F. Bertrand, T. Ricken*

05/06/2024 | 17:00 - 19:00 **Deep Learning Computing II**	MS005B Room: Auditorium I Chaired by: Prof. Serge Prudhomme (Polytechnique Montréal, Canada), Phd. Juan Francisco Rodríguez Gálvez (University of Malaga, Spain)

Finite element interpolated neural networks for forward and transient problems
S. Badia, W. Li, A. Martin*

r-Adaptive Deep Learning PDE Solver With Triangular Meshes
Á. Omella, J. González-Sieiro, T. Teijeiro, D. Pardo*

A Discontinuous Deep Ritz Method for PDEs
M. Strugaru, Á. Omella, D. Pardo, I. Muga*

Enhancing OpenFOAM with Deep Learning for Minimising the Spatial Discretisation Error on Coarse Meshes
J. Gonzalez-Sieiro, D. Pardo, V. Nava, V. Calo*

A deep learning approach for the reconstuction of 3D geometries and fields
S. Pagani, D. Carrara, F. Regazzoni*

A PDE-informed and Physics-informed neural network for learning weak solutions in two-dimensional conservation laws
E. Abreu, J. Florindo, W. Lambert*

05/06/2024 | 17:00 - 19:00
Novel Methods and Algorithms in Topology Optimization: Bridging Design, Materials, Simulations, and Manufacturing III

MS162C
Room: Auditorium II
Chaired by:
Dr. Nicola Ferro (Politecnico di Milano, Italy), Dr. Matteo Giacomini (CIMNE - Universitat Politècnica de Catalunya, Barcelona, Spain)

Design of strut-based lattice structures using a topology optimisation method based non-uniform rational basis spline entities
A. Mathiazhagan, M. Montemurro, K. Hoeschler*

Designing novel vascular stents through topological optimization
F. Mezzadri, D. Carbonaro, N. Ferro, D. Gallo, A. Audenino, C. Chiastra, U. Morbiducci, S. Perotto*

Stress-constrained Topology Optimization of Structures Made of a Triply-Periodic Minimal Surface (TPMS) Lattice
*S. Nguyen-Van, B. Yilmaz, L. Huang, G. Manogharan, J. Norato**

A Combined BESO-OC Method for the Optimization of Functionally Graded Stochastic Lattice Structures
J. Stollberg, T. Gangwar, D. Schillinger*

05/06/2024 | 17:00 - 19:00
Numerical Methods for the Vascular System in Health and Disease I

MS102A
Room: Auditorium III
Chaired by:
Dr. Richard Schussnig (University of Augsburg, Institute of Mathematics, Chair of High-Performance Scientific Computing, Germany), Mr. Rolf-Pissarczyk Malte (Graz University of Technology, Austria)

CRIMSON: An Open-source Framework for Digital Twinning in Biofluids (Keynote Lecture)
A. Figueroa, J. Capecelatro, A. Malipeddi, H. Yang, K. Garikipati*

Cell-level blood flow simulation: a journey through scales
C. Porcaro, M. Saeedipour*

Investigating the Impact of Prothrombin Mutations on Thrombus Formation Using Convection-Diffusion-Reaction Equations
T. Bongartz, A. Piergentili, R. Giulia, M. Behr*

Platelet Function Characterization by Numerical Modeling of Adhesion and Aggregation
F. Zucchelli, F. Raynaud, J. Lätt, B. Chopard, K. Boudjeltia*

A longitudinal study of aortic remodeling in chronic type B dissection with patient-specific fluid-structure interaction models
M. Rolf-Pissarczyk, K. Bäumler, R. Schussnig, G. Mistelbauer, M. Pfaller, T. Fries, A. Marsden, D. Fleischmann, G. Holzapfel*

05/06/2024 | 17:00 - 19:00 **Verification, Validation and Uncertainty Quantification in Modeling and Simulation I**	MS040A Room: Auditorium IV Chaired by: Dr. Luís Eça (IST, Portugal), Dr. Filipe Pereira (Los Alamos National Laboratory, United States)

Overview of ASME V&V20-2009, Standard for Verification and Validation in Computational Fluid Dynamics and Heat Transfer (Keynote Lecture)
*K. Dowding**

A V&VUQ Platform to Assess Credibility of Simulations: Application to Composite Structures
S. Bocquet, L. Barrière*

Verification, Validation and Uncertainty Quantification Applied to Composite Space Structures
G. Poort, J. Fatemi*

Experimental Validation and Uncertainty Analysis of Phase-Averaging for Transcatheter Heart Valve FSI Applications
R. Lozowy, T. Zhao*

Discovering linear and nonlinear shared manifolds for enhancing multifidelity uncertainty quantification
A. Zanoni, G. Geraci, M. Salvador, A. Marsden, D. Schiavazzi*

05/06/2024 | 17:00 - 19:00 **Recent trends in elastic and acoustic metamaterials II**	MS059B Room: Auditorium VI Chaired by: Prof. Antonio Palermo (University of Bologna, Italy), Dr. Andrea Francesco Russillo (University of Reggio Calabria, Italy)

Modeling Wave Propagation in a Finite-Size Metamaterial through a Reduced Relaxed Micromorphic model: a study on Unit Cell "Cut"-related Boundary Effects
P. Demetriou, G. Rizzi, J. Voss, L. Perez Ramirez, S. Hermann, F. Erel-Demore, A. Madeo*

Modelling and optimization of multi-modal metamaterial panels for broadband vibroacoustic attenuation
D. Giannini, M. Schevenels, E. Reynders*

Uniform extension-torsion of helical birods
M. Alam, A. Kumar*

Tailored instabilities at different scales in a metamaterial
N. Marasciuolo, F. Trentadue, D. De Tommasi, G. Vitucci*

Anomalous reflection of acoustic waves using local resonant metamaterials
S. SIKUNDALAPURAM RAMESH, X. Kuci, M. G.D. Geers, V. G. Kouznetsova*

05/06/2024 | 17:00 - 19:00 **Computational Methods for Multiphase Flows with Liquid-Vapor Transition I**	MS068A Room: Auditorium VII Chaired by: Dr. Marica Pelanti (ENSTA Paris - Institut Polytechnique de Paris, France)

Compressible Multifluid Models for Numerical Simulations with Heat Exchange and Phase Change
N. Rutard, A. de Brauer, C. Le Touze*

Unstructured conservative level-set method for interfacial transport processes on adaptive and fixed collocated meshes
N. BALCAZAR ARCINIEGA, J. RIGOLA, A. OLIVA*

Implementation and validation of an evaporation solver in a diffuse interface method for airblast applications
B. Péden, P. Boivin, N. Odier*

Two-fluid Compressible Flows with Multiresolution Adaptive Mesh Refinement
G. Wu, N. Grenier, C. Nore*

Wetting simulation of the porous structure of a heat pipe using an eXtended Discontinuous Galerkin method and a parameterized level-set
I. Shishkina, F. Kummer, M. Oberlack*

05/06/2024 | 17:00 - 19:00 **Multiscale Computational Homogenization for bridging scales in the mechanics and physics of complex materials IV**	MS009D Room: Auditorium VIII Chaired by: Dr. Mayu Muramatsu (Keio University, Japan)

Stochastic Multiscale Analysis of Thermoplastic Composite Materials
S. Gupta, M. Abdul Rasheed, B. Rosić*

Error-Driven Hierarchical Modelling of Composite Structures
N. Feld, M. Fergoug, A. Parret-Fréaud, B. Marchand, S. Forest*

Aspects of parameter identification of models for materials exhibiting propagating instabilities
M. Mucha, L. Rose, A. Menzel*

Two-Scale Geometric Modelling for Defective Media
M. Crespo, G. Casale, L. Le Marrec*

Construction of Coarse Approximation for a Schrödinger Problem with Highly Oscillatory Coefficient
S. Ruget, F. Legoll, C. Le Bris*

Multilevel Computational Modeling of Graphene
*M. Curatolo, A. Genoese, A. Genoese, G. Formica, G. Salerno**

05/06/2024 | 17:00 - 19:00 **Innovative Methods for Fluid-Structure Interaction II**	MS202B Room: Terrace Chaired by: Prof. Joris Degroote (Ghent University, Belgium), Prof. Trond Kvamsdal (Norwegian University of Science and Technology (NTNU), Norway)

Fluid-Structure-Contact Interaction for Lubricated Rolling
M. Billen, T. Spenke, N. Hosters*

Projection Based Reduced Order Model of Elasto-Acoustic Vibrations Computed with Isogeometric Analyses
T. Landi, C. Hoareau, J. Deü, R. Citarella, R. Ohayon*

Non-intrusive reduced order models for partitioned fluid-structure interactions
A. Tiba, T. Dairay, F. De Vuyst, I. Mortazavi, J. Berro Ramirez*

Model Order Reduction for Coupled Multi-Domain Simulations Applied to Helicopters
L. Frie, O. Wengrzyn, M. Keßler, E. Krämer, P. Eberhard*

Vibroacoustic Coupling Including Viscous Boundary Layers
F. Toth, A. Ganapathy*

Recent advances in diffuse-interface models for binary-fluids and elasto-capillarity
H. van Brummelen, T. Demont, T. van Sluijs, S. Stoter, C. Verhoosel, J. Snoeijer, G. van Zwieten*

05/06/2024 | 17:00 - 19:00 **Computational Biomechanics and Applications IV**	MS158D Room: 3A Chaired by: Phd. André Castro (ESTSetúbal, Instituto Politécnico de Setúbal, Portugal)

Considering Uncertain Quantities in the Model of Cryopreservation Process of Biological Samples
A. Skorupa, A. Piasecka-Belkhayat*

Numerical Simulation of Oxygen Distibution in Soft Tissue Exposed to an External Heat Impulse
M. Zadoń, M. Jasiński*

Towards Modeling the Pre and Postoperative State of Cerebral Aneurysms
M. Frank, M. Mayr, A. Popp*

Numerical modelling of bioresorbable stents with micro-digital image correlation as models validation method
G. Kokot, N. Molęda*

05/06/2024 | 17:00 - 19:00 **Efficient CAD-based discretization methods IV**	MS064D Room: 3B Chaired by: Dr. Stefan Takacs (Johannes Kepler University Linz, Austria)

Spline-Based Parameterisation Techniques for Plane Graphs
J. Hinz, A. Buffa, P. Antolín*

Leveraging Quadrilateral Meshes in NEFEM for Enhanced CAD-to-Analysis Integration
G. Santi, M. Montanari, R. Sevilla*

OpenQuad: A semi-automatic and scalable untrimming pipeline for trimmed NURBS
Z. Wei, X. Wei*

A comparison of integration schemes for polyhedral elements for non-linear problems in the context of the Discontinuous Galerkin Method
C. Langlois, T. van Putten, H. Bériot, E. Deckers*

Preparing Trimmed CAD Models for Electrostatic Simulations using Discontinuous Galerkin BEM
B. Marussig, T. Rüberg, J. Zechner, T. Fries*

05/06/2024 | 17:00 - 19:00 **Mechanics of Wood and Biocomposites in Engineering IV**	MS032D Room: 3C Chaired by: Dr. Ani Khaloian (Technical University of Munich, Germany), Dr. Markus Königsberger (TU Wien, Austria)

An orthotropic elastic, orthotropic plastic model with plasticity-induced evolution of orthotropy based on a covariant formulation applied to pulp fibres at finite strains
M. Ulz, C. Celigoj*

Calibration of Hill's Model for Wood
*J. Pelczynski**

Wood Constitutive Law Implementation in Finite Element Software ZSoil to Model Dowel Embedment Tests on Glulam
M. Delage, G. Jacot-Descombes, D. Scantamburlo, S. Commend*

Influence of Fber Orientation and Fiber-Matrix Interface Compliance on Stiffness of Biocomposites: Insights from Micromechanics Multiscale Modeling
M. Königsberger, V. Senk, M. Lukacevic, J. Füssl*

Residual stress analysis in wood and its application
I. Muench, J. Wulf*

05/06/2024 | 17:00 - 19:00 **Recent Advances of Computational Methods in Cardiovascular and Cerebrovascular Biomechanics IV**	MS039D Room: 5A Chaired by: Prof. Sónia Pinto (Engineering Faculty of University of Porto (FEUP), Portugal), Dr. Marco Laudato (KTH Royal Institute of Technology, Sweden)

Large Eddy Simulation and Aeroacoustics of a Collapsible Vessel
M. Laudato, M. Mihaescu*

Computational Fluid Dynamics based simulation of an ICA Aneurysm high-flow bypass : pre and post surgery
P. Panchal, B. Patnaik, J. Sudhir*

Hemodynamics of intentional partial endovascular coil filling in a wide neck middle cerebral artery aneurysm
N. Panneerselvam, B. SUDHIR, S. Kannath, B. Patnaik*

CFD analysis of hemodynamic parameters on initiation of aneurysms of middle cerebral artery bifurcation
C. Valeti, B. Niroop, H. Darshan, B. Patnaik, B. Sudhir*

Publicly Available CFD-enhanced Cerebrovascular 4D Flow MRI Dataset
P. Dirix, L. Jacobs, S. Kozerke*

Study of hemodynamic in the iliac bifurcation through Fluid-Structure Interaction simulations
F. Carneiro, L. Bastos, S. Teixeira, J. Teixeira*

05/06/2024 | 17:00 - 19:00 **Advancing SCiML Surrogates via Numerical Methods and Vice Versa III**	MS166C Room: 5B Chaired by: Dr. Alexander Heinlein (TU Delft, Netherlands), Dr. Alena Kopanicakova (Brown University, United States)

Symplectic neural networks
*B. Tapley**

Fast process simulations of complex engineering parts using physics-informed graph network simulators (PI-GNS)
T. Würth, C. Zimmerling, N. Freymuth, G. Neumann, L. Kärger*

Gaussian Process Learning of Nonlinear Dynamics
D. Ye, M. Guo*

Learning partial differential equations with pseudo-Hamiltonian neural networks
S. Eidnes, K. Lye*

Data-driven methods in energy transition
D. Baroli, M. Multerer, L. Pernigo*

Randomized neural network with Petrov–Galerkin methods for solving nonlinear PDEs
Y. Shang, F. Wang, J. Sun*

05/06/2024 | 17:00 - 19:00 **Computational Models and Methods for Predicting Cancer Progression and Treatment Response I**	MS035A Room: 5C Chaired by: Dr. Guillermo Lorenzo (Health Research Institute of Santiago de Compostela, Spain)

How to make clinical predictions when we do not know everything? (Keynote Lecture)
*H. Hatzikirou**

Bayesian information-theoretic approach to determine effective scanning protocols of cancer patients
H. Cho, A. Lewis, K. Storey*

Integrating Mass Effects in Glioma Radiotherapy Planning by Optimization of a Data and Physics Informed Discrete Loss
M. Balcerak, B. Menze*

A data-driven physics-based model for predicting prostate cancer progression from the PSA blood test
D. Camacho-Gomez, C. Borau, J. Garcia-Aznar, M. Gomez-Benito, M. Perez*

Personalized Imaging-Informed Forecasting of Prostate Cancer Progression during Active Surveillance
G. Lorenzo, C. Wu, J. P. Yung, J. F. Ward, H. Gomez, A. Reali, T. E. Yankeelov, A. M. Venkatesan, T. J. R. Hughes*

05/06/2024 | 17:00 - 19:00 **Advances in Finite Element Methods for Transient, Coupled Interfacial Phenomena I**	MS035A Room: 0.06 MS Corresponding Organizer: Dr. David Noble (Sandia National Laboratories)

Two-phase flow simulation using the X-Mesh approach
A. Quiriny, J. Lambrechts, N. Moës, J. Remacle*

An eXtreme Mesh Deformation Method to Track Shock Waves
V. Degrooff, J. Remacle, N. Moës*

A Discontinuity-Enriched Finite Element Method for modeling Fracture Growth in Brittle Materials
A. Aragón, J. Zhang, Y. Yang*

Cell agglomeration for cut cells in eXtended discontinuous Galerkin methods
*M. Toprak**

A Low Diffusion Verified Conforming Transient h-r Unstructured Adaptive Mesh Refinement (cThruAMR) Method for Coupled Interface Problems
*D. Noble**

High-fidelity multiphase flow modeling of laser welding applications using interface-conformal meshes
S. Lin, D. Moser*

05/06/2024 | 17:00 - 19:00 **Engineering the Future: Advancements in Industrial Aerodynamic Simulations II**	STS269B Room: 0.07 Chaired by: Dr. Oriol Lehmkuhl (Barcelona Supercomputing Center (BSC), Spain)

HAWT Efficiency Increase via Active Flow Control Implementation
A. Nabhani, M. Saemian, J. Bergada*

Deep Learning Surrogate Models for the Autmotive Industry
B. Eiximeno, A. Miró, I. Rodríguez, O. Lehmkuhl*

Adaptive Mesh Refinement for Spectral-Element Simulations of Compressible Turbulent Flows
S. Gómez, J. Muela, A. Gargallo, O. Lehmkuhl*

Towards Active Flow Control Strategies Through Deep Reinforcement Learning
R. Montalà, B. Font, O. Lehmkuhl, R. Vinuesa, I. Rodriguez*

Development and Exploitatoin of Scale-Resolving Simulation Tools for Turbomachine Flows
*M. Rasquin, M. Boxho, O. Coulaud, M. Diaz, A. Rocca, K. Hillewaert, T. Toulorge**

Efficient Algorithms for HPC in the New Generation Solver CFD ONERA-DLR-Airbus (CODA)
V. Couaillier, R. Milani, E. Martin, Y. Jang, J. Nunez, J. Chapelier, F. Renac*

05/06/2024 | 17:00 - 19:00 **STS: Advanced CFD applications for complex aircraft configurations II**	STS240B Room: 0.08 Chaired by: Prof. Jochen Wild (DLR German Aerospace Center, Germany), Dr. Dietrich Knoerzer (Aeronautics Consultant, Belgium)

Increasing Take-Off Performance of a Distributed Propulsion Wing Section using Segmented Flaps
T. Lindner, J. Oldeweme, J. Friedrichs, P. Scholz*

Investigating Truss-Braced Wing Configuration through CFD Based Analysis
M. Hothazie, D. Crunteanu, I. Bunescu, M. Pricop*

Fluidic Actuation for Gust Load Reduction on an Aircraft Wing
A. Bauknecht, F. Siebert, K. Khalil*

Assessment of engine/airframe aerodynamic performance: comparison between ONERA, DLR, NLR and Airbus
F. Sartor, S. Janssen, B. Caruelle, A. Stuermer, M. Laban*

05/06/2024 | 17:00 - 19:00 **Predictive Data-Driven Model Reduction and Discovery for Dynamical Systems III**	MS069C Room: 1.02 Chaired by: Dr. Mengwu Guo (Lund University, Sweden), Prof. Steven Brunton (University of Washington, United States)

Efficient active learning for high dimensional data
C. Wang, L. Feng, W. Lu, W. Bian, Z. You, P. Benner*

Evolving System Parameters: Set-Encoding for Online Nonlinear Dynamics Identification
M. Elaarabi, S. Comas-Cardona, D. Borzacchiello, P. Le Bot, Y. Le Guennec*

Analysis of correlated flow fields via extended cluster-based network models
A. Colanera, M. Reumschuessel, J. Beuth, M. Chiatto, L. de Luca, K. Oberleithner*

05/06/2024 | 17:00 - 19:00 **Advancing Predictive Simulations under Uncertainty: AI and UQ for Computational Mechanics I**	MS160A Room: 1.03 Chaired by: Dr. Sebastian Kaltenbach (ETH Zurich / Harvard University, United States), Dr. Sergey Litvinov (, Switzerland)

A Reduced Order Model Conditioned on Measured Features for Structural Health Monitoring of Nonlinear Systems
K. Vlachas, T. Simpson, A. Garland, E. Chatzi*

Statistical Learning and Inference in the Small Data and Poor Model Limits
R. Ghanem, P. Tsilifis, D. Biller, Z. Gou*

Learned Effective Dynamics (LED) and Bayesian methods for patient-specific cancer immunotherapy
S. Litvinov, S. Kaltenbach, P. Koumoutsakos*

AI- Based Surrogate Modelling Techniques for Time Dependent Parametrized Mathematical Models of Cancer Immunotherapy
P. Koumoutsakos, V. Papadopoulos, T. Stylianopoulos, G. Sotiropoulos, I. Kalogeris*

05/06/2024 | 17:00 - 19:00 **Advances in Turbulence Modeling using Nonlocal Derivatives, Implicit LES and Deep Learning II**	MS080B Room: 1.04 Chaired by: Mr. Pavan Pranjivan Mehta (SISSA, International School of Advanced Studies, Italy), Dr. Marta D'Elia (Meta, United States)

Fractional Reynolds-averaged Navier–Stokes equations
*P. Pranjivan Mehta**

DRDMannTurb: An open-source, GPU-accelerated, nonlocal turbulence model for the atmospheric boundary layer with scalable fluctuation field generation
A. Izmailov, M. Meeker, G. Deskos, B. Keith*

Data-Driven Closures for Explicit Large Eddy Simulations
G. Iaccarino, M. Benjamin*

Adaptive Viscosity Methods for Turbulent Compressible Flow Computations
X. Nogueira, J. Fernández Fidalgo, L. Ramírez, P. Tsoutsanis*

Non-overlapping Near-wall Domain Decomposition for Turbulence Modeling
*S. Utyuzhnikov**

05/06/2024 | 17:00 - 19:00 **Scientific Machine Learning - A catalyst for algorithmic performance in industrial computer aided engineering III**	MS163C Room: 1.05 Chaired by: Dr. Dirk Hartmann (Siemens Industry Software GmbH, Germany), Prof. Thomas Richter (Otto-von-Guericke Universität Magdeburg, Germany)

ML-based ROMs with Sub-structuring for More Accurate Digital Twins in Complex Applications
D. Manvelyan, Y. Filanova, P. Benner*

Scientific Machine Learning for Digital Twins in Green Carbon Processes
P. Benner, J. Bremer, I. Gosea, P. Goyal, L. Peterson, K. Sundmacher*

Neural Subdomain Solver for Magnetostatic Field Computations of a Quadrupole Magnet
M. von Tresckow, I. Ion, H. De Gersem, D. Loukrezis*

Keynote Discussion Round - Quo Vadis: Scientific Machine Learning in Industry?
D. Hartmann, T. Richter*

05/06/2024 | 17:00 - 19:00 **Numerical Modeling and Data Analysis for Advancing Sustainable Innovation II**	MS178B Room: 1.06 Chaired by: Prof. Simona Perotto (MOX, Department of Mathematics, Politecnico di Milano, Italy), Ms. Dajana Conte (Università di Salerno, Italy)

Data Science Approach to Modeling Data Center Energy Efficiency
*Y. Yibrah Gebreyesus, D. dalton, D. de chiara, M. chinnici**

Enhancing industrial quality control efficiency: an innovative deep learning approach for sustainable process monitoring
M. Zribi, P. Pagliuca, F. Pitolli*

Physics Informed neural network for the investigation of the qualitative behavior of the micromodulus function in linear peridynamics
*F. Difonzo, L. Lopez, S. Pellegrino**

A Neural Network Approach to Learn Delay Differential Equations via Pseudospectral Collocation
*D. Breda, M. Tanveer**

Adapted Numerical Methods And Pinns-Based Approaches For Reaction-Diffusion Problems
*F. Colace, D. Conte, G. Pagano, B. Paternoster, C. Valentino**

05/06/2024 | 17:00 - 19:00 **Complex Fluid Flows in Engineering: Modeling, Simulation, and Optimization III**	MS012C Room: 1.07 Chaired by: Dr. Fabian Key (TU Wien, Austria), Prof. Stefanie Elgeti (TU Wien, Austria)

A Data-Driven Rheological Model Based on Input Convex Neural Networks
*N. Parolini**

Using Neural-Networks to Close Reynolds-Averaged Navier-Stokes Equations
D. Oberto, S. Berrone, M. Strazzullo*

Optimizing Physics-Informed Neural Networks for Pulsatile Non-Newtonian Channel Flows
N. Park, J. Son, J. Nam*

Anisotropic mesh adaptation techniques for the Variational MultiScale-Smagorinsky modeling of high Reynolds flows
E. Temellini, N. Ferro, G. Stabile, S. Perotto, T. Chacon Rebollo*

Large eddy simulation of an excited nitrogen-diluted hydrogen flame stabilised by a bluff-body
*L. Caban, A. Wawrzak, A. Tyliszczak**

05/06/2024 | 17:00 - 19:00 **HPC Simulations and AI for the Wide Industrial Realm II**	MS144B Room: 1.08 Chaired by: Prof. TETSURO TAMURA (Yokohama National University, Japan), Dr. Hidenori Kawai (, Japan)

Large-Scale Direct Numerical Simulation of a Turbulent Lean-premixed Swirling Hydrogen Flame on Fugaku
A. Pillai, U. Ahmed, N. Chakraborty, R. Kurose*

Spatiotemporal Dynamics of Spray Combustion Oscillations in a Back-Step Combustor From the Viewpoint of Reservoir Computing
K. Kato, H. Hashiba, J. Nagao, H. Gotoda, Y. Nabae, R. Kurose*

Machine learning-based level-set reinitialization for the computation of the acoustic emission of lean premixed flames
S. Herf, M. Ruttgers, A. Lintermann*

An Efficient Immersed Boundary Method for Conjugate Heat Transfer Based on a Fully Compressible Solver
C. Li, R. Bale, M. Tsubokura*

Direct Numerical Simulation of Millimeter-sized Bubble Dynamic on Horizontal Channel flow with Riblet Surfaces
S. Kim, M. Tsubokura*

05/06/2024 | 17:00 - 19:00 **Computational Methods for Enabling Digital Twins III**	MS047C Room: 1.09 Chaired by: Dr. Dimitrios Loukrezis (Siemens AG, Germany)

Advancing Executable Digital Twin: Efficient Time-Domain Vibroacoustic Reduced Order Models and Multiphysics Integration
D. Bizzarri, H. Beriot, S. van Ophem, O. Atak*

Operator Inference for Nonlinear Structural Mechanics with Stability Guarantees
P. den Boef, D. Manvelyan*

Towards a digital twin of interacting medical interventional devices and patient tissues using model order reduction
R. van Hoof, O. van der Sluis, J. Remmers, C. Verhoosel*

Latent Space Particle Filter using Deep Learning
N. Mücke, S. Bohte, C. Oosterlee*

Navigating Chemical Vapour Deposition Regimes: Leveraging Unsupervised Learning for Process Insights, Surrogate Modeling, and Sensitivity Analysis
G. Loachamín, P. Papavasileiou, E. Koronaki, D. Giovanis, I. Aviziotis, G. Gakis, G. Pozzetti, M. Kathrein, C. Czettl, A. Boudouvis, S. Bordas*

05/06/2024 | 17:00 - 19:00 **Interdisciplinarity in Applied Mechanics and Computational Mechanics I**	MS133A Room: 1.10 Chaired by: Prof. Pedro Areias (Instituto Superior Técnico, Portugal)

A coupled finite element strategy for high-fidelity modelling of mechanical transmissions with non-isothermal lubrication
S. Neeckx, B. Blockmans, R. Boukadia, F. Naets, W. Desmet*

Gap Function and Signed Distance Fields: An Optimization Approach
O. Gouveia, J. Guedes, R. Ruben*

Delayed damage approach to model the degradation of materials exposed to the development of expanding phases
M. Koniorczyk, D. Gawin, I. Omrani*

A numerical study of optical path length variation of Rare-Earth doped optical materials
*A. Mirzai, A. Ahadi**

Effect Of Rotation Of The Boundaries On The Stability Of A Flow Caused BY A Nonlinear Heat Source
A. Gritsans, I. Yermachenko, A. Kolyshkin, F. Sadyrbaev*

05/06/2024 | 17:00 - 19:00 **Multidisciplinary Analysis and Optimisation (MDAO) in Large Scale and High Fidelity for Industrial Applications I**	MS105A Room: 1.11 Chaired by: Dr. Jens-Dominik Mueller (Queen Mary University of London, United Kingdom), Dr. Arthur Stueck (German Aerospace Center (DLR), Germany)

Optimal Design of Vehicle Dynamics Using Gradient-based, Mixed-fidelity Multidisciplinary Optimization
H. Cheong, M. Ebrahimi, H. Salehipour, A. Butscher, A. Tessier*

A CAD-enabled MDAO Framework Approach for Gradient-based Aerodynamic Shape Optimization
T. Hafemann, M. Banovic, A. Büchner, S. Ehrmanntraut, C. Höing, S. Gottfried, A. Stück*

Time-spectral extension to an implicit Navier-Stokes solver: integration and efficiency aspects
R. Haupt, A. Stueck*

05/06/2024 | 17:00 - 19:00 **Gradient-Based and Gradient-Free Optimization Methods, with emphasis on Innovative Designs for a Climate Neutral Aviation I**	MS081A Room: 1.12 Chaired by: Mr. Marco Carini (ONERA, France), Mr. Mohammed Abu-Zurayk (German Aerospace Center (DLR))

Consistent Discretization Schemes for The Continuous Adjoint Equations in Aerodynamic Shape Optimization for Turbulent/Transitional Flows
M. Kontou, X. Trompoukis, V. Asouti, K. Giannakoglou*

Clustered Active Subspaces for Surrogate-Based Aerodynamic Shape Optimisation
M. Chapron, C. Blondeau, M. Bergmann*

Machine Learning-Based Surrogates for Uncertainty Quantification and Design Under Uncertainties
V. Asouti, M. Kontou, K. Giannakoglou*

UQ Analysis and Robust Optimization of a Transonic Airfoil for Open Rotor Design
Q. Bennehard, M. Carini, J. Peter, G. Dergham*

Sampling and Estimating the Set of Pareto Optimal Solutions in Stochastic Multi-Objective Optimization.
Z. Jones, O. Le Maître, P. Congedo*

VG Optimization for Turbomachinery Applications
R. Putzu, T. Ghisu, S. Shahpar, M. Carta*

05/06/2024 | 17:00 - 19:00 **Advances In The Design Of Architectured Metamaterials III**	MS168C Room: 1.13 Chaired by: Phd. Rosaria Del Toro (University of Chieti-Pescara, Viale Pindaro 42, Pescara, Italy, Italy), Prof. Maria De Bellis (Maria Laura De Bellis, Dr, University of Chieti-Pescara, Italy)

Unit Cells with Self-Contact Mechanisms Enable Programmable Stiffness in Mechanical Metamaterials
M. Frey, S. Brandstaeter, A. Popp*

Dynamic continualization approach for Fibonacci superlattices
R. Del Toro, M. De Bellis, A. Bacigalupo*

Multistable tensegrity-like chains for lattice metamaterials: experimental and numerical investigation
C. Intrigila, A. Micheletti, N. Nodargi, P. Bisegna*

Design of programmable mechanical metamaterials
F. Wenz, A. Leichner, C. Eberl, H. Andrae*

05/06/2024 | 17:00 - 19:00 **Mixed-dimensional Models for in-silico Biomechanics I**	MS154A Room: 1.14 Chaired by: Mr. Paolo Zunino (MOX, Department of Mathematics, Politecnico di Milano, Italy), Prof. Luca Heltai (University of Pisa, Italy)

Multiple Scales Approaches to Cerebral Blood Flow and Metabolism
*S. Payne**

A Mixed-Dimensional Coupled Multiphase Approach for Modeling Air Flow, Blood Flow and Gas Exchange in Human Lungs
*L. Köglmeier, W. Wall**

Mixed-dimensional models for molecular transport in human pial perivasculature
M. Kuchta, R. Masri, I. Gjerde, M. Zeinhofer, M. Causemann, B. Riviere, M. Rognes, B. Wohlmuth*

Optimization Based 3D-1D Coupling for the Simulation of Fluid and Chemical Exchanges During Tumor Induced Angiogenesis
S. Berrone, S. Scialò, C. Giverso, D. Grappein, L. Preziosi*

Modeling and Simulation of Cilia-Mediated Cerebrospinal Fluid Flow in Brain Ventricles
H. Herlyng, A. Ellingsrud, M. Rognes, N. Jurisch-Yaksi*

05/06/2024 | 17:00 - 19:00 **Simulating Cardiac Function with Cellular and Subcellular Resolution I**	MS199A Room: 1.15 Chaired by: Dr. Martin Weiser (Zuse Institute Berlin, Germany), Prof. Rolf Krause (UniDistance Suisse / USI, Switzerland)

Simulating Morphology-Controlled Cellular and Subcellular Electro-Calcium Dynamics
*J. Rosado, Q. Guan, A. Vlachos, G. Queisser**

Partial Mean-Field Models for Neurotransmission Processes
A. Montefusco, L. Helfmann, T. Okunola, S. Winkelmann, C. Schütte*

Convergence Study of a Two-Dimensional Finite Volume Method for the Cardiac EMI Model
Z. Chehade, Y. Coudière*

High-order DG Methods for the Cell-By-Cell Electroneutral Nernst-Planck Framework
A. Ellingsrud, R. Masri, M. Kuchta*

Parallel Performance of Robust and Scalable Multilevel Preconditioners for the Cell-by-Cell Model
*E. Centofanti**

Efficient Simulation of Cardiac Electrophysiology with Algebraic Adaptivity
F. Chegini, T. Steinke, M. Weiser*

05/06/2024 | 17:00 - 19:00 **Simulations of Multifunctional Materials Bridging Methods, Scales, and Disciplines I**	MS099A Room: 2.01 Chaired by: Dr. Maximilian Ries (FAU, Germany), Mr. Felix Weber (Institute of Applied Mechanics, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany)

Computational Chemo-Mechanics with Application to Multifunctional and High-Temperature Materials
B. Kiefer, S. Prüger, S. Roth*

The structure tensor field obtained by the covariogram : a way leading to the local description of an heterogeneous material
H. EL MANSOURI, A. NAIT-ALI, D. HALM, M. GUEGUEN*

Numerical Simulation and Characterization of Crack Growth in TiN Thin Films Deposited by Pulsed Laser Deposition: a Cohesive Elements and XFEM Case Study
K. Perzynski, G. Cios, P. Bała, L. Madej*

Atomistic-Continuum Coupling for Amorphous Materials: Recent Advancements Using the Capriccio Method
*S. Pfaller**

Fracture Simulations of Amorphous Materials Using a Concurrent Atomistic-To-Continuum Approach
F. Weber, S. Pfaller*

05/06/2024 | 17:00 - 19:00 **Failure Mechanics of Soft Materials: Modeling and Experimental Approaches I**	MS115A Room: 2.02 Chaired by: Dr. Miguel Angel Moreno-Mateos (Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany), Mr. Soheil Firooz (University of Erlangen-Nuremberg, Germany)

Microstructural Buckling in Soft Composites
*S. Rudykh**

Fatigue fracture phenomenon that violates Lake-Thomas model in amorphous hydrogels with dynamic covalent crosslinks
*C. Yang**

Failure Mechanics of Rubber Components
C. Woo, H. Park, S. Choi*

Soft Fracture: Electro-Mechanical Modulation & Configurational Force Method
M. Moreno-Mateos, P. Steinmann*

05/06/2024 | 17:00 - 19:00 **Advances in Computational Mechanics II**	GS002B Room: 2.03 Chaired by: Prof. Dominique Derome (Université de Sherbrooke, Canada)

4D Imaging and Image-based Pore Network Modelling of Water transport in Textiles at Yarn Scale
R. Fischer, D. Derome, J. Carmeliet*

Development of a software for animating still pictograms
N. Okatani, R. Shioya, Y. Nakabayashi*

An Intersection Interaction Hybrid Method for Energy Flow at Mid-High Frequency for Complex Cavities Acoustic
T. Wanglomklang, F. Gillot, S. Besset*

Concurrent analysis method of conceptual design and economics for ocean wave energy convertor
J. OH, S. CHO, H. KIM*

Development of Launch and Recovery System for Autonomous Underwater Vehicle
H. Kim, B. Jeon, J. Choi, S. Cho, S. Kim, J. Han, T. Yeu, D. Park, S. Hong*

05/06/2024 | 17:00 - 19:00 **Advancements in multi-scale, multi-physics computational methods for heterogeneous porous media I**	MS147A Room: 2.04 Chaired by: Dr. Pania Newell (The University of Utah, United States), Prof. Fadi Aldakheel (Leibniz Universität Hannover, Germany)

Boundary Integral Equation Method in the Coupled Theory of Thermoelastic Nanomaterials with Triple Porosity
*M. Svanadze**

A mixed Hu-Washizu variational principle and finite-element formulation of second-gradient poro-elasticity
*H. Khurshid, E. Polukhov, M. Keip**

Multi-level higher-order homogenization in hierarchical porous media
M. Kuts, P. Newell, N. Popov, A. Tolstikov*

Numerical analysis of SLM-engineered metallic components with focus on process parameters
Y. Heider, B. Ali, F. Aldakheel*

Chemo-mechanical modeling of cross-linked Gel: A study of swelling and shrinking mechanisms
*A. Hajikhani**

Coupled electro-chemo-hydro-mechanical processes in proton exchange membrane water electrolysis stacks
F. Aldakheel, Y. Heider*

Modeling small scale processes in Antarctic sea ice
R. Pathak, T. Ricken, S. Thoms, S. Seyedpour, B. Kutschan*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

Tuesday	10:30 - 12:30	14:30 - 16:30	17:00 - 19:00
Auditorium I	MS005C	MS005D	MS005E
Auditorium II	MS162D	MS162E	MS162F
Auditorium III	MS102B	MS102C	MS102D
Auditorium IV	MS040B	MS040C	MS040D
Auditorium VI	MS059C	MS059D	MS059E
Auditorium VII	MS068B	MS068C	MS068D
Auditorium VIII	MS009E	MS009F	MS051A
Terrace	MS202C	MS185A	MS185B
Room 3A	MS158E	MS063A	MS063B
Room 3B	MS064E	MS054A	MS054B
Room 3C	MS098A	MS098B	MS098C
Room 5A	MS150A	MS150B	MS150C
Room 5B	MS166D	MS188A	MS188B
Room 5C	MS035B	MS035C	MS035D
Room 0.06	MS072A	MS072B	MS072C
Room 0.07	STS244A	STS243A	STS243B
Room 0.08	STS247A	STS268A	STS268B
Room 1.02	MS094A	MS094B	MS087A
Room 1.03	MS160B	MS219A	MS219B
Room 1.04	MS182A	MS182B	MS078A
Room 1.05	MS101A	MS101B	MS101C
Room 1.06	MS178C	MS125A	MS125B
Room 1.07	MS153A	MS153B	MS153C
Room 1.08	MS144C	MS003A	MS003B
Room 1.09	MS073A	MS073B	MS073C
Room 1.10	MS146A	MS146B	MS197A
Room 1.11	MS105B	MS129A	MS129B
Room 1.12	MS081B	MS140A	MS140B
Room 1.13	MS171A	MS171B	MS171C
Room 1.14	MS154B	MS030A	MS030B
Room 1.15	MS061A	MS061B	MS093A
Room 2.01	MS099B	MS211A	MS211B
Room 2.02	MS028A	MS191A	MS191B
Room 2.03	GS002C	GS003A	GS003B
Room 2.04	MS183A	MS011A	MS215A
Room 2.05	MS124A	MS238A	

Thursday, June 6th

06/06/2024 | 08:30 - 09:15 **Plenary Session VI**	PL06 Room: Auditorium I Chaired by: Prof. Laura De Lorenzis (ETH Zurich , Switzerland)
Multiscale modelling and computational material design: from problems to models *X. Oliver**	

06/06/2024 | 09:15 -10:00 **Plenary Session VII**	PL07 Room: Auditorium I Chaired by: Prof. Simona Perotto (MOX, Department of Mathematics, Politecnico di Milano , Italy)
Cut-Galerkin methods for wave-propagation *G. Kreiss**	

10:00 - 10:30
Coffee Break

10:30 - 12:30 | TECHNICAL SESSIONS

06/06/2024 | 10:30 - 12:30 **Deep Learning Computing III**	MS005C Room: Auditorium I Chaired by: Dr. Tomas Teijeiro (BCAM - Basque Center for Applied Mathematics , Spain) , Prof. Omar Ghattas (The University of Texas at Austin , United States)

Regularity-Conforming Neural Networks for PDEs (Keynote Lecture)
J. Taylor, D. Pardo, J. Muñoz-Matute*

UltraPINNs: Exploiting ultraweak implementations to boost the performance of Variational PINNs
*M. Bastidas, C. Uriarte, J. Taylor, S. Rojas, D. Pardo**

An operator preconditioning perspective on training in physics-informed machine learning
T. De Ryck, E. de Bézenac, F. Bonnet, S. Mishra*

Convolution Neural Network for Fluid Flow Simulations in Cascade with Oscillating Blades
V. Heidler, O. Bublík, J. Vimmr*

06/06/2024 | 10:30 - 12:30 **Novel Methods and Algorithms in Topology Optimization: Bridging Design, Materials, Simulations, and Manufacturing IV**	MS162D Room: Auditorium II Chaired by: Dr. Matteo Giacomini (CIMNE - Universitat Politècnica de Catalunya, Barcelona , Spain) , Dr. Matteo Bruggi (Politecnico di Milano , Italy)

Entropy-regularized Wasserstein distributionally robust shape and topology optimization
C. Dapogny, F. Iutzeler, J. Prando, B. Thibert*

Topology Optimisation Under Density Based Geometrical Uncertainties
F. Noal, A. Etienne, M. Montemurro, J. Gardan, J. Dantan*

Efficient Data-driven Sizing and Shaping of Topology Optimization Concepts using Implicit Surfaces, Morphing and Metamodels
*N. Strömberg**

A nonlocal approach to graded surface modeling in topology optimization
S. Singh, L. Pflug, F. Wein, M. Stingl*

A Condition Number-based Numerical Stabilization Method for Geometrically Non-linear Modellling
L. Scherz, C. Pedersen, B. Kriegesmann*

Structural Topology Optimization based on Augmented Lagrangian Method to consider Stress and Displacement Constraints
F. Rutsch, M. Fina, S. Freitag, O. Weeger*

06/06/2024 | 10:30 - 12:30
Numerical Methods for the Vascular System in Health and Disease II

MS102B
Room: Auditorium III
Chaired by:
Ms. Anna Ranno (RWTH Aachen University , Germany) , Dr. Richard Schussnig (University of Augsburg, Institute of Mathematics, Chair of High-Performance Scientific Computing , Germany)

Efficient Parallel Non-Newtonian Blood Flow Simulations in Trilinos - Towards Incorporating Microscopic Information with a Data-Driven Approach
D. Fedosov, G. Gommper, A. Klawonn, N. Kubicki, M. Lanser, A. Topuz*

Generation of Organ-scale Synthetic Vasculature via Mathematical Optimization
*E. Jessen, M. Steinbach, C. Debbaut, D. Schillinger**

3D-1D coupled approach for vascularized tissues
C. Belponer, A. Caiazzo, L. Heltai, L. Müller*

Derivation, model error analysis, and discontinuous Galerkin methods for coupled 3D-1D transport models
*R. Masri**

Advancing Patient-Specific Simulation of Type B Aortic Dissection through Unfitted Mesh Methods
E. Soudah, R. Zorilla, A. Giuliodori*

Effects of pharmacokinetics on arteries with in-stent restenosis in a fluid-solid framework
T. Koritzius, A. Ranno, S. Nerzak, K. Manjunatha, M. Behr*

06/06/2024 | 10:30 - 12:30
Verification, Validation and Uncertainty Quantification in Modeling and Simulation II

MS040B
Room: Auditorium IV
Chaired by:
Mr. Kevin Dowding (Sandia National Laboratories , United States) , Dr. Luís Eça (IST , Portugal)

Quantifying the Numerical Accuracy of Transient Flow Computations
*F. Pereira**

Verification of Detonation Shock Dynamics Models for Accelerating Detonation Waves
S. Andrews, E. Lozano, T. Aslam*

Experimental and numerical investigation of a one-way DEM-FEA coupling
J. Marín Pérez, T. Comlekci, Y. Gorash, D. MacKenzie*

Composite pressure vessel failure: Spatial uncertainty quantification validation
B. Van Bavel, D. Vandepitte, D. Moens*

Benchmark of Inflow Conditions, Turbulence Model and Wall Function Formulation for Effective ABL RANS CFD Modeling
E. Bombardi, L. Cotteleer, A. Gambale, A. Parente*

Assessment of numerical tools and models for the simulation of flow through TPMS structures
E. Gajetti, A. Buffo, G. Boccardo, A. Lucchini, L. Marocco, C. Piatti, L. Savoldi*

06/06/2024 | 10:30 - 12:30 **Recent trends in elastic and acoustic metamaterials III**	MS059C Room: Auditorium VI Chaired by: Prof. Giuseppe Failla (University of Reggio Calabria, Italy , Italy) , Dr. Andrea Francesco Russillo (University of Reggio Calabria , Italy)

Modeling wave propagation and boundary effects in acoustic metamaterials by a relaxed micromorphic continuum (Keynote Lecture)
A. Madeo, P. Neff*

A reduced-order macroscopic homogenized continuum for locally resonant metamaterials
A. Russillo, V. Kouznetsova, G. Failla, M. Geers*

Development of maximally-localized model order reduction for nonlinear acoustic metamaterials
S. Zahedi Fard, P. Tiso, P. Omidvar, M. Serra Garcia*

Nonlinear behaviour of a nonlocal stiffness-tuneable monoatomic chain
F. Guarracino, M. Fraldi, N. Pugno*

A multiple scattering formulation for elastic waveguides equipped with space-time modulated resonators
*X. Pu, A. Marzani, A. Palermo**

06/06/2024 | 10:30 - 12:30 **Computational Methods for Multiphase Flows with Liquid-Vapor Transition II**	MS068B Room: Auditorium VII Chaired by: Mr. Clément Le Touze (ONERA , France)

A Numerical Model for Three-Component Liquid-Vapor-Gas Flows with Arbitrary-Rate Mass Transfer
*M. Pelanti**

Numerical Methods and Relaxation Techniques for Diffuse Interface Models in High-Velocity Two-Phase Flow Simulations
W. haegeman, M. massot, C. Le Touze, J. Dupays*

A unified two-scale gas-liquid two-fluid model with capillarity and interface regularization through a mass transfer between scales
A. Loison, M. Massot, S. Kokh, T. Pichard*

A two-scale model for two-phase flows including geometric variables and mass transfer
G. Orlando, A. Loison, T. Pichard, S. Kokh, M. Massot*

Two-scale two-phase flows modelling based on the stationary action principle and a geometric method of moments
*T. Pichard**

Efficient Simulation of Non-Ideal Fluid Flows with Finite Mechanical Relaxation and Phase Transition
G. Sirianni, B. Re, A. Guardone, R. Abgrall*

06/06/2024 | 10:30 - 12:30 **Multiscale Computational Homogenization for bridging scales in the mechanics and physics of complex materials V**	MS009E Room: Auditorium VIII Chaired by: Prof. Frederic Legoll (ENPC , France)

Towards the Second-Order Computational Homogenization of Darcy-Type Fluid Flow
E. Polukhov, M. Keip*

Variationally consistent computational homogenization of coupled transport processes in nano-porous electrode materials
D. Rollin, F. Larsson, K. Runesson, F. Ekre, R. Jänicke*

Multi-Scale Numerical Methods for Reaction-Diffusion Equations with Oscillating Coefficients
A. LEFORT, F. Legoll, C. Le Bris*

Energy Dissipation with Viscoelastic Architectured Materials
A. Welander, M. Mousavi*

Multiscale computational design of energy dissipation metamaterials
J. Cante, J. Oliver, A. Nuñez-Labielle*

DEM Model for Effective Properties in Electric Current Assisted Powder Sintering
F. Nisar, J. Rojek, S. Nosewicz, M. Chmielewski, K. Kaszyca*

06/06/2024 | 10:30 - 12:30 **Innovative Methods for Fluid-Structure Interaction III**	MS202C Room: Terrace Chaired by: Prof. Harald van Brummelen (Eindhoven University of Technology , Netherlands) , Prof. Joris Degroote (Ghent University , Belgium)

Numerical solution of the dragout problem in film coating and gas-jet wiping processes
*T. coupez**

High-Fidelity FSI Simulations of Vertical-Axis Wind Turbine Using Spectral/ hp Element Method with a Moving Reference Frame
H. Dunn, M. Lahooti, N. Chakraborty, A. Gao*

Adapted simulation approach for the fluid-structure interaction inside fatigue cracks of hydraulic components under cyclic loads
L. Michiels, S. Beiser, M. Geimer*

Coupled Simulations of Blast-loaded Thin Steel Plates with Slits
V. Aune, G. Valsamos, F. Casadei*

Sensing of Particle Shape and Size Using Arrays of Artificial Cilia
D. Divyaprakash, A. Bhattacharya*

Exploring FSI modeling approach on Multi-Mode Behavior in Full-Span Conductors
S. Elmisaoui, J. Redford*

06/06/2024 | 10:30 - 12:30 **Computational Biomechanics and Applications V**	MS158E Room: 3A Chaired by: Prof. Paulo Fernandes (IDMEC, Instituto Superior Técnico, Universidade de Lisboa , Portugal)

Does the Strengthening of Weak Abdominal and Back Muscles Affect the Reduction of the Lumbar Spine Load? Model Studies of Musculoskeletal Loads in Parents of Disabled Children
K. Nowakowska-Lipiec, R. Michnik, P. Linek, A. Myśliwiec, H. Zadoń, J. Gorwa*

Structure and parameter identification of the stepladder walking model
P. Polach, Š. Papáček*

The Impact of Changes in Body Posture in the Subsequent Decades of Life on the Load of the Musculoskeletal System - Model Studies
H. Zadoń, R. Michnik, K. Nowakowska-Lipiec*

Injury Risk Assessment of Microtome Manipulation Using Kinematic Analysis
I. Barbosa, P. Mendonça*

Comparative Analysis Of The Functioning Of The Musculoskeletal System During Natural Gait And Walking With Poles
K. Nowakowska-Lipiec, H. Zadoń, R. Michnik, P. Szaflik, A. Mitas*

Efficient Planar Multibody Neck Model for Whiplash Simulation
M. Carvalho, A. Martins, D. Henriques*

06/06/2024 | 10:30 - 12:30 **Efficient CAD-based discretization methods V**	MS064E Room: 3B Chaired by: Dr. Pablo Antolin (École Polytechnique Fédérale de Lausanne , Switzerland)

Isogeometric approximation of acoustic wave problems: spectral properties and Overlapping Schwarz preconditioners (Keynote Lecture)
E. Zampieri, L. Pavarino, S. Scacchi*

Point collocation method with mollified piecewise polynomial approximants for high-order PDEs
*D. Alfarisy, L. Zuhal, M. Ortiz, F. Cirak, E. Febrianto**

A finite difference scheme with an optimal convergence for elliptic PDEs on domains defined by a level-set function
M. Duprez, V. Lleras, A. Lozinski, K. Vuillemot, V. Vigon*

Fast Poisson solvers for Isogeometric Analysis
*M. Montardini, M. Tani**

Block Mass Lumping Techniques for Isogeometric Analysis
Y. Voet, E. Sande, A. Buffa*

06/06/2024 | 10:30 - 12:30 **Reconciling Physical Fidelity, Robustness and Efficiency in Computational Fluid Dynamics I**	MS098A Room: 3C Chaired by: Prof. Francesco Capuano (Universitat Politècnica de Catalunya , Spain) , Dr. Benjamin Sanderse (CWI Amsterdam , Netherlands)

Symmetry-preserving approximate deconvolutions
F. Trias, A. Gorobets, A. Oliva*

Implicit Near-wall Domain Decomposition Method for Wall-bounded Turbulent Flows
S. Lyu, N. Adams*

On the Conditions for a Stable Projection Method on Collocated Unstructured Grids
D. Santos, J. Hopman, C. Pérez-Segarra, F. Trias*

What exactly is the filter length in a finite-volume based LES?
R. Verstappen, X. Trias*

A MEEVC scheme with general boundary conditions and the ramifications for secondary conservation laws
*Y. Zhang, A. Palha, M. Gerritsma**

Minimum-dissipation Scalar Transport Model and Low-dissipation Methods for LES of Thermally Stratified Turbulent Flows
J. Sun, R. Verstappen, X. Trias*

06/06/2024 | 10:30 - 12:30 **Advances and Applications in Meshfree, Particle, and Peridynamic Methods I**	MS150A Room: 5A Chaired by: Prof. Zhen Chen (University of Missouri , United States) , Prof. Jiun-Shyan Chen (University of California, San Diego , Virgin Islands, USA)

Computational Error Estimation for the Material Point Method in 1D and 2D Analysis and Experiments. (Keynote Lecture)
*M. Berzins**

Metal cutting simulations with the material point method using the Johnson-Cook material law
M. Koßler, S. Maassen, R. Niekamp, J. Schröder*

Three-dimensional stabilization-free virtual element method for hyperelastic problems
B. Xu, P. Wriggers*

N-Adaptive Ritz Method: A Neural Network Enhanced Computational Mechanics Framework
J. Chen, J. Baek, Y. Wang*

A V & V Procedure for Multiscale Evaluation of Shocked Composite Responses via Particle Methods
*Z. Chen**

06/06/2024 | 10:30 - 12:30 **Advancing SCiML Surrogates via Numerical Methods and Vice Versa IV**	MS166D Room: 5B Chaired by: Dr. Alena Kopanicakova (Brown University , United States) , Dr. Alexander Heinlein (TU Delft , Netherlands)

Super-Resolution of 4D-Flow MRI in the Left Ventricle Using Physics-Informed Neural Networks
F. Shone, N. Ravikumar, M. MacRaild, Z. Taylor, P. Jimack, A. Frangi, E. Dall'Armellina*

Physics-Informed Neural Networks for Engineering Problems: Challenges of the Application to 3D Stirred Tank Reactors
V. Travnikova, E. von Lieres, M. Behr*

SGNN: Subgraph Neural Networks for Stress Prediction
B. Ribeiro, J. Ribeiro, M. Bessa*

Physics-Informed Neural Networks For Bending Analysis Of Composite Plate: Solution Discovery And Parameter Identification
J. Torabi, J. Niiranen, A. Vaara, T. Frondelius*

Advances in the data-driven framework to accelerate the 2-Level topology optimisation in structural problems
A. Martínez-Martínez, O. Allix, F. Chinesta, J. Ródenas, E. Nadal*

06/06/2024 | 10:30 - 12:30 **Computational Models and Methods for Predicting Cancer Progression and Treatment Response II**	MS035B Room: 5C Chaired by: Dr. Guillermo Lorenzo (Health Research Institute of Santiago de Compostela , Spain)

Tumor poromechanics: from in vitro studies toward patient-specific digital twins
G. Sciume, S. Urcun, S. Bordas, P. Rohan*

A neuroimaging-informed multiphase model for predicting anisotropic brain tumour growth, healthy tissue deformation and ventricular compression.
C. Giverso, F. Ballatore, G. Lucci*

An image informed phase field model for tumor growth incorporating tissue elasticity
*A. Agosti**

A Computational Framework for Mechanically Controlled Brain Drug Delivery
T. Yuan, N. Pecco, W. Zhan, A. Jamal, M. Riva, A. Falini, F. Rodriguez y Baena, A. Castellano, D. Dini*

Multiphase modeling and patient-specific simulation of malignant neoplasms in brain tissue
M. Suditsch, T. Ricken, A. Wagner*

An Efficient Numerical Model for Multiphase Flow of Tumour Growth
T. Alrefai, O. Harlen, P. Jimack, M. Walkly*

06/06/2024 | 10:30 - 12:30 **Advances in Numerical Methods for Solution Of PDEs I**	MS072A Room: 0.06 Chaired by: Prof. Alexander Idesman (Texas Tech University , United States)

Optimal Local Truncation Error Method for Solution of PDEs on Irregular Domains and Interfaces with Optimal Accuracy and Unfitted Cartesian Meshes. Comparison with Finite Elements. (Keynote Lecture)
*A. Idesman**

The Scaled Boundary Finite Element Method for Hyperelastic Problems in Nonlinear Solid Mechanics
B. Sauren, C. Song, S. Klinkel*

A Novel Approach for Very High-order Transient Simulations with the Finite Volume Method – Recent Advances from the HIBforMBP Project
D. Albuquerque, P. Costa, B. Delgado, F. Tenreiro, L. Oliveira, J. Pereira*

Comparison of Several Krylov Methods to Solve Adjoint Linear System for Goal-Oriented Anisotropic Mesh Adaptation
T. Gauchery, F. Alauzet*

Finite Element Formulations for Axisymmetric Solids: A New Approach Based on the Petrov-Galerkin Method
F. Zähringer, P. Betsch*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

06/06/2024 | 10:30 - 12:30 **The Leading-Edge Computational Methods for Green Aviation I**	STS244A Room: 0.07 Chaired by: Dr. Wen BAI (Chinese Aeronautical Establishment (CAE) , China)

Research on Airborne System Simulation Methodology Based on AI-Enhanced Surrogate modelling Approach
C. Wang, W. Zhao*

Research on System Virtual Integration Method for Complex System
F. TAO, X. MEN*

A Class of Scalloped Riblets for Turbulent Drag Reduction
Y. Wang, S. Fu*

Optimization Design of Aircraft Structure Based on Strain Neighborhood Genetic Algorithm
R. ZHANG, D. Cui, K. Wang*

Conceptual Design of Electric Distributed Propulsion Commuter Airplane
H. ZHU, L. LV, Y. WANG, Y. LI*

06/06/2024 | 10:30 - 12:30 **Disruptive Aircraft's Wing Configurations towards Greening of Aviation I**	STS247A Room: 0.08 Chaired by: Ms. Marianna Braza (INPT , France) , Mr. Yannick Hoarau (University of Strasbourg , France)

Investigation of the electroactive morphing effects on an A320 prototype in subsonic regime at Reynolds number of 1 million
J. Abou Khalil, M. Carvalho, C. Rouaix, C. Raibaudo, G. Harran, S. Cazin, M. Marchall, F. Bergame, H. Ayroles, J. Rouchon, M. Braza*

Three-dimensional Numerical Simulations around an A320 Morphing Wing at high Reynolds Number
*C. Rouaix, M. Braza**

Numerical investigation of electroactive morphing effects through traveling wave actuation on an A320 wing in low subsonic regime and Reynolds number of 1 Million
A. Marouf, R. El akoury, J. Abou Khalil, Y. hoarau, J. Rouchon, M. Braza*

Investigation of the aerodynamic performance increase in transonic flow over an A320 morphing airfoil by numerical simulation at high Reynolds number
J. Abou Khalil, C. Jimenez-Navarro, N. Maynard, A. Marouf, R. El Akoury, Y. Hoarau, J. Rouchon, M. Braza*

Reduced Order Modelling for aerodynamic turbulent flows
*A. MAROUF, R. El Akoury, M. Braza, Y. Hoarau**

Airfoil shape control using SMA actuators
M. Fragiadakis, N. Simiriotis, J. Rouchon, M. Braza*

06/06/2024 | 10:30 - 12:30 **Advances in UQ and Data-driven Methods for Scale-resolving Turbulence Simulations I**	MS094A Room: 1.02 Chaired by: Dr. Saleh Rezaeiravesh (The University of Manchester , United Kingdom) , Prof. Maria Vittoria Salvetti (University of Pisa , Italy)

Uncertainty quantification for Large Eddy Simulations with Remeshed Vortex Methods
M. de Crouy-Chanel, C. Mimeau, I. Mortazavi, M. Salvetti, A. Mariotti*

Impact of filter choice for Approximate Deconvolution Method on Large Eddy Simulation of Taylor-Green turbulence
L. Caban, A. Tyliszczak, B. Geurts*

Stochasticity of laser-induced ignition numerical simulations
D. Passiatore, G. Iaccarino*

BayeSAF: A Bayesian Framework for Modeling Physicochemical Surrogates of Sustainable Alternative Fuels
J. Liberatori, D. Cavalieri, R. Malpica Galassi, M. Valorani, P. Ciottoli*

Comparison between linear and non-linear multifidelity models for turbulent flow problems
M. Glazunov, A. Revell, P. Schlatter, S. Rezaeiravesh*

An Adaptive Cost Function for Multi-Fidelity Optimisation Workflows
M. Pellowe, F. Prutton, G. Page*

06/06/2024 | 10:30 - 12:30 **Advancing Predictive Simulations under Uncertainty: AI and UQ for Computational Mechanics II**	MS160B Room: 1.03 Chaired by: Dr. Sebastian Kaltenbach (ETH Zurich / Harvard University , United States) , Dr. Sergey Litvinov (, Switzerland)

Rephrasing High-dimensional, PDE-based, Bayesian Inverse Problems
V. Scholz, P. Koutsourelakis*

Enhancing bayesian model updating via learnable mappings with application to structural health monitoring
*M. Torzoni, S. Mariani, A. Manzoni**

Scalable Uncertainty Quantification for Deep Molecular Models
*J. Zavadlav**

Uncertainty quantification of time-average quantities of chaotic systems
G. Papadakis, K. Kantarakias*

Inferring Unknown Unknowns with the Real-Rime Data Assimilation with the Regularized Bias-Aware Ensemble Kalman Filter
*A. Novoa, L. Magri**

06/06/2024 | 10:30 - 12:30 **Computational Methods for Soft Robotics I**	MS182A Room: 1.04 Chaired by: Prof. Edoardo Milana (University of Freiburg , Germany) , Dr. Renate Sachse (Technical University of Munich , Germany)

The Design of Flexible Parallel Robots via Finite Element
*A. Tabak, A. Karuppiah, R. Orszulik**

Simulation-driven design process of a soft artificial Venus flytrap gripper
R. Sachse, F. Tauber, T. Speck*

Energy-based Modeling of Conducting Polymer Soft Actuators
S. Ghosh, S. Roy*

Buckling-Enabled Modular Auxetic Structures for Advanced Sensing in Soft Robotics
*H. de Souza Oliveira, E. Milana**

Thermal Effects on the Nonlinear Oscillations of Hard-Magnetic Soft Actuators
S. Nandan, D. Sharma, A. Sharma*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

06/06/2024 | 10:30 - 12:30 **Modern Approaches To Multiphase Flows in Microfluidics: bubbles, droplets, wetting, and transport in complex media I**	MS101A Room: 1.05 Chaired by: Prof. Pavel Ryzhakov (CIMNE, Barcelona , Spain) , Dr. Tomislav Maric (TU Darmstadt , Germany)

Some Aspects of Contact Line Dynamics (Keynote Lecture)
*S. Zaleski**

A Consistent Treatment of Dynamic Contact Angles in the Sharp-Interface Framework with the Generalized Navier Boundary Condition
M. Fricke, T. Fullana, Y. Kulkarni, S. Popinet, S. Afkhami, D. Bothe, S. Zaleski*

Viscous elimination of contact-line singularities
*M. Rieckmann**

Capillary folding of thin elastic sheets
*Z. Li, W. Ren**

A Navier-Stokes-Cahn-Hilliard Model for Immiscible Two-phase Flow in Porous Media: an Experimental-numerical Study
H. Pi, A. Omari, G. Sciumè*

06/06/2024 | 10:30 - 12:30 **Numerical Modeling and Data Analysis for Advancing Sustainable Innovation III**	MS178C Room: 1.06 Chaired by: Ms. Dajana Conte (Università di Salerno , Italy)

Water unsaturated flow: models, methods, and applications
M. Berardi, F. Difonzo, L. Lopez*

Integrating Sustainability into Model-Based Systems Engineering: A Multi-Criteria Decision-Making Approach for Circular Design
*E. Brusa, C. Delprete, A. Di Gesù, C. Gastaldi**

Real-time anomaly detection of spatial processes via conformal prediction and functional data analysis
*T. Bortolotti, A. Menafoglio, S. Vantini**

Hybrid Reduced Order Model for Heat Transfer Fluid (HTF)
C. Núñez, S. Rubino, T. Chacón, J. Valverde*

Topology Optimization and Periodic Anisotropic Mesh Adaptation for Crafting 3D Soilless Cellular Materials
G. Speroni, N. Ferro, S. Perotto*

06/06/2024 | 10:30 - 12:30 **Multi-Scale Advanced Modelling and Design of Variable-Stiffness Composite Structures I**	MS153A Room: 1.07 Chaired by: Prof. Alfonso Pagani (Politecnico di Torino , Italy)

Varicomposite Structures: spatially and temporally variable properties for highly efficient and sustainable performance (Keynote Lecture)
*P. Weaver**

Integrating Multiple Loading Cases In High-Resolution Topology Optimization: A Multi-Scale Approach
P. Jensen, O. Sigmund*

Modeling of Variable Angle Tow Composites based on a Variable Separation Method
P. Vidal, D. Iannotta, G. Giunta, L. Gallimard, O. Polit*

Multi-scale homogenisation strategy for a tubular composite structure obtained by tape winding
T. Chazeau, R. Campos, S. Essongue, M. Montemurro, A. Catapano*

A Model-Reduction Technique based on Perturbation Method for the Analysis of Variable-Stiffness Shells
C. Yan, R. Vescovini*

06/06/2024 | 10:30 - 12:30 **HPC Simulations and AI for the Wide Industrial Realm III**	MS144C Room: 1.08 Chaired by: Prof. Ryoichi Kurose (Kyoto University ,Japan) , Dr. Abhishek Lakshman Pillai (Kyoto University ,Japan)

Numerical Investigation of Inhalation Exposure to Droplets Generated by Speaking
K. Kuga, K. Ito*

High Performance Computational Fluid Dynamics and Optimization Algorithms for Indoor Environment Design
A. Murga, H. Nakagawa, R. Bale, K. Ito, M. Tsubokura*

Prediction of Airborne Virus Transmission: Integrating Computational Fluid Dynamics with Host Cell Dynamics
R. Bale, S. Ohashi, A. Muruga, M. Tsubokura*

Two-Objective Design Exploration of Body Proportions and Aerodynamics of an Automobile
T. NAKASHIMA, R. MIZOGUCHI, T. HIRAOKA, I. KOIZUMI, T. NOUZAWA, K. SEO, K. SHIMIZU, Y. NAKAMURA, A. OYAMA, M. TSUBOKURA*

GNN accelerated Simulation of Water Flow in the Windshield Wiper System
M. Schreyer, M. Leister, S. Adami, T. Indinger*

Nonlinear Reduced-Order Modeling for Three-Dimensional Turbulent Flow Around Vehicle Body Using Distributed Parallel Machine Learning
K. Ando, R. Bale, A. Kuroda, M. Tsubokura*

**06/06/2024	10:30 - 12:30** **Towards Digital Twins for Infrastructures I**	MS073A Room: 1.09 Chaired by: Dr. Michael Kaliske (Technische Universität Dresden , Germany) , Mr. Max von Danwitz (German Aerospace Center , Germany)

Tire-Pavement-Interaction Model for a Digital Twin of the Road
I. Wollny, M. Kaliske, A. Anantheswar, M. May*

Reduced order modeling of road structures in a digital twin
J. Kehls, S. Reese, T. Brepols*

Digital Twin Architecture for Multi-Physical and Multi-Scale Simulations of Future Road Systems using a Single Underlying Model Approach
V. Prokopets, U. Aßmann*

Model-based and Data-driven Digital Twins for Railway Vehicle-Track Interaction Monitoring
B. Baasch, P. Oselin, J. Groos*

An Adaptive Linked Data Modeling Environment to Identify Resilience Enhancing Action Strategies for Critical Infrastructure
N. Winnewisser, S. Saleem, Y. Shi, L. Hennig, J. Salomon, M. Broggi, M. Beer*

**06/06/2024	10:30 - 12:30** **Advanced Parallel Algorithms for Extreme-Scale Simulations I**	MS146A Room: 1.10 Chaired by: Dr. Valeriu Codreanu (SURF , Netherlands) , Prof. F.Xavier Trias (Technical University of Catalonia , Spain)

A Pencil-Decomposed Numerical Algorithm for Many-GPU Calculations of Turbulent Wall Flows at High Reynolds Number
R. Diez Sanhueza, J. Peeters, P. Costa*

Parallel Energy-Minimization Prolongation for Algebraic Multigrid
A. Franceschini, C. Janna, J. Schroder, L. Olson*

A multigrid reduction framework for CFD simulations on symmetric domains
À. Alsalti-Baldellou, C. Janna, X. Álvarez-Farré, F. Trias*

Performance analysis of parallel-in-time techniques in modern supercomputers
J. Plana-Riu, F. Trias, À. Alsalti-Baldellou, G. Colomer, A. Oliva*

Performance Analysis of SpMM in Distributed Parallel CFD Simulations
X. Álvarez-Farré, À. Alsalti-Baldellou, M. Rodrigues, F. Trias*

**06/06/2024	10:30 - 12:30** **Multidisciplinary Analysis and Optimisation (MDAO) in Large Scale and High Fidelity for Industrial Applications II**	MS105B Room: 1.11 Chaired by: Dr. Arthur Stueck (German Aerospace Center (DLR) , Germany) , Dr. Jens-Dominik Mueller (Queen Mary University of London , United Kingdom)

Recent Progress Toward Large-scale Multidisciplinary Design Optimization of Industrial Complexity with Applications to Electric Aircraft
*J. Hwang**

Realizing 3rd Generation Collaborative MDO in the open-source framework KratosMultiphysics
I. Antonau, S. Baars, I. Baimuratov, T. Wittenborg, R. Wüchner, U. Römer*

Algorithmic Differentiation of the pythonOCC Geometric Modeling Library
M. Banovic, T. Hafemann, A. Stück*

Evaluating the Influence of CFRP Laminate Parametrization on a Shape and Sizing Optimization of High Aspect Ratio Wings
*F. Volle**

A High-Fidelity Framework Approach Enabling High-order Implicit Time Stepping For MDAO
F. Roß, A. Büchner, S. Gottfried, A. Stück*

06/06/2024 | 10:30 - 12:30 **Gradient-Based and Gradient-Free Optimization Methods, with emphasis on Innovative Designs for a Climate Neutral Aviation II**	MS081B Room: 1.12 Chaired by: Mr. Kyriakos Giannakoglou (National Technical University Athens) , Mr. Marco Carini (ONERA , France)

Progress and Ongoing Activities in the Nextair Project: an Overview
*M. Carini**

Multidisciplinary Aero-Thermo-Structural Design Optimization of a Modern High-Pressure Turbine Rotor
M. Carta, R. Putzu, T. Ghisu, S. Shahpar*

Natural Laminar Flow High Aspect Ratio Wing Shape Optimization Using a Discrete Adjoint Approach
G. Rogé, F. Billard, G. Laruelle, S. Kleinveld, G. Sporschill*

Continuous Adjoint-Based Optimization of a High Aspect-Ratio Wing Business Jet in Transitional Flows
*M. Kontou, X. Trompoukis, V. Asouti, K. Giannakoglou**

High-Fidelity Multidisciplinary Design Trade Study of Short-Medium Range Aircraft with High Aspect-Ratio Wing
M. Abu-Zurayk, J. Brezillon, A. Balani, K. Sinha, C. Ilic, A. Attravanam, L. Reimer, C. Conlan-Smith, K. thanissaranon*

Advanced MDO and Robust Optimization with GEMSEO
A. Gazaix, F. Gallard, J. Giret, M. De Lozzo*

06/06/2024 | 10:30 - 12:30 **Electromagnetic Problems Arising in Industry: Modelling and Numerical Techniques I**	MS171A Room: 1.13 Chaired by: Ms. Dolores Gómez (Universidade de Santiago de Compostela , Spain) , Dr. Idoia Cortes Garcia (Eindhoven University of Technology , Netherlands)

C1 Finite Elements in Plasma Equilibrium Computations
*B. Faugeras, H. Guillard, B. Nkonga, F. Rapetti**

Tree-cotree Decomposition for High Order Whitney Finite Elements
A. Alonso Rodriguez, F. Rapetti, J. Camaño, E. De Los Santos*

On a Skin Effect in Magnetic Conductors
*V. Péron**

Fast computation of electromagnetic wave propagation with spline differential forms
*B. Kapidani, R. Vázquez**

Numerical simulation and experimental evaluation for the development of a light electronic enclosure used in automotive industry
S. Costa, L. Bastos, L. Rietter, R. Oliveira, R. Freitas, A. Rocha, B. Vale, C. Ribeiro, D. Serrão, J. Silva, N. Gonçalves, F. Carneiro, S. Silva, A. Portinha, P. Bernardo, G. Dias*

06/06/2024 | 10:30 - 12:30 **Mixed-dimensional Models for in-silico Biomechanics II**	MS154B Room: 1.14 Chaired by: Prof. Alexander Popp (University of the Bundeswehr Munich , Germany) , Mr. Paolo Zunino (MOX, Department of Mathematics, Politecnico di Milano , Italy)

Free boundary dynamics of an elastic filament in 3D Stokes flow
*L. Ohm**

Advancements in Etherodimensional Coupling: Exploring Reduced Lagrange Multipliers and Reduced Distributed Lagrange Multipliers Methods
L. Heltai, P. Zunino, L. Mueller, A. Caiazzo, C. Belponer*

An XFEM Domain Decomposition Method for 3D-1D Coupled Problems
S. Scialò, D. Grappein, F. Vicini*

A Mixed-Dimensional Formulation for the Simulation of Slender Structures Immersed in an Incompressible Flow
F. Lespagnol, M. Boulakia, C. Grandmont, P. Zunino, M. Fernández*

Implementing a Multi-Scale model to Simulate Blood flow in Circulatory Networks with Parallel Computing
J. LIU, H. Suito*

06/06/2024 | 10:30 - 12:30 **New Directions for solving Stokes and Navier-Stokes Problems I**	MS154B Room: 1.15 Chaired by: Ms. Vanessa Lleras (University of Montpellier , France) , Dr. Pierre Mollo (Technological University Eindhoven , Netherlands)

The T-coercivity Approach for Solving Stokes Problem (Keynote Lecture)
P. Ciarlet, E. Jamelot*

Numerical methods for the Stokes problem with L^2 boundary data and emphasis on nonconvex domains
T. Apel, K. Lorenz*

An a posteriori error estimate for a 0D-2D Stokes model
*H. Albazzal, A. Lozinski, R. Tittarelli**

Mixed finite element for Stokes eigenvalue problem
*F. Bertrand, T. Dagli**

Analysis of a nonconforming finite element method for vector-valued geophysical flow problems
*C. Mehlmann**

06/06/2024 | 10:30 - 12:30 **Simulations of Multifunctional Materials Bridging Methods, Scales, and Disciplines II**	MS099B Room: 2.01 Chaired by: Mr. Felix Weber (Institute of Applied Mechanics, Friedrich-Alexander-Universität Erlangen-Nürnberg , Germany) , Dr. Maximilian Ries (FAU , Germany)

Effect of the Nanotube Network Morphology on Mechanical Properties of Carbon Nanotube Thin Films: Mesoscopic Simulations
A. Volkov, S. Siahtiri*

Investigating the impact of interfacial decohesion on the piezoresistive properties of graphene/polymer nanocomposites through a multiscale analysis.
X. Lu, F. Detrez, J. Yvonnet, J. Bai*

Interphase characterization in polystyrene-silica nanocomposites based on molecular dynamics simulations
M. Ries, G. Possart, E. Richter, P. Steinmann, S. Pfaller*

Enhancing Multifunctionality: Optimal Properties of Iron-Oxide Reinforced Polyvinyl Difluoride Unveiled through Full Atom Molecular Dynamics Simulation
*F. Bedoui**

Multiphysics Modelling of Full Cell Structural Battery Composites
C. Larsson, F. Larsson, J. Xu, K. Runesson, L. Asp*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

06/06/2024 | 10:30 - 12:30 **Progress in Rapid Methods for aerodynamic design I**	MS028A Room: 2.02 Chaired by: Dr. Simão Marques (University of Surrey , United Kingdom) , Prof. John Doherty (University of Surrey , United Kingdom)

Multi-Fidelity Modelling Strategy of Propeller for Interactional Aerodynamics
Z. Li, V. Maltsev, A. Modarres, A. Da Ronch*

Rapid Method For Predicting Off-Design Performance Maps For Transonic Aircraft Studies
R. Jesudasan, J. Doherty, S. Marques*

Solving PDE constrained MDO problems using non-intrusive disciplinary surrogates
I. Cardoso, S. Dubreuil, N. Bartoli, C. Gogu, M. Salaün*

06/06/2024 | 10:30 - 12:30 **Advances in Computational Mechanics IIII**	GS002C Room: 2.03 Chaired by: Dr. Svetlana Kostic (Faculty of Civil Engineering, University of Belgrade , Serbia)

Framework for an electro-chemo-mechanical multi-component multi-phase-field corrosion model
J. Dittmann, S. Wulfinghoff*

Generalized Plasticity Model for Nonlinear Analysis of Steel Frames at Elevated Temperatures
*M. Bursać, S. Kostić**

Topology and shape optimization of compliant mechanisms using frame model with flexible connections.
*H. Madah**

Topology optimization of soft pneumatic actuators under large deformations
K. Poulios, S. Mehta*

Multi-Objective Optimization in Physics Informed Neural Networks
J. Akhter, A. Heinleim, P. David F¨ahrmann, K. Sonntag, S. Peitz*

Optimizing Algal Cultivation in Raceway Ponds for Bioenergy Production
A. Martinez, L. Alvarez-Vazquez, C. Rodriguez, M. Vazquez-Mendez*

06/06/2024 | 10:30 - 12:30 **Recent Advances in Accelerated Simulations for Solid, Fluid and Coupled Problems: Implementations and Applications I**	MS183A Room: 2.04 MS Corresponding Organizer: Dr. Ado Farsi (Imperial College London / University College London)

Analysis of Coupling Methodologies Between CFD Codes
L. Sirotti, G. Barbi, A. Cervone, F. Giangolini, S. Manservisi*

Mathematical and Numerical Approach of Encapsulated Phase Change Material in Structured Thermocline Systems
O. Sanmarti, J. Vera, S. Torras, C. Perez-Segarra*

Liquid Heavy Metal Applications for Particle Accelerators
G. Barbi, C. Carrelli, A. Cervone, T. Del Moro, I. Di Piazza, F. Giangolini, S. Manservisi, P. Cioli Puviani, L. Sirotti, L. Tricarico*

tanuki™/PyFDEM: the first parallel high-performance pure-Python finite-discrete element code
A. Farsi, D. Picozzi*

06/06/2024 | 10:30 - 12:30 **Numerical methods for optimisation, inverse problem, calibration and uncertainty quantification in nonlinear dynamics I**	MS124A Room: 2.05 Chaired by: Dr. Enora Denimal Goy (Inria , France) , Prof. Rafael Teloli (FEMTO-ST Institut , France)

Optimal limbless locomotion on frictional substrates
A. Bijalwan, J. Munoz*

A Differential Algebra-based optimisation method for space trajectory design
T. Caleb, R. Armellin, S. Lizy-Destrez*

On the use of bifurcation curves for system identification and model updating purposes
A. Mélot, E. Denimal Goy, L. Renson*

Uncertain propagation in a coupled axial-torsional nonlinear dynamic model
Y. Moralles, D. Castello, T. Ritto*

Application of the generalized Harmonic Balance Polynomial Chaos Expansion to Model Limit Cycles under Uncertainty
L. de Jong, U. Römer, M. Müller*

Inverse Uncertainty Quantification in Passive Automobile Safety: Bayesian Inversion for Optimal Safety Ratings with Robustness Quantification
M. Herold, J. Jehle, M. Gerdts*

On the Stochastic Modeling of Viscoelastic Materials based on the RL-ABC Method
R. Teloli, T. Gomes, D. Castello, T. Ritto, M. Ouisse*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

13:45 - 14:30 | SEMI-PLENARY SESSIONS

06/06/2024 | 13:45 - 14:30 **Computational Methods for Conservation of Wooden Artwork**	SPL13 Room: Auditorium VIII Chaired by: Prof. Paulo B. Lourenco (University of Minho , Portugal)
Computational Methods for Conservation of Wooden Artwork *M. Kaliske**	

06/06/2024 | 13:45 - 14:30 **On Modelling Cell Plasticity in Continuum Mathematical Biology**	SPL14 Room: Auditorium I Chaired by: Prof. Helder Rodrigues (Instituto Superior Tecnico , Portugal)
On Modelling cell plasticity in continuum mathematical biology *M. Doblare**	

06/06/2024 | 13:45 - 14:30 **Phase Field Modelling of Multi-Physics Problems, From Li-Ion Battery Degradation to Hydrogen Assisted Failures**	SPL15 Room: Auditorium II Chaired by: Prof. Bert Sluys (Delft University of Technology , Netherlands)
Phase field modelling of multi-physics problems, from Li-Ion battery degradation to hydrogen assisted failures *E. Martinez-Pañeda**	

06/06/2024 | 13:45 - 14:30 **On the Improvement of Solar Sail Membranes through a Multiscale Approach using Graphene-Based Composites**	SPL16 Room: Auditorium VI Chaired by: Prof. Hermann Matthies (Institute of Scientific Computing / TU Braunschweig , Germany)
On the Improvement of Solar Sail Membranes through a Multiscale Approach using Graphene-Based Composites *N. Silvestre**	

14:30 - 16:30 | TECHNICAL SESSIONS

06/06/2024 | 14:30 - 16:30 **Deep Learning Computing IV**	MS005D Room: Auditorium I Chaired by: Dr. Jamie M Taylor (CUNEF Universidad , Spain) , Dr. Pedro Martins (Aragon Institute in Engineering Research. Universidad de Zaragoza , Spain)
Geometric Neural Operators for Bayesian Inverse Problems and Optimization Under Uncertainty *O. Ghattas*, L. Cao, P. Chen, D. Luo, T. O'Leary-Roseberry, U. Villa* Generating Efficient Randomized Quadrature Rules for 2D and 3D Trunk Spaces using Machine Learning *T. Teijeiro*, D. Pardo, V. Calo* ELM type neural networks in scientific computing *D. De Falco*, E. Schiassi, F. Calabrò, M. Pragliola* Goal-Oriented Adaptivity for solving Partial Differential Equations using Neural Networks *C. Uriarte*, D. Pardo, J. Taylor, V. Calo, I. Muga* Injecting physics into deep learning based reduced order models: methods for exact mass conservation *N. Franco*, W. Boon, A. Fumagalli, P. Zunino* Neural Integration for Constitutive Equations in Small Data *F. Masi*, I. Einav*	

06/06/2024 | 14:30 - 16:30
Novel Methods and Algorithms in Topology Optimization: Bridging Design, Materials, Simulations, and Manufacturing V

MS162E
Room: Auditorium II
Chaired by:
Prof. Julián Norato (University of Connecticut , United States) , Dr. Matteo Giacomini (CIMNE - Universitat Politècnica de Catalunya, Barcelona , Spain)

One-shot procedures for efficient topology optimization (Keynote Lecture)
*O. Amir**

A paradigm shift in optimising the topology and anisotropy of continua concurrently
*M. Montemurro**

Computational Geometry Generation of Concept Design Driven by WAAM Manufacturability
F. Schito, M. Hojjat, K. Dörfler, P. D'Acunto*

Optimal Design of Lattice Structure for Column-like Meso-Elements
M. Bruggi, C. Guerini, G. Novati*

Binary topology optimization designs via automatic threshold projection parameter increase
*P. Dunning**

06/06/2024 | 14:30 - 16:30
Numerical Methods for the Vascular System in Health and Disease III

MS102C
Room: Auditorium III
Chaired by:
Dr. Gian Marco Melito (TU Graz , Austria) , Ms. Anna Ranno (RWTH Aachen University , Germany)

Denoising and super-resolution of 4D flow MRI using computational fluid dynamics and deep learning
*A. Prandoni, S. Saitta**

Artificial Neural Networks for Uncertainty Quantification and Calibration of One-Dimensional Hemodynamics
M. Benmahdi, O. Le Maître, P. Congedo*

Model Validation with Global Sensitivity Analysis for Polymeric Scaffolds in Restorative Heart Valves
G. Melito, M. Rolf-Pissarczyk, M. Terzano, M. Wollner, G. Holzapfel, K. Ellermann*

An integrated multi-imaging AI-based pipeline to study cardiovascular hemodynamic indices: aortic and pulmonary vessels case studies
M. Mazzoli, B. Fanni, M. Scarpolini, F. Dell'Agnello, S. Celi*

A Dynamic CT Based Pipeline To Assess Hemodynamic Indexes and Wall Stiffness of the Aorta
F. Dell'Agnello, E. Vignali, K. Capellini, M. Scarpolini, E. Gasparotti, S. Celi*

Patient-Based Stented Coronary Artery: from OCT Image Segmentation to Computational Domain
S. Nerzak, A. Ranno, T. Koritzius, N. Schaaps, F. Vogt, M. Behr*

06/06/2024 | 14:30 - 16:30 **Verification, Validation and Uncertainty Quantification in Modeling and Simulation III**	MS040C Room: Auditorium IV Chaired by: Dr. Filipe Pereira (Los Alamos National Laboratory , United States) , Dr. Luís Eça (IST , Portugal)

The Interplay of Model Form, Uncertainty Quantification and Error in Computational Predictions from a Validation Assessment Perspective
*A. Koskelo**

Evaluation of 3D Capabilities for Simulating Vortex Rings and Jetting in Inertial Confinement Fusion
*V. Chiravalle**

A Validation Framework for Lattice Boltzmann – LES Simulations of Single-Phase Mixing in Stirred Tanks
N. Patsaki, P. Dsouza, M. Wagner, C. Witz, E. Edith Renöckl-Dobnik, J. Remmelgas*

Deploying ASME V&V20-2009 for Engineering Applications and Communicating Credibility
*K. Dowding**

Assessment of Different RANS Turbulence Models in TPMS Pipes through a Multivariate Metric Evaluation
C. Piatti, A. Hicks, E. Gajetti, C. Ward, L. Eça, M. Pourghasemi, L. Marocco, L. Savoldi, N. Fathi*

On the Dependency Between Input and Numerical Uncertainties
L. Eça, M. Kerkvliet, S. Toxopeus, F. Pereira*

06/06/2024 | 14:30 - 16:30 **Recent trends in elastic and acoustic metamaterials IV**	MS059D Room: Auditorium VI Chaired by: Dr. Andrea Francesco Russillo (University of Reggio Calabria , Italy) , Prof. Giuseppe Failla (University of Reggio Calabria, Italy , Italy)

Periodic arrays of perpendicular gyroscopes
K. Madine, D. Colquitt*

On Bandgaps in 2D p4gm Single-phase Phononic Crystals
*I. Nadejde, P. Galich**

Engineering Dispersion Via Graded Elastic Meta-Waveguides
J. De Ponti, L. Iorio, R. Ardito*

A MEMS device integrating a metaplate for vibration absorption
D. Faraci, V. Zega, G. Gattere, C. Comi*

Elastic antenna for wave reconstruction using an encoder-decoder architecture
L. Iorio, L. Rosafalco, J. De Ponti, R. Ardito*

06/06/2024 | 14:30 - 16:30 **Computational Methods for Multiphase Flows with Liquid-Vapor Transition III**	MS068C Room: Auditorium VII Chaired by: Prof. Marc Massot (CMAP (centre de mathématiques appliquées) Ecole polytechnique , France)

Investigations of Boiling Flows with Adaptive Mesh Refinement
X. Chen, S. Zaleski, T. Long*

A Level Set-Ghost Fluid method for the numerical simulation of droplet combustion
H. Cleris, S. Tanguy, O. Rouzaud, J. Estivalezes, A. Urbano*

A diffuse interface method for low-Mach multiphase flows with phase-change
S. Zamani Salimi, A. Mukherjee, M. Pelanti, L. Brandt*

A diffuse interface method for liquid-vapor phase transitions of deformed droplets based on van der Waals' gradient theory
V. Cardoso Cunha, C. Dorao, M. Fernandino*

On the Fidelity of Van der Waals-Korteweg-type Models for the Simulation of Compressible Multiphase Flow
J. Keim, C. Munz, C. Rohde*

Two-phase flow compressible solver for the pool cavitation of a single bubble
M. Deferrez, S. TANGUY, C. COLIN, A. Urbano*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

06/06/2024 | 14:30 - 16:30 **Multiscale Computational Homogenization for bridging scales in the mechanics and physics of complex materials VI**	MS009F Room: Auditorium VIII Chaired by: Mr. Elten Polukhov (University of Stuttgart , Germany)

Influence of the Microstructure on the Upscaled Mechanical Yield Strength of Porous Materials
M. Lesueur, I. Rocha, W. Lindqwister*

Dynamic Homogenization of Chains and Lattices, Compatibility, and Damage-Resilient Assemblages
*A. Cherkaev**

06/06/2024 | 14:30 - 16:30 **Modelling and Simulation of Welding and Wire Arc Additive Manufacturing Processes I**	MS185A Room: Terrace Chaired by: Dr. Josselin DELMAS (Électricité de France R&D , France)

Fast simulation of overlapping beads geometry during wire laser additive manufacturing (Keynote Lecture)
E. Feulvarch, N. Tissot, M. Demesy, S. Guerard, K. Chenegrin*

Physical model of the assembly of weld bead's cross-section geometry through wire arc additive manufacturing
C. Mang, R. Tami*

Modelling Melt Pool Dynamics Using The Particle Finite Element Method For The Simulation Of The Friction Melt Bonding Process
E. Fernández, M. Lacroix, S. Février, T. Zhang, B. Bobach, L. Papeleux, R. Boman, J. Ponthot*

Advanced Numerical Methodologies For Thermo-Mechanical Simulation Of Metal Deposition Process
L. Arbaoui, A. François, C. Friebel, N. Poletz*

Analysis of Uncertainties Associated with Magneto-Thermo-Hydrodynamic Modelling of Arc Welding
M. Le Gal La Salle, S. Cadiou, M. Courtois, M. Carin, A. Brosse*

06/06/2024 | 14:30 - 16:30 **Robust and Scalable Solvers in HPC: Recent Developments and Future Challenges I**	MS063A Room: 3A Chaired by: Dr. Ngoc Mai Monica Huynh (University of Pavia , Italy) , Dr. Nicolas Barnafi (Pontificia Universidad Católica de Chile , Chile)

Compressed communication and algebraic adaptivity for efficient BDDC preconditioners in cardiac simulation (Keynote Lecture)
*F. Chegini, T. Steinke, M. Weiser**

GPU-resident BDDC Preconditioners and Geometric Interface Classification in Cardiac Simulations with Sub-Cellular Resolution
F. Goebel, T. Cojean, H. Anzt*

Multiphysics and Multiscale Computational Modeling of the Heart
M. Bucelli, L. Dede', A. Quarteroni*

A Matrix-Free Stabilized Solver for the Incompressible Navier-Stokes Equations
L. Prieto Saavedra, P. Munch, B. Blais*

Parallel inexact Newton–Krylov and quasi-Newton solvers for cardiac electrophysiology and mechanics
*N. Barnafi, N. Huynh, L. Pavarino, S. Scacchi**

06/06/2024 | 14:30 - 16:30 **Advances in Computational Techniques for Fracture I**	MS054A Room: 3B Chaired by: Prof. Sonia Marfia (Sonia Marfia, Associate Professor, University of Roma Tre , Italy) , Prof. Laura De Lorenzis (ETH Zurich , Switzerland)

Variational Fracture and Applied Loads (Keynote Lecture)
*C. Larsen**

Simulation of Fatigue Fracture Processes with the eXtended Phase-Field Method
*C. Krüger, V. Curosu, S. Loehnert**

Ensemble Kalman Filtering for Stochastic Phase-field Models of Brittle Fracture
L. Hermann, U. Römer, F. Ekre, R. Jänicke, K. Meyer*

The Efficient Simulation of Fracture with an Extended Phase-Field Method
V. Curoşu, C. Krüger, S. Loehnert*

Multi-Phase-Field Modelling for AM Processes Simulation Including In-Situ Thermal Fracturing
R. Darabi, E. Azinpour, A. Reis, J. Cesar de Sa*

06/06/2024 | 14:30 - 16:30 **Reconciling Physical Fidelity, Robustness and Efficiency in Computational Fluid Dynamics II**	MS098B Room: 3C Chaired by: Dr. Benjamin Sanderse (CWI Amsterdam , Netherlands) , Prof. F.Xavier Trias (Technical University of Catalonia , Spain)

Structure preserving discretisations: from structure to results (Keynote Lecture)
*A. Palha**

New Pressure Equilibrium Preserving schemes for compressible flow simulations
G. Coppola, C. De Michele*

Physics-Compatible Wall Model for LES of Highly Compressible Flows
R. Debroeyer, Y. Bartosiewicz, M. Rasquin, T. Toulorge, G. Winckelmans*

Entropy-Aware Strategies in DG-Based Implicit Large Eddy Simulation for Turbulent Compressible Flows
E. Carnevali, A. Crivellini, L. Alberti, A. Colombo*

A Controlled Thickness Volume of Fluid Method for the simulation of Interfacial Flows at High Reynolds Numbers
M. Aknine, D. Fuster, E. Sultan*

06/06/2024 | 14:30 - 16:30 **Advances and Applications in Meshfree, Particle, and Peridynamic Methods II**	MS150B Room: 5A Chaired by: Prof. Martin Berzins (University of Utah , United States) , Prof. Jiun-Shyan Chen (University of California, San Diego , Virgin Islands, USA)

A First-Order Conservation Law Framework for Fast Dynamic Brittle Fracture: Smoothed Particle Hydrodynamics Method
P. Refachinho de Campos, C. Hean Lee, A. Gil, J. Bonet*

A second-order reproducing kernel for SPH method to enhance accuracy and consistency
I. Wiragunarsa, L. Zuhal, T. Dirgantara, I. Putra*

Numerical Study of Melt Pool Dynamics during Ceramics LPBF with High-fidelity Simulations
Z. Zhang, M. Grazyna, M. Afrasiabi, M. Bambach*

Simulation of flux-wall guided transfer in submerged arc welding using two-dimensional particle method
H. Komen, M. Tanaka, H. Terasaki*

Consistent and Mass-Conservative Semi-Analytical Particle Tacking Applied to Finite-Element Models of Thermo-Hydro-Mechanical Processes in Porous Media
P. Selzer, F. Zill, H. Shao, O. Kolditz*

Model Adaptivity for Fluid Flow Simulations using Meshfree Methods
*P. Suchde**

06/06/2024 | 14:30 - 16:30 **Exploring novel applications and advances in lattice Boltzmann methods I**	MS188A Room: 5B Chaired by: Dr. Alessandro De Rosis (University of Manchester , United Kingdom)

Fluid dynamics and beyond: opportunities with the lattice Boltzmann method (Keynote Lecture)
*A. De Rosis**

Lattice Boltzmann for Linear Elastic Solids
O. Boolakee, M. Geier, L. De Lorenzis*

A TRT lattice-Boltzmann solver for pore-scale conjugate heat transfer in porous media
D. Schwendener, J. Latt, J. Noir, X. Kong*

Numerical Simulation of Inertial Particle Motion in Heterogeneous Suspensions
Q. Zhou, B. Owen, T. Krüger*

A hybrid a posteriori limited Lattice Boltzmann Method – LBMOOD
K. Kozhanova, R. Loubere, P. Boivin*

06/06/2024 | 14:30 - 16:30 **Computational Models and Methods for Predicting Cancer Progression and Treatment Response III**	MS035C Room: 5C Chaired by: Dr. Guillermo Lorenzo (Health Research Institute of Santiago de Compostela , Spain)

FA multidisciplinary approach to the therapeutic resistance of prostate cancer
M. Cerasuolo, A. Burbanks, R. Ronca, A. Ligresti*

Agent-based and continuum models for spatial dynamics of infection by oncolytic viruses
D. Morselli, M. Delitala, F. Frascoli*

Mathematical Modelling of in vitro Glioblastoma Adaptation to Evaluate its Response to Chemotherapy with Temozolomide.
M. Pérez-Aliacar, J. Ayensa-Jiménez, M. Doblaré*

Evolution of Phenotypic Plasticity Leads to Tumor Heterogeneity with Implications for Therapy
S. Syga, H. Hatzikirou, A. Deutsch*

Integrating Cell Cycle Data from In Vitro and In Silico Models to Target Radiation Response and Cancer Resistance After Radiation Exposure
L. Lonati, I. Guardamagna, O. Iaria, A. Mentana, A. Previtalia, G. Baiocco*

Modelling the Influence of Loss of E-Catherin and Stroma Attachment in Cancer Cell Invasion: Mathematic Approach
*P. guerrero**

06/06/2024 | 14:30 - 16:30 **Advances in Numerical Methods for Solution Of PDEs II**	MS072B Room: 0.06 Chaired by: Prof. Alexander Idesman (Texas Tech University , United States)

Improvements of ENATE Scheme for the Navier-Stokes Equations
A. Pascau, V. Llorente*

A Riemann-solver-free Spacetime Discontinuous Galerkin Cell Vertex Scheme for General Conservation Laws
S. Tu, Q. Pang, C. Jiang*

Improvement and numerical analysis of cell-vertex finite volume schemes.
Y. Gorschka, G. Puigt, C. Content, B. Maugars, A. Remigi*

Immersed boundary methods for high-order discretization of the compressible Reynolds Averaged Navier-Stokes equations
D. Lodares, J. Manzanero, E. Ferrer, E. Valero*

Variational Quantum Framework for Computational Fluid Dynamics
P. Over, S. Bengoechea, T. Rung*

High-order Flux Reconstruction schemes for turbulent combustion
R. SIMO TAMOU, J. BOHBOT, J. COATLÉVEN, V. PERRIER, Q. TRAN*

06/06/2024 | 14:30 - 16:30 **Contributions of EU-funded projects managed by CINEA towards greener and digital transport I**	MS072B Room: 0.07 Chaired by: Dr. Georgios Bampanis (European Commission , Belgium) , Dr. Dietrich Knoerzer (Aeronautics Consultant , Belgium)

Contributions of EU-funded projects managed by CINEA towards greener and digital transport
*G. Bampanis**

The Dynamic Pickup and Delivery Problem with Crossdock for Perishable Goods
E. Nisyrios, A. Nikolopoulou, K. Gkiotsalitis*

Traffic Forecasting With Uncertainty: A Case for Conformalized Quantile Regression
*G. Petelin, J. Rožanec, G. Papa**

Fleet and Traffic Management Systems for Conducting Future Cooperative Mobility
G. Papa, V. Vukašinović, F. Massi*

AI4CCAM: Trustworthy AI for Connected, Cooperative Automated Driving
*A. Gotlieb**

06/06/2024 | 14:30 - 16:30 **Stability and Sensitivity Methods for Flow Control and Industrial Design I**	STS268A Room: 0.08 Chaired by: Prof. Eusebio Valero (Universidad Politécnica de Madrid , Spain) , Mr. Himpu Marbona (Universidad Politécnica de Madrid , Spain)

Global Stability Analysis of Wavy-surface Induced Laminar Separation Bubbles
M. Moniripiri, D. Rodriguez, A. Hanifi*

Active Control of Separated Flow over a Bump Under Unsteady and Turbulent Conditions
H. Marbona, D. Rodríguez, A. Martínez-Cava, E. Valero*

Influence of Free-stream Turbulence and Discrete Roughness Elements on the Receptivity of Two-dimensional Boundary Layers
E. López Figueiras, E. López Figueiras, D. Rodríguez, J. Gouriet*

Numerical Studies on the Influence of Steps on Secondary Instability Mechanisms in Crossflow-Dominated Boundary Layers
B. Ambrosino, F. Tocci, A. Theiss, S. Hein*

06/06/2024 | 14:30 - 16:30 **Advances in UQ and Data-driven Methods for Scale-resolving Turbulence Simulations II**	MS094B Room: 1.02 Chaired by: Prof. Maria Vittoria Salvetti (University of Pisa , Italy) , Dr. Saleh Rezaeiravesh (The University of Manchester , United Kingdom)

Mixture Density Network for the Prediction of the Wall Shear Stress Statistical Moments for Turbulent Separated Flows
M. Boxho, M. Rasquin, T. Toulorge, G. Dergham, G. Winckelmans, K. Hillewaert*

Combining a hyperlocalized Ensemble Kalman Filter and Large Eddy Simulation for the analysis of the oscillating flow rig
L. Villanueva, K. Truffin, M. Meldi*

A Physics-Infused Immersed Boundary Method Combining Online Data Assimilation With Machine Learning
M. Valero, M. Meldi*

Weakly constrained 4D-Var data assimilation in ABL using LES
A. Alreweny, S. Vandewalle, J. Meyers*

Sensitivity of turbulent inflow methods for aeroacoustic simulations of wall-bounded flows
E. Bagheri, R. Stanly, A. Peplinski, T. Mukha, S. Markidis, P. Schlatter*

Streaming Algorithms for Estimation of Time-averaging Uncertainties in Turbulence Statistics
S. Rezaeiravesh, C. Gscheidle, A. Peplinski, J. Garcke, P. Schlatter*

06/06/2024 | 14:30 - 16:30 **Leveraging Machine Learning Algorithms for Efficient Optimization I**	MS219A Room: 1.03 MS Corresponding Organizer: Phd. M. Giselle Fernández-Godino (Lawrence Livermore National Laboratory)

Structural optimization for fail-safe designs by machine learning
B. Hamann, B. Kriegesmann*

Learning Structures Through Reinforcement Learning
*T. Rochefort-Beaudoin, A. Vadean, S. Achiche**

Optimal design of acoustic metamaterials based on a deep-learning neural network surrogate
D. Yago, G. Sal-Anglada, D. Roca, J. Cante, J. Oliver*

Efficient Gradient-Free Topology Optimization through Latent Space Representation
G. Kus, M. Bessa*

On the applicability and usefulness of AI in Topology Optimisation
R. Woldseth, N. Aage, J. Bærentzen, O. Sigmund*

06/06/2024 | 14:30 - 16:30 **Computational Methods for Soft Robotics II**	MS182B Room: 1.04 Chaired by: Dr. Renate Sachse (Technical University of Munich , Germany) , Prof. Edoardo Milana (University of Freiburg , Germany)

Non intrusive physical parameter inference for a hyperelastic soft robot segment
M. Berghuis, A. Stanic, A. Sadeghi, B. Rosic*

Operational Space Formulation for Modelling and Control of Soft Robots
*S. Arbatani, J. Kovecses**

Modeling and Model-Based Feedforward Control of Soft Material Robots for Fast Trajectory Tracking
M. Grube, R. Seifried*

Model-Based Design and Control of Soft Robotic Systems based on Dielectric Elastomer Artificial Muscles
G. Soleti, J. Kunze, S. Seelecke, G. Rizzello*

06/06/2024 | 14:30 - 16:30 **Modern Approaches To Multiphase Flows in Microfluidics: bubbles, droplets, wetting, and transport in complex media II**	MS101B Room: 1.05 Chaired by: Dr. Tomislav Maric (TU Darmstadt , Germany) , Dr. Mathis Fricke (TU Darmstadt , Germany)

Droplet and particle formation in an X-microdevice
A. Mariotti, S. Tomasi Masoni, C. Galletti, M. Salvetti, E. Brunazzi*

Droplet Characterization through Neural Network Geometric Analysis and Classification for Drop-on-Demand Inkjet Systems
A. Ares de Parga, A. Hashemi, N. Sibuet, R. Rossi, P. Ryzhakov*

Predicting the thermal performance of a cooling system of Lithium battery unit cell in the presence of boiling process
M. Mesgarpour, S. Wongwises, M. Safdari shadloo*

From grid size to drop size: Statistical convergence in atomisation DNS using the Manifold Death method
Y. Kulkarni, C. Pairetti, R. Villiers, S. Popinet, S. Zaleski*

Numerical Study of an Inertial Particle Separator Efficiency Under the Effect of Ice Accretion Caused by the Water Impingement
L. Bahramian, A. Amani, J. Rigola, C. Oliet, C. Pérez-Segarra*

Eulerian-Lagrangian Approach to Assess Microfluidic Multiphasic Reactive Separations
G. González-Lavín, B. García-Merino, C. Fernández-Maza, E. Bringas, L. Gómez-Coma, M. Fallanza, I. Ortiz*

Quantitative constitutive model selection for inertial microcavitation rheometry using Bayesian inference
V. Sanchez, J. Estrada, J. Yang, S. Bryngelson, D. Henann, M. Rodriguez Jr.*

06/06/2024 | 14:30 - 16:30 **Modelling, monitoring and retrofitting strategies of masonry structures in seismic areas I**	MS125A Room: 1.06 Chaired by: Prof. Antonio Formisano (Università di Napoli Federico II , Italy) , Dr. Luis Carlos M. da Silva (Politecnico di Milano , Portugal)

State Space System Identification and Impact Aided Damping Ratio Estimation for a Strengthened Stone Masonry Building
D. Gautam, R. Adhikari, S. Olafsson, R. Rupakhety*

Behaviour of URM piers under horizontal actions – Comparison of experimental and numerical results
I. Hafner, T. Kišiček, M. Gams*

The use of digital tools in assessment of seismic behaviour of existing masonry structures
K. Ožić, M. Stepinac, A. Moretić*

On the nonlinear behaviour of masonry cloister vaults: A case study in Piacenza, Emilia Romagna, Italy
N. Pingaro, M. Buzzetti, G. Milani*

06/06/2024 | 14:30 - 16:30 **Multi-Scale Advanced Modelling and Design of Variable-Stiffness Composite Structures II**	MS153B Room: 1.07 Chaired by: Mr. Paul Weaver (Universities of Limerick and Bristol , United Kingdom) , Mr. Peter Jensen (Technical University of Denmark , Denmark)

Topology and Anisotropy Optimisation of Variable-Stiffness Composite Structures Non-Uniform Rational Basis Spline Entities
A. Mas, M. Montemurro, S. Zerrouq*

Novel Design Methods for Composite Toroidal Pressure Vessels
S. Daghighi, G. Zucco, P. Weaver*

Efficient Multiscale Framework for Reliability Analysis of Unidirectional FRP Composites using Onset Theory
S. Allen, P. Dunning, S. Sriramula*

Least-weight design of variable stiffness composites considering manufacturing signature and unified structural theories
*A. Pagani, A. Sanchez-Majano, D. Zamani**

Aero-visco-elastic flutter analysis of supersonic sandwich panels using layerwise finite elements
J. Moreira, F. Moleiro, A. Araújo, A. Pagani*

06/06/2024 | 14:30 - 16:30 **Advanced Materials: Computational Analysis of Properties and Performance I**	MS003A Room: 1.08 Chaired by: Prof. Vadim Silberschmidt (Loughborough University , United Kingdom)

Toughening of intrinsically brittle materials by arrays of voids (Keynote Lecture)
*D. Brescakovic, O. Kolednik**

Incompatibility stress at grain boundary under external stress for cubic material
K. Liu, M. Sluiter*

Computational analysis of non-proportional biaxial shear reverse experiments superimposed by different cyclic loads
Z. Wei, S. Gerke, M. Brünig*

Modeling of Cyclic Deformation in a Secondary Cast-Aluminum Alloy: a Crystal Plasticity Approach
N. Prabhu, P. Eisenlohr, M. Diehl*

An energy-based approach for calculating near-tip elastoplastic stress field at the atomistic scale
A. Basu, G. Singh*

06/06/2024 | 14:30 - 16:30 **Towards Digital Twins for Infrastructures II**	MS073B Room: 1.09 Chaired by: Prof. Alexander Popp (University of the Bundeswehr Munich , Germany) , Dr. Ines Wollny (Technische Universität Dresden , Germany)

Formulation and Regularization of the Optimization Problem for Adjoint-Based Digital Twin Construction
*I. Antonau, S. Warnakulasuriya, F. Airaudo, R. Löhner, H. Antil, R. Wüchner**

Optimal Sensor Placement Methodology for Adjoint-based Weakening Localization in Structures
S. Warnakulasuriya, I. Antonau, F. Airaudo, R. Löhner, H. Antil, R. Wüchner*

On the Use of Risk Measures in Digital Twins to Identify Weaknesses in Structures
F. Airaudo, H. Antil, R. Lohner, S. Warnakulasuriya, I. Antonau, R. Wuchner*

Hybrid Digital Twinning of Reinforced Concrete Based on Mixed Dimensional Modelling
B. Maradni, S. Brandstaeter, I. Steinbrecher, A. Popp*

Digital Twinning of Crack Propagation using Computer Vision and Finite Element Method
Y. Zhang, J. Niiranen*

Comparative Analysis of Traditional On-Site and Automated Road Damage Assessments
H. Garita-Duran, T. Avila-Esquivel, M. Kaliske*

06/06/2024 | 14:30 - 16:30 **Advanced Parallel Algorithms for Extreme-Scale Simulations II**	MS146B Room: 1.10 Chaired by: Dr. Xavier Álvarez Farré (SURF , Netherlands) , Mr. Àdel Alsalti (Universitat Politècnica de Catalunya , Spain)

A Distributed Memory Tri-diagonal Solver Optimised for CPU and GPU Architectures
S. Akkurt, S. Laizet*

Large Scale Parallel Vibration Analysis of Stradivarius Using Domain Decomposition Method
R. Shioya, M. Kojima, M. Yokoyama, A. Takei, G. Yagawa*

Contact formulation for Mixed Finite Element
L. Kaczmarczyk, C. Pearce, A. Shavrts, C. Runcie*

Hardware aware matrix-free approach for accelerating finite-element discretized eigenvalue problems: Application to large-scale Kohn-Sham density functional theory
G. Panigrahi, P. Motamarri*

06/06/2024 | 14:30 - 16:30 **New Trends for Improving the Large-Scale Simulation of Wave Propagation I**	MS129A Room: 1.11 Chaired by: Prof. Rabia Djellouli (California State University Northridge , United States) , Dr. Helene Barucq (Inria , France)

Recent Developments in the Mixed-Dimensional Analysis of Elastic Structures
D. Givoli, D. Rabinovich, Y. Mayorov*

Flux Reconstruction Type Auxiliary Solvers for a Trefftz Domain Decomposition Method Dealing with Time-Harmonic Electromagnetism
S. Pernet, M. Rivet, S. Tordeux*

Domain decomposition method based on One-Way approaches applied to acoustic liners
M. Ruello, S. Pernet, J. Brazier*

Locally Implicit Time Schemes for Transient Visco-Elastic Wave Propagation Problems on Non-Uniform Meshes
V. Vasanthan, A. Imperiale*

Stabilized explicit leapfrog schemes for transient visco-elastic wave propagation problems
*V. Vasanthan, A. Imperiale**

Application of the Sparse Direct Solver MUMPS to Hybridizable Discontinuous Galerkin Discretization for Wave Modeling
P. Amestoy, A. Buttari, F. Faucher, J. L'Excellent, T. Mary*

06/06/2024 | 14:30 - 16:30 **Reduced Order Models and Artificial Intelligence for Industrial Applications I**	MS140A Room: 1.12 Chaired by: Dr. Massimiliano Lupo Pasini (Oak Ridge National Laboratory , United States) , Dr. Michele Giuliano Carlino (ONERA , France)

Solving lattice structures via reduced order modelling and iterative solvers
R. Rubio, A. Ferrer, J. Hernandez*

An Integrated Workflow for Solving Parametric Nonlinear Problems Through Reduced Order Modeling
P. Malleval, R. Scanff, D. Néron*

Multi-objective Shape Optimization of a Cavitating Marine Propeller Using Reduced Order Models
R. Zamolo, A. Scardigli, A. Petronio, F. Gallizio, M. Lavaroni, M. Govetti*

Reduced order models for ICE intake ports design
I. Cozza, A. Scardigli, C. Carriero, D. Menghini, R. McAlpine*

Structure preserving reduced-order model for parametric cross-diffusion systems
J. Dabaghi, V. Ehrlacher*

An Optical Data Innovative Format: Application to Land Cover Analysis
L. Liverotti, N. Ferro, M. Matteucci, S. Perotto*

06/06/2024 | 14:30 - 16:30 **Electromagnetic Problems Arising in Industry: Modelling and Numerical Techniques II**	MS171B Room: 1.13 Chaired by: Dr. Idoia Cortes Garcia (Eindhoven University of Technology , Netherlands) , Ms. Dolores Gómez (Universidade de Santiago de Compostela , Spain)

Object Characterisation for Metal Detection in Security Screening and Other Applications
J. Elgy, P. Ledger*

Efficient and Accurate Numerical Simulation of Micromagnetic Problems Using Projection-Based Finite Elements and Optimization on Manifolds
A. Müller, M. Bischoff, M. Keip*

Modal Transmission Condition for Domain Decomposition for Guided Wave Problems
F. Quetscher, E. Gjonaj, H. De Gersem*

Convergence of Waveform Relaxation for Coupled DAEs Describing Field/Circuit Coupled Systems
*I. Cortes Garcia, P. Kumbhar, J. Pade**

High-Order Surface Integral Equation Solutions for Complex Electromagnetic Simulations
*M. Horn, W. Cole, D. Faircloth**

06/06/2024 | 14:30 - 16:30 **Hydrogen Underground Storage (HUGS) I**	MS030A Room: 1.14 Chaired by: Dr. Luis Cueto-Felgueroso (Universidad Politécnica de Madrid , Spain) , Dr. Jose Paris (University of A Coruña , Spain)

Stability Analysis of Salt Caverns in Bedded Saline Formations for the Storage of Green Hydrogen (Keynote Lecture)
A. Soage, F. Navarrina, R. Juanes, J. Paris, I. Colominas, L. Cueto-Felgueroso*

Simulation of salt caverns for hydrogen storage under cyclic operations
H. Tasinafo Honorio, H. Hajibeygi*

Upscaling the mechanical properties of rock microstructures under cyclic loading with a digital rock physics framework
S. Zwarts, H. Hajibeygi, M. Lesueur*

Temperature Envelope for Construction of Salt Caverns
B. Fernández Amado, M. Soage Quintáns, J. París López, I. Colominas Ezponda, L. Cueto-Felgueroso Landeira*

Study of Short-Term Operating Cycles for Underground Hydrogen Storage in Salt Caverns
F. Figueiras, A. Soage, J. París, I. Colominas, L. Cueto-Felgueroso*

06/06/2024 | 14:30 - 16:30 **New Directions for solving Stokes and Navier-Stokes Problems II**	MS061B Room: 1.15 Chaired by: Dr. Erell Jamelot (CEA and Université Paris-Saclay , France) , Dr. Roberta Tittarelli (FEMTO-ST , France)

Counting Rayleigh-Benard instabilities for a variable viscosity
*O. Lafitte**

A new immersed boundary method (phi-FEM) to treat Stokes equations and particulate ows
M. Duprez, V. Lleras, A. Lozinski*

Numerical Model of the Cerebral Venous Blood Flow using Real Biomedical Acquisitions
P. Mollo, S. Salmon, G. Dollé, O. Balédent*

BDF 1-6 Tme-Stepping Methods for the Transient Stokes Problem
*A. Contri, B. Kovács, A. Massing**

Finite volume method with diffusion control parameter for the compressible Navier-Stokes equation: Application to supersonic flow over a flat plate.
W. aboussi, I. kissami, M. Boubekeur, M. Ziggaf*

06/06/2024 | 14:30 - 16:30
Multiscale Modeling of Vascular Growth and Remodeling I

MS211A
Room: 2.01
Chaired by:
Dr. Anna Corti (Politecnico di Milano , Italy) , Prof. Claudio Chiastra (Politecnico di Torino , Italy)

A validated multiscale model for in-stent restenosis in stented coronary arteries
*A. Hoekstra**

An In-Silico Model of Atherosclerosis Progression in Coronary Arteries Bridging Hemodynamics, Tissue Mechanics, and Pathophysiology
J. Warren, A. Corti, C. Meyer, H. Hayenga*

In-Silico Modeling of Atherosclerosis: Hybrid Approach of Convection-Diffusion-Reaction Model and Agent-Based Model
R. Caballero, M. Martínez, E. Peña*

Adaptive Integration for Constrained Mixture Models of Organ-Scale Growth and Remodeling
A. Gebauer, M. Pfaller, W. Wall*

On the Impact of Residual Strains in the Stress Analysis of Patient-Specific Atherosclerotic Carotid Vessels: Predictions Based on the Homogenous Stress Hypothesis
A. Mastrofini, M. Marino, E. Karlof, U. Hedin, C. Gasser*

06/06/2024 | 14:30 - 16:30
Exploring New Avenues for the Interaction of Numerical Methods for PDEs and Deep Learning I

MS191A
Room: 2.02
Chaired by:
Mr. Paolo Zunino (MOX, Department of Mathematics, Politecnico di Milano , Italy) , Prof. Kent-Andre Mardal (University of Oslo / Simula Research Laboratory , Norway)

Data driven approximation of the solutions to parametric eigenvalue problems
*D. Boffi**

DeepONet for Matrix-Free Preconditioners Construction
G. D'Inverno, C. Millevoi, M. Ferronato*

Learning Mesh Extension Operators
*O. Hellan**

Collocation method with two-layer Neural Networks
*F. Calabrò**

Deep-Learning Preconditioners for Mixed-Dimensional Partial Differential Equations on 3D-1D Domains
N. Dimola, N. Franco, P. Zunino*

Enhancing Thermal Conductivity Modeling of Polyurethane with Phase Change Materials via Physics-Informed Neural Networks at Multiple Scales
*B. Liu**

**06/06/2024	14:30 - 16:30** **Advances in Fluid Dynamics I**	GS003A Room: 2.03 Chaired by: Mr. Lushun Fan (Cranfield university , United Kingdom)

Experimental and Numerical Characterization of the Discharge Flow of Low-Pressure Rotor-Only Axial Fans
H. Witte, C. Bode*

Flow Structures around the Burj Khalifa in 2D and 3D
L. Fan, T. Teschner, J. Li*

Implementation and validation of a partitioned approach for conjugate heat transfer problems into a fluid-structure interaction framework
V. Van Riet, W. Beyne, M. De Paepe, J. Degroote*

Adaptation of a two-way coupled CFD-FEA model for fire determination of insulated sandwich panels using the Immersed Boundary Method.
D. Fellows, S. Walton, J. Thompson, O. Hassan, K. Tinkham, E. Quigley*

A Lagrangian Position-Based Space-Time Formulation for Finite Strain Free-Surface Flows
D. Moreira, R. Sanches*

**06/06/2024	14:30 - 16:30** **Modeling Of Failure Of Additively Manufactured Parts I**	MS011A Room: 2.04 Chaired by: Dr. Narges Dialami (UPC-CIMNE , Spain)

Experimental and Computational Multiscale Failure Analysis of Fused Filament Fabrication Parts
I. Rivet, N. Dialami, M. Cervera, M. Chiumenti*

A novel nonlocal orthotropic damage-plastic model for FDM-3D printed materials
E. Monaldo, D. Linardi, S. Marfia*

Experiments-Based Numerical Analysis of Size Effects on Fracture Mechanisms in FFF Printed Polymer Lattices
*R. Salem, I. Benedetti, F. Barbe**

**06/06/2024	14:30 - 16:30** **Differential Problems on Heterogeneous Structures and Networks: Modelling, Numerics and Applications I**	MS238A Room: 2.05 MS Corresponding Organizer: Prof. Adriano Festa (Politecnico of Turin)

Multiscale model of Partial Discharges and Electrical Treeing
B. Crippa, A. Scotti, A. Villa*

Modelling 3D-1D Soil-Root Interactions with Mixed Virtual Element Methods
G. Teora, S. Berrone*

A data-driven kinetic model for opinion dynamics with social network contacts
G. Albi, E. Calzola, G. Dimarco*

A numerical scheme for the critical value approximation of eikonal Hamilton–Jacobi equations on networks
V. Coscetti, M. Pozza*

Convergence Analysis of an Algorithm for the Critical Value of Eikonal Equations Posed on Networks
M. Pozza, V. Coscetti*

Traffic-Informed Navigation: a Multi-Population Model for Smart Routing Strategies
*A. Festa, P. Goatin, F. Vicini**

Hybrid games in route planning for sailing vessels and their mean field limit
*A. Festa**

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

17:00-19:00 | TECHNICAL SESSIONS

06/06/2024 | 17:00 - 19:00 **Deep Learning Computing V**	MS005E Room: Auditorium I Chaired by: Dr. Carlos Uriarte (BCAM - Basque Center for Applied Mathematics , Spain) , Dr. Tim De Ryck (ETH Zurich , Switzerland)

Parsimonious PINN-PGD with full domain decomposition capabilities
C. Ghnatios, F. Chinesta*

Physics informed Graph Neural Networks – towards real-time applications for haptic devices
P. Martins, B. Moya, F. Chinesta, E. Cueto*

New treatment of the boundary conditions in Deep-Galerkin/PINNs methods: application to high dimensional non-linear parabolic PDEs
J. García Rodríguez, J. Pérez Villarino, Á. Leitao*

Learning Thermodynamically Consistent Master Equations for Open Quantum Systems
P. Sentz, S. Günther, B. Keith*

Large-scale Statistical Learning for Mass Transport Prediction in Porous Materials Using 90,000 Artificially Generated Microstructures
B. Prifling, M. Röding, P. Townsend, M. Neumann, V. Schmidt*

06/06/2024 | 17:00 - 19:00 **Novel Methods and Algorithms in Topology Optimization: Bridging Design, Materials, Simulations, and Manufacturing VI**	MS162F Room: Auditorium II Chaired by: Dr. Matteo Bruggi (Politecnico di Milano , Italy) , Prof. Marco Montemurro (Arts et Métiers Sciences and Technologies , France)

Stress-constrained topology optimization of anisotropic structures
O. Giraldo-Londoño, R. Muñeton-Lopez, C. Bettale*

Tuneable Continuous Topology Optimization Using Cartesian Grids
R. Merli, A. Martínez-Martínez, J. Ródenas, M. Bosch-Galera, J. Navarro, J. Albelda*

Dehomogenization in stress minimization problems
A. Ferrer, P. Geoffroy-Donders, G. Allaire*

Locally tuning the compliance of a structure by acting on its contiguous bodies: an adjoint method-based topology optimization approach
*F. Rotini, S. Marconi, G. Alaimo**

06/06/2024 | 17:00 - 19:00 **Numerical Methods for the Vascular System in Health and Disease IV**	MS102D Room: Auditorium III Chaired by: Mr. Ivo Steinbrecher (Universität der Bundeswehr München , Germany) , Dr. Gian Marco Melito (TU Graz , Austria)

Parameter estimation from undersampled MRI in frequency space
M. Löcke, C. Bertoglio*

Validation of finite volume FSI solver on patient-specific Type-B aortic dissection
A. Horvat, Ž. Tuković*

On the role of tissue mechanics in fluid-structure interaction simulations of patient-specific aortic dissection
R. Schussnig, M. Rolf-Pissarczyk, K. Bäumler, T. Fries, G. Holzapfel, M. Kronbichler*

An Optimisation-Based Fully Segregated Reduced Order Model for Fluid-Structure Interaction Problems
I. Prusak, D. Torlo, M. Nonino, G. Rozza*

Fluid-Structure Interaction Simulation of Transcatheter Aortic Valve Implantation Using Smoothed Particle Hydrodynamics
C. Catalano, O. Zahalka, T. Turgut, V. Bouwman, S. Pasta*

06/06/2024 | 17:00 - 19:00 **Verification, Validation and Uncertainty Quantification in Modeling and Simulation IV**	MS040D Room: Auditorium IV Chaired by: Mr. Kevin Dowding (Sandia National Laboratories , United States) , Dr. Luís Eça (IST , Portugal)

The Role of Uncertainty Quantification in Model Verification and Validation (Keynote Lecture)
*B. Thacker**

Multi-fidelity sampling uncertainty quantification: overview, recent trends, and perspectives
*G. Geraci**

Uncertainty Quantification for Lattice Boltzmann Method on Large Eddy Simulations based Turbulent Channel Flow
X. Xue, J. McCullough, P. Coveney*

Uncertainty Analysis of Combustion-Wall Interaction
K. Tang, T. Ricciardi, J. Freund*

Parallel active learning for quantile estimation from composites damage models.
C. Laboulfie, M. DE LOZZO, F. GROTTO, S. MIOT, L. BARRIERE, S. BOCQUET*

06/06/2024 | 17:00 - 19:00 **Recent trends in elastic and acoustic metamaterials V**	MS059E Room: Auditorium VI Chaired by: Dr. Andrea Francesco Russillo (University of Reggio Calabria , Italy) , Prof. Antonio Palermo (University of Bologna , Italy)

Locally Resonant Acoustic Metamaterials for Underwater Pile Driving Noise Mitigation
M. Antonacci, M. Cremonesi, V. Kouznetsova, O. Rokos, L. Sangiuliano, V. Zega*

Water-tank metabarriers for seismic surface waves attenuation
*A. Russillo, F. Arena, G. Failla**

Optimization of seismic metamaterials using different performance measures for reduction of ground vibration due to surface loads
Z. Kabirian, G. Degrande, G. Lombaert*

Metadamping And Stiffness Nonlinearity Effects On Wave Dispersion In Beam On Cubic Nonlinear Foundation: A Method Of Multiscale
A. Bhatt, A. Banerjee*

A locally resonant metamaterial layer for enhanced filtering and attenuation of elastic surface waves
F. Zeighami, A. Palermo, A. Marzani*

Ground vibration reduction by multimodal locally resonant seismic metasurfaces
D. Carneiro, G. Lombaert, G. Degrande*

06/06/2024 | 17:00 - 19:00 **Computational Methods for Multiphase Flows with Liquid-Vapor Transition IV**	MS068D Room: Auditorium VII Chaired by: Dr. Sébastien Tanguy (Université Paul Sabatier - Toulouse 3 , France)

Numerical Study of Acoustic Cavitation and Tissue Deformation
*G. Son**

Numerical Method Employing Preconditioned Artificial Dissipation for Gas-liquid Two-phase Flow
T. Zhao, B. Shin*

Comparative Study of Orifice Shapes on Shock Absorber: Impact on Energy Dissipation and Cavitation
P. A. S. F. Silva, A. A. Sheikh Al-Shabab, P. Tsoutsanis,, M. Skote*

Automated Flow Physics Identification and Classification in Multiphysics Multifidelity Simulations
A. Sheikh Al-Shabab, P. Silva, P. Tsoutsanis, M. Skote*

06/06/2024 | 17:00 - 19:00 **Data-Driven Simulation of Flow and Multi-Physics Problems I**	MS051A Room: Auditorium VIII Chaired by: Prof. Alvaro Coutinho (COPPE/Federal University of Rio de Janeiro , Brazil) , Prof. Gianluigi Rozza (SISSA , Italy)

High-Fidelity Computational Fluid Dynamics and Particle Modelling Using Neural Networks
C. Pain, C. Heaney, B. Chen, J. Gomes, O. Matar*

Multiscale Numerical Methods and their Interplay with Artificial Intelligence
*J. Fonseca, A. Gomes, L. Martins, F. Valentin**

Physics-based data augmentation in POD for the incompressible Navier-Stokes equations
A. Muixí, S. Zlotnik, M. Giacomini, P. Díez*

A mass-conservative INSIM-FT data-driven model
M. Grave, E. da* Silva Castro, S. Pesco, A. Borges Barreto Junior, L. da Silva Gasparini, R. Gusmão Cavalcante, R. *Reis da Costa, J. Pereira Rodrigues*

Data-driven optimal control of self-propelled undulatory swimmers
K. Maroun, M. Bergmann, P. Traoré*

06/06/2024 | 17:00 - 19:00 **Modelling and Simulation of Welding and Wire Arc Additive Manufacturing Processes II**	MS185B Room: Terrace Chaired by: Dr. Josselin DELMAS (Électricité de France R&D , France)

Thermo-mechanical modelling of the direct energy deposition waam process
S. Hilal, S. Hendili, D. Missoum-Benziane, P. Kerfriden, M. Mazière*

Multifield thermoplasticity
R. Williams, C. Runcie, A. Shvarts, C. Pearce, A. McBride, L. Kaczmarczyk*

Towards industrial relevance: Uncertainty in numerical resistance spot welding models
B. Verkens, M. Faes, P. Van Rymenant, D. Moens*

Multi-fidelity Surrogate Models for Welding Applications
P. Pereira Alvarez, J. Pelamatti, S. Hilal*

Machine Learning-Based Inverse Problem Solving for Identifying Heat Input in Tungsten Inert Gas (TIG) Welding
Z. BOUTALEB, S. ROUQUETTE, I. BENDAOUD, F. SOULIÉ*

06/06/2024 | 17:00 - 19:00 **Robust and Scalable Solvers in HPC: Recent Developments and Future Challenges II**	MS063B Room: 3A Chaired by: Mr. Fritz Goebel (Karlsruhe Institute of Technology , Germany) , Dr. Pasquale Claudio Africa (SISSA International School for Advanced Studies , Italy)

Improving Algebraic Multigrid Performance for High-order Finite Elements with Multipoint Constraints
M. Kelemen, R. Wüchner, S. Warnakulasuriya*

Physics-based block preconditioning for beam/solid coupling
M. Firmbach, I. Steinbrecher, A. Popp, M. Mayr*

Exploring Nonlinear Preconditioning for Quasi-Newton Methods
H. Kothari, S. Zampini, A. Kopanicakova, D. Keyes, R. Krause*

Lower-order Refined Preconditioning for Spectral/hp Element Methods for Complex, 3D Geometries
P. Khurana, S. Sherwin, J. Hoessler, D. Moxey, A. Chatzopoulos*

Comparison between block preconditioner and monolithic preconditioner for iterative solution of coupled multi-field problems from generalized continuum models
N. Alkmim, P. Gamnitzer, G. Hofstetter*

06/06/2024 | 17:00 - 19:00 **Advances in Computational Techniques for Fracture II**	MS054B Room: 3B Chaired by: Prof. Laura De Lorenzis (ETH Zurich , Switzerland) , Prof. Stefan Löhnert (TUD Dresden University of Technology , Germany)

Reduced model for fracture of geometrically exact beam (Keynote Lecture)
*A. Ibrahimbegovic**

Enhanced virtual element method for mixed-mode cohesive fracture simulations
S. Marfia, E. Monaldo, E. Sacco*

The Virtual Element Method for Efficient Crack Growth Simulations Based on Configurational Forces
K. Schmitz, A. Ricoeur*

Simulation of crack propagation coupling FEM and VEM
G. Giambanco, M. Puccia, E. Sacco, A. Spada*

Globally Enriched Cohesive Zone Model for Modelling Fracture
A. Marzok, H. Waisman*

06/06/2024 | 17:00 - 19:00 **Reconciling Physical Fidelity, Robustness and Efficiency in Computational Fluid Dynamics III**	MS098C Room: 3C Chaired by: Prof. F.Xavier Trias (Technical University of Catalonia , Spain) , Prof. Roel Verstappen (University of Groningen , Netherlands)

Improving the Efficiency of the Sub-Stepping Velocity Splitting Scheme within the Nektar++ Framework
A. Liosi, S. Sherwin, J. Hoessler, A. Swift, A. Chatzopoulos, F. Bottone, M. Horikoshi*

Assessment of the accuracy and robustness of different numerical methods in wall-bounded flows
S. Toosi, J. Larsson, P. Schlatter*

Cost-accuracy analysis for symmetry-preserving methods
J. Hopman, À. Alsalti-Baldellou, J. Rigola, F. Trias*

Towards an actuator line model for the interaction between air jets and slender multi-component structures
A. Bral, L. Daelemans, J. Degroote*

Overset-Grids Method for Flow Computation on Complex Geometry and its Performance Improvement with Hybrid Parallelization using Shared Memory and Distributed Memory Techniques
*K. Ohashi**

Conditional statistics in turbulent/non-turbulent interfaces
M. Zecchetto, R. Xavier, H. Abreu, C. Silva*

06/06/2024 | 17:00 - 19:00 **Advances and Applications in Meshfree, Particle, and Peridynamic Methods III**	MS150C Room: 5A Chaired by: Dr. George Gazonas (DEVCOM Army Research Laboratory , United States) , Prof. Jiun-Shyan Chen (University of California, San Diego , Virgin Islands, USA)

A Meshfree Generalization of the Finite Volume Method
F. Breiden, C. Albrecht, M. Schweitzer*

A New Remeshing Strategy Relying on Level-Set Functions for the Particle Finite Element Method
*E. Fernandez, J. Ponthot**

Two approaches within radial basis function-based collocation method for solving interface boundary value problems
A. Krowiak, J. Podgórski*

MESHFREE simulations for the automotive industry
C. Sanghavi, I. Michel, J. Kuhnert*

On Some Aspects of Elastic-Plastic Analysis by the Multipoint Meshless Method
*I. Jaworska**

06/06/2024 | 17:00 - 19:00 **Exploring novel applications and advances in lattice Boltzmann methods II**	MS188B Room: 5B Chaired by: Dr. Alessandro De Rosis (University of Manchester , United Kingdom)

Performance optimality in GPU-based, mesh-refined LBM codes
J. Latt, C. Coreixas*

Coupling finite volume and lattice Boltzmann methods for the simulation of high-Reynolds-number flows
Y. Zhou, M. Camps Santasmasas, A. De Rosis, A. Revell*

Simulation of Crystallization Reaction on Nano-Scale Using Lattice Boltzmann Methods
F. Bukreev, D. Teutscher, A. Kummerländer, M. Krause*

Numerical study of the effect of rectangular cross-sections in straight channels on particle migration in inertial particle microfluidics
F. Mirghaderi, B. Georgieva, M. Temkin, B. Owen, T. Krueger*

Lattice_Boltzmann modelling of supercritical CO2 flows
J. Cardenas, J. Favier, J. Ferrasse, P. Berthelemy, P. Boivin*

Three-Dimensional Compressible Flow Solutions Using the Entropic Lattice Boltzmann Method
B. Selimhocaoğlu, Y. Özyörük*

06/06/2024 | 17:00 - 19:00 **Computational Models and Methods for Predicting Cancer Progression and Treatment Response IV**	MS035D Room: 5C Chaired by: Dr. Guillermo Lorenzo (Health Research Institute of Santiago de Compostela , Spain)

Mechanistic mathematical modeling of tumor microenvironment
*N. Mohammad Mirzaei, L. Shahriyari**

Towards Prostate Cancer Predictive in Silico Models – the early stages and vascular growth
R. Travasso, M. Palmeira, R. Angelo, F. Paiva, A. Morais, S. Carvalho, N. Rodrigues, J. Carvalho, J. Pardo Montero, G. Lorenzo*

Patient-specific Simulation of Tumor-induced Angiogenesis Informed with Optical Coherence Tomography
F. Pradelli, G. Minervini, S. Azad, P. Venkatesh, S. Tosatto*

Quantification of the Accuracy of a ROM for Fracture Prediction in Metastatic Vertebrae
B. Gandia, X. Garcia, E. Arana, J. Navarro, E. Nadal, J. Ródenas*

A patient-specific in silico 3D model for radiation-induced pulmonary fibrosis development prediction
*E. Ioannou, M. Hadjicharalambous, A. Malai, D. Vomvas, V. Vavourakis**

Computational Study of Nanoparticle Drug Release for the Treatment of Cancer
*G. Suárez Guerrero**

06/06/2024 | 17:00 - 19:00 **Advances in Numerical Methods for Solution Of PDEs III**	MS072C Room: 0.06 Chaired by: Prof. Alexander Idesman (Texas Tech University , United States)

A well-balanced scheme based on characteristics for numerical flux computation: application to pollutant transport in shallow water flows on hybrid mesh
M. ZIGGAF, I. KISSAMI, M. Boubekeur*

Local Timestep Super-Time-Stepping Integration Methods Applied to Heat and Mass Transfer in Anisotropic Porous Media
N. Dellinger, G. Dufour, X. Lamboley, L. Reboul, F. Rogier*

An Implicit Substepping Time Integration Scheme For Finite Strain Rate-Dependent Crystal Plasticity
*B. Alheit**

Numerical solution of nonlinear Fokker-Planck equation by variational approach
*S. Stoykov**

A Mixed Approximation of the Boundary Element Method for the Mixed Problem of Linear Elasticity
*C. Schwarz**

A Multi-layered Integral Approach to the de-icing process
H. Beaugendre, A. Benoit, F. Morency, M. Parisot*

06/06/2024 | 17:00 - 19:00 **Contributions of EU-funded projects managed by CINEA towards greener and digital transport II**	STS243B Room: 0.07 Chaired by: Dr. Georgios Bampanis (European Commission , Belgium) , Dr. Dietrich Knoerzer (Aeronautics Consultant , Belgium)

OPTIWISE: Design optimisation of wind assisted ship propulsion
M. Flikkema, T. van Terwisga, R. Eggers, M. Garenaux, S. Werner, G. Mazza*

Numerical simulation of microwires within carbon-fibre composites for structural health monitoring of aerospace components
W. Krach, W. Vonach, J. Malm, C. Johansson, A. Zhukov*

On the Training of Algorithms Using Finite-Element Computation Data for Damage Identification in Sensorised Composite Structures
R. Chabukswar, C. Mullen, K. Kouramas*

Deep Reinforcement Learning Applied to a Navigation Task in a Representative Flow Field for Urban Environments
F. Tonti, J. Rabault, R. Vinuesa*

06/06/2024 | 17:00 - 19:00 **Stability and Sensitivity Methods for Flow Control and Industrial Design II**	STS268B Room: 0.08 Chaired by: Prof. Eusebio Valero (Universidad Politécnica de Madrid , Spain)

Competition between stall cells and low-frequency global modes in transitional flows around airfoils near stall
K. Sarras, O. Marquet*

High-Order Mesh Generation and Mesh Adaptation for Complex Geometries with the Open-Source Code NekMesh
K. Kirilov, J. Peiró, J. Zhou, M. Green, D. Moxey*

Study on the Effect of the Upcoming Turbulent Boundary Layer on Automotive Test Case
A. O'Sullivan, K. Puri, E. Ferrer*

Transonic buffet prediction around laminar airfoils utilizing linear global stability analysis
M. Plath, F. Renac, O. Marquet, C. Tenaud*

06/06/2024 | 17:00 - 19:00 **Stable FE Methods for Challenging Problems in Engineering and Science I**	MS087A Room: 1.02 Chaired by: Prof. Eirik Valseth (Norwegian University of Life Sciences , Norway)

Least-Squares Finite Element Methods for eigenvalue problems
*F. Bertrand**

Multi-dimensional Flood Modeling of the "Hans" Extreme Weather Event in Nesbyen, Norway
K. Valseth, L. Valnes, E. Valseth, K. Mardal*

Stabilized Finite Element Schemes for Applications in Modeling Compound Floods
M. Loveland, C. Trahan, M. Farthing, E. Valseth, B. Pachev, G. Savant*

06/06/2024 | 17:00 - 19:00 **Leveraging Machine Learning Algorithms for Efficient Optimization II**	MS219B Room: 1.03 MS Corresponding Organizer: Phd. M. Giselle Fernández-Godino (Lawrence Livermore National Laboratory)

Challenges in Training Generative Models for Kirigami Metamaterials
V. Slesarenko, G. Felsch*

Bayesian Optimization for mechanical metamaterial design
I. Kuszczak, M. Bessa, F. Azam, P. Tan, F. Bosi*

What can structural optimization learn from machine learning?
*N. Aage**

Bayesian Quality-Diversity optimization for conditional search-space problems based on budget allocation
L. Baraton, A. Urbano, L. Brevault, M. Balesdent*

Enhancing Constraint-handling in Crash through Bayesian Optimization with Constraint-driven Trust Regions
P. Ascia, E. Raponi, F. Duddeck*

06/06/2024 | 17:00 - 19:00 **Learning Differential Equations for Science and Engineering Applications via Scientific Machine Learning I**	MS078A Room: 1.04 Chaired by: Dr. Benjamin Sanderse (CWI Amsterdam , Netherlands) , Dr. Giovanni Stabile (Sant'Anna School of Advanced Studies , Italy)

Physics-Informed Machine Learning for Characterizing Multistable Stochastic Dynamics (Keynote Lecture)
B. Moya, E. Cueto, E. Chatzi, F. Chinesta*

Guaranteed Stability in Inference of Nonlinear Dynamical Systems Using Quadratic Lyapunov Functions
I. Pontes Duff, P. Goyal, P. Benner*

Adjoint-Optimized Deep Learning Sub-Grid Scale Models for Airfoil Flows
T. Hickling, J. Sirignano, J. MacArt*

Digital Twin for Close-proximity On-orbit Spacecraft Operations
S. Henao-Garcia, M. Kapteyn, M. Tezzele, K. Willcox*

Simultaneous Denoising and Recovery of Dynamical System Equations from Noisy Measurements
A. Doostan, J. Wentz, J. Hokanson*

06/06/2024 | 17:00 - 19:00 **Modern Approaches To Multiphase Flows in Microfluidics: bubbles, droplets, wetting, and transport in complex media III**	MS101C Room: 1.05 Chaired by: Dr. Mathis Fricke (TU Darmstadt , Germany) , Prof. Pavel Ryzhakov (CIMNE, Barcelona , Spain)

Space-time methods for compressible multiphase flow
P. Antony, N. Hosters, M. Behr*

An Enriched Finite Element (E-FEM)/ Conservative Level-Set Approach for Analysis of Microfluidic Two-Phase Flows
A. Shamekhi, M. Hashemi, P. Ryzhakov, R. Codina*

A Filtered Signed-Distance Calculation for Approximating Interface Normals and Curvature in the Unstructured VOF Method
L. Nagel, A. Lippert, T. Tolle, T. Maric*

A residual-based non-orthogonality correction for force-balanced unstructured Volume-of-Fluid methods
*J. Liu, T. Maric**

A VoF-Based Investigation of Permeability Reduction Caused by Oil Droplets During Produced Water injection
E. Sabooniha, H. Nick*

Instability of two-layer viscoelastic flows
S. Afkhami, N. Rezaei*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

06/06/2024 | 17:00 - 19:00 **Modelling, monitoring and retrofitting strategies of masonry structures in seismic areas II**	MS125B Room: 1.06 Chaired by: Prof. Antonio Formisano (Università di Napoli Federico II , Italy) , Dr. Luis Carlos M. da Silva (Politecnico di Milano , Portugal)

Fast seismic vulnerability analysis of historical masonry structures by means of a novel limit analysis-based approach
M. Buzzetti, N. Pingaro, G. Milani*

Finite element analysis of a rigid body isolated with high-damping unbonded fiber-reinforced elastomeric isolators
G. Pianese, N. Van Engelen, G. Milani*

A Novel Deformable Limit Analysis Modeling for the Masonry Arch or Vault Structures
Y. Hua, G. Milani*

Pushover Analysis of Masonry Double Curvature Structures Subjected to Horizontal Loads: The Anime Sante Dome
A. Gandolfi, G. Milani*

06/06/2024 | 17:00 - 19:00 **Multi-Scale Advanced Modelling and Design of Variable-Stiffness Composite Structures III**	MS153C Room: 1.07 Chaired by: Dr. Aurelio Araujo (IDMEC , Portugal) , Mr. Cheng Angelo Yan (Politecnico di Milano , Italy)

Structural Performance Prediction in Fiber-Polymer Composite Structures
N. Grünvogel, D. Forster, Y. Guo, J. Knippers, M. Bischoff*

Mechanical Investigation of Variable-Angle Tow Composite Structures Through Hierarchical Finite Element Models
D. Iannotta, G. Giunta, M. Montemurro*

Postbuckling Analysis of Variable Stiffness Laminates via R-Function Method
P. Foligno, C. Yan, R. Vescovini*

Variable kinematics models for the analysis of thermal stresses in metallic and composite laminates
E. Carrera, A. Pagani, E. Zappino, F. Bracaglia, D. Scano*

06/06/2024 | 17:00 - 19:00 **Advanced Materials: Computational Analysis of Properties and Performance II**	MS003B Room: 1.08 Chaired by: Prof. Vadim Silberschmidt (Loughborough University , United Kingdom)

Strength criterion and fracture behaviors of defective two-dimensional materials
*G. Zhang**

Tunable Morphology and Mechanical Behaviors in Interlayer-Bonding Twisted and Strained Bilayer Graphene
*S. Liu**

Thermal Properties of Graphene/Epoxy Nanocomposites: Molecular Dynamics Simulation
A. Senturk, A. Ahadi*

Matrix Analysis of Molecular Structures: applications in molecules, carbon allotropes and proteins
A. Fernández San Miguel, I. Couceiro Aguiar, L. Edreira Marzoa, F. Navarrina Martínez, L. Ramírez Palacios*

Dynamic Crack Front Deformations in Cohesive Materials
T. Roch, M. Lebihain, J. Molinari*

06/06/2024 | 17:00 - 19:00 **Towards Digital Twins for Infrastructures III**	MS073C Room: 1.09 Chaired by: Dr. Ines Wollny (Technische Universität Dresden , Germany) , Mr. Max von Danwitz (German Aerospace Center , Germany)

Consideration of Realistic Soil Behaviour in Road Structures: A Numerical Investigation on the Cyclic Interaction between Road Struture and Subsoil
S. Ullmann, I. Herle*

Towards Digital Twins of Bridges Using Bridge Weigh-in-Motion Data
D. Hekič, P. Češarek, A. Žnidarič, A. Anžlin*

Homogenized Lattice Boltzmann Methods for City-Scale Flow Simulations in Digital Twins
D. Teutscher, F. Bukreev, S. Simonis, M. Krause*

Contaminant Dispersion Simulation in a Digital Twin Framework for Critical Infrastructure Protection
M. von Danwitz, J. Bonari, P. Franz, L. Kühn, M. Mattuschka, A. Popp*

Acoustic wave analysis and its auralization using VR technology
K. Kashiyama, H. Miyauchi, H. Yoshikawa*

06/06/2024 | 17:00 - 19:00 **Advances in Modeling Hydrogen-Assisted Fracture Phenomena I**	MS197A Room: 1.10 Chaired by: Prof. Emilio Martinez-Pañeda (University of Oxford , United Kingdom)

Towards the quantification of hydrogen-microstructure interactions using full-field models
A. Hussein, K. Verbeken, T. Depover*

Computational assessment of structural integrity of welded joints in hydrogen transport pipelines
T. Mandal, J. Parker, M. Gagliano, E. Martinez-Paneda*

A Variational Method for the Simulation of Hydrogen Diffusion in Metals
*E. Andrés, I. Romero**

Numerical Simulation of the Welding Process and Phase Field modelling of the Fracture behavior of X80 steel Welded Pipes in the presence of Hydrogen
L. Castro García, Y. Navidtherani, C. Betegón Biempica, E. Martínez Pañeda*

06/06/2024 | 17:00 - 19:00 **New Trends for Improving the Large-Scale Simulation of Wave Propagation II**	MS129B Room: 1.11 Chaired by: Dr. Stefano Frambati (TotalEnergies , France) , Prof. Rabia Djellouli (California State University Northridge , United States)

Frequency-explicit stability estimates for time-harmonic elastodynamic problems in nearly incompressible materials
*T. Chaumont-Frelet, S. Nicaise**

A Galerkin Method with Microlocalised Shape Functions to Solve High-Frequency Helmholtz Problems
*T. Chaumont-Frelet, V. Dolean, M. Ingremeau, F. Proust**

Comparison of high order time integration schemes for second order acoustic wave equations in GPU-CPU simulation
*A. Citrain, S. Frambati, I. Ibrahim, M. N'diaye**

Model Order Reduction Techniques for the Prediction of Railway Induced Vibration
A. Pashov, S. François, G. Degrande*

New Stabilization of Hybridizable Discontinuous Galerkin discretization for anisotropic wave equation in Voigt notation
H. Barucq, F. Faucher, H. Pham*

06/06/2024 | 17:00 - 19:00 **Reduced Order Models and Artificial Intelligence for Industrial Applications II**	MS140B Room: 1.12 Chaired by: Dr. Michele Giuliano Carlino (ONERA , France) , Dr. Nicola Ferro (Politecnico di Milano , Italy)

Numerical Design of Engineering Components and their Production Processes
S. Elgeti, J. Lee*

Application of Graph Neural Networks to Predict Hydrogen Explosions in Congested Environments
G. Covoni, V. Tagarielli, F. Montomoli, V. Bisio, S. Rossin, M. Ruggiero*

Turbulent modeling from sparse measurements through a combination of data assimilation and Machine Learning
R. Villiers, V. Mons, D. Sipp, E. Lamballais, M. Meldi*

Uncertainty-aware Transonic Flow Predictions with Bayesian Deep Learning
M. Anhichem, S. Timme, J. Castagna, A. Peace, M. Maina*

Evaluating the Probability of Infection in a UK Hospice through CFD Data Driven AI
*M. Elsarraj**

Accurate extrapolations of formation energy from binary to ternary solid solution alloys using graph neural networks
M. Lupo Pasini, G. Samolyuk, J. Choi, Y. Yang*

06/06/2024 | 17:00 - 19:00 **Electromagnetic Problems Arising in Industry: Modelling and Numerical Techniques III**	MS171C Room: 1.13 Chaired by: Ms. Dolores Gómez (Universidade de Santiago de Compostela , Spain) , Dr. Idoia Cortes Garcia (Eindhoven University of Technology , Netherlands)

Mathematical and numerical analysis of an axisymmetric thermoelectrical problem
*D. Gómez, B. López-Rodríguez, P. Salgado, P. Venegas**

Study and numerical solution of the UC-ACOPF problem
D. Gómez, A. Ríos-Alborés, P. Salgado*

Time Parallelization of Field-Circuit Coupled Simulations with Micro-Macro Parareal
M. Wiesheu, S. Schöps, I. Cortes Garcia*

06/06/2024 | 17:00 - 19:00 **Hydrogen Underground Storage (HUGS) II**	MS030B Room: 1.14 Chaired by: Dr. Jose Paris (University of A Coruña , Spain) , Dr. Luis Cueto-Felgueroso (Universidad Politécnica de Madrid , Spain)

Compositional Modelling of Hydrogen Storage in Aquifers and Underground Natural Gas Storage Facilities
L. Cueto-Felgueroso, G. Giacomi, M. Dentz, E. Abarca*

Multirate Numerical Approach for Coupled Flow and Deformation in Heterogeneous Fractured Media
*S. Andrés, M. Dentz, L. Cueto-Felgueroso**

Hydrogen Underground Storage Simulations of Multiphase Flows Using Equations of State that Preserve the Correct Surface Tension
J. Fernández-Fidalgo, L. Cueto-Felgueroso, L. Ramírez, A. Martínez, X. Nogueira*

Spreading and mixing of hydrogen in heterogeneous porous media
A. Fernandez Visentini, L. Cueto-Felgueroso, J. Hidalgo, M. Dentz*

Numerical analysis of geomechanical constraints on Underground Hydrogen Storage in aquifers and depleted gas reservoirs.
J. Bastias, L. Cueto, D. Santillan*

06/06/2024 | 17:00 - 19:00 **Emerging Trends in Model Reduction for Nonlinear Mechanics Problems I**	MS093A Room: 1.15 Chaired by: Prof. Shobhit Jain (TU Delft , Netherlands) , Prof. Mingwu Li (Southern University of Science and Technology , China)

Data-Driven Nonlinear Model Reduction to Spectral Submanifolds (Keynote Lecture)
*G. Haller**

Data-Driven Extraction of Intrinsic Dynamics for Control of Continuum Robots
J. Alora, M. Cenedese, G. Haller, M. Pavone*

Model Reduction on Manifolds: A differential geometric framework
P. Buchfink, S. Glas, B. Haasdonk, B. Unger*

Solving vibration control of high-dimensional nonlinear mechanical systems as linear control of low-dimensional reduced-order models via invariant manifolds
*M. Li**

Reduced Order Modelling Of Electro-Mechanical Microsystems Through Invariant Manifolds
A. Frangi, A. Colombo, A. Vizzaccaro, C. Touze*

06/06/2024 | 17:00 - 19:00 **Multiscale Modeling of Vascular Growth and Remodeling II**	MS211B Room: 2.01 Chaired by: Prof. Claudio Chiastra (Politecnico di Torino , Italy) , Dr. Anna Corti (Politecnico di Milano , Italy)

Fluid-solid computational model of arteries with in-stent restenosis
A. Ranno, K. Manjunatha, T. Koritzius, S. Nerzak, F. Vogt, S. Reese, M. Behr*

Post-EVAR damage-induced growth and remodelling in common iliac arteries
I. Tagiltsev, C. Gasser, J. Roy, P. Wriggers*

On the Modeling of Left Atrial Appendage Inversion: a Reverse Growth Analysis
R. Scuoppo, S. Pasta*

Effect of the Carotid Geometry on the Onset of Atherosclerotic Plaques
M. Salvetti, J. Singh, K. Capellini, A. Mariotti, S. Celi*

06/06/2024 | 17:00 - 19:00 **Exploring New Avenues for the Interaction of Numerical Methods for PDEs and Deep Learning II**	MS191B Room: 2.02 Chaired by: Prof. Kent-Andre Mardal (University of Oslo / Simula Research Laboratory , Norway) , Mr. Paolo Zunino (MOX, Department of Mathematics, Politecnico di Milano , Italy)

Neural Operator Surrogates for Elliptic PDEs
C. Marcati, C. Schwab, J. Zech*

Neural latent dynamics models
S. Fresca, N. Farenga, A. Manzoni*

A non-intrusive mesh-free surrogate model to address geometrical variability in patient-specific hemodynamics
R. Tenderini, L. Pegolotti, A. Marsden, S. Deparis*

PoroTwin: Digital twins and machine learning for laboratory-scale porous media
E. Keilegavlen, E. Fonn, K. Johanessen, K. Eikehaug, J. Both, M. Fernø, T. Kvamsdal, A. Rasheed, J. Nordbotten*

Physics Informed Neural Networks for a Peridynamic Inverse Problem
F. Difonzo, L. Lopez, S. Pellegrino*

An Experimental Analysis of effects of different Training Methods for the Accuracy and the Computational Cost of PINNs
*F. Colace, D. Conte, A. Lorusso, G. Pagano, B. Paternoster, C. Valentino**

06/06/2024 | 17:00 - 19:00 **Advances in Fluid Dynamics II**	GS003B Room: 2.03

Local Immersed Boundary Method on body-conformal grids for the capture of geometrical features in aerodynamic simulations
R. Nkenfack Soppi, F. Basile, S. Péron, M. Lagha, I. Hammani*

Hybrid Rans-Les Computational Modeling Of Liquid Droplet Aerobreakup
V. ROSSANO, G. DE STEFANO*

Mean Adaptive Mesh Refinement for Efficient CFD Simulations with Operating Conditions Variability
H. Dornier, O. Le Maître, P. Congedo, S. Bourasseau, I. Salah el Din, J. Marty*

Numeric Comparison of Hydraulic and Pneumatic Flow Forces and Velocities in a Proportional Solenoid Valve
J. Daehn, A. Wierschem, E. Ultsch*

Numerical investigations of the artificial speed of sound approach for compressible low-Mach number flows
V. Courtin, J. Boniface*

06/06/2024 | 17:00 - 19:00 **Advances in Numerical Methods for Shallow Water Equations and its Applications I**	MS215A Room: 2.04 Chaired by: Phd. Elena Bachini (University of Padua , Italy) , Mr. Marco Fois (Polytechnic of Milan , Italy)

2-D Depth-averaged floating debris-flow model using smoothed particle hydrodynamics (SPH) for floods and tsunamis
B. ROGERS, A. BOTTACIN-BUSOLIN, M. ASLAMI, P. STANSBY*

Monolithic Shallow Water Model Coupling Advancements in the Adaptive Hydraulics Software Suite
C. Trahan, G. Choudhary, M. Farthing*

An Efficient Depth Averaged Material Point Method Applied to Shallow Water Equations for Landslide Simulations
M. Fois, C. de Falco, L. Formaggia*

Efficient Numerical Schemes for Depth-integrated Landslide Runout Models
F. Gatti, C. de Falco, S. Perotto, L. Formaggia*

Using PINNs to solve Shallow Water Equations
E. Miglio, R. Anelli*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

Tuesday	10:30 - 12:30	14:30 - 16:30
Auditorium I	MS141A	MS141B
Auditorium II	MS162G	
Auditorium III	MS075A	MS075B
Auditorium IV	MS077A	MS077B
Auditorium VI	MS084A	MS084B
Auditorium VII	MS053A	MS053B
Auditorium VIII	MS051B	MS062A
Terrace	MS185C	MS092A
Room 3A	MS063C	MS063D
Room 3B	MS054C	MS054D
Room 3C	MS098D	MS025A
Room 5A	MS150D	MS071A
Room 5B	MS188C	MS188D
Room 5C	MS136A	MS136B
Room 0.06	MS091A	MS128A
Room 0.07	STS248A	
Room 0.08	STS245A	STS245B
Room 1.02	MS087B	MS087C
Room 1.03	MS219C	MS173A
Room 1.04	MS078B	MS078C
Room 1.05	MS037A	MS212A
Room 1.06	MS125C	MS109A
Room 1.07	MS006A	MS006B
Room 1.08	MS003C	
Room 1.09	MS241A	MS241B
Room 1.10	MS145A	MS145B
Room 1.11	MS132A	MS132B
Room 1.12	MS221A	MS221B
Room 1.13	MS117A	MS117B
Room 1.14	MS169A	MS169B
Room 1.15	MS093B	MS093C
Room 2.01	MS123A	MS123B
Room 2.02	MS097A	MS097B
Room 2.03	GS003C	
Room 2.04	MS215B	

Friday, June 7th

07/06/2024 | 08:30 - 09:15 **Communications**	COM Room: Auditorium I Chaired by: Prof. Jose Cesar de Sa (INEGI/FEUP , Portugal)
Scientific opportunities in digital twins *R. Lohner*, H. Antil*	

07/06/2024 | 09:15 -10:00 **Plenary Session VIII**	PL08 Room: Auditorium I Chaired by: Dr. Michael Kaliske (Technische Universität Dresden , Germany)
Design of Composite Materials and Structures Across the Scales: Physical and Data-driven Models *P. Camanho**	

10:00 - 10:30
Coffee Break

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

10:30 - 12:30 | TECHNICAL SESSIONS

07/06/2024 | 10:30 - 12:30 **Electrohydrodynamic and Beyond I**	MS141A Room: Auditorium I Chaired by: Dr. Mohammadmahdi Abdollahzadehsangroudi (Universidade da Beira Interior , Portugal) , Prof. Frederico Rodrigues (Universidade da Beira Interior , Portugal)

Flow Manipulation Strategies: Detached Eddy Simulation Study of DBD Plasma Actuators in a Bluff Body Burner
F. Bagherighajari, M. Esmailpour, J. Páscoa, M. Abdollahzadehsangroudi*

Numerical Investigation of Electrostatic Coating Using Nitrotherm Spray Technique
A. Benmoussa, M. Pendar, J. Páscoa*

Advancements in EHD-Printing Simulation within OpenFOAM
J. Liedtke, C. Mehring*

Axial Magnetic Control on Turbulent Vortices and Nanopowder Cloud in a Thermal Plasma Jet System
*M. Shigeta**

07/06/2024 | 10:30 - 12:30 **Novel Methods and Algorithms in Topology Optimization: Bridging Design, Materials, Simulations, and Manufacturing VII**	MS162G Room: Auditorium II Chaired by: Dr. Nicola Ferro (Politecnico di Milano , Italy) , Dr. Matteo Giacomini (CIMNE - Universitat Politècnica de Catalunya, Barcelona , Spain)

Optimal Design of Cone Support Layouts for Thermal Displacement Reduction in Selective Laser Melting
C. Mommeyer, S. Cornelissen, T. Craeghs, H. Debaere, D. Deferm, M. Schevenels, G. Lombaert*

A geometric approach for controlling local overheating in topology optimization for additive manufacturing
M. Das, R. Ranjan, K. Wu, J. Wu, C. Ayas*

Multi-Planar Material Deposition Optimization for Metal Additive Manufacturing
V. Mishra, J. Wu*

Proper Generalized Decomposition for Topology Optimization of Problems with Separable Geometry
T. Pauwels, G. Degrande, M. Schevenels*

New Developments in Topology Optimization Using Computer Graphics and Machine Learning Techniques
A. Kawamoto, C. Yuhn, Y. Sato, H. Kobayashi, T. Nomura*

Design Domain Distribution for Topology Optimization using Machine Learning
F. Endress, S. Sergi Pagés i Diaz, M. Zimmermann*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

07/06/2024 | 10:30 - 12:30 **Recent Advances in Deep Reinforcement Learning of Complex Dynamical Systems I**	MS075A Room: Auditorium III Chaired by: Dr. Nicolò Botteghi (University of Twente , Netherlands) , Phd. Stefania Fresca (Politecnico di Milano , Italy)

Reinforcement Learning of Active Aerodynamics in Wind Tunnel Environments
*G. Rigas**

Turbulent separation bubble control using deep reinforcement learning in pre-exascale machines
B. Font, F. Alcántara-Ávila, J. Rabault, R. Vinuesa, O. Lehmkuhl*

SINDy-RL: Interpretable and Efficient Reinforcement Learning
N. Zolman, U. Fasel, N. Kutz, S. Brunton*

Optimizing Thermal Control in Pulsating Jets through Deep Reinforcement Learning
S. Salavatidezfouli, G. Stabile, G. Rozza*

Distributed Control of Partial Differential Equations Using Convolutional Reinforcement Learning
S. Peitz, J. Stenner, V. Chidananda*

A proposal of coupling deep reinforcement learning and high-fidelity fluid simulation in separation controls over an airfoil
K. Tan, K. Asada, T. Tatsukawa, K. Fujii*

07/06/2024 | 10:30 - 12:30 **Efficient Spline Methods for Complex (Iso) Geometric Modeling and Simulation I**	MS077A Room: Auditorium IV Chaired by: Prof. Alessandro Reali (University of Pavia , Italy)

Isogeometric methods for high order problems with C^1 hierarchical spline spaces on multipatch geometries (Keynote Lecture)
C. Bracco, A. Farahat, C. Giannelli, M. Kapl, A. Reali, M. Torre, R. Vàzquez*

Adaptive Local Bezier Projection for THB-Splines
K. Dijkstra, D. Toshniwal*

New insights into the variational isogeometric collocation method
M. Möller, M. Vorechovsky*

Graded isogeometric mesh refinement towards corners of singularly parametrized domains
P. Zilk, T. Apel*

A Unified Framework for Advanced Spline Constructions in Isogeometric Analysis
H. Verhelst, C. Giannelli*

07/06/2024 | 10:30 - 12:30 **Data-Enhanced Reduced Order Modeling I**	MS084A Room: Auditorium VI Chaired by: Dr. Marco Tezzele (University of Texas at Austin , United States) , Dr. Romit Maulik (Argonne National Laboratory , United States)

Neural Empirical Interpolation Method for Nonlinear Model Reduction
M. Hirsch, F. Pichi, J. Hesthaven*

Hybrid Autoencoder/Galerkin approach for nonlinear reduced order modelling
N. Lepage, S. Beneddine, C. Fiorini, I. Mortazavi, D. Sipp, N. Thome*

Flow Control with Data-Driven Approaches
A. Corrochano, S. Le Clainche*

Physics-based, non-intrusive modeling for systems with spatially localized behavior through reduced/full-order model coupling
L. Gkimisis, N. Aretz, M. Tezzele, P. Benner, T. Richter, K. Willcox*

Approximation of acoustic black holes with finite element mixed formulations and artificial neural network correction terms
A. Fabra, O. Guasch, J. Baiges, R. Codina*

Distances between Proper Orthogonal Decomposition Reduced Subspaces of Repeating Subdomains
S. Ruan, J. Yanez, A. Class*

07/06/2024 | 10:30 - 12:30
Advances In Modelling and Simulation for High-Speed Aerodynamics I

MS053A
Room: Auditorium VII
Chaired by:
Dr. Jian Fang (STFC, Daresbury Laboratory , United Kingdom) , Dr. Benzi John (STFC , United Kingdom)

Wall Cooling Effects in High-Speed Turbulent Boundary Layers at High Reynolds Number
G. Della Posta, M. Cogo, F. Picano, M. Bernardini*

Large eddy simulation on compressible multi-component flow for the effect of hydrogen injection
V. badrkhani, T. Karpowski, A. Scholtissek, C. Hasse*

Assessment of a CFD Solver Implementing H2/He State-to-State Kinetics for Gas and Ice Giants Entry Conditions
D. Ninni, F. Bonelli, G. Colonna, G. Pascazio*

Studies on Effect of Interaction of Coaxial Jets on Thrust of Air-breathing Rocket
T. Sawada, A. Oyama, Y. Maru, H. Manako*

Analysis of the effect of the inflow boundary layer on a cavity-stabilised premixed flame in a model scramjet combustor using direct-numerical simulations
M. Lin, J. Fang, X. Deng, X. Gu, Z. Chen*

Flow Instability in a Multistage Axial-centrifugal Combined Compressor
C. Tian, S. Fu*

07/06/2024 | 10:30 - 12:30
Data-Driven Simulation of Flow and Multi-Physics Problems II

MS051B
Room: Auditorium VIII
Chaired by:
Prof. Alvaro Coutinho (COPPE/Federal University of Rio de Janeiro , Brazil)

Turbidity Currents Simulations in Channels with Different Slopes Using ROM-NN Models
R. Velho, A. Côrtes, G. Barros, J. Camata, G. Guerra, R. Elias, F. Rochinha, A. Coutinho*

AI Model to Predict in-situ Relative Permeability of Rock Formation
*S. Zhong, X. Ge, H. Thomas, C. Li**

The Role of Provenance Data in Physics Informed Machine Learning
*L. Oliveira, D. Pina, L. Kunstmann, D. Oliveira, M. Mattoso**

Implicit Neural Representation For Accurate CFD Flow Field Prediction
L. de Vito, N. Pinnau, S. Dey*

A Novel Data-based Strategy for RANS Wall Models Inspired from Dirichlet-to-Neumann Map
M. Romanelli, S. Beneddine, I. Mary, H. Beaugendre, M. Bergmann, D. Sipp*

Field-inversion analyses for machine-learning applications of compressible RANS computations in a discontinuous Galerkin framework
B. Fanizza, P. Stefanin Volpiani, F. Renac, D. Sipp*

A machine learned near-well model in OPM
P. von Schultzendorff, J. Both, J. Nordbotten, T. Sandve, B. Kane, D. Marban*

07/06/2024 | 10:30 - 12:30
Modelling and Simulation of Welding and Wire Arc Additive Manufacturing Processes III

MS185C
Room: Terrace
Chaired by:
Dr. Josselin DELMAS (Électricité de France R&D , France)

ABSTRACT TITLE Combining Phase Field Modeling and Deep Learning for Accurate Modeling of Crystal Orientation in Solidification Microstructure obtained by Wire Arc Additive Manufacturing
*A. Herbeaux, H. Aboleinein, E. Durand, A. Villani, C. Maurice, J. Bergheau, H. Klöcker**

Thermomechanical Finite Element Macroscopic Model to Estimate the Impact of Grinding Model on Welding Residual Stresses
A. Michon, D. Nélias, A. Platzer, S. Hendili, J. Delmas, M. Berthaud*

Improvements in 16MND5 phase transformation for welding or WAAM modelling
A. Brosse, F. Gommez, M. Yescas, N. Sallez*

Virtual Calibration Procedure for Welded Aluminium Connections
S. Aune, D. Morin, M. Langseth, O. Myhr, A. Clausen*

07/06/2024 | 10:30 - 12:30
Robust and Scalable Solvers in HPC: Recent Developments and Future Challenges III

MS063C
Room: 3A
Chaired by:
Dr. Nicolas Barnafi (Pontificia Universidad Católica de Chile , Chile)

PINA: a PyTorch Framework for Deep Differential Equation Learning for Research and Production Environments
D. Coscia, N. Demo, G. Rozza*

Innovating Linear System Solutions in Fluid and Solid Mechanics through Randomized Algorithms
*Y. Mesri**

Getting high order sharp interface methods ready for HPC
*F. Kummer**

Accelerating the FlowSimulator: Mixed Precision Linear Solvers in Industrial Grade CFD
J. Wendler, I. Huismann, O. Krzikalla, A. Rempke*

Investigation of Polynomial Smoothing Using Chebyshev Polynomials
M. Čorak, T. Uroić, H. Jasak*

Efficient high-fidelity simulations for the energy transition using ARM and x86 64 architectures
*A. Anciaux-Sedrakian, R. Gayno, T. Guignon, A. Mohamed El Maarouf**

07/06/2024 | 10:30 - 12:30
Advances in Computational Techniques for Fracture III

MS054C
Room: 3B
Chaired by:
Dr. Michael Kaliske (Technische Universität Dresden , Germany) , Prof. Christopher Larsen (WPI , United States)

A computational framework for two- and three-dimensional discrete crack propagation and crack path prediction using cohesive zone model
K. Daadouch, V. Gudžulić, G. Meschke*

Fracture propagation analysis through Hybrid Equilibrium Element Formulation with Adaptive Element-Side Orientation
F. Parrinello, S. Lo Franco, G. Borino*

Objective Numerical Evaluation of Quasi-Brittle Fracture via Adaptive Mesh and Formulation Refinement
G. Barbat, M. Cervera, H. Venghaus, C. Moreira, M. Chiumenti*

Hyperbolic modeling of gradient damage and one-dimensional finite volume simulations
N. Favrie, A. renaud, D. kondo*

A Discontinuous Galerkin / Cohesive Zone Model Computational Framework for Fracture in Slender Beams
S. Kota, S. Kumar, B. Giovanardi*

Mixed finite elements for crack propagation
C. Runcie, A. Shvarts, L. Kaczmarczyk, C. Pearce*

07/06/2024 | 10:30 - 12:30
Reconciling Physical Fidelity, Robustness and Efficiency in Computational Fluid Dynamics IV

MS098D
Room: 3C
Chaired by:
Prof. Gennaro Coppola (, Italy) , Phd. Nicolas Valle (Technische Universiteit Delft , Netherlands)

A Generic Adaptive Mesh Refinement Criterion for Solving Turbulence in Unstationary Systems: Application to H2 Industrial Safety
M. Dagois, C. Mehl, O. Colin, P. Sagaut*

Zonal Time-stepping Method for Multi-scale Unsteady Simulations within an Industrial CFD Code
*C. Le Touze**

A Low Mach Asymptotic Preserving Pressure Correction Scheme for (Viscous and Inviscid) Compressible Flows with MUSCL-like Convection Fluxes
T. Harbreteau, R. Herbin, J. Latché, C. Perrin*

Extension of a Face-Based Cut-Cell Inspired 2D Immersed Boundary Method to 3D flows
Y. Jha, K. Madabushi, S. Ghosh*

Large-Scale Parallel Mesh Adaptation for High-Order Discontinuous Galerkin Methods Applied to Scale-Resolving Simulations
O. Coulaud, A. Rocca, T. Toulorge*

A Thorough Analysis of Deflation Techniques Applied to CFD: from RPM to BoostConv and Beyond
J. Kalfoun, G. Pierrot, J. Cagnol*

07/06/2024 | 10:30 - 12:30
Advances and Applications in Meshfree, Particle, and Peridynamic Methods IV

MS150D
Room: 5A
Chaired by:
Prof. Jiun-Shyan Chen (University of California, San Diego , Virgin Islands, USA) , Prof. Martin Berzins (University of Utah , United States)

Peridynamic Modeling of Dynamic Fracture of Brittle Ceramics in a SHPB (Keynote Lecture)
*G. Gazonas**

Enhancing Computational Performance in Bond-Based Peridynamic Models through a Multi-Adaptive Framework
G. Ongaro, A. Shojaei, F. Mossaiby, A. Hermann, C. Cyron, P. Trovalusci*

Piezoresistive Deformation and Damage Sensing in Energetic Material Under Vibration and Impact Loads via Peridynamics
*G. Seidel**

Peridynamics Simulation of Wave Isolation in Metamaterials
S. -, P. Roy*

A 3D Particle Model For Reinforced Concrete Fracture Aanalysis
N. Monteiro Azevedo, M. Braga Farinha, S. Oliveira*

07/06/2024 | 10:30 - 12:30 **Exploring novel applications and advances in lattice Boltzmann methods III**	MS188C Room: 5B Chaired by: Dr. Alessandro De Rosis (University of Manchester , United Kingdom)

Recent advances in LBM modeling of reactive flows (Keynote Lecture)
P. Boivin, S. Zhao*

Key Components for Efficient High Re Flow Simulations Around an Airfoil Using LBM
J. Gericke, K. Stahl, H. Klimach, S. Roller*

Mesh refinement on GPU for lattice Boltzmann methods: Application to subsonic and supersonic flow simulations
C. Coreixas, K. Thyagarajan, J. Latt, X. Shan*

Design of Optimal Drying of Porous Media in Isothermal and Non-isothermal ConditionsDITIONS USING LBM
*F. Linlin, D. Derome, J. Carmeliet**

A Flexible Massively Parallel Library for Differentiable Lattice Boltzmann
M. Ataei, O. Hennigh, M. Meneghin, H. Salehipour*

The Coupling Scheme of FVM and GPU-accelerated LBM for Complex Geometries
R. Wang, M. Camps Santasmasas, A. De Rosis, A. Skillen, P. Ouro, A. Revell*

07/06/2024 | 10:30 - 12:30 **Recent advances in computational stochastic mechanics I**	MS136A Room: 5C Chaired by: Prof. George Stefanou (Aristotle University of Thessaloniki , Greece) , Prof. Marcin Kamiński (Lodz University of Technology , Poland)

Finite Volume Method in determination of Shannon entropy in some Navier-Stokes problem with uncertainty
M. Kamiński, R. Ossowski*

A finite element method for nonlinear stochastic diffusion equations with fluctuating sources
P. Martínez Lera, M. De Corato*

Strength Estimation of a Unidirectional Fiber Reinforced Composite Plate under Transverse Loading considering Random Fields of Correlated Local Strength and Apparent Elastic Property
S. Sakata, K. Shirahama, G. Stefanou, Y. Arai, S. Araki*

Non-linear Dynamical Response of the Guy Line in the Guyed Tower to Stochastic Seismic Excitation
H. Weber, R. Iwankiewicz*

**07/06/2024	10:30 - 12:30** **Recent Developments in Model Order Reduction for Cardiovascular Modeling I**	MS091A Room: 0.06 Chaired by: Dr. Pasquale Claudio Africa (SISSA International School for Advanced Studies , Italy) , Dr. Michele Girfoglio (SISSA, Trieste , Italy)

Bridging Scientific Machine Learning methods with physics-based models in Computational Cardiology
F. Regazzoni, S. Pagani, M. Salvador, L. Dede', A. Quarteroni*

Machine learning and statistical shape modelling for real-time prediction of stent deployment in realistic anatomies
B. Bisighini, M. Aguirre, B. Pierrat, S. Avril*

Efficient Reduced Order Modeling for Coupled Problems in Cardiac Electrophysiology
E. Zappon, A. Manzoni, A. Quarteroni*

Taming the Computational Burden: PBDW for Efficient State Estimation
F. Mantegazza, F. Caforio, E. Karabelas*

Constructive non-linear model order reduction for parametric Fluid-Structure Interaction in uncertain and moving domains.
D. Lombardi, M. Fernandez, S. Riffaud*

Comprehensive risk assessment of patients following type-A aortic dissection surgery: A shape analysis and machine learning approach
J. Reddy, T. Watanabe, T. Hayashi, H. Suito*

A non-overlapping optimization-based domain decomposition approach to component-based model reduction of incompressible flows
L. Zhang, T. Taddei, X. Xu*

**07/06/2024	10:30 - 12:30** **Aerodynamic Shape Optimisation for Reducing Aircraft Emission and Increasing Wind Turbine Efficiency I**	STS248A Room: 0.07 Chaired by: Prof. Ning Qin (University of Sheffield , United Kingdom) , Prof. Chunling Zhu (Nanjing University of Aeronautics and Astronautics , China)

Meso-microscale coupled modelling of wind resource over complex terrain wind farm
Y. Song, G. Ma, N. Zhao, L. Tian*

Manifold-guided multi-objective optimization for supersonic aircraft shape design
*Z. Tang**

Unsteady Numerical Simulation of Icing Process on Oscillating Airfoils
*C. Tian, W. Guo, N. Zhao, C. Zhu**

Parameter Reduction for Adjoint Based Aerodynamic Shape Optimisation of Gas Turbine Tips
*G. Ye, N. Qin**

Euler-Lagrangian Method of SLD droplet collection efficiency calculation based on particle parallelism
*W. Xie, Q. Bian, C. Zhu**

Recent progress in high-order WENO schemes with arbitrary linear weights for inviscid and viscous compressible flow
*Z. Wang, J. Zhu, L. Tian, N. Zhao**

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

07/06/2024 | 10:30 - 12:30 **Prospects for Green Aircraft: Critical Technologies and Operational Aspects driving Overall Design I**	STS245A Room: 0.08 Chaired by: Mr. Luis Campos (Universidad de Lisboa , Portugal)

THE EFACA On Environmentally Friendly Aviation
L. Campos, P. Serrão, J. Marques*

Design of Hybrid Regional Airliner
S. Fil, D. Berbenets, A. Khaustov, O. Urban, O. Bondarchuk*

Design of a hybrid turbo-electric propulsion (HTEP) with fuel cells for a regional aircraft with 80 seats. Demonstration and verification of some solutions for HTEP.
M. Kirichkov, S. Dmytriyev, O. Yelanskiy, I. Kravchenko*

Review of liquid hydrogen tanks for short- and medium-haul aircrafts
D. Terlizzi, A. Bamoshmoosh, G. Valenti*

Cooing Design and Fefrigerant Selection of an Aviation PEM Fuel Cell System
*X. Gao**

07/06/2024 | 10:30 - 12:30 **Stable FE Methods for Challenging Problems in Engineering and Science II**	MS087B Room: 1.02 Chaired by: Prof. Eirik Valseth (Norwegian University of Life Sciences , Norway)

Variational Multiscale Method Derived from an Adaptive Stabilized FEM for Mineral Flow Deposition in Highly Anisotropic and Heterogeneous Porous Media
J. Giraldo, V. Calo*

Efficient variational three-field reduced order modeling for nearly incompressible materials
M. Shamim, S. Wulfinghoff*

Polytopal templates and mappings for the unified construction of tensor-valued finite element spaces on triangulations
A. Sky, J. Hale, A. Zilian*

Automatic Variationally Stable FE Analyses and Goal-Oriented Error Estimation of Convection-Dominated BVPs
A. Romkes, E. Valseth*

Mean zero artificial diffusion for stable finite element approximation of convection in cellular aggregate formation
S. Firooz, D. Reddy, V. Zaburdaev, P. Steinmann*

07/06/2024 | 10:30 - 12:30 **Leveraging Machine Learning Algorithms for Efficient Optimization III**	MS219C Room: 1.03 MS Corresponding Organizer: Phd. M. Giselle Fernández-Godino (Lawrence Livermore National Laboratory)

Automatic Differentiation in Dynamic Topology Optimization
K. Korner, W. Schill, J. Belof, J. Andrej, T. Kolev, R. Rieben, B. Talamini, M. Tupek, D. White, D. Tortorelli*

Automating Inverse Problems: A Differentiable Inverse Finite Element Solver for Elastography
A. Awasthi, P. Mahajan, A. Suri, S. Roy*

Risk Management of Multi-component Engineering System with Probabilistic Reinforcement Learning
*Y. Zhang**

07/06/2024 | 10:30 - 12:30 **Learning Differential Equations for Science and Engineering Applications via Scientific Machine Learning II**	MS078B Room: 1.04 Chaired by: Dr. Giovanni Stabile (Sant'Anna School of Advanced Studies , Italy) , Mr. Henrik Rosenberger (Centrum Wiskunde & Informatica , Netherlands)

Graph-Based Machine Learning Approaches for Model Order Reduction
F. Pichi, B. Moya, J. Hesthaven*

Progressive construction of projection-based ROMs for data assimilation
*E. Agouzal, J. Argaud, M. Bergmann, G. Fertè, T. taddei**

Bayesian Learning of Reduced-order Operators with Gaussian Processes
S. McQuarrie, M. Guo, A. Chaudhuri*

A Time-Relaxation Reduced Order Model for the Turbulent Channel Flow
P. Tsai, P. Fischer, T. Iliescu*

07/06/2024 | 10:30 - 12:30 **Simulation and experimental validation of bone-implant-systems in clinical applications I**	MS037A Room: 1.05 Chaired by: Dr. Michael Roland (Saarland University , Germany) , Ms. Kerstin Wickert (Saarland University Applied Mechanics , Germany)

Optimizing Fracture Healing: Examining the Impact of External Influences such as Partial Weight Bearing and Rehabilitation on the Establishment of Perfect Boundary Conditions
A. Andres, M. Roland, K. Wickert, B. Braun, T. Histing, S. Diebels*

Fracture Generation according to AO Classification: Exploring Freeform Software for Biomechanical Simulation and Virtual Reconstruction
K. Wickert, M. Roland, A. Andres, S. Diebels*

Parametric Surrogate Modelling for Implant Stability Assessment
M. Reiber, F. Bensel, Z. Zheng, U. Nackenhorst*

An Image-based Mesh Generation Method for Nonhomogeneous Bio-medical Structures
*M. Lee**

A complete human thorax simulation model to develop patient-specific 3D printed rib implants
W. Krach, A. Gradischar, C. Lebschy*

In-silico study on the influence of implant material on secondary bone healing
G. Nayak, M. Roland, B. Wiese, N. Hort, S. Diebels*

The critical impact of anthropometric parameters on the fracture gap micro-mechanics - a simulation-based study
M. Roland, S. Diebels, B. Boullion, T. Tjardes*

07/06/2024 | 10:30 - 12:30 **Modelling, monitoring and retrofitting strategies of masonry structures in seismic areas III**	MS125C Room: 1.06 Chaired by: Prof. Antonio Formisano (Università di Napoli Federico II , Italy) , Dr. Luis Carlos M. da Silva (Politecnico di Milano , Portugal)

Mesoscale Modeling of Damage Development in Neutron-Irradiated Concrete
J. Zhang, B. Pomaro, G. Mazzucco, B. Dongmo, C. Majorana, V. Salomoni*

An innovative lightweight integrated seismic - energy coating system for the retrofit of a masonry clustered building in Timisoara city (Romania)
G. Longobardi, M. Mosoarca, A. Formisano*

Laboratory Tests and LCA Analysis on Hemp-FRCM for Integrated Retrofit of Masonry Walls
E. Meglio, A. Formisano*

Numerical Analysis of Different Seismic Isolation Systems
K. Guo, G. Milani*

07/06/2024 | 10:30 - 12:30 **Development and Applications of Computational Methods for Digital Twins I**	MS125C Room: 1.07 Chaired by: Dr. Alejandro Jiménez Rios (Oslo Metropolitan University , Norway) , Dr. Rafael Ramirez (University of Minho , Portugal)

Towards the Creation of Synthetic Bridge Digital Twins What-If Scenarios: Study Case and Calibration
A. Jiménez Rios, K. Demirlioglu, V. Plevris, M. Nogal*

A Human-Centric Approach to Modeling a Digital Twin
C. Palmer, R. Grant, Y. Goh, E. Hubbard*

Twinning of Efficient Numerical Strategies for the Structural Integrity Protection of URM Structures
A. Vuoto, S. Szabó, M. Funari, B. Pulatsu, P. Lourenço*

Digital Twin Model of an Early Medieval Church: Entanglement of Historical Studies and Mathematical Methods
E. Babilio, S. Rapuano*

07/06/2024 | 10:30 - 12:30 **Advanced Materials: Computational Analysis of Properties and Performance III**	MS003C Room: 1.08 Chaired by: Prof. Vadim Silberschmidt (Loughborough University , United Kingdom)

Prediction of temperature-dependent thermo-mechanical properties of PCB conductive layers using convolutional neural network
M. Shevchuk, C. Schipfer, P. Fuchs, Q. Tao*

Numerical and analytical evaluation of resin flow during PCB pressing cycles
C. Schipfer, J. Zuendel, Q. Tao, T. Krivec, P. Fuchs*

Inverse analysis for assessing the thermophysical properties of cork at elevated temperatures
A. Bicelli, P. Cantor, M. Arruda, A. Duarte, C. Tiago, F. Branco, J. Trindade*

Advancing Mechanical Metamaterials: A Topology Optimization Approach to Design Excellence
U. Krishnan, R. Chowdhury*

Numerical modeling of interface propagation in elastic solids with stress concentrators
P. Kabanova, A. Freidin*

Computational Modelling of Triboelectric Nanogenerators Considering Surface Roughness
M. Sanglap, C. Kumar, I. Athanasiadis, L. kaczmarczyk, C. Pearce, D. Mulvihill, A. Shvarts*

**07/06/2024	10:30 - 12:30** **Active Programmability and Artificial Intelligence in Mechanical Metamaterials I**	MS241A Room: 1.09 Chaired by: Prof. Susmita Naskar (University of Southampton , United Kingdom)

Tailoring the mechanical responses of metamaterial through a waterbomb-based tubular architecture
A. Sharma, S. Naskar, T. Mukhopadhyay*

On Exploiting Coupled Physical and Artificial Intelligence for Enhancing the Strength of Lattice Metamaterials
B. Isanaka, T. Mukhopadhyay, R. Varma, V. Kushvaha*

Multi-fidelity Machine Learning for Quantifying Uncertainty in the Progressive Damage of Composites
R. Singh Chahar, T. Mukhopadhyay*

On Optimal Placement of Piezoelectric Elements in Active Mechanical Metamaterials
S. Mondal, T. Mukhopadhyay, S. Naskar*

Nano-architected 2D Metamaterials for Enhancing the Mechanical Properties Beyond Conventional Limits
K. Saumya, P. Chakraborty, T. Mukhopadhyay*

**07/06/2024	10:30 - 12:30** **Machine and Deep Learning Techniques Applied to Computational Mechanics I**	MS145A Room: 1.10 Chaired by: Prof. Jorge Belinha (ISEP-INEGI , Portugal) , Prof. Sergio Tavares (Universidade de Aveiro , Portugal)

Implementing a Dual-Phase Machine Learning Strategy to Develop ANN-Based Constitutive Models
A. Tariq, B. Deliktaş*

Variational Physics-Informed Neural Networks for Non-smooth Differential Equations in Solid Mechanics
N. Radin, S. Klinkel, O. Altay*

Physics Informed Neural Networks for hyperelasticty in soft solids
V. Pratap, B. Tripathi*

Solving Forward and Inverse Problems of Solid Mechanics using Variational Physics-Informed Neural Networks
T. Sahin, A. Popp*

Advances in modeling relative permeability curves under salinity effects using artificial neural networks
V. Czarnobay, L. Lamas, D. Sebrão, L. Hegele Jr*

**07/06/2024	10:30 - 12:30** **Recent Advances in Data-Driven Modeling and Uncertainty Quantification of Complex Dynamical Systems I**	MS132A Room: 1.11 Chaired by: Dr. Matthew Farthing (Engineer Research and Development Center , United States)

Data-driven Modeling of Multi-physics Coastal Hydrodynamics using a Deep Neural Operator Framework
S. Dutta, P. Rivera-Casillas, M. Loveland, J. Lee, M. Farthing, C. Dawson*

Transfer learning for inversion of multi-fidelity data in subsurface hydrology
A. Chiofalo, V. Ciriello, D. Tartakovsky*

Multifidelity scientific machine learning
*A. Howard, W. Chen, S. Ahmed, P. Stinis**

Machine Learning-Aided Extended Drag-Based Model to Improve the Estimate of CMEs' Travel Time
M. Rossi, S. Guastavino*

07/06/2024 | 10:30 - 12:30 **Modeling and Artificial Intelligence Decision Support System for Heart Failure I**	MS221A Room: 1.12 Chaired by: Prof. Nenad Filipovic (BIOIRC doo Kragujevac , Serbia) , Ms. Tijana Geroski (Faculty of Engineering, University of Kragujevac , Serbia)

Explainable prediction of hypotension during general anesthesia
B. Aubouin-Pairault, M. Fiacchini, T. Dang, M. Reus*

Predicting Coronary Plaque Vulnerability through a Radiomics-Biomechanics Approach
A. Corti, M. Stefanati, M. Leccardi, P. Cerveri, F. Migliavacca, V. Corino, J. Rodriguez Matas, L. Mainardi, G. Dubini*

Aortic Dissection And The Importance Of Virtual Surgery
I. Saveljic, S. Tomasevic, T. Djukic, D. Nikolic, N. Filipovic*

Parameter Estimation of O'Hara Model for Arrhythmia Modeling Using Genetic Algorithms and Particle Swarm Optimization
B. Milicevic, M. Milosevic, V. Simic, M. Kojic, N. Filipovic*

07/06/2024 | 10:30 - 12:30 **Engineering Design Optimization with the Open-source Software SU2 I**	MS117A Room: 1.13 Chaired by: Dr. nijso beishuizen (Bosch Thermotechnology , Netherlands) , Dr. Lisa Kusch (Eindhoven University of Technology , Netherlands)

Characterization of Discrete Adjoint Solvers in SU2 for Aerodynamic Design Optimization
*H. Patel, J. Alonso, O. Burghardt**

Adjoint-Based Sensitivity Analysis for Multi-Disciplinary Optimization with the Open-Source Software SU2
O. Burghardt, N. Gauger*

Design of Parallel Flow Manifolds using Topology Optimization in Open-Source Software SU2
S. Vermani, L. van der Mark, C. De Servi, N. Anand*

Investigations of Surrogate Modeling Methods for a Distributionally Robust Design Framework
J. Rottmayer, L. Chen, E. Özkaya, N. Gauger*

Data-Driven Aerodynamic Shape Design with Distributionally Robust Optimization Approaches
L. Chen, J. Rottmayer, L. Kusch, N. Gauger, Y. Ye*

Extending the One-Shot Optimization Capabilities in SU2
E. Bunschoten, L. Kusch*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

07/06/2024 | 10:30 - 12:30
Recent Advances in Model Order Reduction of Non-Linear Systems: a Prospective from Early Stage Researchers I

MS169A
Room: 1.14
Chaired by:
Dr. Mattia Manucci (University of Stuttgart , Germany) , Mr. Jonas Nicodemus (University of Stuttgart , Germany)

Model Reduction for Transport-Dominated Systems using Transformed Modes and Gaussian Process Regression
P. Schulze, M. Stoll*

Certifying Bifurcations in ROMs: a Deflated-Greedy Algorithm for Enhanced Accuracy in Nonlinear Parametric PDEs
M. Strazzullo, F. Pichi*

A nonlinear reduced basis approximation of discrete contact problems in crowd motion
*V. Ehrlacher, G. Sambataro**

Data-Driven techniques for spatio-temporal dynamics of Turing and oscillatory type
A. Monti, A. Alla, I. Sgura*

Passivity enforcement via spectral factorization
J. Nicodemus, S. Gugercin, B. Unger*

07/06/2024 | 10:30 - 12:30
Emerging Trends in Model Reduction for Nonlinear Mechanics Problems II

MS093B
Room: 1.15
Chaired by:
Prof. Mingwu Li (Southern University of Science and Technology , China) , Prof. Shobhit Jain (TU Delft , Netherlands)

Nonintrusive Model Reduction of Nonlinear Finite Element Models via Spectral Submanifolds
*S. Jain**

Backbone Curve Optimization using Lyapunov Subcenter Manifolds
M. Pozzi, J. Marconi, S. Jain, F. Braghin*

An efficient physics-based model order reduction technique for nonlinear finite element models with finite strains
P. Babbepalli, J. Remmers, O. Sluis*

Reduced Model Reanalysis – Combining Data-Based Model Reduction and Reanalysis to Accelerate Structural Analysis
A. Strauß, J. Kneifl, J. Fehr, M. Bischoff*

Development of high-fidelity numerical models for 3D printing of patient-specific anatomy
L. Guezou, A. Barbarulo, B. Tie*

PGD-Approximations for Prediction of Evolving Plasticity in Wheel-Rail Contact
C. Ansin, F. Larsson, R. Larsson*

07/06/2024 | 10:30 - 12:30 **Bayesian Inversion for model calibration and digital twinning in engineering I**	MS123A Room: 2.01 Chaired by: Phd. Noemi Friedman (Institute for Computer Science and Control (SZTAKI) , Hungary) , Prof. Bostjan Brank (University of Ljubljana , Slovenia)

Complex inverse analysis of shrinkage-induced deformation and cracking in concrete beams exposed to various drying regimes
D. Šilhánek, A. Kučerová, P. Havlásek*

On Application of Bayesian Model Updating for Buildings and Bridges
*B. Kurent, T. Franković, N. Friedman, U. Bohinc, B. Brank**

Efficient Bayesian Inference for Parametric PDE Inverse Problems using ZigZag Sampling and Approximate Gradients
L. Riccius, I. Rocha, F. van der Meer*

Uncertainty Propagation and Calibration of the Expected Behavior of Constitutive Models
M. Wollner, C. Holzer, A. Caulk, G. Holzapfel*

A Coupling Filter for Sequential State-Parameter Estimation
J. Grashorn, M. Broggi, L. Chamoin, M. Beer*

Identification of Material Parameters in Enhanced Fracture Model with the Embedded Strong Discontinuity
M. Sodan, M. Nikolic, N. Friedman, A. Stanic*

07/06/2024 | 10:30 - 12:30 **Mathematical and Numerical Aspects of Algorithms Related to Computational Electromagnetism I**	MS097A Room: 2.02 Chaired by: Prof. Hiroshi Kawai (Toyo University , Japan) , Dr. Masao Ogino (Daido University , Japan)

GPBi-CG revisited: a hybrid of the CGS method and the GPBi-CG method for nonsymmetric linear systems
*T. Sogabe, S. Zhang**

Preliminary Acceleration on Speeding up ICCG Method for High Frequency Electromagnetic Field Simulation
K. Masui, Y. Koyama, F. Ino*

Study on Improvement of Convergence in Electromagnetic Field Analysis by Hierarchical Domain Decomposition Method
*S. Sugimoto**

Parallel Microwave Analysis Open Source Softwate: ADVENTURE_FullWave
*A. Takei**

07/06/2024 | 10:30 - 12:30 **Advances in Fluid Dynamics III**	GS003C Room: 2.03 Chaired by: Prof. SANG EUI LEE (CHANGWON NATIONAL UNIVERSITY , Republic of Korea)

Influence of vibrational non-equilibrium on non-linear turbulence dynamics in compressible flows
S. SRIVASTAVA, S. SINHA*

Prediction Accuracy of Entropy Generation Mechanisms in a Compressor Cascade
T. Borcherding, H. Witte, C. Bode*

Construction and application of an algebraic dual basis and the Fine-Scale Greens' Function for computing projections and reconstructing unresolved scales
S. Shrestha, J. Dekker, M. Gerritsma, S. Hulshoff, I. Akkerman*

Development of Numerical Modelling Techniques of a Circular Rotating Cylinder at Critical and Supercritical Reynolds Number
S. Lee, B. Lee*

07/06/2024 | 10:30 - 12:30 **Advances in Numerical Methods for Shallow Water Equations and its Applications II**	MS215B Room: 2.04 Chaired by: Mr. Marco Fois (Polytechnic of Milan , Italy) , Phd. Elena Bachini (University of Padua , Italy)

A coupled aproach to the large scale simulation of incompressible flows
A. Montanino, M. Masò, A. Franci*

An Improved Geometrically Intrinsic Lagrangian-Eulerian Formulation For 2D Shallow Water Equations For Spatially Discontinuous Topography
E. Abreu, E. Bachini, J. Pérez, M. Putti*

Barotropic-Baroclinic Splitting for Multi-Layer Rotating Shallow Water Models with Mass Exchange
N. Aguillon, S. Hörnschemeyer, J. Sainte-Marie*

An all-regime solver for unsteady open channel flow in networks through the Junction Riemann Problem
J. Mairal, J. Murillo, P. García-Navarro*

Comparison of the shear shallow flow and shallow moment equations
I. Steldermann, M. Torrilhon, J. Kowalski*

Shear shallow water model : Energy consistent schemes.
B. Nkonga, P. Chandrashekar, A. Bhure*

13:45 - 14:30 | SEMI-PLENARY SESSIONS

07/06/2024 | 13:45 - 14:30 **Isogeometric Analysis: Recent Advances With Applications to Complex and Coupled Problems**	SPL17 Room: Auditorium I Chaired by: Prof. Mats G. Larson (Umea University , Sweden)

Isogeometric analysis: recent advances with applications to complex and coupled problems
*A. Reali**

07/06/2024 | 13:45 - 14:30 **Structure-Preserving Methods for High-Dimensional Problems**	SPL18 Room: Auditorium VIII Chaired by: Mr. Martin Jakob Gander (University of Geneva , Sweden)

Structure-preserving methods for high-dimensional problems
*K. Kormann**

07/06/2024 | 13:45 - 14:30 **Solution of Hyperbolic Problems on Cut Cell Meshes**	SPL19 Room: Auditorium II Chaired by: Prof. Boniface Nkonga (Univ. Côte d'Azur & Inria , France)

Solution of hyperbolic problems on cut cell meshes
*S. May**

07/06/2024 | 13:45 - 14:30 **Modelling the Dynamics of Masonry Structures With Discrete Elements**	SPL20 Room: Auditorium VI Chaired by: Prof. Carlos Pina (LNEC - Laboratório Nacioanal de Engenharia Civil , Portugal)

Modelling the dynamics of masonry structures with discrete elements
*J. de Lemos**

14:30 - 16:30 | TECHNICAL SESSIONS

07/06/2024 | 14:30 - 16:30
Electrohydrodynamic and Beyond II

MS141B
Room: Auditorium I
Chaired by:
Dr. Mohammadmahdi Abdollahzadehsangroudi (Universidade da Beira Interior , Portugal) , Prof. Masaya Shigeta (Tohoku University , Japan)

Numerical study of the water drop behavior in a vertical electric field
A. Martynenko, P. Naderi*

Multi-physical Modelling of Electrohydrodynamic Liquid Jets: Perspectives on Deep Learning Surrogates
S. Cândido, J. Páscoa*

Numerical simulation of vectoring of arc plasma jet using Coanda effect
F. Rodrigues, M. Modanloujoubari, F. Dolati, H. Deylami, J. Pascoa, M. Abdollahzadehsangroudi*

A Novel EHD-Jet System to Achieve High Performance in Terms of Energy Consumption and Heat Transfer
M. Abdollahzadehsangroudi, F. Dolati, F. Hasani, J. Páscoa*

Numerical study of the impact of surface catalycity on the MHD interaction in a hypersonic flow of a blunt body
O. Teixeira, J. Páscoa*

07/06/2024 | 14:30 - 16:30
Recent Advances in Deep Reinforcement Learning of Complex Dynamical Systems II

MS075B
Room: Auditorium III
Chaired by:
Phd. Stefania Fresca (Politecnico di Milano , Italy) , Dr. Nicolò Botteghi (University of Twente , Netherlands)

Conditional Generative Models for Robot Control: new insights and perspectives
F. Califano, N. Botteghi*

Co-design Optimization of Adaptive Structures using Deep Reinforcement Learning
A. Buda, D. Grover, S. Armanini, U. Fasel*

Real-Time Optimal Control of Parametrized Systems by Deep Learning-Based Reduced Order Models
M. Tomasetto, F. Braghin, A. Manzoni*

HydroGym: A Modern Reinforcement Learning Platform for Flow Control
L. Paehler, J. Callaham, S. Ahnert, N. Adams, S. Brunton*

Approximated Bayesian Reinforcement Learning
V. Arnaoutis, B. Rosic*

Matryoshka policy gradient for control problems
M. Han Veiga, F. Ged*

07/06/2024 | 14:30 - 16:30 **Efficient Spline Methods for Complex (Iso) Geometric Modeling and Simulation II**	MS077B Room: Auditorium IV Chaired by: Dr. Matthias Möller (Delft University of Technology , Netherlands)

An isogeometric approach to coupled thermomechanics in 3D via hierarchical adaptivity
M. Carraturo, M. Torre, C. Giannelli, A. Reali*

A channel problem solution based on NURBS
M. Riboli, E. Manconi, R. Garziera*

A Space-Time tensor-product B-spline discretization for Schrödinger Equation
A. Bressan, A. Kushova, G. Sangalli, M. Tani*

Analysis-Suitable Multi-Patch Coupling for Smooth Isogeometric Scaled Boundary Kirchhoff-Love Shells
M. Reichle, J. Arf, B. Simeon, S. Klinkel*

Low-rank multipatch solver for Isogeometric Analysis
M. Montardini, G. Sangalli, M. Tani*

A novel preconditioner for isogeometric analysis for a parabolic optimal control problem in primal formulation
*K. Mardal, J. Sogn, S. Takacs**

07/06/2024 | 14:30 - 16:30 **Data-Enhanced Reduced Order Modeling II**	MS084B Room: Auditorium VI Chaired by: Dr. Marco Tezzele (University of Texas at Austin , United States) , Dr. Romit Maulik (Argonne National Laboratory , United States)

Using the non-intrusive reduced basis method to quantify uncertainties for large-scale multiphysics real-case applications
D. Degen, F. Wellmann*

Data-Driven Reduced Models Using Radial Basis Functions
I. Actor, A. Gruber*

Geometrical Parametrization of the Lower-Limb for Lymphedema Treatment
A. Garcia-Llona, M. Aguirre, S. Avril*

07/06/2024 | 14:30 - 16:30 **Advances In Modelling and Simulation for High-Speed Aerodynamics II**	MS053B Room: Auditorium VII Chaired by: Dr. Benzi John (STFC , United Kingdom) , Dr. Jian Fang (STFC, Daresbury Laboratory , United Kingdom)

FLEW: a DNS solver for compressible flows in generalized curvilinear coordinates
G. Soldati, A. Ceci, S. Pirozzoli*

A node-conservative cell-centered Finite Volume method for solving multidimensional Euler equations over unstructured grids; Part I: construction of the numerical method
P. Maire, R. Loubère, V. Delmas*

A node-conservative cell-centered Finite Volume method for solving multidimensional Euler equations over unstructured grids; Part II: 3D & second-order extensions and validation
V. Delmas, R. Loubère, P. Maire*

High-altitude Study of Rarefied Hypersonic Cavity Flow
B. John, J. Fang, D. Emerson*

Aerothermic performance prediction of a film cooled Nozzle Guide Vane with anisotropic mesh adaptation
A. Remigi, E. Parente, F. Alauzet*

**07/06/2024	14:30 - 16:30** **Machine Learning and Data-Driven Approaches in Railway Dynamics I**	MS062A Room: Auditorium VIII Chaired by: Dr. Araliya Mosleh (Porto University , Portugal) , Dr. Andreas Stollwitzer (TU Wien , Austria)

Data-based verification for mathematical calculation of the damping factor of railway bridges
A. Stollwitzer, J. Fink, L. Bettinelli*

Unsupervised Data-driven Tool for Track Support Conditions Assessment – First Results
J. Morais, A. Meixedo, E. Fortunato, D. Ribeiro, J. Mendes*

Cost Efficient Axle Load Collective Estimation
H. Riedel, M. Rupp, S. Lorenzen, C. Hübler*

Comparison of Data-Driven Output-Only Methods for Damage Detection with a Focus on Deep Learning Algorithms
J. Stähle, T. Heiland, M. Weiel, M. Götz, A. Stark*

Drive-by Monitoring of Railway Bridge Modal Parameters - Comparison of Different Data-Driven Methods Using In-Situ Recorded Data
*M. Reiterer, J. Schellander**

Train speed optimization under punctuality and energy constraints
C. FUNFSCHILLING, G. PERRIN*

**07/06/2024	14:30 - 16:30** **Machine Learning-based Latent-Space Models for Multiscale Simulations I**	MS092A Room: Terrace Chaired by: Dr. Wouter Edeling (Centrum Wiskunde & Informatica , Netherlands) , Dr. Maxime Vassaux (CNRS , France)

Data-assimilation closure for low-dimensional fluid models
S. Ephrati, A. Franken, E. Luesink, B. Geurts*

New Low-Dimensional Closure Models for Turbulence
R. Hoekstra, W. Edeling*

A-priori Energy-Biased Training for the Prediction of Closure Terms of the VMS Navier-Stokes Equations
A. Bettini, S. Hulshoff*

Accelerating Multiscale Modeling of Delamination With a Suite of Surrogate Models
L. Ke, I. Rocha, M. Maia, F. van der Meer*

Active learning of constitutive surrogate models from molecular dynamics simulations
*M. Vassaux**

Identifying active subspaces in molecular dynamics using machine learning
W. Edeling, M. Vassaux, P. Coveney*

**07/06/2024	14:30 - 16:30** **Robust and Scalable Solvers in HPC: Recent Developments and Future Challenges IV**	MS063D Room: 3A Chaired by: Dr. Pasquale Claudio Africa (SISSA International School for Advanced Studies , Italy) , Mr. Nicola Demo (SISSA mathLab, Fast Computing Srl , Italy)

Fast and Robust Simulations for Low-Speed Industrial Flows using a Matrix-free Linear-Implicit Scheme
H. Wüstenberg, S. Sherwin, J. Peiro, D. Moxey*

Fast High-Order Finite Element Solvers on Simplices
P. Brubeck, P. Farrell, R. Kirby*

Arbitrary Order Contact Formulation Tailored for Schur Complement Preconditioners
A. Shvarts, I. Athanasiadis, K. Lewandowski, C. Runcie, R. Williams, A. McBride, P. Steinmann, C. Pearce, L. Kaczmarczyk*

Parallel and Matrix-Free Implementation of the Non-Nested Multigrid Method
M. Feder, L. Heltai, M. Kronbichler, P. Munch*

07/06/2024 | 14:30 - 16:30
Advances in Computational Techniques for Fracture IV

MS054D
Room: 3B
Chaired by:
Prof. Stefan Löhnert (TUD Dresden University of Technology , Germany) , Prof. Sonia Marfia (Sonia Marfia, Associate Professor, University of Roma Tre , Italy)

An Efficient Eigenerosion Framework for Modelling Complex Fracture Patterns and Fragmentation of Tempered Glass
A. Kanan, J. Storm, M. Kaliske*

A Parametric Study on Compressive Failure Modeling of UD Composites Based on Damage Mechanics
K. Hertelendy, R. Larsson, R. Gutkin*

Multiphysics modeling of damage-healing phenomena in brittle elastic solids
L. Salmon, S. Lejeunes, M. Garajeu, V. Blanc*

The Discontinuous Strain Method: Accurately Representing Fatigue and Failure
L. Herrmann, A. Daneshyar, S. Kollmannsberger*

Fully Coupled Dem/Cfd Studies on the Static/Dynamic Response of Partially Saturated Concrete
*M. KRZACZEK, J. TEJCHMAN**

Enhanced total Lagrangian smoothed particle hydrodynamics for fatigue crack growth analysis
*I. Wiragunarsa, L. Zuhal, T. Dirgantara, I. Putra**

07/06/2024 | 14:30 - 16:30
20 Years of Partially-Averaged Navier-Stokes Equations: Progress, Challenges, and Future I

MS025A
Room: 3C
Chaired by:
Dr. Filipe Pereira (Los Alamos National Laboratory , United States) , Dr. Branislav Basara (AVL List GmbH , Austria)

Twenty Years of PANS: Advances and Opportunities
*S. Girimaji**

A Generally Applicable Partially-Averaged Navier-Stokes Scale-Resolving Method
B. Basara, Z. Pavlovic, M. Stipic*

Dynamic versions of PANS capable of mimicking DES and IDDES
C. Friess, L. Davidson*

Seamless Integration of RANS and LES via PANS for Vehicle Aerodynamics
*L. Kutej, B. Basara, S. Jakirlic**

On the Usage of PANS for the CFD Simulation of Wind Turbines
T. Gomes, G. Vaz, A. Maximiano, J. Muralha, L. Sileo, V. Krasilnikov*

Progress on scaled resolved simulation with variable resolution
S. Wallin, S. Girimaji, M. Carlsson*

Progress in PANS Modeling for Variable Density Flow
*F. Pereira**

07/06/2024 | 14:30 - 16:30
AI/Machine-Learning in Earthquake Engineering: Insights from Seismic Risk Towards Disaster-Resilient Cities I

MS071A
Room: 5A
Chaired by:
Dr. Shaghayegh Karimzadeh (University of Minho , Portugal) , Prof. Raghukanth S.T.G. (Indian Institute of technology Madras , India)

Development of ground motion models for peak ground acceleration (PGA) and acceleration spectrum intensity (ASI) using Catboost algorithm and Covariance Matrix Adaptation Evolution Strategy
F. Kuran, D. Caicedo, M. Hussaini, S. Karimzadeh, G. Tanircan, P. Lourenco*

Prediction of cumulative absolute velocity (CAV) with boosting algorithms: A case study of Turkiye
F. Kuran, G. Tanircan, E. Pashaei*

Optimal Composed Intensity Measure for the Seismic Assessment of Masonry Buildings Using Lasso Regression
D. Caicedo, S. Karimzadeh, V. Bernardo, P. Lourenço*

Nonparametric Ground Motion Models for Scenario-Based Stochastic Simulation
S. Hussaini, S. Karimzadeh, P. Lourenço*

07/06/2024 | 14:30 - 16:30
Exploring novel applications and advances in lattice Boltzmann methods IV

MS188D
Room: 5B
Chaired by:
Dr. Alessandro De Rosis (University of Manchester , United Kingdom)

Lattice Boltzmann Large Eddy Simulation of Pollutant Dispersion: Application To Natural Ventilation Inside Buildings
*J. Jacob**

Exponential distribution functions for positivity-preserving lattice Boltzmann schemes: Validations in 3D
K. Thyagarajan, J. Latt, C. Coreixas*

Demonstrating Sensitivity Analysis using Parametric Urban Design and a GPU-based Lattice-Boltzmann Solver
P. Spelten, A. Reiswich, J. Kleinert, A. Hagg, S. Elsweijer*

Simulating the Dynamical Behaviour of Solids with the LBM
H. Müller, A. Schlüter, R. Müller*

Optical Tweezer Loading Approach Comparison for Transient GPU Lattice Boltzmann-Immersed Boundary Spring Network Red Blood Cell CFD Simulations
G. Gallagher, F. Boyle*

07/06/2024 | 14:30 - 16:30 **Recent advances in computational stochastic mechanics II**	MS136B Room: 5C Chaired by: Prof. Marcin Kamiński (Lodz University of Technology , Poland) , Prof. George Stefanou (Aristotle University of Thessaloniki , Greece)

Modelling material properties of composites using stochastic tensor approach
W. Schuttert, M. Abdul Rasheed, B. Rosic*

Dynamic Response of a Bridge With Stochastic Road Profile to a Moving Vehicle
R. Iwankiewicz, R. Kwiatkowski, J. Chen*

On the random field of the buckling load of cylinder shells under combined load
N. Reuter, B. Kriegesmann*

Material Parameter Sensitivity Analysis for Intralaminar Damage of Laminated Composites through Direct Differentiation
P. Minigher, A. Arteiro, A. Turon, P. Camanho*

Strength Estimation of Composite Material by Peridynamics With Random Field Modeling of Inclusions and Microscopic In-Situ Measurement
Y. Arai, S. Sakata*

07/06/2024 | 14:30 - 16:30 **From the Nose to the Lung: Fluid Dynamics of the Upper Airways I**	MS128A Room: 0.06 MS Corresponding Organizer: Prof. Lars Krenkel (Technical University of Applied Sciences (OTH) Regensburg)

Effect of Surface Waves and Mucus Viscoelasticity in the Modelling of Shear-Induced Aerosol Generation in the Human Respiratory System
J. Michel, F. Erzinger, L. Krenkel*

Particle-wall interaction computational model for nasal drug delivery considering mucus layer
S. Ceccacci, H. Calmet, C. Rigaut, B. Haut, G. Houzeaux, B. Eguzkitza*

CFD-DEM Simulations of Pharmaceutical Aerosol Deposition in Intra-Thoracic Airways: Limitations and Future Perspectives
G. Spasov, R. Rossi, A. Vanossi, C. Cottini, A. Benassi*

Simulation and Analyis of the Unsteady Flow within Nasal Airways
M. Rütten, L. Krenkel, M. Quadrio*

07/06/2024 | 14:30 - 16:30 **Prospects for Green Aircraft: Critical Technologies and Operational Aspects driving Overall Design II**	STS245B Room: 0.08 Chaired by: Mr. Luis Campos (Universidad de Lisboa , Portugal)

Promising technologies to reduce aviation noise at airports
O. Zaporozhets, K. Kazhan, V. Makarenko, V. Tokarev, A. Chyla, M. Bukala*

Promising technologies to reduce global and local aviation emissions
K. Synylo, O. Zaporozhets, S. Karpenko, A. Krupko*

Prospects of Novel Technologies for SAF Production
R. Adami, P. Lamberti, A. Yakolevka, S. Boichenko, M. Sarno, V. Tucc*

Market Prospects For a Hybrid Turbo-electric Propulsion (HTEP) With Fuel Cells Fors a Regional Aircraft With 80 Seats
M. Zamarreño Suarez, R. Delgado-Aguilera Jurado, F. Perez Moreno, V. Gomez Comendador, R. Arnaldo Valdés*

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

07/06/2024 | 14:30 - 16:30 **Stable FE Methods for Challenging Problems in Engineering and Science III**	MS087C Room: 1.02 Chaired by: Dr. Corey Trahan (USACE-ERDC-ITL , United States)

A mixed hybrid-stress virtual element for plane elasticity
F. Liguori, A. Madeo, S. Marfia, E. Sacco*

Numerical stability of an explicit time integration scheme for an enriched beam model
M. Sharifi, F. Daude, C. Stolz*

Mixed data-driven finite element formulation for nonlinear transport problems
A. Kulikova, A. Shvarts, L. Kaczmarczyk, C. Pearce*

Finite Element Discretization Error as Epistemic Uncertainty
A. Poot, P. Kerfriden, I. Rocha, F. van der Meer*

07/06/2024 | 14:30 - 16:30 **Explainable AI for Computational Mechanics I**	MS173A Room: 1.03 Chaired by: Dr. Nicolas Bousquet (EDF , France) , Dr. Elena Raponi (Leiden University , Netherlands)

New results in interpretability of models and algorithms with dependent inputs
*M. Il Idrissi, M. Herin, V. Chabridon, B. Iooss, N. Bousquet**

First Steps to Integrate Sustainability into Crash Topology Optimisation
*F. Duddeck**

Unveiling soft biological tissues via Constitutive Artificial Neural Networks (CANNs)
K. Linka, C. Cyron*

Global Sensitivity Analysis Reporting Tool for Easily Detecting Variable Impact and Interaction in Crashworthiness Optimization
E. Raponi, N. van Stein, T. Bäck, F. Duddeck*

Artifcial Intelligence in Design of New Nanostructures
T. Burczyński, W. Kuś, M. Maźziarz, A. Mrozek*

07/06/2024 | 14:30 - 16:30 **Learning Differential Equations for Science and Engineering Applications via Scientific Machine Learning III**	MS078C Room: 1.04 Chaired by: Dr. Giovanni Stabile (Sant'Anna School of Advanced Studies , Italy) , Mr. Henrik Rosenberger (Centrum Wiskunde & Informatica , Netherlands)

Sparse RED-LSTM network for predicting structural response under dynamics load
*B. Rosic**

Neural Green's Operators for Parametric Partial Differential Equations
H. Melchers, J. Prins, M. Abdelmalik, B. Koren*

07/06/2024 | 14:30 - 16:30 **Vehicle-Bridge Interaction Dynamics I**	MS212A Room: 1.05 Chaired by: Prof. Yeong-Bin Yang (Chongqing University , Taiwan) , Prof. Judy Yang (National Yang Ming Chiao Tung University , Taiwan)

Investigation of Wheel-size Effect for Scanning Bridge Frequencies in VSM
J. Yang, T. Feng*

Investigation of vehicle-bridge interaction for trains with equidistant wheelsets using 2D multi-body models
A. Kohl, M. Rupp, G. Lombaert, C. Hübler*

Bridge Damping Formula Based on Test Vehicle's Front and Rear Contact Responses by Hilbert Transform
Y. Yang, H. Xu, M. Yang*

Level 2-Calculations of Dynamic Vehicle-Bridge Compatibility for Determining Permissible Speeds in the Railway Network (Germany)
R. Behnke, G. Grunert, X. Liu*

Enhanced Indirect Identification Of Bridges Based On The Dynamic Response Of Moving Vehicles
M. Mazzeo, A. Di Matteo, R. Santoro*

Assessing Inattend Human Elements in Critical Driving Safety Eventstiveness an
J. Raiyn, G. Weidl*

07/06/2024 | 14:30 - 16:30 **Combining Physics-Based and Data-Driven Approaches for Uncertainty Quantification I**	MS109A Room: 1.06 MS Corresponding Organizer: Dr. Augustin Persoons (KU Leuven)

Advancements in Hybrid Modeling for Battery Electrode Manufacturing Utilizing a Physics-inspired Data-driven Approach
S. Hosseinhashemi, C. Thon, C. Schilde*

Detection Quality Analysis for Automotive Radar
M. Jürgensen, J. Fuentes Michel, M. Vossiek*

A Point-Cloud Enhanced Transfer Learning Approach for Crashworthiness Analysis
G. Colella, V. Lange, F. Duddeck*

Mapping Manufacturing Variability to Composite Pressure Vessels' Geometry
R. Santos, A. Persoons, D. Moens*

Machine Learning Prediction of Random Property Fields From Microstructure Images
P. Gavallas, J. Bourinet, C. Mattrand, G. Stefanou, D. Savvas*

Model Uncertainty Quantification and Selection for Deep Learning-based Simulation of Hysteresis with Stiffness and Strength Degradations
J. Jeon, J. Song, O. Kwon*

07/06/2024 | 14:30 - 16:30 **Development and Applications of Computational Methods for Digital Twins II**	MS006B Room: 1.07 Chaired by: Dr. Alejandro Jiménez Rios (Oslo Metropolitan University , Norway)

A Bayesian Approach to Multi-fidelity Gas Turbine Development Tests and Experimental Design
F. Prutton, M. Pellowe*

MuPIF: Framework for Digital Twins and Interoperable Simulation Platform for Advanced Material Design
B. Patzák, S. Šulc, V. Šmilauer*

Non Linear CFD data interpolation in parameterized advection-dominated flows
J. Labatut, A. Iollo, T. Taddei*

07/06/2024 | 14:30 - 16:30 **Active Programmability and Artificial Intelligence in Mechanical Metamaterials II**	MS241B Room: 1.09 Chaired by: Prof. Tanmoy Mukhopadhyay (University of Southampton , United Kingdom)

AI-Driven Stress Analysis in Varied Fiber Geometries of Particulate Polymer Composites
S. Gupta, T. Mukhopadhyay, D. Varade, V. Kushvaha*

Inverse design of acoustic programmable metamaterial beams based using deep learning
M. Machado, M. Dutkiewicz*

Determination of Neutral Axis and Effect of the Variation of Cross Sectional Area on the Mechanical Properties of Smart Meta-Structure
S. Sahana, A. Singh, B. Bhattacharya*

An Energy-based Unified Framework for Electro-mechanical Programmability in Lattice Metamaterials
A. M S, T. Mukhopadhyay*

07/06/2024 | 14:30 - 16:30 **Machine and Deep Learning Techniques Applied to Computational Mechanics II**	MS145B Room: 1.10 Chaired by: Prof. Jorge Belinha (ISEP-INEGI , Portugal) , Prof. Sergio Tavares (Universidade de Aveiro , Portugal)

Designing unit cells with specific elastic properties with neural network
A. Pais, J. Lino Alves, J. Belinha*

Accellerating the prediction of bone remodelling with neural networks
*A. Pais, J. Lino, J. Belinha**

Scour depth prediction using Machine-Learning (ML) algorithm for offshore tripod foundations
A. Jatoliya, D. Bhattacharya, B. Manna, T. Ferradosa*

PIKFNN: Physics-Informed Kernel Function Neural Networks for Forward and Inverse PDE Problems
W. Xu, Z. Fu*

Numerical and experimental data driven digital twins for structural assessment
S. Tavares, J. Ribeiro, J. Belinha*

Application of machine learning to accelerate explicit time integration in structural dynamics
M. Bischoff, T. Willmann, M. Schilling*

07/06/2024 | 14:30 - 16:30 **Recent Advances in Data-Driven Modeling and Uncertainty Quantification of Complex Dynamical Systems II**	MS132B Room: 1.11 Chaired by: Dr. Sourav Dutta (The University of Texas at Austin , United States)

Error propagation for inverse problems: Applications to solar physics
E. Perracchione, A. Volpara, F. Camattari, A. Massone, M. Piana*

Meta Multifidelity Estimators for Uncertainty Quantification within Outer-Loop Applications
F. Law, A. Cerfon, B. Peherstorfer, F. Wechsung*

Wasserstein-VAEs for Monte Carlo ensemble generation
A. Mohsin Hassan Abdalla, M. Putti, G. Santin*

Enhancing Data Assimilation and Uncertainty Analysis in CCUS Projects Through AI Integration
G. Seabra, N. Mücke, V. Silva, D. Voskov, F. Vossepoel*

07/06/2024 | 14:30 - 16:30 **Modeling and Artificial Intelligence Decision Support System for Heart Failure II**	MS221B Room: 1.12 Chaired by: Prof. Nenad Filipovic (BIOIRC doo Kragujevac , Serbia) , Ms. Tijana Geroski (Faculty of Engineering, University of Kragujevac , Serbia)

From Data to Dynamics: Exploring Physics Informed Neural Network Solutions for Complex Transport Phenomena
T. Geroski, O. Pavić, L. Dašić, N. Filipović*

3D Reconstruction and Simulation of Atherosclerosis Progression within the Patient-Specific Arterial Models
S. Tomasevic, T. Djukic, M. Anic, B. Arsic, I. Saveljic, B. Gakovic, I. Koncar, N. Filipovic*

Generative Adversarial Networks for Improvement of Femoral Artery CT Scan Resolution
L. Benolić, L. Spahić, S. Ur-Rehman Qamar, T. Geroski, V. Ranković, N. Filipović*

Parameter Optimization of Drug Diffusion Transport Within Axial Symmetric Model for Drug Coating Balloon (DCB) Using Genetic Algorithms
V. Simic, B. Milicevic, M. Milosevic, N. Filipovic, M. Kojic*

07/06/2024 | 14:30 - 16:30 **Engineering Design Optimization with the Open-source Software SU2 II**	MS117B Room: 1.13 Chaired by: Prof. Nicolas R. Gauger (University of Kaiserslautern-Landau (RPTU) , Germany) , Dr. Long Chen (University of Kaiserslautern-Landau , Germany)

Adjoint-based Optimization of a Hypersonic Air Intake with RANS Credibility Constraint
A. Perlini, G. Girardello, G. Gori*

Multi-point optimization for laminar hydrogen burners within SU2
C. Morales Ubal, N. Beishuizen, J. van Oijen*

Adjoint Based Aerodynamic Shape Optimization of a Missile Engine Inlet Cover
A. Ozuzun, I. Tuncer*

Free-Shape Optimization of U-Bend with SU2
*P. Hemmen**

Discrete Adjoint optimization of Compact Heat Exchangers
*N. Beishuizen**

07/06/2024 | 14:30 - 16:30 **Recent Advances in Model Order Reduction of Non-Linear Systems: a Prospective from Early Stage Researchers II**	MS169B Room: 1.14 Chaired by: Mr. Jonas Nicodemus (University of Stuttgart , Germany) , Dr. Mattia Manucci (Gran Sasso Science Institute , Italy)

Fast and Reliable Reduced-Order Models for Cardiac Electrophysiology
S. Chellappa, B. Cansiz, L. Feng, P. Benner, M. Kaliske*

Parametric Nonlinear Model Order Reduction for Large Nonlinear Finite Element Systems in Rolling Contact
L. Bürger, F. Naets*

Non-intrusive reduced models for arbitrarily shaped parametric domains
K. Kollepara, D. Borzacchiello, J. Aguado*

Sparse Data-Driven Quadrature Rules via lp-Quasi-Norm Minimization
M. Manucci, J. Aguado, D. Borzacchiello*

07/06/2024 | 14:30 - 16:30 **Emerging Trends in Model Reduction for Nonlinear Mechanics Problems III**	MS093C Room: 1.15 Chaired by: Prof. Shobhit Jain (TU Delft , Netherlands) , Prof. Mingwu Li (Southern University of Science and Technology , China)

Model Order Reduction for Nonlinear Modular Structures by Hyperreduction of the Components and Mortar Tied Contact
S. Ritzert, J. Kehls, D. Macek, T. Brepols, H. Holthusen, S. Reese*

A Reduced Order Model for Poro-plasticity and Wellbore Stimulation
R. Gracie, S. Hatefi Ardakan*

Quadratic manifold for model order reduction of a geometrically nonlinear beam with friction contact
F. Mashayekhi, S. zucca*

07/06/2024 | 14:30 - 16:30 **Bayesian Inversion for model calibration and digital twinning in engineering II**	MS123B Room: 2.01 Chaired by: Prof. Anna Kucerova (Czech Technical University In Prague, Faculty Of Civil Engineering , Czechia) , Dr. Mijo Nikolic (University of Split, Faculty of Civil Engineering, Architecture and Geodesy , Croatia)

Digital Twin for structural health monitoring of cultural heritage: the BUILDCHAIN Demo-Pilot, Palazzo Poniatowski-Guadagni in Florence
P. Croce, F. Landi, F. Meligeni*

Effect of measurement errors covariance structure in Bayesian inference of material model parameters
A. Kucerova, D. Jaruskova, J. Sykora*

Enhancing Tall Timber Building Design through Multi-Building Bayesian Inversion
N. Friedman, B. Popovics, B. Kurent, A. Urbanics, B. Brank*

Material Design Driven by Morphology Characteristics
K. Das, J. Sykora, A. Kucerova*

An adaptive Approach for Surrogate Modeling Based on Full Maximum a Posteriori Estimation of Model Error for Efficient Calibration of Numerical Codes
S. Janati Idrissi, P. Congedo, O. Le-maître, M. Rodio*

Sequential Sensitivity Analyses on Masonry Mechanical Parameters in the Substructure Analysis of a Monumental Construction
G. Bartolini, A. De Falco, F. Landi*

**07/06/2024	14:30 - 16:30** **Mathematical and Numerical Aspects of Algorithms Related to Computational Electromagnetism II**	MS097B Room: 2.02 Chaired by: Prof. Amane Takei (, Japan) , Dr. Shin-ichiro Sugimoto (Hachinohe Institute of Technology , Japan)

Meshes and schemes hybridization with Compatible Discretization for Maxwell's equations: toward high performance solutions compatible with physics
V. Ritzenthaler, P. Cantin, X. Ferrieres*

Numerical Computations of An Incomplete Balancing Domain Decomposition Method Based On Polytopal Finite Element Spaces
*D. TAGAMI**

Robust Mesh Generation Technique for Huge Scale Microwave Analysis
*H. Kawai**

PINN-based Domain Decomposition Method in Linear Magnetostatic Analysis
*M. Ogino**