Congress Programme

2022

ECCOMAS CONGRESS

OSLO, NORWAY

8th European Congress
on Computational Methods
in Applied Sciences and Engineering
ECCOMAS Congress 2022

Oslo, Norway
5th - 9th of June, 2022

CONTENTS

Greetings from the Co-Chairmen of the Conference

The ECCOMAS Congress 2022 proceeds from a string of previous and successful congresses, the first one organized 30 years ago in Brussels, Belgium, in 1992. This year's congress is hosted by the Norwegian University of Science and Technology (NTNU), SINTEF, and the Nordic Association for Computational Mechanics in Engineering (NOACM).

After more than two years of a pandemic that unfortunately is still ongoing worldwide, it is our pleasure to welcome you to an entirely in-person event at the congress venue NOVA Spektrum in Lillestrøm, which is part of the Oslo metropolitan area. We hope the event will give you a perfect opportunity to communicate science and further expand personal connections worldwide, particularly for young researchers.

The Nordic countries have quite an impressive list of famous scientists compared to their small population. Furthermore, some of the most prestigious scientific prizes, the Nobel Prize and the Abel Prize, are awarded by Swedish and Norwegian committees to recognize scientific advances. Related to ECCOMAS, we mention two highly influential Norwegian mathematicians. Niels H. Abel (1802-1829) made pioneering contributions in various fields. His most famous result is the first complete proof demonstrating the impossibility of solving the general quantic equation in radicals. He was also an innovator in the field of elliptic functions and a discoverer of Abelian functions. Sophus Lie (1842–1899) is another famous Norwegian mathematician (second only to Abel). He largely created the theory of continuous symmetry and applied it to the study of geometry and differential equations. Lie groups and Lie algebra are named after him and are important tools, e.g., in nonlinear mechanics.

The Nordic countries have a rich history in computational methods in applied sciences, starting with numerical weather prediction from the early days of computers in the late 1940s. A particularly noteworthy engineering achievement is the design and structural analysis of the Troll A platform for the Troll gas field off the west coast of Norway. Rising more than 400 meters, the Troll A Condeep platform is the tallest and heaviest structure that has ever been moved to another position relative to the surface of the Earth. Its design and production are among the largest and most complex engineering projects in history. The structural analyses of the Troll A platform were conducted using SESAM, a finite element method (FEM) program developed initially by Pål G. Bergan (one of the plenary lecturers at this year's congress) and Erik Åldstedt in 1969 at NTH (now NTNU) and further developed by NTH, SINTEF, and DNV throughout the 1970s and 1980s. "SESAM contributed an enormous amount to the development of the Norwegian oil industry, more than people realize," said the earlier DNV Software managing director Elling Rishoff.

We are pleased to offer a varied technical program consisting of more than 1700 presentations of ideas and methods that will accelerate the development and usage of state-of-the-art computational methods in a broad spectre of applications in science and engineering. We mention particularly the significant number of presentations related to the fusion of physics-based (differential equations) and data-driven (artificial intelligence and machine learning) modelling techniques into hybrid analysis and modelling for disruptive development of faster and better computational methods. The presentations consist of 6 plenary, 28 semi-plenary, and 61 keynote lectures held by highly acknowledged researchers. More than 1800 participants from 44 countries will attend the congress.

We wish you all a great congress,


Professor Trond Kvamsdal


Professor Kjell Magne Mathisen


Chief Scientist Knut-Andreas Lie


Professor Mats G. Larson

Oslo, 5 June 2022

NoACM greetings

The Nordic Association of Computational Mechanics (NoACM) represents the Nordic and Baltic countries in ECCOMAS and IACM. The association was founded in 1988, and its first Chairman was Nils-Erik Wiberg, professor of civil engineering at Chalmers University of Technology in Sweden. The mission of NoACM is to promote research in Computational Mechanics and create an arena for collaboration and interaction between the Nordic and Baltic countries and with the ECCOMAS and IACM organizations.

We are delighted that Oslo is the selected venue for the ECCOMAS Congress 2022 and wish to thank the ECCOMAS community for its support and the large number of participants contributing to an inspiring scientific program. We also want to express our gratitude to the organization committee and the secretariat of CIMNE for organizing a fantastic event despite the recent difficulties and uncertainties caused by the pandemic.

The NoACM fully supports the conference and wishes all delegates welcome to Oslo, a great stay, and an exciting congress.

Mats G. Larson, Chairman of NoACM

NOACM Nordic Association of Computational Mechanics

Oslo, 5 June 2022

Greetings from the President of ECCOMAS

Dear Colleagues, dear Friends,

it is with an infinite pleasure that I am addressing just few lines to all of you.
The pleasure is first of all due to the fact that shortly we are all going to meet in person in Oslo from 5th to the 9th of June for the 8th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS Congress 2022); it will be a fully in-person event and, after such a long period of social distancing, we are all looking forward to a reunion, to great talks, to many scientific discussions, and finally to spend some time in a friendly community. So far more than 1700 abstracts have been accepted for an oral presentation and I am sure that all these contributions, as well as a warm welcome from the excellent local organizers (Trond Kvamsdal, Kjell Magne Mathisen, Knut-Andreas Lie, and Mats G. Larson), will make our meeting an excellent one.

Another strong reason of happiness and pleasure in addressing you is relative to the fact that in Oslo we are going to celebrate the 30th anniversary of our ECCOMAS association. The fact that there is already such a long standing history of meetings, accomplishments, pleasure in sharing research, ideas, friendship is giving us even more willingness in thinking about the future and how to even improve the impact of our community.

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

Oslo, 5 June, 2022

ORGANIZERS

Conference Chairpersons

Chair
Professor Trond Kvamsdal
NTNU, Norway

Vice Chair
Professor Kjell Magne Mathisen
NTNU, Norway

Vice Chair
Chief Scientist Knut-Andreas Lie
SINTEF Digital, Norway

Vice Chair
Professor Mats G. Larson
Umeå University, Sweden

Conference Organizers and local hosts

Norwegian University of Science and Technology - NTNU

SINTEF

Nordic Association of Computational Mechanics (NOACM)

European Community on Computational Methods in Applied Sciences (ECCOMAS)

Conference Secretariat

CIMNE Congress Bureau
Campus Nord UPC -Building C3 - "Zona Comercial"
Jordi Girona, 1-3 (08034) - Barcelona, Spain

ORGANIZING COMMITTEES

Executive Committee

Ferdinando Auricchio	President of ECCOMAS
Harald van Brummelen	Secretary General of ECCOMAS
Trond Kvamsdal	Chair of the Conference
Kjell Magne Mathisen	Vice-Chairperson
Knut-Andreas Lie	Vice-Chairperson
Mats G. Larson	Vice Chairperson

Local Organising Committee

Professor Elena Celledoni	Professor Fredrik Larsson	Chief Scientist Marie E. Rognes
Professor Jianying He	Professor Peter Hansbo	Chief Scientist Tor Dokken
Professor Leif R. Hellevik	Professor Johan Hoffman	Chief Scientist Knut-Andreas Lie
Professor Odd S. Hopperstad	Professor Mats G. Larson	Professor Ragnar Larsson
Professor Trond Kvamsdal	Professor Erik Burman	Professor Anders Logg
Professor Kjell M. Mathisen	Professor Ole Sigmund	Professor Rolf Stenberg
Professor Adil Rasheed	Professor Jens H. Walther	Professor Pekka Neittaanmäki
Professor Zhiliang Zhang	Assoc. Professor Jens Gravesen	Research Coordinator Tero Tuovinen
Professor Kent-Andre Mardal	Professor Erik Lund	Professor Reijo Kouhia
Professor Antti H. Niemi	Chief Scientist Marie E. Rognes	

SCIENTIFIC COMMITTEES

Chairs of the Technical Committees

Odd S. Hopperstad (Computational Solid Mechanics)
Computational material mechanics, i.e., plasticity and ductile fracture.

Jens. H. Walther (Computational Fluid Dynamics)
Efficient algorithms for Nano- and macros-scale fluid dynamics.

Zhiliang Zhang (Computational Natural Sciences)
Fracture and damage of materials and nanomechanics in general.

Pekka Neittaanmäki (Computational Applied Mathematics)
Numerical analysis and development of mathematical software

Anders Logg (Scientific Computing)
Development of open source codes for scientific computing.

Marie E. Rognes (Young Investigators Initiative)
Numerical analysis and computational biomedicine.

CONFERENCE VENUE

The conference facilities are located in the premises of the complex made up of the **NOVA Spektrum** and the **Thon Hotel Arena** directly adjacent to it.

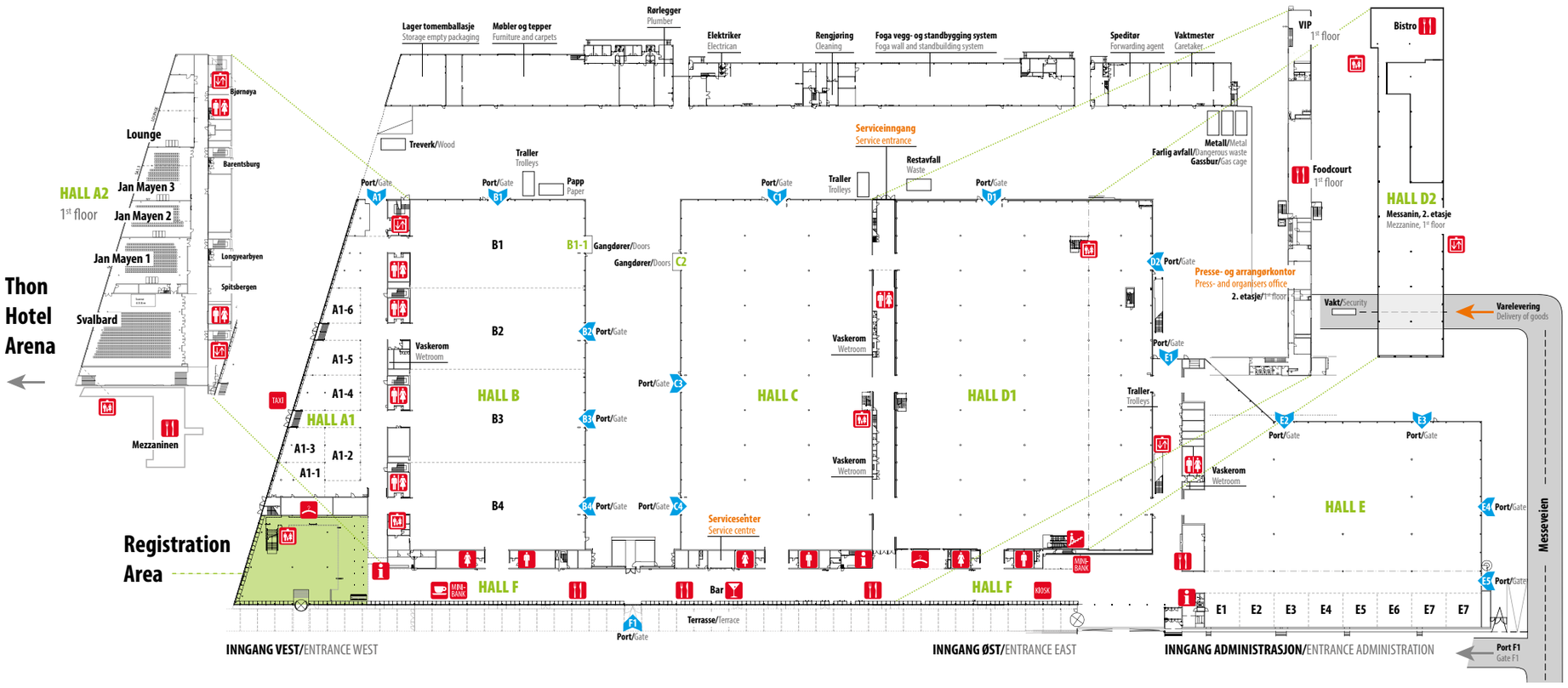
Nova Spektrum is 10 min walk from Lillestrøm Station, between Oslo Central Station and Oslo International Airport. Easy access whether you are coming by train, car or bus. 10 minutes by train from the airport and Central Station. Trains normally depart from Platform no 11 at Oslo Central Station.

TRAIN

Vy has several departures per hour from both Oslo and Gardermoen station. Journey time from Oslo Central Station (Oslo S) is 11 and 12 minutes from Oslo Airport.

FLYOGET – Airport Train

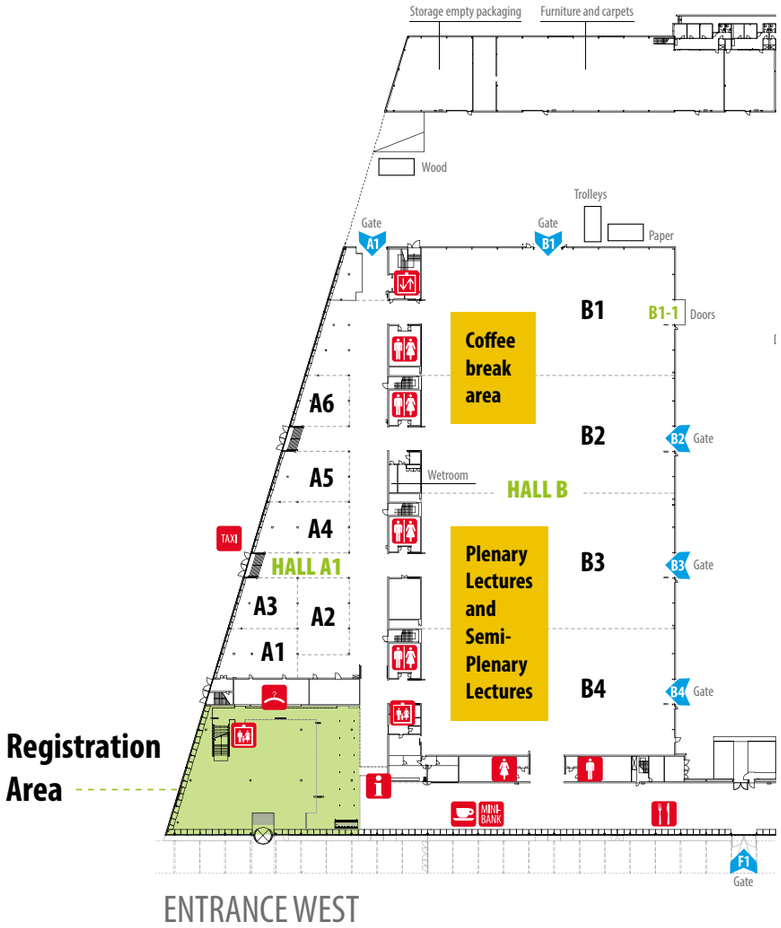
For travel to/from the Oslo Airport at Gardermoen it is convenient to use the airport train (Flytoget) that takes 12 minutes between the airport and Lillestrøm and 19 minutes between the airport and Oslo Central Station. Notice that it is not possible to take the airport train for travelling to/from Oslo Central Station and Lillestrøm.



ROOMS AT THE NOVA SPEKTRUM

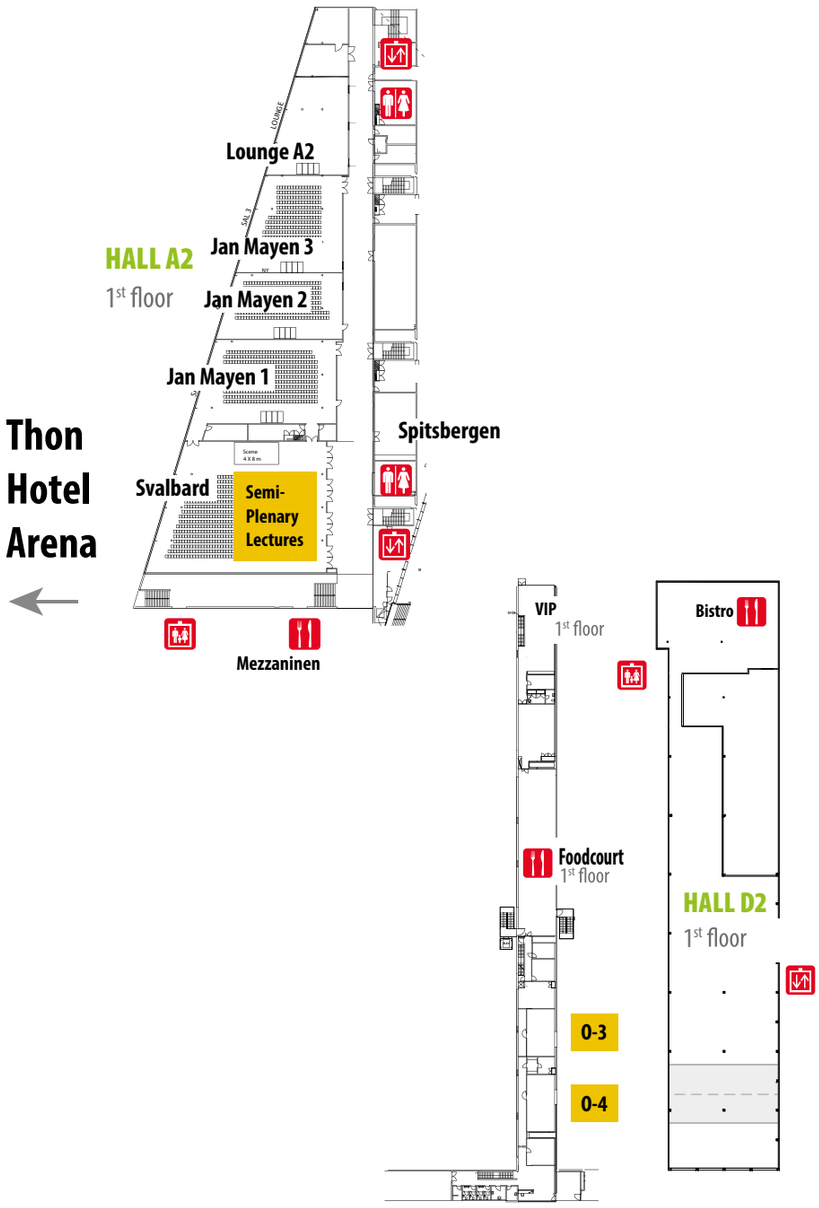
Ground Level

The main entrance is the **Entrance West** that get you straight to the **Registration Area**. This floor houses the **Plenary Lectures and Semi-Plenary Lectures Room** (B3+B4), the **Coffee Break area** (inside Hall B1 and B2) and the following meeting rooms: **A1, A2, A3, A4, A5, A6, B1 and B2.**



First Floor - Corridor

This floor is accessible by stairs and lift and also from the Thon Hotel Arena, houses the **second room for Semi Plenary Lectures** (Svalbard) and the following meeting rooms: **Jan Mayen 1, Jan Mayen 2, Jan Mayen 3, Lounge A2, Spitsbergen, O-3, O-4.**

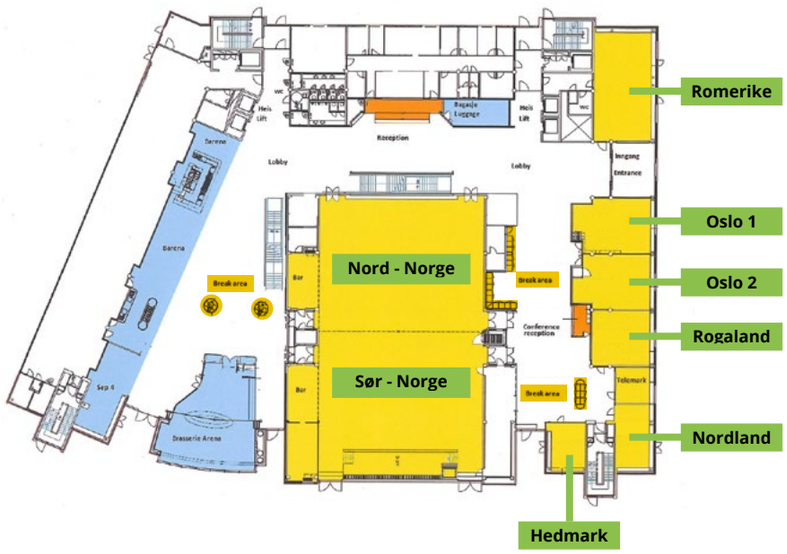


ROOMS AT THE THON HOTEL ARENA

The Thon Hotel Arena is directly connected to the Nova Spektrum and it is also accessible from the main entrance of the hotel. We are using 14 meeting rooms.

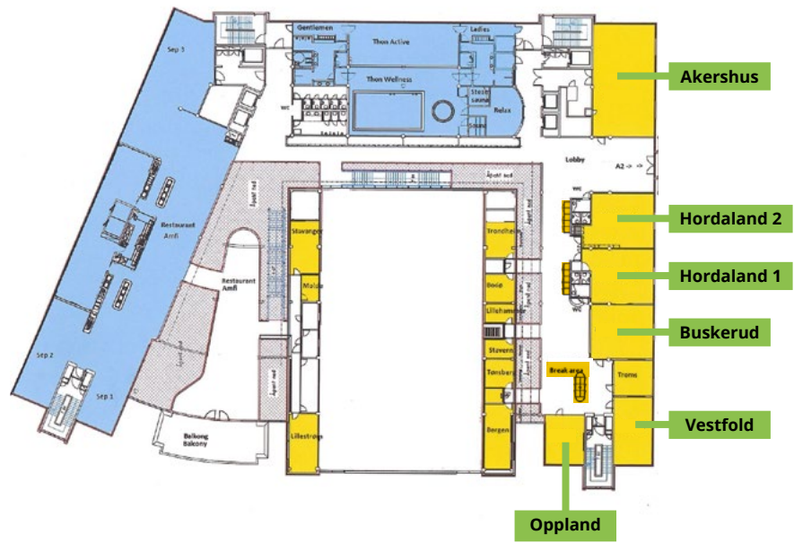
Ground Floor

Hedmark, **Nordland**, **Oslo 1**, **Oslo 2**, **Rogaland**, **Romerike** and the **Sør – Norge** and **Nord - Norge** where the the **Semi-Plenary Lecture**s will be addressed.



First Floor

Akershus, Buskerud, Hordaland 1, Hordaland 2, Oppland, Vestfold



CONFERENCE INFORMATION

Registration and Check in

All attendees are required to check in at the registration desks, located in the registration area, at Nova Spektrum.

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 remember to bring the badge with you every day, a duplicate will cost you 80€.

Please recall also that the badge should be returned to the secretariat at the end of the Congress, before you leave the venue. This is due to sustainability, in particular, in order to reduce the plastic waste.

Accompanying persons are not allowed to attend technical sessions.

Secretariat Timetable

Sunday, June 5: 16:00 - 20:00
Monday, June 6: 07:30 - 18:00
Tuesday, 7, Wednesday 8: 08:30 - 17:00
Thursday, June 9 15: 09:00 - 16:30

Conference website & Programme updates: www.eccomas2022.org

The Congress organisers have arranged to include NFC keychains for all the registered participants of the ECCOMAS Congress 2022. The keychain has an NFC chip inside; this chip allows wireless communication with your smart phone.

After holding an NFC-capable smartphone near the keychain, the contents about the scientific programme of the Congress and last minute information will pop-up on the screen

Presentations

Time and Equipment:

- **Plenary Lectures** will last 45 minutes with no gap within lectures.
- **Semi-Plenary Lectures** will last 30 minutes with no gap within lectures.
- **Technical Sessions** will last 2 hours.

CONFERENCE INFORMATION

The format will consist of:

- Sessions with a Keynote Lecture (KL): KL presentation (40 minutes) plus 4 presentations of 20 minutes each. Time includes Q&A.
- Sessions without a Keynote Lecture: 6 regular presentations (20 minutes each). Time includes Q&A.
- Sessions during the second afternoon blocks (16:30 to 18:30) scheduling 7 presentations will end at 18:50.

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 **Hall B1/B2** and outside **Svalbard** and J**an Mayen 1-2-3** at Nova Spektrum and also outside **Oslo 1 and 2**, **Rogaland** and **Hordaland 1-2** at Hotel Thon Arena.

Lunch Options

Lunch Bags
Lunch bags previously booked can be collected in the Hall B1/B2.

Eating out at the Venue
Thon Hotel Arena is serving a full "Scandinavian Lunch Buffet" and there will be small restaurants at NOVA Spektrum serving different styles of lunch food. Furthermore, you can have some Poke bowls at the Food Box shop or at the Bakery inside the venue.

Social Events

Sunday, June 5	**Monday, June 6**	**Thursday, June 9**
18:00 – 20:00	19:00-21:00	Aperitif 18:30-19:20
Icebreaking drink	Welcome Reception	(B3 and B4)
Nova Spektrum	Nova Spektrum	Congress Banquet 19:30-23:00
		(Hall E)

SOCIAL PROGRAMME

The social events of ECCOMAS 2022 coincide with the Icebreaking reception, the Welcome Cocktail and the Conference Banquet. They are included in the registration fees but you should confirm your attendance in your personal records. Accompanying persons can join these events by purchasing a ticket at the cost of 200€.

Ice breaking reception

Sunday June 5th afternoon
18:00 to 20:00
Nova Spektum Registration area

Welcome reception

Monday June 6th
19:00 to 21:00
Nova Spektrum Hall B3-4

Spend a nice evening with colleagues and friends while enjoying Scandinavian Finger-buffet together with matching wines from famous European wine regions.

Conference banquet

Thursday June 9th
18:30 - 19:30 - Aperitif served at B3 and B4
19:30 - 23:00 - Dinner served at Nova Spektrum Hall E

The ECCOMAS Congress 2022 Banquet will be held in Hall E at Nova Spektrum. You will be served a three-course gourmet dinner with excellent Norwegian foods paired with matching wines from famous European wine regions.

SCIENTIFIC PROGRAMME

Introduction

Close to 2000 abstracts have been received, resulting in more than 1.700 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 139 mini-symposia that have been organised by the scientific community but the programme also includes 6 plenary and 32 semi-plenary lectures, 60 Keynote Lectures, the EYIC Young Investigators Minisymposium, the 12th PhD ECCOMAS Olympiad, 7 Special Technological Sessions and 4 contributed sessions.

A short guide to the Scientific Programme

Opening Ceremony: The conference will commence at 9:00 a.m, on Monday, June 6.

Plenary lectures will be delivered on Tuesday, Wednesday and Thursday in the morning in the B3+B4 Room.

Semi-Plenary lectures will be delivered on Tuesday and Thursday in the afternoon (right after lunch time).

EYIC Young investigators MS is schedule on Monday, June 6.

The 12th PhD ECCOMAS Olympiad is scheduled on Wednesday, June 8, in the afternoon.

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 keychains you have received at the registration desk.

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

- Sessions without a Keynote Lecture: 6 regular presentations (20 minutes each including Q&A).
- Sessions with a Keynote Lecture (KL): KL presentation (40 minutes) + 4 presentations of 20 minutes each. Time includes Q&A.
- Sessions during the second afternoon blocks (16:30 to 18:30) scheduling 7 presentations will end at 18:50.

Rooms Location:

All the presentations will take place in the premises of the complex made up of **NOVA Spektrum** and the **Thon Hotel Arena** directly adjacent to it.

Green rooms are located at the Thon Hotel Arena

Yellow rooms are located at the NOVA Spektrum Center

Programme Overview

	Sunday	Monday	Tuesday	Wednesday	Thursday
09:00 - 10:30		Opening Ceremony	PL1	PL2	PL3
10:30 - 11:00		Coffee Break			
11:00 - 13:00		MS / CS 1	MS / CS 4	MS / CS 6	MS / CS 9
13:00 - 14:00		Lunch Time			
14:00 - 16:00		MS / CS 2	SPL 1 - 4	MS / CS 7	SPL 5 - 8
16:00 - 16:30		Coffee Break			
16:30 - 18:30	16:30-20:00 Registration	MS / CS 3	MS / CS 5	MS / CS 8	M S/ CS 10
	18:00-20:00 Ice-breaking reception	19:00 - 21:00 Welcome Reception			18:30 - 19:30 Aperitif
					19:30 - 23:00 Congress Banquet

Session Codes

OC: Opening Ceremony
PL: Plenary Lecture
SPL: Semi-Plenary Lecture
MS: Minisymposium
CS: Contributed Session
STS: Special Technological Session
YIMS: EYIC Young Investigators Minisymposium
CF: EYIC Career Forum
JW: EYIC Junior workshop
ECO: ECCOMAS Olympiads

INVITED LECTURES

Plenary Lectures overview

		Tuesday	Wednesday	Thursday
9:00 - 10:30	B3 + B4	Pål G. Bergan	George Karniadakis	Annalisa Buffa
		Thomas J.R. Hughes	David Keyes	Paul Steinmann

Plenary Speakers

07 June 2022 09:00 - 10:30
Pål G. Bergan
NTNU, Norway
Computational mechanics and the green transition: motivation and examples

08 June 2022 09:00 - 10:30
George Karniadakis
Brown University, USA
Approximating functions, functionals and operators with neural networks for diverse applications

09 June 2022 09:00 - 10:30
Annalisa Buffa
École Polytechnique Fédérale de Lausanne, Switzerland
The impact of defeaturing on the accuracy of PDE solutions

08 June 2022 09:00 - 10:30
David Keyes
King Abdullah University of Science and Technology (KAUST), Saudi Arabia
Nonlinear Preconditioning for Implicit Solution of Discretized PDEs

07 June 2022 09:00 - 10:30
Thomas J.R. Hughes
University of Texas at Austin, USA
The Finite Element Method and Computational Mechanics: Past, Present and a Vision of the Future

09 June 2022 09:00 - 10:30
Paul Steinmann
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany/ GCEC, University of Glasgow, UK
The Advent of Continuum-Kinematics-Inspired Peridynamics: A Novel Take on Nonlocal Continuum Modelling and Simulation

Semi-Plenary Lectures overview

		Tuesday	Thursday
14:00 - 16:00	Nord – Norge (GF)	Christopher Pain Paola Goatin Jianying He Anna Pandolfi	Harald Van Brummelen Carmen Rodrigo Cardiel Massimiliano Cremonesi
	Sør – Norge (GF)	Dennis Kochmann Fredrik Larsson Odd Sture Hopperstad Jerzy Rojek	Niels Aage Andrea Walther Jessica Zhang
	B3 + B4	Olaf Steinbach Daniel Peterseim Donatella Marini J an Martin Nordbotten	Thomas Richter Anders Logg Tarek Zohdi
	Svalbard	Andrea Beck Yuri Bazilev Sanjay Mittal Marie Elisabeth Rognes	Garth Wells Dominik Göddeke Josef Kiendl

Semi-Plenary Speakers

Niels Aage
Technical University of Denmark
On the usefulness of ultra-high resolution topology optimization methods

Andrea Beck
Universität Stuttgart, Germany
Towards data-driven high-fidelity Computational Fluid Dynamics

Yuri Bazilevs
Brown University, USA
Breakthroughs in the Modeling of Shell Structures: IGA and Beyond

Massimiliano Cremonesi
Politecnico di Milano, Italy
Lagrangian approaches for free-surface fluid flows and fluid-structure interaction problems

Paola Goatin
INRIA, France
Multi-scale models for mixed human-driven and autonomous vehicles

Dominik Göddeke
University of Stuttgart, Germany
Towards FAIR principles in mathematical research data

Jianying He
Norwegian University of Science and Technology (NTNU), Norway
Nanoscale thermal transport

Odd Sture Hopperstad
Norwegian University of Science and Technology, Norway
Modelling of plasticity and fracture across the scales – applications to aluminium alloys

Josef Kiendl
Bundeswehr University Munich, Germany
Isogeometric Methods in Structural Analysis: Recent Advances and Applications

Dennis Kochmann
ETH Zürich, Switzerland
Architected materials as a playground for homogenization

Fredrik Larsson
Chalmers University, Sweden
Efficient finite element procedures for bridging the scales in solid mechanics

Anders Logg
Chalmers University of Technology, Sweden
Digital Twin Cities: Multi-Disciplinary Modeling and High-Performance Simulation of Cities

Donatella Marini
University of Pavia, Italy
Recent results on Virtual Element Methods

Sanjay Mittal
Indian Institute of Technology Kanpur, India
Fluid-structure interactions: multiple lock-ins

Jan Martin Nordbotten
University of Bergen, Norway
Modeling and simulation of mixed-dimensional problems

Christopher Pain
Imperial College London, UK
Applying AI techniques to Model Fluid Flows

Anna Pandolfi
Politecnico di Milano
Computational Models and Experimental methods for the Human Cornea

Daniel Peterseim
University of Augsburg, Germany
Super-localized numerical homogenization and its links to variational multiscale and isogeometric analysis

Thomas Richter
Otto-von-Gutricke University Magdeburg, Germany
Deep neural networks for accelerating fluid-dynamics simulations

Carmen Rodrigo Cardiel
Universidad de Zaragoza, Spain
Robust preconditioners for poromechanics

Marie Elisabeth Rognes
Simula Research Laboratory/ University of Bergen, Norway
Mathematical modelling of the human brain: from medical images to biophysical simulation

Jerzy Rojek
IPPT, Poland
Numerical simulations of powder metallurgy processes

Olaf Steinbach
Graz University of Technology, Austria
Space-time finite element methods

Harald Van Brummelen
Eindhoven University of Technology, Netherlands
Recent advances in computational elasto-capillary fluid-solid interaction

Andrea Walther
Humboldt University of Berlin, Germany
Adjoint-based optimization for industrial applications

Garth Wells
University of Cambridge, UK
Computing at the Exascale

Jessica Zhang
Carnegie Mellon University, USA
Machine Learning Enhanced Simulation and PDE-Constrained Optimization for Material Transport Control in Neurons

Tarek Zohdi
UC Berkeley, USA
Modeling and Simulation Tools for Industrial and Societal Research Applications: Digital Twins and Genome-based Machine-learning

SPECIAL TECHNOLOGY SESSIONS

The Special Technology Sessions (STS) and their papers provide an overview on the state of-the-art and future technologies in computational and digitalized methods and tools (modelling, simulation, optimisation and control, Artificial Intelligence (AI), etc.) for the application in aeronautics and other industries with related technology validations.

Session	Title
STS01	The Combined Role of Modelling, Simulation, Optimization, Control and Digitalization for Solving New Computational Challenges of Aviation, Transport and Renewable Energy (Part 1 + 2)
STS03	Unsteady Simulation of High-Lift System Aerodynamics
STS04	Application of Hybrid Laminar Flow Control for Drag Reduction of Transport Aircraft
STS05	Shock Wave Boundary Layer Interaction in Aeronautical Applications
STS-06	Disruptive Aircrafts Wing Configurations towards Climate Neutrality
STS-08	EU-Funded Research and Innovation on Computational Methods towards Climate Neutrality of Aviation
STS-10	Additive Manufacturing, Applications and Numerical Modelling

The STS Book of Abstract provides the STS abstracts with its content and rational and the presented paper abstracts of all STS. A PDF-copy of this STS Book of Abstracts can be downloaded on the conference website.

EYIC YOUNG INVESTIGATORS MINISYMPOSIUM

Organizers

Simone Morganti, University of Pavia, Italy
Carina Schwarz, University of Duisburg-Essen, Germany
Markus Lukacevic, Vienna University of Technology, Austria
Leo Nouveau, IRMAR/INSA, France

This minisymposium - scheduled on Monday - is organised by young investigators (all of which are members of the ECCOMAS Young Investigators Committee) for young investigators. The format, which has first been introduced at the ECCOMAS Congress 2016 with great success, is quite different from the regular minisymposia in order to particularly attract young researchers.

There will be three types for presentations:

1. Presentation 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 them. The two presenters know each other, but usually do not work at the same institution. The idea is to view a topic from two different perspectives, thus leading to intense discussions on pros and cons 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 that did not work or led to different outcomes than expected. This gives the chance to present “negative” results. Authors will 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 the speaker has been working on for quite some time, but for which he/she 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 will 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 suggestions.

12th 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 **Tuesday, June 7**

Tobias Bode, Leibniz University Hannover, Germany

David Codony, CIMNE, Spain

Erik Orvehed Hiltunen, Yale University, United States

Nikos Vasileiadis, University of Thessaly, Greece

Donatella Passiatore, Politecnico di Bari, Italy

Mohammad Reza Pendar, University of Beira Interior, Portugal

Ernesto Pimentel-García, University of Málaga, Spain

Marco Tezzele, University of Texas at Austin, United States

Marie Touboul, University of Manchester, United Kingdom

Michał Wichrowski, Universität Heidelberg, Germany

LIST OF MINISYMPOSIA

1000 Computational Solid Mechanics

MS4: ADVANCED MATERIALS: COMPUTATIONAL ANALYSIS OF PROPERTIES AND PERFORMANCE
Vadim V. Silberschmidt and Valery P. Matveenko

MS6: MULTISCALE COMPUTATIONAL HOMOGENIZATION FOR BRIDGING SCALES IN THE MECHANICS AND PHYSICS OF COMPLEX MATERIALS
Julien Yvonnet, Kenjiro Terada, Peter Wriggers, Marc Geers, Karel Matous and Paul Steinmann

MS7: MULTISCALE MODELING AND SIMULATION OF SURFACES IN CONTACT: MECHANICS OF CONTACT, FRICTION, AND WEAR
Ramin Aghababaei, David Kammer and Lucia Nicola

MS9: BRAIN MECHANICS ACROSS SCALES
Silvia Budday, Kristian Franze, Jochen Guck and Paul Steinmann

MS15: ADVANCED COMPUTATIONAL DESIGN AND MANUFACTURING SIMULATION OF NOVEL MATERIALS AND STRUCTURES
Eric Li, Bing LI, ZC He, QQ Li, Fei Wu, ZQ Zheng and Yi Wu

MS17: COMPUTATIONAL MECHANICS IN HIGH STRAIN RATE AND IMPACT DYNAMICS
Patrice Longère and Eric Deletombe

MS21: MECHANICS OF WOOD AND BIOCOMPOSITES IN ENGINEERING
Ani Khaloian, Markus Lukacevic and Jan-Willem van de Kuilen

MS24: MULTI-SCALE MODELLING OF GENERALISED CONTINUA AND ARCHITECTURED MATERIALS
Igor A. Rodrigues Lopes, Francisco M. Andrade Pires and Eduardo de Souza Neto

MS29: RECENT ADVANCES IN THE MODELLING OF ARCHITECTURED METAMATERIALS
Daniela Addessi, Andrea Bacigalupo, Maria Laura De Bellis and Francesca Fantoni

MS30: SIMULATIONS OF POLYMERS AND POLYMER COMPOSITES
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MS37: CONTINUUM BIOMECHANICS OF ACTIVE SYSTEMS
Tim Ricken, Oliver Röhrle and Silvia Budday

MS42: UNCERTAINTY QUANTIFICATION IN MATERIAL SCIENCES
Florent Pled, Christophe Desceliers, Maarten Arnst and Christian Soize

MS53: METAMATERIALS ACROSS THE SCALES: MODELING, EXPERIMENT AND SIMULATION
Jörg Schröder, Varvara Kouznetsova, Dennis Kochmann, Marc-Andre Keip and Geralf Hütter

MS59: SOFT BIOLOGICAL TISSUE: MICROSTRUCTURE-BASED MODELING AND SIMULATION
Bjørn Skallerud and Gerhard A. Holzapfel

MS62: ADAPTIVE AND COMPLIANT ENGINEERING STRUCTURES
Malte von Scheven, Renate Sachse, Ann C. Sychterz and Victor Charpentier

MS63: HETEROGENEOUS MATERIAL MODELLING: STATISTICAL CHARACTERIZATION, DIGITAL RECONSTRUCTION, AND NUMERICAL SIMULATION
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MS68: INELASTICITY AT FINITE STRAINS: MODELS, IDENTIFICATION AND NUMERICS
Ralf Landgraf, Bernhard Eidel and Alexey V. Shutov

MS71: ADVANCED MODELLING PROCEDURES FOR MASONRY STRUCTURES
Daniela Addessi, Miguel Cervera and Elio Sacco

MS74: COMPUTATIONAL ANALYSIS OF ADVANCED MATERIALS AND STRUCTURES
Efstathios E. Theotokoglou and Ioannis K. Giannopoulos

MS76: MODELING AND SIMULATION OF CONCRETE STRUCTURES: RECENT ADVANCES
Mahdi Kioumarsi and Vagelis Plevris

MS77: NEW CHALLENGES IN INSTABILITIES OF STRUCTURES AND SOFT MATERIALS
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MS82: MECHANICS OF SOFT, MULTIFUNCTIONAL MATERIALS: EXPERIMENT, MODELING AND SIMULATION
Mokarram Hossain, Daniel Garcia-Gonzalez and Ruike Zhao

MS87: MULTISCALE METHODS FOR COMPOSITES AND HETEROGENEOUS MATERIALS
Paul Steinmann, Guillermo Etse, Daya Reddy and Osvaldo Manzoli

MS88: MULTI-SCALE AND MULTI-LEVEL NUMERICAL METHODS FOR NON-LINEAR SOLIDS
Frédéric Lebon and Isabelle Ramière

MS93: ADVANCED BEAM MODELS - DEVELOPMENT AND APPLICATION
Ioannis Tsiptsis, Evangelos Sapountzakis and Kai-Uwe Bletzinger

MS95: MULTI-SCALE AND MULTI-PHYSIC INTERFACE MODELS
Michele Serpilli, Maria Letizia Raffa, Raffaella Rizzoni, Serge Dumont, Frédéric Lebon, Mikhail Poluektov and Lukasz *Figiel*

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Luiza Angheluta, Jorge Vinals, Marco Salvalaglio and Stefanos Papanikolaou

MS102: ADVANCES IN SHM GUIDED BY ARTIFICIAL INTELLIGENCE AND DATA FUSION
ILARIA VENANZI, FILIPPO UBERTINI and SIMON LAFLAMME

MS105: MODELLING AND SIMULATION OF PARTICLES IN CONTACT
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MS146: MULTISCALE MODELING OF CONCRETE AND CONCRETE STRUCTURES - IN HONOR OF THE 80TH BIRTHDAY OF PROF. HERBERT A. MANG
Bernhard Pichler, Yong Yuan and Günther Meschke

MS148: MODELLING AT DIFFERENT SCALES OF PROCESSES INVOLVING MELTING AND SOLIDIFICATION OF METALS
Jose Cesar de Sa and Michel Bellet

MS149: COMPUTATIONAL STRUCTURAL STABILITY
Herbert A. Mang and Yeong-Bin Yang

MS156: COMPUTATIONAL ANALYSIS OF CONCRETE IN AN EXPERIMENTAL-VIRTUAL-LAB
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MS159: INNOVATIONS IN PHASE-FIELD MODELING, COMPUTATION AND EXPERIMENTAL VALIDATION
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2000 Computational Fluid Dynamics

MS3: MULTIPHASE FLOW AND NON-NEWTONIAN FLUID – MODELLING AND APPLICATIONS
Chenfeng Li

MS5: COMPUTATIONS IN ENVIRONMENTAL AND GEOPHYSICAL FLUID MECHANICS
Clint Dawson, Ethan Kubatko and Eirik Valseth

MS11: HIGH-ORDER GRIDS: GENERATION, ADAPTION AND APPLICATIONS IN FLUIDS AND COUPLED PROBLEMS
Régis Duvigneau and Matthias Möller

MS12: COMPLEX FLUID FLOW IN ENGINEERING: MODELING, SIMULATION AND OPTIMIZATION
Fabian Key, Marek Behr and Stefanie Elgeti

MS14: MULTIPHASE FLOWS WITH SURFACE TENSION AND CAPILLARITY
Julien Bruchon, Nicolas Moulin, Modesar Shakoor and Luisa Silva

MS19: DATA-DRIVEN NUMERICAL AND REDUCED ORDER MODELING OF FLOWS
Nikolaus Adams and Jörg Schumacher

MS22: ADVANCES ON COMPUTATIONAL METHODS FOR MULTIPHASE FLOWS WITH PHASE CHANGE
Luca Brandt, Marica Pelanti and Maria Giovanna Rodio

MS23: UNSTRUCTURED MESH ADAPTATION: FROM MESH GENERATION TO APPLICATIONS
Nicolas Barral, Hugues Digonnet, Algiane Froehly and Jeroen Wackers

MS28: DISCRETE CONSERVTION PROPERTIES FOR FLUID FLOWS: FROM FUNDAMENTALS TO APPLICATIONS.
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F.Xavier Trias, Alexey Duben and Roel Verstappen

MS66: LAMINAR TO TURBULENCE TRANSITION IN AERO/HYDRODYNAMICS
Mostafa Safdari Shadloo and Abdellah Hadjadj

MS84: CURRENT TRENDS IN MODELLING AND SIMULATION OF TURBULENT FLOWS
Suad Jakirlic

MS85: NEAR-WALL REACTIVE FLOWS: SIMULATION, MODELLING AND VALIDATION
Amsini Sadiki, Suad Jakirlic, Christian Hasse and Andreas Dreizler

MS86: MACHINE LEARNING AND DATA-DRIVEN APPROACHES FOR AERODYNAMIC ANALYSIS AND UNCERTAINTY QUANTIFICATION
Esther Andrés

MS89: MODELING OF WETTING AND DEWETTING PHENOMENA ON SMOOTH, ROUGH, AND PATTERNED SUBSTRATES
Mohammad R. Hashemi and Pavel B. Ryzhakov

MS96: LOW REYNOLDS NUMBER FLOWS: FROM MICROSWIMMERS TO MICRODRONES
Matteo Giacomini, Manuel García-Villalba and Ignazio Maria Viola

MS99: BIOLOGICAL FLUID MECHANICS: MODELING, SIMULATION, AND ANALYSIS
Boyce Griffith, Sookkyung Lim and Sarah Olson

MS106: ADVANCES IN NUMERICAL METHODS FOR INHOMOGENEOUS VISCOUS FLOWS: NON-NEWTONIAN, VISCOELASTIC, MULTIPHASE, EDDY-VISCOSITY AND OTHER COMPLEX MODELS
Douglas Pacheco and Richard Schussnig

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MS115: ADVANCES IN SHOCK CAPTURING STRATEGIES FOR HIGH ORDER METHODS
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Celio Fernandes

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Rekha Rao, Jeremy Lechman, Kevin Long, Scott Roberts, Elie Hachem and Patrick Anderson

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Gavin Tabor and Fred Mendonca

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Oriol Lehmkuhl, Eusebio Valero and Jordi Pons

MS127: ADVANCES IN NUMERICAL METHODS FOR FLUID-STRUCTURE INTERACTION
Bernhard Müller, Wolfgang Schröder, Arthur Rizzi, Joris Degroote and Stein Tore Johansen

MS133: STRUCTURE-PRESERVING REDUCED ORDER MODELS FOR FLUID FLOWS
Benjamin Sanderse, Giovanni Stabile and

MS135: MULTIPHYSICS MODELLING BY THE LATTICE BOLTZMANN METHOD
Alessandro De Rosis

MS142: STRUCTURE-PRESERVING FINITE ELEMENT METHODS IN COMPUTATIONAL FLUID DYNAMICS
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MS144: MATHEMATICAL AND COMPUTATIONAL MODELING OF FLUID FLOW AND TRANSPORT IN THE BRAIN AND CENTRAL NERVOUS SYSTEM
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MS154: INTERDISCIPLINARY CHALLENGES TOWARDS EXASCALE FLUID DYNAMICS
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MS155: UQ AND DATA-DRIVEN METHODS FOR SCALE-RESOLVING TURBULENT FLOW SIMULATIONS
Saleh Rezaeiravesh, Philipp Schlatter and Maria Vittoria Salvetti

MS157: MATHEMATICS OF SEA ICE, ICE SHEETS AND ICE SHELVES
Carolin Mehlmann and Clara Burgard

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MS16: IMAGE-INFORMED COMPUTATIONAL MODELS AND METHODS FOR PREDICTION OF CANCER GROWTH AND TREATMENT RESPONSE
Guillermo Lorenzo, David A. Hormuth II, Chengyue Wu, Ernesto A.B.F. Lima, Michael R. A. Abdelmalik, Alessandro Reali, Thomas J.R. Hughes and Thomas E. Yankeelov

MS27: NEW TRENDS IN COMPUTATIONAL POROMECHANICS AT FINITE STRAIN
Pedro Navas, Jinhyun Choo and Lorenzo Sanavia

MS48: MODELING COMPLEX FLUID AND SOLID DYNAMICS DURING EARTHQUAKE RUPTURES
Fabian Barras, Gaute Linga, François Renard, Omar Duran and Eirik Keilegavlen

MS60: BONE-IMPLANT SYSTEMS: FROM EXPERIMENT AND SIMULATION TO CLINICAL APPLICATION
Michael Roland, Marcel Orth, Benedikt Braun and Stefan Diebels

MS70: FEMALE PELVIC FLOOR BIOMECHANICS
Rita Rynkevic, Dulce Oliveira and Elisabete Silva

MS132: MODELLING OF ENVIRONMENT-ASSISTED FRACTURE
Haiyang Yu and Zhiliang Zhang

MS138: MODELLING DIFFUSION IN SOLIDS
Andrés Díaz

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MS2: ISOGEOMETRIC METHODS
Alessandro Reali, Yuri Bazilevs, David J. Benson, René de Borst, Thomas J.R. Hughes, Trond Kvamsdal, Giancarlo Sangalli and Clemens V. Verhoosel

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MS13: DEEP LEARNING FOR HAMITONIAN PROBLEMS AND VARIATIONAL ANALYSIS
Emmanuel Franck, Laurent Navoret and Yannick Privat

MS18: INVERSE PROBLEMS, DESIGN & OPTIMIZATION IN HEAT TRANSFER
Helcio Orlande, George Dulikravich, Marcelo Colaço and Zbigniew Bulinski

MS20: LOCALLY REFINED SPLINE SPACES – PROPERTIES AND STRUCTURES FOR DIFFERENT REFINEMENT FRAMEWORKS
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MS25: ROBUST AND RELIABLE NUMERICAL METHODS IN POROMECHANICS
Fleurianne Bertrand and Jakub Both

MS26: POLYGONAL AND POLYHEDRAL DISCRETIZATIONS FOR PARTIAL DIFFERENTIAL EQUATIONS
Joe Bishop, Michele Botti, Gianmarco Manzini and N. Sukumar

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Christophe Berthon, Manuel J. Castro Díaz and Victor Michel-Dansac

MS34: SIMULATION-BASED OPTIMIZATION CONSIDERING DYNAMIC SYSTEMS AND/OR UNCERTAINTY
Thomas Rung, Benedikt Kriegesmann, Kathrin Welker, MArtin Siebenborn, Robert Seifired and Alexander Düster

MS38: BLOCK PRECONDITIONING FOR CHALLENGING MULTIPHYSICS SYSTEMS
Peter Ohm, John N. Shadid and Matthias Mayr

MS39: MULTI-FIDELITY METHODS FOR UNCERTAINTY QUANTIFICATION AND OPTIMIZATION
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MS45: INNOVATIVE METHODS FOR FLUID-STRUCTURE INTERACTION
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MS64: COMPUTATIONAL PROBLEMS FOR CHARGE TRANSPORT IN LOW DIMENSIONAL STRUCTURES
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Gianluigi Rozza and Giovanni Stabile

MS83: ADVANCES IN SOLUTION STRATEGIES FOR PHYSICAL PROCESSES IN POROUS MEDIA WITH COMPLEX GEOMETRIES
Alessio Fumagalli, Elyes Ahmed and Michele Starnoni

MS90: STRUCTURE PRESERVING AND ADAPTIVE POLYTOPAL METHODS
Paola F. Antonietti, Andrea Cangiani, Zhaonan Dong and Lorenzo Mascotto

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Manuel Jesus Castro Diaz, Siddharta Mishra and David Pardo

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Luca Dede', Nicola Parolini and Christian Vergara

MS120: MATHEMATICAL AND COMPUTATIONAL ASPECTS OF MIXED-DIMENSIONAL COUPLING PROBLEMS
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MS158: PREDICITIVE MODELLING FOR MULTI-PHYSICS PROBLEMS IN ENGINEERING: METHODS, ALGORITHMS AND CHALLENGES
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MS32: BAYESIAN INFERENCE OF ENGINEERING MODELS: ADVANCES IN THEORY AND APPLICATIONS
Oindrila Kanjilal, Iason Papaioannou, Daniel Straub, Geert Lombaert and Costas Papadimitriou

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MS107: HPC METHODS FOR EIGENVALUE PROBLEMS IN APPLIED SCIENCE AND ENGINEERING
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MS116: EMERGING METHODS FOR LARGE-SCALE AND ROBUST MULTIDISCIPLINARY OPTIMIZATION (MDO) FOR INDUSTRIAL APPLICATIONS
Jens-Dominik Mueller, Arthur Stueck and Marcus Meyer

MS117: DEEP LEARNING APPROACHES FOR APPLIED SCIENCES AND ENGINEERING
M. Giselle Fernández-Godino, Charles F. Jekel and Christian Gogu

MS125: REDUCED ORDER MODELING OF DYNAMICAL SYSTEMS THROUGH DEEP LEARNING TECHNIQUES
Andrea Manzoni, Mengwu Guo and Paris Perdikaris

MS128: DAKOTA SOFTWARE FOR OPTIMIZATION, UNCERTAINTY QUANTIFICATION AND MODEL CALIBRATION
D. Thomas Seidl, Brian M. Adams, J. Adam Stephens and Gianluca Geraci

MS129: RECENT ADVANCES IN NUMERICAL SIMULATION OF LANDSLIDES AND DEBRIS FLOWS
Pavel A. Trapper

MS151: ADVANCES IN AUTOMATIC CODE-GENERATION SOFTWARE FOR SIMULATIONS IN SCIENCE AND ENGINEERING
Jeremy Bleyer, Jack S. Hale, Marie E. Rognes and Garth N. Wells

MS152: ADVANCEMENTS IN VULNERABILITY ASSESSMENT AND STRENGTHENING OF HISTORICAL CONSTRUCTIONS
Mahdi Kioumarsi, Maria Zucconi, Francesca Nerilli and Amirhosein Shabani

6000 Young Investigators Initiative

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MS50: DATA-DRIVEN REDUCED SIMULATION MODELS FOR INDUSTRIAL APPLICATIONS
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MS57: CHALLENGES AND PROGRESS IN COMPUTATIONAL SCIENCE AND ENGINEERING: FROM INDUSTRY 4.0 TO SUSTAINABLE DEVELOPMENT
Matteo Giacomini, Simona Perotto and Gianluigi Rozza

MS73: PHYSICS- AND DATA-DRIVEN MODELLING TECHNIQUES FOR DIGITAL TWINS
Oliver Barrowclough, Jeroen Broekhuijsen, Kjetil Johannessen and Andre Stork

MS79: MATHEMATICAL MODELS AND SIMULATION TOOLS FOR FUNCTIONAL COATINGS
Natalia Konchakova, Peter Klein, Ulf Schoeneberg, Daniel Hoeche and Heinz A. Preisig

MS143: DISCRETE ELEMENT METHOD (DEM) SIMULATIONS OF PHARMACEUTICAL PROCESSES
Peter Toson and Peter Böhling

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

Monday	9:00 - 10:30	11:00 - 13:00	14:00 - 16:00	16:30 - 18:30
Hedmark (GF)		STS01A	STS05A	STS05B
Nord – Norge (GF)		MS2A	MS2B	MS2C
Nordland (GF)		MS150A	MS150B	MS23A
Oslo 1 (GF)		YIMSA	YIMSB	MS147A
Oslo 2 (GF)		MS53A	MS53B	MS53C
Rogaland (GF)		MS57A	MS57B	MS62A
Romerike (GF)		MS105A	MS105B	MS105C
Sør – Norge (GF)		MS99A	MS99B	MS99C
Akershus (1F)		MS146A	MS146B	MS146C
Buskerud (1F)		MS155A	MS155B	MS145A
Hordaland 1 (1F)		MS5A	MS5B	MS5C
Hordaland 2 (1F)		MS92A	MS92B	MS92C
Oppland (1F)		CS01A	CS01B	CS02A
Vestfold (1F)		MS89A	MS11A	MS91A
A1 – 1		MS21A	MS21B	MS21C
A1 – 2		MS72A	MS72B	MS72C
A1 – 3		MS161A	MS161B	MS161C
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A1 – 5		MS30A	MS30B	MS30C
A1 – 6		MS15A	MS15B	MS15C
B1 – 1		MS42A	MS42B	MS90A
B1 – 2		MS10A	MS10B	MS61A
B3 + B4	OC	MS12A	MS12B	MS12C
Jan Mayen 1		MS44A	MS44B	MS44C
Jan Mayen 2		MS153A	MS153B	MS153C
Jan Mayen 3		MS117A	MS117B	MS117C
Lounge A2		MS37A	MS37B	MS37C
Spitsbergen		MS86A	MS143A	MS151A
Svalbard		MS6A	MS6B	MS6C
O – 3		MS16A	MS16B	MS24A
O – 4		MS29A	MS29B	MS107A

Thon Hotel Arena NOVA Spektrum Center

Sunday, June 5th

16:30 - 20:00	**Registration at Nova Spektrum West entrance**
18:00 - 20:00	**Ice-breaking Reception at Nova Spektrum West entrance**

Monday, June 6th

6/6/22 09:00 - 10:30 **Opening Session**	OS Room: B3 + B4 Chair: Trond Kvamsdal

Welcome Addresses

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

ECCOMAS Medals:
The Prandtl Medal
The Euler Medal

10:30 - 11:00
Coffee Break

11:00 - 13:00 | TECHNICAL SESSIONS

6/6/22 11:00 - 13:00 **The Combined Role of Modelling, Simulation, Optimization, Control and Digitalization for Solving New Computational Challenges of Aviation, Transport and Renewable Energy I**	STS01A Room: Hedmark (GF) Chair: Jaques Periaux

Grey-Box Modeling with Applications in Data-driven Turbulence Modeling
Nicolas R. Gauger

Rapid Aerodynamic Modelling at Airbus
Xavier Bertrand

Hybrid optimization methods applied to preliminary design of a wing
Marti Coma, Jordi Pons-Prats and Gabriel Bugeda

Multi-fidelity simulations for multidisciplinary design optimization
Alberto Clarich, Luca Battaglia, Lucia Parussini and Carlo Poloni

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

6/6/22 11:00 - 13:00
Isogeometric Methods I
Minisymposium organized by Alessandro Reali, Yuri Bazilevs, David J. Benson, René de Borst, Thomas J.R. Hughes, Trond Kvamsdal, Giancarlo Sangalli and Clemens V. Verhoosel

MS2A
Room: Nord – Norge (GF)
Chair: Alessandro Reali

Steps Towards Productive Use of IGA in LS-DYNA for Full Vehicle Crash Simulations (Keynote Lecture)
Lukas Leidinger, Stefan Hartmann, Attila Nagy, Liping Li, Marco Pigazzini, Lam Nguyen and Dave Benson

Intrinsically selective mass scaling for isogeometric structural analysis
Bastian Oesterle, Lisa-Marie Krauß, Rebecca Thierer, Anton Tkachuk and Manfred Bischoff

Transverse shear parametrization in non-linear isogeometric shell analysis
Rebecca Thierer, Bastian Oesterle and Manfred Bischoff

Isogeometric Impact Simulations Under Large Rotations in Flexible Multibody Systems
Tobias Rückwald, Alexander Held and Robert Seifried

Towards IGA application on crashworthiness CAE analysis in the automotive industry
Lluis Martorell, Riccardo Rossi, Lucia Barbu and Eduardo Martin-Santos

6/6/22 11:00 - 13:00
Mathematical models and numerical methods for interface-coupled multiphysics problems I
Minisymposium organized by Ana Budisa, Miroslav Kuchta and Kent-Andre Mardal

MS150A
Room: Nordland (GF)
Chair: Ana Budisa

An integrated model of the human heart: coupling electrophysiology, solid mechanics and fluid dynamics
Michele Bucelli, Luca Dede' and Alfio Quarteroni

3D-0D closed-loop model for the simulation of cardiac electromechanics
Roberto Piersanti, Christian Vergara, Luca Dede' and Alfio Quarteroni

Fluid-structure interaction of slender bodies immersed in three-dimensional flows: a new approach for mathematical modeling and numerical approximation
Fabien Lespagnol, Muriel Boulakia, Céline Grandmont, Paolo Zunino and Miguel-Angel Fernández

Boundary integral equation method in the coupled theory of double-porosity thermoelastic materials
Merab Svanadze

Mathematical investigation of corrosion behavior of bioabsorbable metals on the biodegradation interface
Mojtaba Barzegari and Liesbet Geris

6/6/22 11:00 - 13:00
EYIC Young Investigators Minisymposium I
Minisymposium organized by Simone Morganti, Carina Schwarz, Markus Lukacevic and Lèo Neauveau

YIMSA
Room: Oslo 1 (GF)
Chair: Simone Morganti
CoChair: Leo Nouveau

Interlaminar stress modeling of composite Kirchhoff plates combining immersed Isogeometric Analysis and equilibrium
Alessia Patton, Massimo Carraturo, Ferdinando Auricchio and Alessandro Reali

Robust discretizations for poroelastic problems: engineering and mathematical points of views in a presenation in pairs
Maximilian Brodbeck and Fleurianne Bertrand

Comparison of different numerical methods in biomedical applications I
Natalia Moleda, Anna Skorupa, Grzegorz Kokot and Alicja Piasecka-Belkhayat

Comparison of different numerical methods in biomedical applications II
Natalia Molęda, Anna Skorupa, Grzegorz Kokot and Alicja Piasecka-Belkhayat

On different discretisation strategies to solve the kinematical and equilibrium problem for masonry-like structures
Andrea Montanino, Carlo Olivieri, Daniela De Gregorio and Antonino Iannuzzo

6/6/22 11:00 - 13:00
Metamaterials Across the Scales: Modeling, Experiment and Simulation I
Minisymposium organized by Jörg Schröder, Varvara Kouznetsova, Dennis Kochmann, Marc-Andre Keip and Geralf Hütter

MS53A
Room: Oslo 2 (GF)
Chair: Jörg Schröder

Wang tiles for exploring and manufacturing modular metamaterials (Keynote Lecture)
Jan Zeman

Manipulation of acoustic wavefronts by resonator-based metasurface
Xhorxha Kuci, Marc G.D Geers and Varvara G. Kouznetsova

Two-scale asymptotic homogenization in a MEMS auxetic structure for over etch identification
David Faraci, Alessandro Nastro, Valentina Zega and Claudia Comi

Architectured and additively manufactured double-negative index metamaterials
Cláudia Almeida, João Cardoso, Pedro Coelho, Alexandre Velhinho and José Xavier

Multiscale reduced-order model for metafoams
Renan Liupekevicius Carnielli, Hans van Dommelen, Marc Geers and Varvara Kouznetsova

Challenges and progress in computational science and engineering: from industry 4.0 to sustainable development I
Minisymposium organized by Matteo Giacomini, Simona Perotto and Gianluigi Rozza

MS57A
Room: Rogaland (GF)
Chair: Matteo Giacomini
CoChair: Simona Perotto

Model and Method Hierarchies for Biomedical Flow Simulation (Keynote Lecture)
Marek Behr

Deep Reinforcement Learning for fluid mechanics
Elie Hachem, Philippe Meliga, Hassan Ghaieb, Ramy Nemer, Rudy Valette, Aurelien Larcher and Jonathan Viquerat

Separation behaviour of small foreign objects in dry foods
Shunsuke Takeda and Masato Saeki

Variational image segmentation on anisotropic adapted meshes for medical applications
Nicola Ferro, Francesco Clerici, Simona Perotto, Stefano Micheletti, Stefania Marconi and Erika Negrello

HiFiMagnet: a toolchain for the design and simulation of high field magnets
Christophe Trophime, Vincent Chabannes, Christophe Prud'Homme, Romain Hild and Fracnois Debray

6/6/22 11:00 - 13:00
Modelling and simulation of particles in contact I
Minisymposium organized by Kristin M. de Payrebrune and Matthias Kröger

MS105A
Room: Romerike (GF)
Chair: Kristin de Payrebrune
CoChair: Matthias Kröger

Particles in rubber contacts
Matthias Kröger

Adhesion in rolling contact of a particle
Qiang Li and Valentin L. Popov

Investigation of the Contact Behaviour of a Tyre for Non-Steady Maneouvers by Means of Frustated Total Reflection
Tobias Hellberg and Martin Meywerk

Simulation and experimental investigation of tire tread block wear in three-body contact
Duc Nam Nguyen and Stephanie Kahms

The role of particles in the sealing contact of radial shaft seals
Stefan Thielen, Tim Schollmayer and Oliver Koch

Interactions between the contact area and self-excited vibrations in a particle-solid system
Thomas Fürstner and Matthias Kröger

6/6/22 11:00 - 13:00
Biological fluid mechanics: modeling, simulation, and analysis I
Minisymposium organized by Boyce Griffith, Sookkyung Lim and Sarah Olson

MS99A
Room: Sør – Norge (GF)
Chair: Sarah Olson

Simulations of fluttering leaves
Shilpa Khatri, Nicholas Battista, Laura Miller and Matea Santiago

Flash or Sniff: Testing the evolutionary divergence of firefly antennae due to sexual selection
Lindsay Waldrop and Shilpa Khatri

Numerical Investigation of a 3D Dragonfly Wing Captured with a High-Resolution Micro-CT
Vera Stelzer, Markus Rütten and Lars Krenkel

Swimming behavior of polarly-flagellated bacteria
Sookkyung Lim, Yongsam Kim, Wanho Lee and Jeungeun Park

Hydrodynamic entrapment of uni-flagellated bacteria with flexible flagellum near a flat surface
Vahid Nourian and Henry Shum

Effects of prey capture on the swimming and feeding performance of choanoflagellates
Lisa Fauci, Hoa Nguyen, Emma Ross, Ricardo Cortez and M.A.R. Koehl

6/6/22 11:00 - 13:00
Multiscale modeling of concrete and concrete structures - in honor of the 80th birthday of Prof. Herbert A. Mang I
Minisymposium organized by Bernhard Pichler, Yong Yuan and Günther Meschke

MS146A
Room: Akershus (1F)
Chair: Bernhard Pichler

A Critical Appraisal Of Peridynamics And Phase-Field Models In Light Of Gap Test And Classical Fracture Tests (Keynote Lecture)
Zdenek Bazant, Hoang Nguyen and Abdullah Donmez

3D Finite Element Analysis of Time-Dependent Structural Failure of Concrete Beams in Bending due to Nonlinear Creep
Alexander Dummer, Matthias Neuner and Günter Hofstetter

Static and dynamic analysis of concrete fracture using localizing gradient damage
Adam Wosatko, Jerzy Pamin and Andrzej Winnicki

Thermodynamically consistent interface model of bond in reinforced concrete applicable to general loading conditions
Abedulgader Baktheer, Mario Aguilar, Miroslav Vořechovský, Josef Hegger and Rostislav Chudoba

Physics-informed neural networks with trainable weighted loss using uncertainty: applications to inverse analysis of tunnel rings
Chen Xu, Ba Trung Cao, Günther Meschke and Yong Yuan

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

6/6/22 11:00 - 13:00
UQ and data-driven methods for scale-resolving turbulent flow simulations I
Minisymposium organized by Saleh Rezaeiravesh, Philipp Schlatter and Maria Vittoria Salvetti

MS155A
Room: Buskerud (1F)
Chair: Maria Vittoria Salvetti

Development of a data-driven wall-model for separated flows (Keynote Lecture)
Margaux Boxho, Michel Rasquin, Thomas Toulorge, Grégory Dergham, Grégoire Winckelmans and Koen Hillewaert

Effects of uncertainties of image-based material properties of great vessels on vascular deformation
Benigno Marco Fanni, Maria Nicole Antonuccio, Giuseppe Santoro, Alessandro Mariotti, Maria Vittoria Salvetti and Simona Celi

Quantifying Uncertainties in Direct Numerical Simulations of a Turbulent Channel Flow
Joseph O'Connor, Sylvain Laizet, Andrew Wynn, Jon McCullough and Peter Coveney

Quantification of time-averaging uncertainties in turbulence simulations
Donnatella Xavier, Saleh Rezaeiravesh, Ricardo Vinuesa and Philipp Schlatter

Data-Driven Inference Design for the Bayesian Uncertainty Quantification of the Reactive Shock-Bubble Interaction
Ludger Paehler and Nikolaus A. Adams

6/6/22 11:00 - 13:00
Computations in Environmental and Geophysical Fluid Mechanics I
Minisymposium organized by Clint Dawson, Ethan Kubatko and Eirik Valseth

MS5A
Room: Hordaland 1 (1F)
Chair: Eirik Valseth
CoChair: Ethan Kubatko

Model Adaptivity – Combining Hydrostatic And Non-Hydrostatic Shallow Water Modeling (Keynote Lecture)
Jörn Behrens

An adaptive model for meteotsunamis
Nicole Beisiegel and Jörn Behrens

Comparaison of Lax-Wendroff numerical schemes solving conservative and non-conservative Boussinesq equations to an operational code
Aurore Cauquis, Mario Ricchiuto and Philippe Heinrich

Influence of the turbulent wake downstream offshore wind turbines on larval dispersal: development of a new Lagrangian-Eulerian model
Souha Ajmi, Martial Boutet, Anne-Claire Bennis and Jean-Claude Dauvin

Propagation of acoustic and gravity waves in the ocean: a new derivation for a general model
Juliette Dubois, Jacques Sainte-Marie and Sébastien Imperiale

6/6/22 11:00 - 13:00
Higher order finite element methods for challenging mathematical problems in engineering and applied sciences I
Minisymposium organized by Antti H. Niemi and Leszek F. Demkowicz

MS92A
Room: Hordaland 2 (1F)
Chair: Antti Niemi

Non-polynomial trial shape functions in the DPG method
Leszek F. Demkowicz and Eirik Valseth

Multistage DPG time-marching scheme for semi-linear problems
Judit Muñoz-Matute, David Pardo and Leszek Demkowicz

Regularization of rough linear functionals and adaptivity
Ignacio Muga, Felipe Millar, Sergio Rojas and Kristoffer Van der Zee

A C0 interior penalty method for mth-Laplace equation
Weifeng Qiu

A superconvergent adaptive stabilized finite element method based on residual minimization
José Hasbani, Ignacio Muga, Sergio Rojas and Patrick Vega

Goal-oriented hp-adaptive finite element methods: a painless multilevel automatic coarsening strategy for non-SPD problems
Felipe V. Caro, Vincent Darrigrand, Julen Alvarez-Aramberri, Elisabete Alberdi and David Pardo

6/6/22 11:00 - 13:00
Advanced Methods in Computational Mechanics-
Minisymposium organized by Bernhard Pichler, Yong Yuan and Günther Meschke

CS01A
Room: Oppland (1F)
Chair: Miguel Costas

Seismic performance of dissipative automated rack supported warehouses
Agnese Natali, Francesco Morelli and Walter Salvatore

Seismic performance of an innovative dissipative replaceable components bracing steel frame (DRBrC)
Silvia Caprili, Francesca Mattei and Walter Salvatore

Dissipation of sound and shear waves in confined channels
Hannes Holey, Peter Gumbsch and Lars Pastewka

Aerated wave propagation and wave impacts on structures
Peter Wellens and Martin van der Eijk

Comparing three calculation methods of load distribution in radial bearings
Mario C. Ricci

Dynamic behaviour and stability of localized bipenalty formulation in contact-impact problems
Radek Kolman, José A. González, Ján Kopačka, Radim Dvořák and K.C. Park

6/6/22 11:00 - 13:00
Modeling of wetting and dewetting phenomena on smooth, rough, and patterned substrates
Minisymposium organized by Mohammad R. Hashemi and Pavel B. Ryzhakov

MS89A
Room: Vestfold (1F)
Chair: Mohammad R. Hashemi

Reactive wetting versus non-reactive wetting
Ensieh Yousefi, Youqing Sun, Anil Kunwar, Muxing Guo, Nele Moelans and David Seveno

Simulating wetting of geometrically complex surfaces using the unstructured Volume-of-Fluid method
Muhammad Hassn Asghar, Mathis Fricke, Dieter Bothe and Tomislav Maric

A 3D Enriched-FEM / Level-set framework for simulating droplet dynamics with contact-angle hysteresis
Mohammad R. Hashemi, Pavel B. Ryzhakov and Riccardo Rossi

A droplet-phase approach to solve thin-film flows
Anand Sundaresan, Pratik Suchde and Joerg Kuhnert

Data-driven approaches as a possible means for modeling water transport in gas diffusion layer of fuel cells
Pavel Ryzhakov, Mohammad R. Hashemi, Marc Nuñez, Riccardo Rossi, Olga Antonova and Artur Perovskii

6/6/22 11:00 - 13:00
Mechanics of wood and biocomposites in engineering I
Minisymposium organized by Ani Khaloian, Markus Lukacevic and Jan-Willem van de Kuilen

MS21A
Room: A1 – 1
Chair: Markus Lukacevic
CoChair: Ani Khaloian

Asymptotic homogenization of the effective hygro-elastic response of oak based on microscopic images
Mohammadamin Livani, Emanuela Bosco and Akke.S.J Suiker

Computed tomography-based modelling of moisture transport and hygro-mechanical behaviour of sawn timber during kiln drying
Sara Florisson, Lars Hansson, Johannes Huber, José Couceiro and Dick Sandberg

Wood feature reconstruction for simulations using x-ray computed tomography data
Johannes A. J. Huber, Olof Broman, Johan Oj and Lars Hansson

Micromechanics of biocomposites: Stiffness upscaling from cellulose nanofibrils to natural fibers and their composites
Markus Königsberger, Markus Lukacevic and Josef Füssl

Predicting the mechanical behaviour of a natural composite: the flax fibre
Emmanuelle Richely, Hom Dhakal, Zhongyi Zhang, Johnny Beaugrand and Sofiane Guessasma

6/6/22 11:00 - 13:00
Model order reduction - Challenges in engineering and industrial applications I
Minisymposium organized by Annika Robens-Radermacher, Wil Schilders, Karen Veroy and Chady Ghnatios

MS72A
Room: A1 – 2
Chair: Karen Veroy

State of the art and perspectives for reduced order methods in industrial computational fluid dynamics (Keynote Lecture)
Gianluigi Rozza

Stability Analysis of Reduced Basis Model Predictive Control for Parametrized Optimal Control Problems
Saskia Dietze and Martin Grepl

Nonlinear Reduced Modelling based on Optimal Transport Metrics
Minh-Hieu Do, Jean Feydy and Olga Mula

Model order reduction of solidification problems
Florian Arbes, Øyvind Jensen and Kent-Andre Mardal

Accelerated nonlinear PDE-constrained optimization by reduced order modelling
Benjamin F. Gibson and Masayuki Yano

6/6/22 11:00 - 13:00
Modeling and simulation of highly flexible slender structures I
Minisymposium organized by Martin Arnold, Olivier Brüls, Elena Celledoni, Brynjulf Owren, Damien Durville, José Escalona, Johannes Gerstmayr, Gordan Jelenić, Sigrid Leyendecker, Joachim Linn, Tomaž Šuštar , Olivier Thomas and Dejan Zupan

MS161A
Room: A1 – 3
Chair: Damien Durville

Pure bending in non-linear elasticity - analytical solution for a family of elastic materials in 2d continuum mechanics
Gordan Jelenic

A high-order finite element formulation for nonlinear computation of cables
André Hildebrandt, Prateek Sharma, Stefan Diebels and Alexander Düster

Homogenization of the constitutive properties of composite beam cross-sections
Martina Stavole, Rodrigo T. Sato, Margus Lohk and Sigrid Leyendecker

Modeling the Effective Inelastic Behavior of Multi-Wire Cables Under Mechanical Load Using Finite Elements
Muhannad Hawwash, Vanessa Dörlich, Joachim Linn, Roger Keller and Ralf Müller

Data-based inelastic constitutive models in the framework of Cosserat rods.
Davide Manfredo, Vanessa Dörlich, Joachim Linn and Martin Arnold

Computational homogenization of spiral strands using 1d finite strain beam elements
Mohammad Ali Saadat and Damien Durville

6/6/22 11:00 - 13:00
Innovative Methods for Fluid-Structure Interaction I
Minisymposium organized by Harald van Brummelen, Trond Kvamsdal and Roger Ohayon

MS45A
Room: A1 – 4
Chair: Harald van Brummelen

On the accuracy of Robin-type loose coupling for FSI (Keynote Lecture)
Erik Burman, Rebecca Durst, Miguel A. Fernández and Johnny Guzmán

Waveform relaxation methods for thermal fluid structure interaction
Philipp Birken, Peter Meisrimel and Niklas Kotarsky

A Quasi-Newton-Accelerated Robin-Neumann Scheme for Fluid-Structure Interaction
Thomas Spenke, Michel Make and Norbert Hosters

Second-order accurate staggered schemes for fluid-structure interaction based on Dirichlet-Neumann coupling
Eman Alhayki, Wulf G. Dettmer and Djordje Perić

6/6/22 11:00 - 13:00
Simulations of Polymers and Polymer Composites I
Minisymposium organized by Sebastian Pfaller, Fabrice Detrez and Hans van Dommelen

MS30A
Room: A1 – 5
Chair: Fabrice Detrez

Nonlinear viscoelastic behavior of polymer nanocomposites: Coarse-grained-based predictions and experimental validation
Atiyeh Mousavi, Behrouz Arash, Max Jux and Raimund Rolfes

Domain-decomposition simulations of polymers
Sebastian Pfaller

An adaptive multiscale coupling method for thermoplastic polymers
Christof Bauer and Sebastian Pfaller

Molecular mechanisms involved in treatment of waterlogged archaeological wood with polyethylene glycol: A hybrid Monte Carlo and molecular dynamics study
Ali Shomali, Chi Zhang, Benoit Coasne, Eleanor J. Schofield, Dominique Derome and Jan Carmeliet

An atomistic-to-continuum coupling method for fracture simulations of amorphous polymers
Wuyang Zhao, Paul Steinmann and Sebastian Pfaller

From self-assembly to mechanical behaviour: a computational data-driven framework for block copolymers
Aravinthen Rajkumar, Peter Brommer and Lukasz Figiel

6/6/22 11:00 - 13:00
Advanced Computational Design and Manufacturing Simulation of Novel Materials and Structures I
Minisymposium organized by Eric Li, Bing LI, ZC He, QQ Li, Fei Wu, ZQ Zheng and Yi Wu

MS15A
Room: A1 – 6
Chair: P. Antolin

Multiscale isogeometric design of lattice structures
Thibaut Hirschler, Pablo Antolin and Annalisa Buffa

Shape and size optimization of a complex extruded aluminium profile for protection of battery trays in electric vehicles
Debora Obkircher, Miguel Costas, Tore Børvik and Odd Sture Hopperstad

Modular-topology optimization of structures and mechanisms: a free-material optimization-based heuristics
Marek Tyburec, Martin Doškář, Jan Zeman and Martin Kružík

Assesment of some integration methods for an evolution equation based high-cycle fatigue model
Juha Jeronen, Reijo Kouhia, Joonas Lahtinen and Heikki Orelma

A machine learning-based soft finite element method
Van Dung Nguyen, Sara Garzon-Hernandez, Pablo S. Naharro, Jose M. Peña and Antoine Jérusalem

Further development of a simulation model for the description of the crystallization kinetics of semi-crystalline thermoplastics in additive manufacturing
Felix Winkelmann and Robert Hein

6/6/22 11:00 - 13:00
Uncertainty Quantification in material sciences I
Minisymposium organized by Florent Pled, Christophe Desceliers, Maarten Arnst and Christian Soize

MS42A
Room: B1 – 1
Chair: Florent Pled
CoChair: Maarten Arnst

Phase Field Model for Brittle Fracture in Random Heterogeneous Elastic Media : Forward Numerical Simulations and Sensitivity Analysis
Idiris Satgun, Florent Pled and Christophe Desceliers

Numerical model of the variability of particulate filled structural adhesive behaviour and failure in tension
Lorraine Aparecida Silva, Christine Espinosa, Eric Paroissien, Frédéric Lachaud and Lucas F.M. da Silva

Probabilistic modeling of LCF failure times using a epidemiological crack percolation model
Mathis Harder, Philipp Lion, Lucas Mäde, Tilmann Beck and Hanno Gottschalk

Dynamic simulation of viscoelastic stochastic structures using time-separated stochastic mechanics
Hendrik Geisler, Jan Nagel and Philipp Junker

A modular nonlinear stochastic finite element formulation for uncertainty estimation in contact mechanics
Yanis Ammouche and Antoine Jérusalem

Simulation of an additive manufacturing process considernig process and material uncertainties using a voxel-based approach
Albrecht Schmidt and Tom Lahmer

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

6/6/22 11:00 - 13:00
Advanced Techniques for Coupled Problems I
Minisymposium organized by Markus Bause and Florin Adrian Radu

MS10A
Room: B1 – 2
Chair: Markus Bause
CoChair: Florin A. Radu

Analysis and approximation of mixed-dimensional pdes on 3d-1d domains coupled with lagrange multipliers (Keynote Lecture)
Luca Heltai, Miroslav Kuchta, Kent-Andre Mardal and Paolo Zunino

An explicit two-scale scheme for a two-phase porous media flow model: A view on the effective parameters
Manuela Bastidas, Sohely Sharmin, Sorin Pop and Carina Bringedal

Efficient solution of heart-torso coupled problems through DEIM-based data projection across non-conforming interfaces
Elena Zappon, Andrea Manzoni and Alfio Quarteroni

Efficient parametric derivative computations of the pressure in an acoustic cavity with immersed structures
Antoine Legay and Luc Laurent

Decoupling time integration methods for coupled elliptic-parabolic systems
Robert Altmann, Abdullah Mujahid and Benjamin Unger

6/6/22 11:00 - 13:00
Complex fluid flow in engineering: modeling, simulation and optimization I
Minisymposium organized by Fabian Key, Marek Behr and Stefanie Elgeti

MS12A
Room: B3 + B4
Chair: Marek Behr

Analysis of Shear-thinning Planar Flows
Jaewook Nam, Hyungyeol Kwak and Nayeon Park

Numerical simulation of pipelines sinking and floatation in a liquefied sand
Massimiliano Cremonesi, Gabriele Della Vecchia and Federico Pisanò

Development lengths for non-newtonian flows in pipes and tubes based on the wall shear stress
Chryso Lambride, Alexandros Syrakos and Georgios C. Georgiou

Stabilized mixed formulation for an implicit Material Point Method for viscoplastic fluids by using the variational subgrid-scale framework
Laura Moreno, Antonia Larese and Alessandro Contri

Numerical modeling of the extrusion process in fused filament fabrication
Mehul Lukhi, Christoph Mittermeier and Josef Kiendl

Phenomenological modeling of thrombus formation: an application for aortic dissection
Alireza Jafarinia, Chlöe H. Armour, Xiao Y. Xu and Thomas Hochrainer

6/6/22 11:00 - 13:00
Recent advances in immersed boundary and fictitious domain methods I
Minisymposium organized by Alexander Idesman, Guglielmo Scovazzi, Antonia Larese , Riccardo Rossi , André Massing, Santiago Badia and Francesc Verdugo

MS44A
Room: Jan Mayen 1
Chair: Guglielmo Scovazzi

The Inverse Finite Cell Method for Structural Identification (Keynote Lecture)
Tim Bürchner, Philipp Kopp, Stefan Kollmannsberger and Ernst Rank

A cut finite-element method for fracture and contact problems in large-deformation solid mechanics
Mikhail Poluektov and Lukasz Figiel

A Cut Finite Element Method for Ionic Electrodiffusion Problems on Resolved Cell Geometries
Nanna Berre, André Massing and Marie Rognes

Polytopal discontinuous Galerkin approximation of the fully-coupled thermo-poroelastic problem
Paola F. Antonietti, Stefano Bonetti and Michele Botti

Recovering equilibrating tractions on conforming hexahedral elements in the cgFEM framework
M. Bosch-Galera, EAW Maunder, E. Nadal, J.J. Ródenas and J.M. Navarro-Jiménez

6/6/22 11:00 - 13:00
Robust and scalable numerical methods for wave propagation: design, analysis and application I
Minisymposium organized by Hélène Barucq, Théophile Chaumont-Frelet, Rabia Djellouli and Axel Modave

MS153A
Room: Jan Mayen 2
Chair: T. Chaumont-Frelet
CoChair: A. Modave

Virtual element method for solving boundary integral equations of electromagnetic scattering at a perfectly conducting body
Alexis Touzalin, Emanuele Arcese and Sébastien Pernet

High-frequency estimates on boundary integral operators for the Helmholtz exterior Neumann problem
Jeffrey Galkowski, Pierre Marchand and Euan Spence

A Hybrid High-Order Method for the Indefinite Time-Harmonic Maxwell Problem
Matteo Cicuttin and Christophe Geuzaine

Iterative Trefftz method for three-dimensional electromagnetic waves simulation
Sébastien Pernet, Margot Sirdey and Sébastien Tordeux

Spectral coarse spaces for indefinite and non-self adjoint problems
Niall Bootland, Victorita Dolean, Ivan G. Graham, Chupeng Ma and Robert Scheichl

Multi-GPU speedup of an iterative time-harmonic wave solver
Christiaan C. Stolk

6/6/22 11:00 - 13:00
Deep Learning Approaches for Applied Sciences and Engineering I
Minisymposium organized by M. Giselle Fernández-Godino, Charles F. Jekel and Christian Gogu

MS117A
Room: Jan Mayen 3
Chair: M. Giselle Fernandez -Godino
CoChair: Charles F. Jekel

Simulation of reacting flows using artificial neural networks: application to multi-regime combustion
Cédric Mehl and Damien Aubagnac-Karkar

Neural network-based filtered drag model for cohesive gas-particle flows
Josef Tausendschön, Stefan Radl and Sankaran Sundaresan

Using conservation laws to infer deep learning model accuracy of Richtmyer-Meshkov instabilities
Charles F. Jekel, Dane M. Sterbentz, Sylvie Aubry, Youngsoo Choi, Daniel A. White and Jonathan L. Belof

Deep Convolutional Autoencoders for Predicting Wind-Driven Spatial Patterns
M. Giselle Fernández-Godino, Donald D. Lucas and Qingkai Kong

Approximating the full-field temperature evolution in 3D electronic systems from randomized "Minecraft" systems
Monika Stipsitz and Helios Sanchis-Alepuz

Estimating geomechanical parameters from hydraulic fracturing tests using a soft computing-based methodology
Rafael Abreu, Cristian Mejia and Deane Roehl

6/6/22 11:00 - 13:00
Continuum Biomechanics of Active Systems I
Minisymposium organized by Tim Ricken, Oliver Röhrle and Silvia Budday

MS37A
Room: Lounge A2
Chair: Tim Ricken
CoChair: Lena Lambers

A coupled multiphysics approach for modelling in-stent restenosis (Keynote Lecture)
Stefanie Reese, Kiran Manjunatha, Marek Behr and Felix Vogt

A Multiphysics Continuum Model for In-Stent Restenosis
Meike Gierig, Peter Wriggers and Michele Marino

Multiscale Simulation of Active Biological Multiphase Tissue
Tim Ricken, Lena lambers, Franziska Egli and Seyed Morteza

A Multiscale and Multiphase, Data- and Knowledge-Driven Simulation of Function-Perfusion Processes in the Human Liver
Lena Lambers, Steffen Gerhäusser, Luis Mandl, André Mielke and Tim Ricken

Modelling of advection-diffusion transport in liver tissue using the homogenization approach
Eduard Rohan, Vladimir Lukes and Jana Camprova Turjanicova

6/6/22 11:00 - 13:00
Machine Learning and Data-Driven Approaches for Aerodynamic Analysis and Uncertainty Quantification
Minisymposium organized by Esther Andrés

MS86A
Room: Spitsbergen
Chair: Esther Andrés

Data-Driven Reduced Order Modeling for Aerodynamic Flow Predictions
Derrick A. Hines Chaves and Philipp Bekemeyer

Comparison of uncertainty quantification methods for mathematical and mechanical problems in intermediate dimensions
Jacques Peter and Quentin Bennehard

A comparison of machine learning methods for pressure coefficient prediction of an aeronautical configuration
Alejandro Gorgues, Rodrigo Castellanos, Jaime Bowen and Esther Andrés

Reynolds stress correction by machine learning methods with physical constraints
Thomas Philibert, Andrea Ferrero, Angelo Iollo and Francesco Larocca

MPI-Parallel Machine Learning Algorithms for the Analysis of High-Speed Video Data
Alexander Ruettgers and Anna Petrarolo

Neural network prediction of the flow field in a periodic domain with hyper-neural network parametrization
Ondřej Bublík, Václav Heidler, Aleš Pecka and Jan Vimmr

6/6/22 11:00 - 13:00
Multiscale Computational Homogenization for Bridging Scales in the Mechanics and Physics of Complex Materials I
Minisymposium organized by Julien Yvonnet, Kenjiro Terada, Peter Wriggers, Marc Geers, Karel Matous and Paul Steinmann

MS6A
Room: Svalbard
Chair: Julien Yvonnet

A New Finite Strain Reduced Order Multiscale Formulation for Polycrystalline Materials (Keynote Lecture)
Damin Xia and Caglar Oskay

Machine learning of evolving physics-based material models for fast and accurate concurrent multiscale modeling
Iuri Rocha, Pierre Kerfriden and Frans van der Meer

Self-Adversarial Training for enhanced robustness of neural network based inelastic constitutive descriptions
Julien Stoecker, Ferenc Leichsenring, Alexander Fuchs and Michael Kaliske

A FE^4 multiscale scheme for CNT-reinforced concrete accelerated by deep neural networks
Stefanos Pyrialakos, Ioannis Kalogeris and Vissarion Papadopoulos

An efficient training technique for teaching deep material networks to reproduce creep loading of short fiber-reinforced thermoplastics
Argha Protim Dey, Fabian Welschinger, Matti Schneider, Sebastian Gajek and Thomas Boehlke

6/6/22 11:00 - 13:00
Image-informed computational models and methods for prediction of cancer growth and treatment response I
Image-informed computational models and methods for prediction of cancer growth and treatment response I

MS16A
Room: O – 3
Chair: Guillermo Lorenzo
CoChair: Michael R. A. Abdelmalik

A Cahn-Hilliard Keller-Segel model for tumor growth with angiogenesis
Abramo Agosti, Alice Giotta Lucifero, Sabino Luzzi and Elisabetta Rocca

Image-informed biomechanical model for glioblastoma growth: a combined descriptive and predictive model
Meryem Abbad Andaloussi, Andreas Hursch, Frank Hertel, Stéphane Urcun and Stéphane Bordas

Fitting the evolution of glioma's mean radius before and after radiotherapy with a simple biophysical model
Leo Adenis, Stephane Plaszczynski, Basile Grammaticos, Johan Pallud and Mathilde Badoual

Patient-specific prediction of the growth of asymptotic meningiomas using spatial mechanistic modeling and deep learning
Annabelle Collin, Oliver Saut and Virginie Montalibet

Modeling and simulation of vascular tumors embedded in evolving capillary networks
Marvin Fritz, Prashant K. Jha, Tobias Köppl, J. Tinsley Oden, Andreas Wagner and Barbara Wohlmuth

Personalized computational forecasting of prostate cancer growth during active surveillance
Guillermo Lorenzo, Jon S. Heiselman, Michael A. Liss, Michael I. Miga, Hector Gomez, Thomas E. Yankeelov, Thomas J. R. Hughes and Alessandro Reali

6/6/22 11:00 - 13:00
Recent Advances in the Modelling of Architectured Metamaterials I
Minisymposium organized by Daniela Addessi, Andrea Bacigalupo, Maria Laura De Bellis and Francesca Fantoni

MS29A
Room: O – 4
Chair: De Bellis Maria Laura
CoChair: Bacigalupo Andrea

Attenuation and localization of waves in taut cables with suspended masses
Marco Moscatelli, Claudia Comi and Jean-Jacques Marigo

Design of piezoelectric lattice metamaterials
Nicola A. Nodargi, Claudio Intrigila and Paolo Bisegna

Optimization of materials with desired nonlinear properties utilizing internal contact
Gore Lukas Bluhm, Konstantinos Poulios, Dennis Kochmann and Ole Sigmund

Wave redirection and confinement via elastic meta-lattices
Jacopo Maria De Ponti, Luca Iorio, Raffaele Ardito and Alberto Corigliano

Mathematical modeling and numerical results on the propagation of solitary waves on tensegrity lattices
Ada Amendola, Fernando Fraternali and Giuseppe Saccomandi

13:00 - 14:00
Lunch Time

14:00 - 16:00 | TECHNICAL SESSIONS

6/6/22 14:00 - 16:00
Shock Wave Boundary Layer Interaction in Aeronautical Applications I

STS05A
Room: Hedmark (GF)
Chair: Pawel Flaszynski

Three decades of SBLI in European Research
Piotr Doerffer and Pawel Flaszynski

Numerical tripping of supersonic/hypersonic boundary layers
Alessandro Ceci, Andrea Palumbo, Johan Larsson and Sergio Pirozzoli

Length and Time Scale Comparison in Different Transitional SBLIs
Mariadebora Mauriello, Lionel Larchevêque and Pierre Dupont

Numerical simulation and turbulence modelling of a 3D transonic regime around a supercritical wing involving strong separation
Cesar Jimenez Navarro, Nikolaos Simiriotis, Abderrahmane Marouf, Rajaa El Akoury, Clement Rouaix, Yannick Hoarau and Marianna Braza

6/6/22 14:00 - 16:00
Isogeometric Methods II
Minisymposium organized by Alessandro Reali, Yuri Bazilevs, David J. Benson, René de Borst, Thomas J.R. Hughes, Trond Kvamsdal, Giancarlo Sangalli and Clemens V. Verhoosel

MS2B
Room: Nord – Norge (GF)
Chair: Yuri Bazilevs

Isogeometric collocation: A mixed displacement-pressure method for nearly incompressible elasticity in small and large deformations
Simone Morganti, Michele Torre, Frederik Fahrendorf, Laura De Lorenzis, John A. Evans, Thomas J.R. Hughes and Alessandro Reali

A rigorous framework to explicitly enforce damage irreversibility in finite element and isogeometric computations of phase-field brittle fracture
Alessia Patton, Alessandro Marengo, Luigi Greco, Matteo Negri, Alessandro Reali and Umberto Perego

NURBS-based isogeometric analysis of a bi-ventricular heart model
Robin Willems, Clemens V. Verhoosel and Olaf Sluis

Patch-wise Integration of Trimmed Surfaces
Michael Loibl, Leonardo Leonetti, Alessandro Reali and Josef Kiendl

Numerical Quadrature for Gregory Quads
Jun Zhou, Pieter Barendrecht, Michael Barton and Jiri Kosinka

Isogeometric analysis of industry applications with Geomiso SEA: a new hybrid software for shell analysis
Panagiotis Karakitsios, Vasiliki Tsotoulidi, Panagiotis Kolios and George Mprellas

6/6/22 14:00 - 16:00
Mathematical models and numerical methods for interface-coupled multiphysics problems II
Minisymposium organized by Ana Budisa, Miroslav Kuchta and Kent-Andre Mardal

MS150B
Room: Nordland (GF)
Chair: Miroslav Kuchta
CoChair: Kent-Andre Mardal

A new stabilization of Biot's consolidation model
Carmen Rodrigo, Álvaro Pé de la Riva and Francisco J. Gaspar

Hybrid Finite-Volume/Discontinuous Galerkin framework for the solution of Multiphysics problems using unstructured meshes
Vadim Maltsev, Panagiotis Tsoutsanis and Martin Skote

Parameter-robust methods for the Biot-Stokes interfacial coupling without Lagrange multipliers
Wietse M. Boon, Martin Hornkjøl, Miroslav Kuchta, Kent-André Mardal and Ricardo Ruiz-Baier

Interface Preconditioners for Multiphysics Problems
Xiaozhe Hu

Robust software modules for modelling interfaces
Ana Budisa, Miroslav Kuchta, Kent-Andre Mardal, Xiaozhe Hu, James Adler and Ludmil Zikatanov

6/6/22 14:00 - 16:00
EYIC Young Investigators Minisymposium II
Minisymposium organized by Simone Morganti, Carina Schwarz, Markus Lukacevic and Lèo Neauveau

YIMSB
Room: Oslo 1 (GF)
Chair: Markus Lakacevic
CoChair: Enrique Nadal Soriano

On the knotty effect of a single parameter on cardiac muscle simulations
Michele Torre, Simone Morganti, Francesco Pasqualini and Alessandro Reali

On mixed order approaches not working for goal oriented adaptivity in a space-time setting
Jan Philipp Thiele and Thomas Wick

Shifted boundary method and moving front for mixed formulation of phase change problems
Tiffanie Carlier, Léo Nouveau, Heloise Beaugendre, Mathieu Colin and Mario Ricchiuto

The Influence of the Lennard-Jones-Potential in Steered Molecular Dynamics
Julia Kamml and David Kammer

Improved embedded methods for flow in fractured porous media
Davide Losapio and Anna Scotti

Investigation of parameter-dependent material characteristics of additively manufactured specimens for data-driven part optimization
Dominic Zettel, Piotr Breitkopf, Pascal Nicolay and Roland Willmann

6/6/22 14:00 - 16:00
Metamaterials Across the Scales: Modeling, Experiment and Simulation II
Minisymposium organized by Jörg Schröder, Varvara Kouznetsova, Dennis Kochmann, Marc-Andre Keip and Geralf Hütter

MS53B
Room: Oslo 2 (GF)
Chair: Jörg Schröder

Multiscale Optimization using Surrogate Constitutive Models for Programmable Mechanical Metamaterials
Alexander Leichner, Tobias Lichti, Heiko Andrä, Franziska Wenz, Chris Eberl, Angela Schwarz and Christof Hübner

Low-frequency band-gaps in solid/solid and solid/fluid seismic metamaterials
Christoph Bös and Chuanzeng Zhang

Elastic wave control via octet-based architected lattices
Giulia Aguzzi, Andrea Colombi and Eleni Chatzi

Comparative study of different finite element formulations for the relaxed micromorphic model
Mohammad Sarhil, Lisa Scheunemann, Patrizio Neff and Jörg Schröder

6/6/22 14:00 - 16:00
Challenges and progress in computational science and engineering: from industry 4.0 to sustainable development II
Minisymposium organized by Matteo Giacomini, Simona Perotto and Gianluigi Rozza

MS57B
Room: Rogaland (GF)
Chair: Simona Perotto
CoChair: Matteo Giacomini

An orientation-field based algorithm for free-form filament deposition
Varun Murugan, Gianluca Alaimo, Ferdinando Auricchio and Stefania Marconi

Towards an automatic optimization framework for performance oriented precast concrete design
Erik Tamsen and Jörg Unger

Stress minimization for lattice structures
Alex Ferrer, Grégoire Allaire and Perle Geoffroy

Topology optimization of nonlinear structures in industrial context
Grégoire Allaire, Jeet Desai and François Jouve

A computational design pipeline of 3D discrete-element assemblies in architecture
Gene Ting-Chun Kao, Francesco Ranaudo, Antonino Iannuzzo, Stelian Coros, Tom Van Mele and Philippe Block

Geomiso ISA: a hybrid software for isogeometric analysis with plate elements and advanced spline techniques
Panagiotis Karakitsios, Konstantinos Gogos and Konstantinos Mprellas

Automatic CAD Reconstruction for a Seamless Integration of CAE and Design
Roxana Pohlmann, Sebastian Hube and Stefanie Elgeti

6/6/22 14:00 - 16:00
Modelling and simulation of particles in contact II
Minisymposium organized by Kristin M. de Payrebrune and Matthias Kröger

MS105B
Room: Romerike (GF)
Chair: Kristin de Payrebrune
CoChair: Matthias Kröger

Modelling of surface forces between two highly rough surfaces using AFM topography scans
Lisa Ditscherlein and Urs A. Peuker

Experimental and numerical study of the contact between particles and microstructured surfaces covered with a liquid layer
David Strohner and Sergiy Antonyuk

Contact behavior of particle laden bubbles
Jan Nicklas, Lisa Ditscherlein and Urs A. Peuker

Influence of Cooling Lubricants on the Interaction Between Indenter and Material Surface During Scratch Tests
Felix Kästner and Kristin M. de Payrebrune

Contact avoiding for rigid particles in a Stokesian fluid
Anna Broms and Anna-Karin Tornberg

Numerical and experimental understanding of wet three-body abrasive wear in pumps
Jens S. K. Jensen and Ramin Aghababaei

6/6/22 14:00 - 16:00
Biological fluid mechanics: modeling, simulation, and analysis II
Minisymposium organized by Boyce Griffith, Sookkyung Lim and Sarah Olson

MS99B
Room: Sør – Norge (GF)
Chair: Sook Lim

Strain stiffening of Salmonella flagella measured by flow-induced deformations
Hossein Moghmifam, Jamel Ali, Min Jun Kim and Henry C. Fu

Models and simulations of micro-swimmer motion in complex confinement
Enkeleida Lushi

Simulated motility of a bilophotrichous bacterium
Henry Shum and Vahid Nourian

Experimental investigation of flow through deformable bodies under physiological condition
Mateusz Mesek, Aleksander Sinek, Marek Rojczyk, Jan Juszczyk, Wojciech Adamczyk, Ziemowit Ostrowski and Ryszard Białecki

On the influence of natural curvature on the reconfiguration of thin submerged biological structures
Alessandro Nitti and Marco D. de Tullio

Dynamics of membrane growth and form
Thomas Fai

6/6/22 14:00 - 16:00
Multiscale modeling of concrete and concrete structures - in honor of the 80th birthday of Prof. Herbert A. Mang II
Minisymposium organized by Bernhard Pichler, Yong Yuan and Günther Meschke

MS146B
Room: Akershus (1F)
Chair: Günther Meschke

Multiscale mechanics of dental cement paste
Petr Dohnalik, Bernhard Pichler, Luis Zelaya-Lainez, Olaf Lahayne, Gilles Richard and Christian Hellmich

Simulating Concrete Failure Using the Microplane (M7) Constitutive Model and Correspondence-Based Peridynamics: Validation and Extension to Fracture and Fragmentation
Yuri Bazilevs

A LCP formulation for the fracture analysis of concrete using zero-thickness interface elements
Caterina Biscaro, Giovanna Xotta and Ignacio Carol

Multiscale analysis of elastic stiffness properties sodium hydroxide-activated slag pastes coupling thermodynamic modeling and micromechanical modeling
Luise Göbel, Markus Königsberger, Ali Naqi and Stéphanie Staquet

Multiphysics modeling of concrete: improved description of the hygro-mechanical coupling of shrinkage and creep
Andreas Brugger, Peter Gamnitzer and Günter Hofstetter

Synthesis of multiscale simulations and 3d-scanning for the characterization of freeze-thaw damage in concrete
Jithender J. Timothy, Alexander Haynack, Thomas Kränkel and Christoph Gehlen

6/6/22 14:00 - 16:00
UQ and data-driven methods for scale-resolving turbulent flow simulations II
Minisymposium organized by Saleh Rezaeiravesh, Philipp Schlatter and Maria Vittoria Salvetti

MS155B
Room: Buskerud (1F)
Chair: Saleh Rezaeiravesh
CoChair: Philipp Schlatter

Multi-Fidelity Surrogate Models for Aerodynamic Applications
Andrew Mole, Alex Skillen and Alistair Revell

Energy consistent machine learning closure model for fluid flow problems
Toby van Gastelen and Benjamin Sanderse

Data-driven LES for the flow around a 5:1 rectangular cylinder
Gabriel I. Moldovan, Alessandro Mariotti, Guilaume Lehnasch, Laurent Cordier, Maria V. Salvetti and Marcello Meldi

Adaptive Gaussian process surrogate modelling of large-eddy simulation for microscale atmospheric dispersion
Bastien X. Nony, Mélanie C. Rochoux, Didier Lucor and Thomas Jaravel

Learning reduced subgrid-scale models
Wouter Edeling and Daan Crommelin

Explorative In-situ Analysis of Turbulent Flow Data Based on a Data-Driven Approach
Christian Gscheidle and Jochen Garcke

6/6/22 14:00 - 16:00
Computations in Environmental and Geophysical Fluid Mechanics II
Minisymposium organized by Clint Dawson, Ethan Kubatko and Eirik Valseth

MS5B
Room: Hordaland 1 (1F)
Chair: Clint Dawson
CoChair: Eirik Valseth

Quadrature-free discontinuous Galerkin method for shallow water equations on block-structured grids
Vadym Aizinger, Sara Faghih-Naini and Daniel Zint

On shallow water, diffusive, and kinematic flow approximations for modeling rainfall runoff
Ethan Kubatko and Younghun Kang

Microscale simulations of extreme events in wind farms over complex terrain driven by mesoscalar flows
Matias Avila, Oriol Lehmkuhl, Herbert Owen and Daniel Paredes

Block-preconditioning of variable-viscosity flows in ice-sheet modeling
Christian Helanow and Josefin Ahlkrona

Comparison of structure-preserving numerical methods for the KdV equation
Arnout D. Franken, Paolo Cifani, Erwin Luesink, Sagy R. Ephrati and Bernard J. Geurts

A compositional Eulerian approach for modelling oil spills in the sea
Benjamin Ivorra, Susana Gomez, Jesús Carrera and Ángel M. Ramos

6/6/22 14:00 - 16:00
Higher order finite element methods for challenging mathematical problems in engineering and applied sciences II
Minisymposium organized by Antti H. Niemi and Leszek F. Demkowicz

MS92B
Room: Hordaland 2 (1F)
Chair: Antti Niemi
CoChair: Leszek Demkowicz

An hp-adaptive discontinuous Petrov-Galerkin Finite element method for compressible viscous flows
Waldemar Rachowicz and Witold Cecot

Discontinuous Galerkin method for the computation of axisymmetric flows.
Anthony Bosco, Vincent Perrier and Jonathan Jung

Implicit discontinuous Galerkin method for the efficient scale resolving simulation of compressible turbulent flows
Francesco Bassi, Alessandro Colombo, Andrea Crivellini and Francesco Carlo Massa

Under-resolved Direct Numerical Simulation of NACA0012 at Stall
Mohsen Lahooti, Guglielmo Vivarelli, Francesco Montomoli and Spencer Sherwin

A matrix-free solver for high-order discretization in cardiac electrophysiology
Pasquale C. Africa, Matteo Salvador and Paola Gervasio

6/6/22 14:00 - 16:00
Advanced Methods in Computational Mechanics II

CS01B
Room: Oppland (1F)
Chair: Josef Kiendl

Experimental and numerical investigation on development of 4D printed actuators with integrated temperature-controlled triggering system.
Robin Delbart, Colin Robert, T.Quynh Truong Hoang and Francisca Martinez-Hergueta

Modelling of anisotropic damage of 3D printed polymers under severe compression
Sofiane Guessasma and Sofiane Belhabib

Nonlinear problem of head-on-web effect solved with a use of the “beam-inside-beam” model
Piotr Koziol

Hyperelasto-plastic model for analysing the frictions at the mesoscopic scale of laid-strand synthetic ropes
Laure Civier, Guilhem Bles, Peter Davies and Yann Marco

Intelligent Initiatives to Reduce CO2 Emissions in Construction
Leila Farahzadi and Mahdi Kioumarsi

Optimal Spline Connections
Niels L. Pedersen

6/6/22 14:00 - 16:00
High-order grids: generation, adaption and applications in fluids and coupled problems
Minisymposium organized by Régis Duvigneau and Matthias Möller

MS11A
Room: Vestfold (1F)
Chair: Régis Duvigneau
CoChair: Matthias Möller

Isogeometric Discontinuous Galerkin method for compressible flows: opportunities and issues
Régis Duvigneau and Stefano Pezzano

Feature-independent mesh generation for high-order NEFEM
Xi Zou, Ruben Sevilla, Oubay Hassan and Kenneth Morgan

P2 cavity operator with simplex-based Jacobian correction and metric-based volume edge curvature
Lucien Rochery and Adrien Loseille

Spline-Based Parameterisation Techniques and Applications To Complex Engineering Designs
Jochen Hinz and Annalisa Buffa

Fully integrated mesh generation in fluid-structure interaction
Thomas-Peter Fries, Domagoj Bošnjak and Richard Schussnig

6/6/22 14:00 - 16:00
Mechanics of wood and biocomposites in engineering II
Minisymposium organized by Ani Khaloian, Markus Lukacevic and Jan-Willem van de Kuilen

MS21B
Room: A1 – 1
Chair: Catharina Czech
CoChair: Taoyi Yu

Phase Field Method-based Modeling of Fracture in Wood
Sebastian Pech, Markus Lukacevic and Josef Füss

Numerical simulation of moisture transport in wood and moisture induced cracking
Florian Brandstätter, Maximilian Autengruber, Markus Lukacevic and Josef Füssl

Failure modeling of wood based on local material properties
Franziska Seeber

Constitutive model for the analysis of the behavior and mechanics of wood damage
Roberto E. Quinteros-Mayne, Ignacio de Artega Jorda and José M. Cabrero

A comparative study of materials models for solid and laminated birch wood over wide ranges of strain, strain-rate and temperature
Georg Baumann, Ulrich Müller, Reinhard Brandner and Florian Feist

Development of a 3D visco-elastic model for wood under large deformations
Raúl Lazo-Molina, Carlos Felipe Guzmán, Juan Carlos Pina, Erick I. Saavedra Flores and Sergio J. Yanez

6/6/22 14:00 - 16:00
Model order reduction - Challenges in engineering and industrial applications II
Minisymposium organized by Annika Robens-Radermacher, Wil Schilders, Karen Veroy and Chady Ghnatios

MS72B
Room: A1 – 2
Chair: Wil Schilders

On the application of interpolation multipoint constraints within the floating frame of reference for the reduction of flexible multibody systems
Alessandro Cammarata, Pietro Maddìo and Rosario Sinatra

Model order reduction for large-scale coupled problems with application to thermo-mechanical reliability analysis
Pascal den Boef, Jos Maubach, Wil Schilders and Nathan van de Wouw

Computationally efficient controller design for drilling automation using reduced order models
Sajad Naderi Lordejani and Wil Schilders

Abstracted structure-preserving reduction of interconnected structural models
Luuk Poort, Rob Fey, Bart Besselink and Nathan van de Wouw

Model reduction for variational inequalities
Idrissa Niakh, Alexandre Ern, Virginie Ehrlacher and Guillaume Drouet

Reduced-order modeling methods for the construction of virtual charts in nonlinear dynamics
Alexandre Daby-Seesaram, Amélie Fau, Pierre-Étienne Charbonnel and David Néron

6/6/22 14:00 - 16:00
Modeling and simulation of highly flexible slender structures II
Minisymposium organized by Martin Arnold, Olivier Brüls, Elena Celledoni, Brynjulf Owren, Damien Durville, José Escalona, Johannes Gerstmayr, Gordan Jelenić, Sigrid Leyendecker, Joachim Linn, Tomaž Šuštar , Olivier Thomas and Dejan Zupan

MS161B
Room: A1 – 3
Chair: Damien Durville

An isogeometric frictionless contact formulation for hyperelastic Cosserat rods with deformable cross-sections
Myung-Jin Choi, Roger A. Sauer and Sven Klinkel

Director-based IGA beam elements for sliding contact problems
Paul Wasmer and Peter Betsch

Objective mortar formulation for beam-to-beam contact
Jan Tomec and Gordan Jelenić

Axially moving beams in contact with sheaves
Konstantina Ntarladima, Michael Pieber and Johannes Gerstmayr

Mixed-dimensional coupling between 1D Cosserat continua and 3D solids - From embedded fibers towards contact
Ivo Steinbrecher and Alexander Popp

Coupling between 1D beam elements and 3D solid elements for the modelling of fiber-reinforced composites
Valentin Poussard and Damien Durville

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

6/6/22 14:00 - 16:00
Innovative Methods for Fluid-Structure Interaction II
Minisymposium organized by Harald van Brummelen, Trond Kvamsdal and Roger Ohayon

MS45B
Room: A1 – 4
Chair: Harald van Brummelen

A mechanically consistent model for fluid-structure interactions with contact including seepage
Stefan Frei, Erik Burman, Miguel A. Fernandez and Fannie M. Gerosa

Leaflet contact modelling and fluid-structure interaction within the left ventricle of the human heart
Joel Kronborg and Johan Hoffman

A Spline-Based Framework for Microscopic Lubricated Contact Modelling in Orthogonal Cutting
Jaewook Lee, Stefanie Elgeti, Jannis Saelzer and Andreas Zabel

Spline-based methods for fluid-structure interaction
Michel Make, Thomas Spenke and Norbert Hosters

Particle Finite Element Method for 2D/3D Fluid-Structure Interactions, including Contact Interactions
Martin Lacroix, Simon Février, Romain Boman, Jean-Francois Remacle and Jean-Philippe Ponthot

Projection-based reduced order model for the parametric analysis of hydroelastic vibrations of liquid-storage tanks
Christophe Hoareau, Jean-François Deü and Roger Ohayon

6/6/22 14:00 - 16:00
Simulations of Polymers and Polymer Composites II
Minisymposium organized by Sebastian Pfaller, Fabrice Detrez and Hans van Dommelen

MS30B
Room: A1 – 5
Chair: Sebastian Pfaller

An arclength method for microscale analysis of the rate-dependent nonlinear response of composites under off-axis loading
Dragan Kovačević and Frans P. van der Meer

Asymptotic fiber orientation states of the quadratically closed Folgar-Tucker equation and a subsequent closure improvement
Tobias Karl, Davide Gatti, Bettina Frohnapfel and Thomas Böhlke

Spatially distributed elastic-perfectly plastic material behavior of SFRC with experimental validation
Natalie Rauter

Extended failure models for global and local analyses of composite aerostructures
Giuseppe Corrado, Albertino Arteiro, José Reinoso, Florian Glock and Fernass Daoud

Micromechanical Modelling of Rubber Toughened Glassy Polymers
Martijn Wismans, Tom A. P. Engels, Lambèrt C. A. van Breemen, Johannes A. W. van Dommelen and Leon E. Govaert

Efficient calibration of a crystallization model for injection moulding simulation using surrogate modelling
Sandra Saad, Camilo Cruz, Gilles Regnier and Amine Ammar

6/6/22 14:00 - 16:00
Advanced Computational Design and Manufacturing Simulation of Novel Materials and Structures II
Minisymposium organized by Eric Li, Bing LI, ZC He, QQ Li, Fei Wu, ZQ Zheng and Yi Wu

MS15B
Room: A1 – 6
Chair: N. BLAL

Data driven computational strategies for bottom-up and top-down multiscale modelling
Nawfal Blal, Anthony Gravouil and Nahiene Hamila

Strength-oriented design of multi-material microstructures using topology optimization
Fábio Conde, Pedro Coelho and José Guedes

Numerical and experimental characterization of 3D printed lattice structures
Massimo Carraturo, Gianluca Alaimo, Alessandro Reali and Ferdinando Auricchio

Validation of the temperature history during extrusion based additive manufacturing
Robert Hein and Felix Winkelmann

Pore-microstructure characterisation, reconstruction and simulation for CT-based fatigue-ranking of additively manufactured materials
Alexander Raßloff, Paul Seibert, Marreddy Ambati and Markus Kästner

6/6/22 14:00 - 16:00
Uncertainty Quantification in material sciences II
Minisymposium organized by Florent Pled, Christophe Desceliers, Maarten Arnst and Christian Soize

MS42B
Room: B1 – 1
Chair: Florent Pled
CoChair: Maarten Arnst

Data-driven finite element method for diffusion and transport problems
Adriana Kulikova, Andrei G. Shvarts, Lukasz Kaczmarczyk and Chris J. Pearce

A statistical approach for permeability prediction in random fibrous media : influence of morphological parameters and fluid slip
Aubin Geoffre, Nicolas Moulin, Sylvain Drapier and Julien Bruchon

Stochastic analysis of spatially distributed out-of-plane fibre waviness in cfrp materials
Andreas Schuster

Can we separate individual variability from experimental noise ? a sensitivity study of mixed-effects models
Clément Laboulfie, Loïc Brevault , Mathieu Balesdent, Sébastien Da Veiga, François-Xavier Irisarri , Rodolphe Le Riche and Jean-François Maire

Interval field methods with local gradient control
Conradus van Mierlot, Matthias Faes and David Moens

6/6/22 14:00 - 16:00
Advanced Techniques for Coupled Problems II
Minisymposium organized by Markus Bause and Florin Adrian Radu

MS10B
Room: B1 – 2
Chair: Markus Bause
CoChair: Florin A. Radu

Least-Squares and DPG approximation of eigenvalue associated to coupled problems
Fleurianne Bertrand

Hybridized discontinuous Galerkin/hybrid mixed discretizations for multiple network poroelasticity
Johannes Krause, Philip L. Lederer, Maria Lymbery, Kevin Oshues and Joachim Schöberl

A multirate-in-time framework for coupled transport and flow with goal-oriented space-time adaptivity
Marius P. Bruchhäuser, Uwe Köcher and Markus Bause

A Study of FEM/DEM Coupled Solution of Triaxial Test: An Experimental Validation
Amir Atrian, Lars Radtke, Maksym Dosta and Alexander Düster

Speeding up convergence for a coupled dynamic multi-field model for anisotropic porous materials
Nico De Marchi, Giovanna Xotta, Massimiliano Ferronato and Valentina Salomoni

6/6/22 14:00 - 16:00
Complex fluid flow in engineering: modeling, simulation and optimization II
Minisymposium organized by Fabian Key, Marek Behr and Stefanie Elgeti

MS12B
Room: B3 + B4
Chair: Stefanie Elgeti

On the design of fractional step methods for flow problems--Application to viscoelastic flows and compressible flows
Ramon Codina, Joan Baiges, Samuel Parada and Laura Moreno

Adaptive Immersed Mesh Method for Fluid–Structure Interaction
Ramy Nemer, Aurelien Larcher and Elie Hachem

Non-reflecting boundary condtions on unstructured grids
Hans-Peter Kersken and Christian Frey

Dirichlet boundary control of a steady multiscale fluid-structure interaction system
Giacomo Barbi, Andrea Chierici, Valentina Giovacchini, Luigi Manes, Sandro Manservisi and Lucia Sirotti

A boundary-conforming mesh-update method for flow problems with topology changes
Felipe Gonzalez-Cornejo, Stefanie Elgeti and Marek Behr

CFD validation of a controllable pitch marine propeller using a truly autonomous mesh generation with adaptive mesh refinement
Mathias Vångö and Pietro Scienza

6/6/22 14:00 - 16:00
Recent advances in immersed boundary and fictitious domain methods II
Minisymposium organized by Alexander Idesman, Guglielmo Scovazzi , Antonia Larese , Riccardo Rossi , André Massing, Santiago Badia and Francesc Verdugo

MS44B
Room: Jan Mayen 1
Chair: Andre Massing

Optimal Local Truncation Error Method for Solution of PDEs on Irregular Domains and Interfaces with Optimal Accuracy and Unfitted Cartesian Meshes (Keynote Lecture)
Alexander Idesman

Comparison of stabilization techniques for CutDG methods
Maximilian Bergbauer, Peter Munch, André Massing, Martin Kronbichler and Wolfgang A. Wall

Topology-preservation, residual-based error estimation and adaptivity for scan-based immersed isogeometric analysis
S.C. Divi, C.V. Verhoosel, F. Auricchio, A. Reali and E.H. van Brummelen

Higher Order Unfitted Space-time Finite Element Methods for PDEs on Moving Domains
Fabian Heimann, Janosch Preuß and Christoph Lehrenfeld

Unfitted mixed finite element methods
Guosheng Fu, Christoph Lehrenfeld and Tim van Beeck

6/6/22 14:00 - 16:00
Robust and scalable numerical methods for wave propagation: design, analysis and application II
Minisymposium organized by Hélène Barucq, Théophile Chaumont-Frelet, Rabia Djellouli and Axel Modave

MS153B
Room: Jan Mayen 2
Chair: H. Barucq
CoChair: R. Djelouli

Nonlocal material parameters describing metamaterials at the effective level
Fatima Z. Goffi, Ramakrishna Venkitakrishnan, Carsten Rockstuhl and Michael Plum

Numerical treatment of the vectorial equations of solar oscillations
Tilman Alemán, Martin Halla, Christoph Lehrenfeld and Paul Stocker

Adaptive DPG-based Multigrid Solver for Bent Optical Fiber Simulations
Jacob Badger and Leszek Demkowicz

A posteriori error estimates for finite element discretizations of time-harmonic Maxwell's equations coupled with a non-local hydrodynamic Drude model
Théophile Chaumont-Frelet, Stéphane Lanteri and Patrick Vega

Frequency-domain acoustic wave modeling via unstructured isogeometric analysis: performance and pollution study
Hélène Barucq, Henri Calandra, Julien Diaz and Stefano Frambati

Mixed precision sparse direct solver applied to 3D wave propagation
Partick Amestoy, Alfredo Buttari, Florian Faucher, Matthieu Gerest, Jean-Yves L'Excellent and Theo Mary

6/6/22 14:00 - 16:00
Deep Learning Approaches for Applied Sciences and Engineering II
Minisymposium organized by M. Giselle Fernández-Godino, Charles F. Jekel and Christian Gogu

MS117B
Room: Jan Mayen 3
Chair: M. Giselle Fernandez -Godino
CoChair: Charles F. Jekel

Machine Learning in Topology Optimisation - Challenges and Prospects (Keynote Lecture)
Rebekka V. Woldseth, Niels Aage, J. Andreas Bærentzen and Ole Sigmund

Deep learning based dimensionality reduction for fracture mechanics
Krushna Shinde, Vincent Itier, José Mennesson, Dmytro Vasiukov and Modesar Shakoor

Mesh generation for finite element simulations with Deep Learning
Martin Legeland, Kevin Linka and Christian J. Cyron

Real-time large deformations: A probabilistic deep learning approach
Saurabh Deshpande, Jakub Lengiewicz and Stephane Bordas

An explainable pipeline for machine learning with functional data
Katherine Goode, J. Derek Tucker, Daniel Ries and Heike Hofmann

6/6/22 14:00 - 16:00
Continuum Biomechanics of Active Systems II
Minisymposium organized by Tim Ricken, Oliver Röhrle and Silvia Buddayi

MS37B
Room: Lounge A2
Chair: Silvia Budday
CoChair: Lena Lambers

Computational continuum modeling of cell aggregation phenomenon
Soheil Firooz, Hui-Shun Kuan, Vasily Zaburdaev, Paul Steinmann and Ali Javili

Nonlocal bone remodelling with open system peridynamics
Emely Schaller, Ali Javili and Paul Steinmann

FE models predict microdamage in normal and osteoporotic trabecular bone during compression
Athanassios Tsirigotis and Despoina Deligianni

Experimental and numerical investigation of the behaviour of articular cartilage under tensile loading: A Theory of Porous Media (TPM) approach
Franziska S. Egli, Seyed Morteza Seyedpour and Tim Ricken

LBM Bloodflow-Simulations in 3D Aneurysm-Geometries: From risk-assessment to the follow-up treatment
Gladys Gutierrez, Markus Muhr, Natalia Nebulishvili and Barbara Wohlmuth

Two-layers cell-wall modelling for S. cerevisiae yeasts
Zeinab Awada, Etienne Harté, Françoise Argoul, Léo Delmarre, Pierre Argoul, Anne Devin and Boumediene Nedjar

6/6/22 14:00 - 16:00
Discrete element method (DEM) simulations of pharmaceutical processes
Minisymposium organized by Peter Toson and Peter Böhling

MS143A
Room: Spitsbergen
Chair: Peter Toson
CoChair: Peter Böhling

Development And Validation Of A Fast And Effective Iterative DEM Calibration Data-Base
Marko Matic, Peter Toson, Johan Remmelgas, Dalibor Jajcevic, Thomas O'Connor, Abdollah Koolivand, Geng Tian, Scott M. Krull and Johannes G. Khinast

Impact of rotation axis positioning on industrial-scale powder mixers: a DEM study
Luca Orefice and Johannes G. Khinast

Modeling of Pharmaceutical Tablet Compaction with Multi-Contact Discrete Element Method
Kostas Giannis, Carsten Schilde, Jan Henrik Finke and Arno Kwade

In-Depth analysis of a Tablet Press Feed Frame with DEM
Peter Böhling, Pankaj Doshi, Peter Toson, Martina Trogrlic, Marko Matic, Daniel Blackwood, Kai Lee, Marta Moreno-Benito, Giuseppe Cogoni, Elisabeth Peeters, James Kimber, Hugh Verrier, Johannes Khinast and Dalibor Jajcevic

6/6/22 14:00 - 16:00
Multiscale Computational Homogenization for Bridging Scales in the Mechanics and Physics of Complex Materials II
Minisymposium organized by Julien Yvonnet, Kenjiro Terada, Peter Wriggers, Marc Geers, Karel Matous and Paul Steinmann

MS6B
Room: Svalbard
Chair: Caglar Oskay

Using a reduced set of Fourier modes in terms of a FFT-based microstructure simulation
Christian Gierden, Johanna Waimann, Bob Svendsen and Stefanie Reese

Fast FE2 nonlinear multiscale simulations with loading path-dependent behaviors using k-means
Julien Yvonnet, Mohamed Amine Benaimeche, Souhail Chaouch, Benoit Bary and Qi-Chang He

Multiscale modelling of shell structures with artificial neural networks
Jeremy Geiger, Werner Wagner and Steffen Freitag

Multiscale modeling of quasi-brittle materials based on artificial neural networks
Gian-Luca Geuken, Patrick Kurzeja and Jörn Mosler

Numerical model reduction with adaptive basis enrichment for computational homogenization of porous media
Fredrik Ekre, Ralf Jänicke, Carmen Gräßle, Heike Faßbender, Fredrik Larsson and Kenneth Runesson

Accelerating geometrically parameterized nonlinear microstructures via a non-intrusive reduced basis method
Theron Guo, Ondřej Rokoš and Karen Veroy

6/6/22 14:00 - 16:00
Image-informed computational models and methods for prediction of cancer growth and treatment response II
Minisymposium organized by Guillermo Lorenzo, David A. Hormuth II, Chengyue Wu, Ernesto A.B.F. Lima, Michael R. A. Abdelmalik, Alessandro Reali, Thomas J.R. Hughes and Thomas E. Yankeelov

MS16B
Room: O – 3
Chair: Guillermo Lorenzo
CoChair: Michael R. A. Abdelmalik

Dynamic contrast enhanced MRI for informing cancer treatment: challenges and outlook for use in cancer modeling
Ryan T. Woodall, Jennifer M. Munson and Russell C. Rockne

A Finite Element method to incorporate the effects of diffusion to the Extended Tofts Model
Diego Sainz-DeMena, Wenfeng Ye, María Ángeles Pérez and José Manuel García-Aznar

Combination therapies and drug resistance in heterogeneous tumoral populations
Marcello Delitala, Elena Piretto and Mario Ferraro

A mathematical study of the influence of hypoxia on phenotypic heterogeneity in cancer and its impact on radiotherapy effectiveness
Giulia Chiari

6/6/22 14:00 - 16:00
Recent Advances in the Modelling of Architectured Metamaterials II
Minisymposium organized by Daniela Addessi, Andrea Bacigalupo, Maria Laura De Bellis and Francesca Fantoni

MS29B
Room: O – 4
Chair: De Bellis Maria Laura
CoChair: Addessi Daniela

Localized modes in imperfect periodic structures
Yilun LI, Régis COTTEREAU and Bing TIE

Micropolar identification of periodic cauchy materials through asymptotic homogenization
Maria Laura De Bellis, Andrea Bacigalupo and Giorgio Zavarise

Design optimization of a single-phase elastic metamaterial for enhancing impact resistance
Ana C. A. Vasconcelos, Dingena Schott, Jovana Jovanova and Alejandro M. Aragón

Beam lattice metamaterials with internal contact and instabilities
Martin Horák, Emma La Malfa Ribolla and Milan Jirásek

16:00-16:30
Coffee Break

16:30-18:30 | TECHNICAL SESSIONS

6/6/22 16:30 - 18:30
Shock Wave Boundary Layer Interaction in Aeronautical Applications II

STS05B
Room: Hedmark (GF)
Chair: Pawel Flaszynski

Transonic Buffet Simulation using a Partially-Averaged Navier-Stokes Approach
Andrea Petrocchi, Rene Steijl and George Barakos

Numerical Investigations of Transitional SBLI on a Highly Loaded Transonic Compressor Passage in Industrial Applications
Selin Kahraman, Paolo Adami and Marius Swoboda

Test Section Design for Investigations of SBLIs in Highly Loaded Compressor Stator
Arun Joseph, Pawel Flaszynski, Piotr Doerffer and Michal Piotrowicz

Towards mitigation of altitude-excitations in transonic compressors
Philipp Nel, Patrick Grothe and Paolo Adami

6/6/22 16:30 - 18:30
Isogeometric Methods III
Minisymposium organized by Alessandro Reali, Yuri Bazilevs, David J. Benson, René de Borst, Thomas J.R. Hughes, Trond Kvamsdal, Giancarlo Sangalli and Clemens V. Verhoosel

MS2C
Room: Nord – Norge (GF)
Chair: Giancarlo Sangalli

Some recent advances and applications in isogeometric analysis (Keynote Lecture)
Alessandro Reali

Floating isogeometric analysis
Helge C. Hille, Siddhant Kumar and Laura De Lorenzis

An optimally convergent smooth blended B-spline construction for unstructured quadrilateral and hexahedral meshes
Kim Jie Koh, Deepesh Toshniwal and Fehmi Cirak

Adaptive mixed isogeometric analysis of a highly convective benchmark problem for the Boussinesq equations
Abdullah Abdulhaque, Trond Kvamsdal, Mukesh Kumar and Arne Morten Kvarving

G1-conforming Bezier FE formulation for the analysis of Kirchhoff rod assemblies
Leopoldo Greco, Massimo Cuomo and Angelo Scrofani

6/6/22 16:30 - 18:30
Unstructured mesh adaptation: from mesh generation to applications I
Minisymposium organized by Nicolas Barral, Hugues Digonnet, Algiane Froehly and Jeroen Wackers

MS23A
Room: Nordland (GF)
Chair: Jeroen Wackers

A novel approach for anisotropic mesh adaptation on massively parallel distributed-memory systems
Bastien Andrieu, Bruno Maugars and Eric Quémerais

Parallel mesh adaptation on complex microstructures
Hugues Digonnet, Nesrine Aissa and Luisa Silva

A practical algorithm to build geometric models of cardiac muscle tissue
Mark Potse, Luca Cirrottola and Algiane Froehly

Anisotropic adaptive finite elements for aluminium electrolysis
Samuel Dubuis, Marco Picasso and Paride Passelli

Towards coupled simulations on unstructured meshes for CO2 geological storage
Margaux Raguenel, Jeanne Pellerin, Pierre Samier and Gilles Darche

Mesh adaptation of ablating hypersonic vehicles
Jérôme Breil, Claire Roche and Marina Olazabal

Design of cellular materials for multiscale topology optimization
Simona Perotto, Nicola Ferro, Daniele Bianchi, Raffaele Ferrante and Marco Mannisi

6/6/22 16:30 - 18:30
Optimal Control and parameter estimation for plasmas
Minisymposium organized by Didier Auroux, Louis Lamerand, Francesca Rapetti and Eric Serre

MS147A
Room: Oslo 1 (GF)
Chair: Didier Auroux
CoChair: Jacques Blum

Identification of the plasma current density in a Tokamak
Jacques Blum, Cedric Boulbe and Blaise Faugeras

Fast high-order integral equation solver for stepped pressure magnetohydrodynamic equilibria
Dhairya Malhotra, Antoine Cerfon, Lise-Marie Imbert-Gérard and Michael O'Neil

GVEC: A new MHD equilibrium code for three-dimensional magnetic confined plasma states
Florian Hindenlang

Direct gradient-based design of non-axisymmetric coil systems with excellent charged particle confinement properties
Andrew Giuliani, Florian Wechsung, Georg Stadler, Antoine Cerfon and Matt Landreman

Parameter identification for turbulent transport of fusion plasmas
Louis Lamerand, Didier Auroux and Francesca Rapetti

Neural network based closures to fluid systems trained with kinetic simulations
Léo Bois, Emmanuel Franck, Laurent Navoret and Vincent Vigon

Equibrium reconstruction in Tokamaks using neural networks
Cedric Boulbe, Blaise Faugeras and Guillaume Gros

6/6/22 16:30 - 18:30
Metamaterials Across the Scales: Modeling, Experiment and Simulation III
Minisymposium organized by Jörg Schröder, Varvara Kouznetsova, Dennis Kochmann, Marc-Andre Keip and Geralf Hütter

MS53C
Room: Oslo 2 (GF)
Chair: Jörg Schröder

Efficient dispersion curve computations for periodic vibro-acoustic structures using the (generalized) Bloch mode synthesis
Vanessa Cool, Frank Naets, Lucas Van Belle, Wim Desmet and Elke Deckers

Influences of the geometrical nonlinearity on the complex band structures of periodic lattice frame structures
Marius Mellmann and Chuanzeng Zhang

Controlling stiffness of a mechanical metamaterial by pneumatic actuation
Ondřej Faltus, Jan Zeman, Ron H.J. Peerlings, Milan Jirásek, Ondřej Rokoš, Martin Horák and Martin Doškář

Three-dimensional solids and structures within strain gradient elasticity: numerical methods and model comparisons
Jarkko Niiranen, Seyyed Hosseini, Jalal Torabi and Tuan Nguyen

Energy-momentum conserving dynamic variational modeling of fiber-bending stiffness in composites
Iniyan Kalaimani, Julian Dietzsch and Michael Groß

6/6/22 16:30 - 18:30
Unstructured mesh adaptation: from mesh generation to applications I
Minisymposium organized by Malte von Scheven, Renate Sachse, Ann C. Sychterz and Victor Charpentier

MS62A
Room: Rogaland (GF)
Chair: Ann C. Sychterz
CoChair: Malte von Scheven

Bioinspired compliant folding mechanisms
Axel Körner and Jan Knippers

Redundancy distribution in elastostatic beam and thin-walled structures
Jan Gade, Anton Tkachuk, Malte von Scheven and Manfred Bischoff

Cable-actuation of pill bug-inspired adaptive origami structure using computer vision
Ann C. Sychterz

Design of integrated fluidic actuators for muti-axial loaded structural elements
Matthias J. Bosch, Markus Nitzlader, Timon Burghardt, Matthias Bachmann, Hansgeorg Binz, Lucio Blandini and Matthias Kreimeyer

Topological derivative-based topology optimization of incompressible structures using mixed formulations
Inocencio Castañar, Joan Baiges, Ramon Codina and Henning Venghaus

Vibration sensors placement optimization
Marko Jokić and Jurica Rožić

The Redundancy Matrix as an Alternative Measure for the Assessment of Adaptive Structures
Malte von Scheven, Florian Geiger, Jan Gade, Ekkehard Ramm and Manfred Bischoff

6/6/22 16:30 - 18:30
Modelling and simulation of particles in contact III
Minisymposium organized by Kristin M. de Payrebrune and Matthias Kröger

MS105C
Room: Romerike (GF)
Chair: Matthias Kröger
CoChair: Kristin de Payrebrune

An effective level set discrete element model (LS-DEM) for sintering
Brayan M. Paredes Goyes, David Jauffres and Christophe Martin

Fast and simple creation of powder beds for selective laser melting
Luca Luberto and Kristin M. de Payrebrune

Sintering of Alumina Nanoparticles: A Comparison of Interatomic Potentials by Atomistic Simulations
Shyamal Roy, Arun Prakash and Stefan Sandfeld

Contact force models between nanoparticles in agglomerates, aggregates, and films and their parameterisation.
Stefan Endres and Lutz Mädler

On the formation of rolling particles during sliding contact
Ramin Aghababaei

Simulation of non-round particles in tribological three-body systems
Raphael Bilz and Kristin M. de Payrebrune

Microstructural modelling of materials processed with wire arc additive manufacturing
Johannes van Dommelen, Tim van Nuland, Luca Palmeira Belotti, Johan Hoefnagels and Marc Geers

6/6/22 16:30 - 18:30
Biological fluid mechanics: modeling, simulation, and analysis III
Minisymposium organized by Boyce Griffith, Sookkyung Lim and Sarah Olson

MS99C
Room: Sør – Norge (GF)
Chair: Enkeleida Lushi

The many behaviors of active droplets
Yuan-Nan Young, Michael Shelley and David Stein

How fluid rheology shapes micororganism swimming gait in viscoelastic fluids
Robert Guy, Kathyrn Link and Becca Thomases

Hydrodynamic Interactions of Micro-Swimmers
Sarah Olson and Lucia Carichino

Ion-binding-mediated swelling of a mucus-like polyelectrolyte gel model
Owen Lewis, Jian Du, James Keener and Aaron Fogelson

Flow coupled with advection, reaction and diffusion in evolving porous media: homogenisation and simulation
David Wiedemann and Malte A. Peter

Microhydrodynamics of linear poroelastic materials
Moslem Moradi, Wenzheng Shi and Ehssan Nazockdast

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

6/6/22 16:30 - 18:30
Multiscale modeling of concrete and concrete structures - in honor of the 80th birthday of Prof. Herbert A. Mang III
Minisymposium organized by Bernhard Pichler, Yong Yuan and Günther Meschke

MS146C
Room: Akershus (1F)
Chair: Yong Yuan

Multiscale modelling of load induced distributed damage for early identification of concrete damage
Giao Vu, Jithender J. Timothy, Erik H. Saenger and Günther Meschke

Development of a FE² Multiscale Model of Chloride Ions Transport in Recycled Aggregates Concrete
Arthur Fanara, Luc Courard and Frédéric Collin

Identification and validation of a discrete element model of concrete submitted to impacts
Laurent Daudeville, Andria Antoniou, Philippe Marin and Serguei Potapov

Discrete elastic parameters for lattice model with embedded discontinuities and application in concrete fracture
Jadran Čarija, Mijo Nikolić and Eduard Marenić

Kinetic Monte Carlo simulations of carbonation and self-healing in concrete
Enrico Masoero, Alex Aleena and Irina D. Ofiteru

Finite element model of kurpsai dam in kyrgyzstan based on actual response measured by extensive network of various sensors
Shakhzod Takhirov, Sagynbek Orunbaev, Elyor Toshmatov and Ravshan Shamansurov

Added value of multiscale modeling of concrete: exemplary assessment by means of structural analysis of segmental tunnel rings
Jiao-Long Zhang, Herbert Mang, Yong Yuan and Bernhard L.A. Pichler

6/6/22 16:30 - 18:30
Advances in structure-preserving methods and applications I
Minisymposium organized by Joubine Aghili and Francesco Bonaldi

MS145A
Room: Buskerud (1F)
Chair: Joubine Aghili
CoChair: Francesco Bonaldi

Flexible weights for high order Whitney forms (Keynote Lecture)
Ana Alonso Rodriguez, Ludovico Bruni Bruno and Francesca Rapetti

Structure-preserving discretizations and preconditioning for incompressible MHD models
Fabian Laakmann, Patrick E. Farrell, Kaibo Hu and Lawrence Mitchell

Computational fluid dynamics with discrete exterior calculus
Pankaj Jagad, Abdullah Abukhwejah2, Bhargav Mantravadi, Minmiao Wang and Ravi Samtaney

On Geometric PIC-like discretizations of Lie-Poisson brackets
William Barham, Philip Morrison and Eric Sonnendruecker

Continuum semiconductor physics model compression via Data-driven Discrete Exterior Calculus
Andy Huang, Nathaniel Trask, Jonas Actor, Xiaozhe Hu, Ravi Patel, Xujiao Gao and Christopher Brissette

A framework for implementing general higher order virtual element spaces
Andreas Dedner and Alice Hudson

6/6/22 16:30 - 18:30
Computations in Environmental and Geophysical Fluid Mechanics III
Minisymposium organized by Clint Dawson, Ethan Kubatko and Eirik Valseth

MS5C
Room: Hordaland 1 (1F)
Chair: Ethan Kubatko
CoChair: Clint Dawson

Computational multiphysics modelling to predict the performance of melting probes in ice
Leonardo Boledi, Stefanie Elgeti and Julia Kowalski

Simulation of hydraulic failure in the framework of the Theory of Porous Media
Julia Nicolina Sunten, Alexander Schwarz, Joachim Bluhm and Jörg Schröder

Physics-Informed Machine Learning for Underground Reservoir Pressure Management with Heterogeneity
Aleksandra Pachalieva, Dan O'Malley, Dylan Harp and Hari Viswanathan

A Stable Mixed Finite Element Method for the Elastic Deformation of Coastal Structures
Eirik Valseth, Clint Dawson, Albert Romkes and Austin Kaul

6/6/22 16:30 - 18:30
Higher order finite element methods for challenging mathematical problems in engineering and applied sciences III
Minisymposium organized by Antti H. Niemi and Leszek F. Demkowicz

MS92C
Room: Hordaland 2 (1F)
Chair: Leszek Demkowicz

Deep neural network-driven hp-adaptive finite element method in three dimensions
Maciej Paszynski, Rafał Grzeszczuk, Witold Dzwinel and David Pardo

A discontinuous Petrov-Galerkin method for elasticity problems with non-linear decomposition of the elastic energy density function
Jacob Salazar solano and Leszek Demkowicz

Effective Material Parameters for Perforated Shells
Stefano Giani and Harri Hakula

A framework for identifying better cubature rules for plane and solid elements
Weizhu Wang and Stefanos-Aldo Papanicolopulos

New Three-Node Assumed Strain Mindlin Plate Finite Elements
Marin Grbac and Dragan Ribarić

Asymptotic and numerical analysis of the buckling problem for a cylindrical shell
Antti H. Niemi, Harri Hakula and Keijo Ruotsalainen

6/6/22 16:30 - 18:30
Computational Methods for Biomechanics

CS02A
Room: Oppland (1F)
Chair: Victorien Prot

Mathematical and numerical modeling of cardiac electromechanics in scar-related ventricular tachycardia
Matteo Salvador, Marco Fedele, Francesco Regazzoni, Stefano Pagani, Pasquale Claudio Africa, Luca Dede', Natalia Trayanova and Alfio Quarteroni

Modeling the electromechanics of the whole heart in detailed image-based geometries
Marco Fedele, Francesco Regazzoni, Roberto Piersanti, Matteo Salvador, Pascquale Claudio Africa, Luca Dedè and Alfio Quarteroni

Non-linear model for the evolution of glioblastoma cells in microfluidic devices
Albert Costa-Solé, Marco Discacciati, Marina Pérez-Aliacar, Jacobo Ayensa-Jiménez, Manuel Doblaré and Josep Sarrate

NUMERICAL ANALYSIS OF ASYMMETRIC SEPTAL HYPERTHROPIC CARDIOMIOPATHY
Igor Saveljic, Dalibor Nikolic, Smiljana Tomasevic and Nenad Filipovic

Influence of boundary conditions on oxygen distribution in an organ-on-a-chip platform
Violeta Carvalho, Nelson Rodrigues, Raquel Rodrigues, Rui A. Lima and Senhorinha Teixeira

6/6/22 16:30 - 18:30
Study of ferromagnetism systems
Minisymposium organized by Clémentine Courtès, Raphaël Côte and Stéphane Labbé

MS91A
Room: Vestfold (1F)
Chair: Clémentine Courtès
CoChair: Stéphane Labbé

Stability of 2-domain wall for the Landau-Lifshitz-Gilbert equation in a nanowire with Dzyaloshinskii-Moriya interaction
Raphaël Côte and Guillaume Ferriere

Domain Walls pinning in notched ferromagnetic nanowires
Gilles Carbou and David Sanchez

Modeling and control of ferromagnetic nanowires
Yannick Privat and Emmanuel trélat

Numerical methods for inertial spin dynamics in ferromagnets and antiferromagnets
Michele Ruggeri

Stochastic modelling of thermal effects on a ferromagnetic nano particle
Jérôme Lelong and Stéphane Labbé

Higher dimensional topological textures in multiferroics
Patrick Buhl, Louise Desplat, Sebastian Meyer and Bertrand Dupé

Computational micro-magneto-mechanics
Christian Dorn and Stephan Wulfinghoff

6/6/22 16:30 - 18:30
Mechanics of wood and biocomposites in engineering III
Minisymposium organized by Ani Khaloian, Markus Lukacevic and Jan-Willem van de Kuilen

MS21C
Room: A1 – 1
Chair: Markus Königsberger
CoChair: Ani Khaloian

Complex finite element simulations of linear Hardwood cutting
František Šebek, Petr Kubík, Jan Tippner, Martin Brabec and Ondřej Dvořáček

Numerical analysis of rotational machining of hardwood
Petr Kubík, František Šebek, Ondřej Dvořáček, Martin Brabec and Jan Tippner

Numerical Analysis of Cross-Laminated Timber Connections with Mechanical Fasteners using a Beam-on-Foundation Model
Joan W. Gikonyo, Michael Schweigler and Thomas K. Bader

Analysis of residual stress in curved glulam beams considering material uncertainties
Taoyi Yu, Ani Khaloian and Jan-Willem van de Kuilen

Modeling approach to estimate the bending strength and height effect of glued laminated timber beams
Christoffer Vida, Markus Lukacevic and Josef Füssl

Integrated approach for modeling post-tension loss in mass-timber panel buildings
Ryan P. Longman Longman, Esther J. Baas, John A. Nairn, Lech Muszyński, Mariapaola Riggio, André R. Barbosa and Gabriele Granello

An anisotropic elastic constitutive model for wood with hygroscopic swelling in infinite strains
Winston Mmari and Björn Johannesson

6/6/22 16:30 - 18:30
Model order reduction - Challenges in engineering and industrial applications III
Minisymposium organized by Annika Robens-Radermacher, Wil Schilders, Karen Veroy and Chady Ghnatios

MS72C
Room: A1 – 2
Chair: Annika Robens-Radermacher

Model Reduction for Explicit Finite Elements in Crash Applications
Mathias Lesjak and Fabian Duddeck

Using Digital Twins for Predicitive Maintenance
Julian Henning and Karsten Urban

On the invariant subspaces of deep learning-based reduced order models in MEMS
Giorgio Gobat, Stefania Fresca, Andrea Opreni, Andrea Manzoni and Attilio Frangi

Data-driven models for shrinkage porosity prediction in aluminium casting
Madyen Nouri, Julien Artozoul, Aude Caillaud, Amine Ammar, Francisco Chinesta and Ole Köser

Surrogate Models for CFD Simulations Based on Convolutional Neural Networks
Matthias Eichinger, Viktor Grimm, Alexander Heinlein and Axel Klawonn

6/6/22 16:30 - 18:30
Modeling and simulation of highly flexible slender structures III
Minisymposium organized by Martin Arnold, Olivier Brüls, Elena Celledoni, Brynjulf Owren, Damien Durville, José Escalona, Johannes Gerstmayr, Gordan Jelenić, Sigrid Leyendecker, Joachim Linn, Tomaž Šuštar , Olivier Thomas and Dejan Zupan

MS161C
Room: A1 – 3
Chair: Damien Durville

A geometric nonsmooth modelling approach for braiding processes
Indrajeet Patil, Alejandro Cosimo, Facundo Cosimo and Olivier Brüls

Simulation of Frictional Contact Interactions Between Heddles and Yarns Withing Jacquard Harness of Weaving Looms for 3D Interlock Fabrics
Salah Eddine Mermouli, Pietro Del Sorbo, Damien Durville, Bastien Tranquart and Dominique Coupé

Velocity-based beam model for non-linear analysis of frame-likestructures with efficient consideration of strain localization
Sudhanva Kusuma Chandrashekhara and Dejan Zupan

Asymptotically based simulation of the Stokes flow in a layer through periodic flexural plates made of beams
Maxime Krier and Julia Orlik

An Elastica Robot: Tip control in tendon-driven elastic arms
Ramsharan Rangarajan and Poornakanta Handral

Nondimensionalized approach for flexible body motion with time-varying length and variable boundary
Riko Ogawara, Yoshiaki Terumichi and Stefan Kaczmarczyk

6/6/22 16:30 - 18:30
Innovative Methods for Fluid-Structure Interaction III
Minisymposium organized by Harald van Brummelen, Trond Kvamsdal and Roger Ohayon

MS45C
Room: A1 – 4
Chair: Harald van Brummelen

Immersed method with metric based anisotropic meh adaptation for multiphase flow and fluid solid interaction (Keynote Lecture)
Coupez Thierry, Nemer Rami and Hachem Elie

Low order fictitious domain method for FSI with enhanced stability and interfacial mass conservation
Daniele C. Corti, Guillaume Delay, Miguel A. Fernandez, Fabien Vergnet and Marina Vidrascu

Numerical Resolution of Eulers equations in a domain containing permeable moving boundary using immersed boundary methods with ghost points.
Constance Bocquet, Cyril Desjouy and Gwénaël Gabard

Modeling and simulation of thin-walled piezoelectric energy harvesters immersed in flow using monolithic fluid-structure interaction
Lan Shang, Christophe Hoareau and Andreas Zilian

Variational space-time localization for adjoint-based adaptivity of Navier-Stokes equations
Julian Roth, Jan Philipp Thiele and Thomas Wick

6/6/22 16:30 - 18:30
Simulations of Polymers and Polymer Composites III
Minisymposium organized by Sebastian Pfaller, Fabrice Detrez and Hans van Dommelen

MS30C
Room: A1 – 5
Chair: Hans van Dommelen

Constitutive Modelling and Experimental Validation Of Amorphous Polymeric Blends PC/ABS
Fernando P.B. Macedo, Abílio M.P. de Jesus and Francisco M.A. Pires

Rate-dependent damage-plasticity model for filled adhesive thermosets
Pedro Henrique Rios Silveira, Jan Vorel and Roman Wan-Wedner

Nonlinear Schapery viscoelastic material model for thermoplastic polymers
Loredana Kehrer, Thomas Zink, Valerian Hirschberg, Manfred Wilhelm and Thomas Böhlke

Material modelling and mechanical behaviour of an SLA additively manufactured polymer
Ruben L. Sælen, Odd S. Hopperstad and Arild H. Clausen

Growth modeling and mechanical study of anisotropy of polymer spherulite aggregates by FFT method
Xiaoxin Lu, Fabrice Detrez, Nicolas Auffray and Sebastian Roland

Constitutive modelling of biopolymer aerogels
Ameya Rege

A thermo-coupled constitutive model for semi-crystalline polymers at finite strains: Application to varying degrees of crystallinity and temperatures
Marie-Christine Reuvers, Birte Boes, Sebastian Felder, Tim Brepols and Stefanie Reese

6/6/22 16:30 - 18:30
Advanced Computational Design and Manufacturing Simulation of Novel Materials and Structures III
Minisymposium organized by Eric Li, Bing LI, ZC He, QQ Li, Fei Wu, ZQ Zheng and Yi Wu

MS15C
Room: A1 – 6
Chair: Eric Li

Computational Design and Simulation of Acoustic/Mechanical Metamaterials with Efficient Algorithms (Keynote Lecture)
Eric Li and ZC He

Modeling of the Thermal Field in Fused Deposition Modeling
Jan Vorisek

De-homogenization of Stiffness Optimal Infill for Additive Manufacturing
Peter D. L. Jensen, Ole Sigmund, Niels Aage and Fengwen Wang

Damping Optimization of Viscoelastic Cantilever Beams and Plates Under Free Vibration
Antoni Joubert, Gregoire Allaire, Samuel Amstutz and Julie Diani

Determination of the forming limit diagram of the multilayer sandwich plates with numerical simulation of the Nakazima test
Konrad Perzynski, Lukasz Madej and Janusz Majta

6/6/22 16:30 - 18:30
Structure preserving and adaptive polytopal methods
Minisymposium organized by Paola F. Antonietti, Andrea Cangiani, Zhaonan Dong and Lorenzo Mascotto

MS90A
Room: B1 – 1
Chair: Lorenzo Mascotto
CoChair: Andrea Cangiani

Numerical modeling of multi-physics wave propagation with polytopal Discontinuous Galerkin methods
Paola F. Antonietti, Michele Botti and Ilario Mazzieri

A multiscale hybrid-mixed method for Helmholtz problems in periodic structures
Théophile Chaumont-Frelet, Zakaria Kassali and Stéphane Lanteri

Three quasi-Trefftz bases for the 3D convected Helmholtz equation
Lise-Marie Imbert-Gerard and Guillaume Sylvand

Stabilization free Virtual Element Methods
Stefano Berrone, Andrea Borio and Francesca Marcon

A velocity-based moving mesh virtual element method
Harry Wells

Convergence analysis for some AVEMs
Claudio Canuto

The Virtual Element Method for the 3D Resistive Magnetohydrodynamic Model
Lourenco Beirao da Veiga, Franco Dassi, Gianmarco Manzini and Lorenzo Mascotto

6/6/22 16:30 - 18:30
High Performance Computing With Space-Time Methods
Minisymposium organized by Norbert Hosters and Max von Danwitz

MS61A
Room: B1 – 2
Chair: Max von Danwitz
CoChair: Norbert Hosters

Coxeter triangulations, their quality, and an efficient data structure
Jean-Daniel Boissonnat , Siargey Kachanovich and Mathijs Wintraecken

A space-time discontinuous Galerkin method for seismic wave propagation problems
Ilario Mazzieri and Paola F. Antonietti

Evaporation of a Suspended Droplet Using a Space-Time Least-Squares Spectral Element Method with C1 Hermite Elements for the Navier-Stokes-Korteweg Equations
Vitor H. Cardoso Cunha, Maria Fernandino and Carlos A. Dorao

Solution of nonlocal diffusion-type problems in unbounded domains using a space/time approach
Arman Shojaei, Alexander Hermann and Christian J. Cyron

Space-time finite element methods for flow problems
Max von Danwitz, Norbert Hosters and Marek Behr

Space-time methods for compressible flow on moving domains
Patrick Antony, Norbert Hosters and Marek Behr

Simplex Space-Time Finite Elements for Fluid-Structure Interaction
Norbert Hosters, Patrick Antony, Max von Danwitz, Daniel Hilger, Michel Make, Thomas Spenke and Marek Behr

6/6/22 16:30 - 18:30
Complex fluid flow in engineering: modeling, simulation and optimization III
Minisymposium organized by Fabian Key, Marek Behr and Stefanie Elgeti

MS12C
Room: B3 + B4
Chair: Fabian Key

PINN-based Reconstruction of Particle/Density-driven Gravity Flows
Romulo Silva, Ameya Jagtap, Khemraj Shukla, Gabriel Barros, Alvaro Coutinho and George Karniadakis

Reduced fluid structure interaction modeling of the aortic valve including leaflets curvature
Ivan Fumagalli, Luca Dede' and Alfio Quarteroni

A partitioned semi-implicit Reduced Basis Method for a Fluid-Structure Interaction problem
Monica Nonino, Francesco Ballarin and Gianluigi Rozza

Neural networks investigation of bifurcating phenomena in fluid-dynamics
Federico Pichi, Francesco Ballarin, Gianluigi Rozza and Jan S. Hesthaven

POD-Galerkin ROMs and physics-informed neural networks for solving inverse problems for the Navier--Stokes equations.
Saddam Hijazi, Niels Landwehr and Melina Freitag

Optimal control and bifurcating systems: an application to Navier-Stokes equations
Maria Strazzullo, Federico Pichi , Francesco Ballarin and Gianluigi Rozza

Optimization of the shape of Vertical Axis Wind Turbine rotor using POD based reduced order approach
Zbigniew Buliński, Tomasz Krysiński, Łukasz Marzec and Jakub Tumidajski

6/6/22 16:30 - 18:30
Recent advances in immersed boundary and fictitious domain methods III
Minisymposium organized by Alexander Idesman, Guglielmo Scovazzi , Antonia Larese , Riccardo Rossi , André Massing, Santiago Badia and Francesc Verdugo

MS44C
Room: Jan Mayen 1
Chair: Alexander Idesman

The shifted boundary method for computational mechanics
Guglielmo Scovazzi, Nabil Atallah, Kangan Li and Antonio Rodriguez-Ferran

A Cut Finite Element Method for the Stokes Problem on Anisotropic Background Meshes
Josefin Ahlkrona, André Massing and Daniel Elfverson

Three-grid immersed finite elements for complex CAD models
Eky Febrianto, Jakub Sistek, Pavel Kus, Matija Kerman and Fehmi Cirak

High order scheme for mixed formulation of problems with moving internal boundaries
Tiffanie Carlier, Léo Nouveau, Heloise Beaugendre, Mathieu Colin and Mario Ricchiuto

Adaptive finite element approximations for the elliptic problems using regularized forcing data
Luca Heltai and Wenyu Lei

Learning cut-cell integration by means of deep neural networks
Rene Hiemstra and Dominik Schillinger

6/6/22 16:30 - 18:30
Robust and scalable numerical methods for wave propagation: design, analysis and application III
Minisymposium organized by Hélène Barucq, Théophile Chaumont-Frelet, Rabia Djellouli and Axel Modave

MS153C
Room: Jan Mayen 2
Chair: R. Djelouli
CoChair: A. Modave

Incorporating effective transmission conditions between fluid and solid domains in transient wave propagation problems using the mortar element method
Alexandre Imperiale

Elastic wave propagation in multi-domain with a symetric BEM/FEM coupling
Sara Touhami and Denis Aubry

Transient, global-in-time, convergent iterative coupling of acoustic BEM and elastic FEM
Alice Nassor, Marc Bonnet and Stéphanie Chaillat

Algorithmic aspects of time-domain Energetic BEM for Elastodynamics
Alessandra Aimi, Luca Desiderio, Giulia Di Credico and Chiara Guardasoni

High-order accelerated integral scattering solvers for frequency- and time-domain simulation, optimization and design
Oscar P. Bruno

Spacetime Trefftz-DG Formulation for Modelling Wave Propagation in Unbounded Domains
Hélène Barucq, Henri Calandra, Julien Diaz and Vinduja Vasanthan

6/6/22 16:30 - 18:30
Deep Learning Approaches for Applied Sciences and Engineering III
Minisymposium organized by M. Giselle Fernández-Godino, Charles F. Jekel and Christian Gogu

MS117C
Room: Jan Mayen 3
Chair: Charles F. Jekel

A PINN-based model for coupled hydro-poromechanics in reservoir simulations
Caterina Millevoi, Nicolò Spiezia and Massimiliano Ferronato

CoSTA: Improving physics-based models using deep learning
Sindre S. Blakseth, Adil Rasheed, Trond Kvamsdal and Omer San

Physics-informed neural networks applied to two-phase flow in porous media problems
John Hanna, Jose V. Aguado, Sebastien Comas-Cardona, Ramzi Askri and Domenico Borzacchiello

Towards understanding of boiling conjugate heat transfer using physics informed neural network
Robin Kamenicky, Konstantinos Ritos, Victorita Dolean, Jennifer Pestana, Katherine Tant and Salaheddin Rahimi

Deep learning model operating on graph structured data for assisting multiphase flows
George El Haber, Jonathan Viquerat, Aurelien Larcher, David Ryckelynck and Elie Hachem

Physics inspired neural network plasticity modeling
Knut Andreas Meyer and Fredrik Ekre

6/6/22 16:30 - 18:30
Continuum Biomechanics of Active Systems III
Minisymposium organized by Tim Ricken, Oliver Röhrle and Silvia Budday

MS37C
Room: Lounge A2
Chair: Oliver Röhrle
CoChair: Lena Lambers

A multi-filament model of the ciliary axoneme with beating driven by dynamic instability
Louis Woodhams and Philip Bayly

A computational model of self-organized shape dynamics of active surfaces in fluids
Lucas D. Wittwer, Mirco Bonati, Elisabeth Fischer-Friedrich and Sebastian Aland

Relocation of VEGFR2 and integrin during adhesion and spreading of endothelial cells
Mattia Serpelloni, Matteo Arricca, Claudia Bonanno, Cosetta Ravelli, Elisabetta Grillo, Stefania Mitola and Alberto Salvadori

Active self-organization in actin-cytoskeleton
Waleed Ahmad Mirza, Marino Arroyo, Alejandro Torres Sanchez, Marco de Corato, Marco Pensalfini and Guillermo Vilanova

Soft adhesion and decohesion dynamics of fluid membranes mediated by mobile binders
Pradeep K. Bal, Dimitri Kaurin and Marino Arroyo

How mechanobiology captures receptor clustering on lipid rafts during ligand binding
Luca Deseri

6/6/22 16:30 - 18:30
Advances in automatic code-generation software for simulations in Science and Engineering
Minisymposium organized by Jeremy Bleyer, Jack S. Hale, Marie E. Rognes and Garth N. Wells

MS151A
Room: Spitsbergen
Chair: Marie Rognes
CoChair: Garth Wells

Automatic Verification of Algorithmically Differentiated Code
Christina Paulin, Sébastien Bourasseau and Cédric Content

Matrix-free, hybridised, compatible, high order finite element methods in Firedrake
Sophia Vorderwuelbecke, David Ham and Colin Cotter

Cleaning up distributed objects in managed languages and applications in extremely large scale simulations
Jack Betteridge, Patrick Farrell and David Ham

The Feel++ software: automation, code generation, applications
Christophe Prud'homme, Joubine Aghili, Luca Berti, Vincent Chabannes, Zohra Djatouti, Romain Hild, Thibaut Métivet, Philippe Ricka, Thomas Saigre-Tardif, Abdoulaye Samake, Marcela Szopos and Christophe Trophime

Scalable I/O for Firedrake and PETSc
Koki Sagiyama, Vaclav Hapla, Matthew G. Knepley, Lawrence Mitchell and David A. Ham

Nuclear thermal hydraulics modelling using automatic code generation
Kenechukwu Nwegbu, Claire Hearney, Alan Jones, Gerard Gorman, Christopher Pain and Paul Smith

Second order density based nonlinear topology optimization using a high level weak form language
Konstantinos Poulios and Gore Lukas Bluhm

6/6/22 16:30 - 18:30
Multiscale Computational Homogenization for Bridging Scales in the Mechanics and Physics of Complex Materials III
Minisymposium organized by Julien Yvonnet, Kenjiro Terada, Peter Wriggers, Marc Geers, Karel Matous and Paul Steinmann

MS6C
Room: Svalbard
Chair: Ashwini Gupta

Computational homogenization for predicting the macroscopic fatigue life of 3D-printed metallic microlattice materials
Farzin Mozafari and Ilker Temizer

Fatigue damage modelling of intermetallic phases in polycrystals
Manon Lenglet, Samuel Forest and Anna Ask

Multiscale topology optimization of buckling-resistant structures
Federico Ferrari and Ole Sigmund

Two complementary high-cycle fatigue models for the multiscale simulation of fiber reinforced polymers
Matthias Kabel, Jonathan Köbler, Nicola Magino, Shaharyar Jamali, Heiko Andrä, Fabian Welschinger, Ralf Müller and Matti Schneider

3D Homogenization and Failure Analysis of Interpenetrating Metal-Ceramic Composites
Dominik Horny and Katrin Schulz

Numerical solution of inverse problems for identification of a composite microstructure. Applications in design of functionally graded materials
Marek Wojciechowski, Marek Lefik and Daniela Boso

6/6/22 16:30 - 18:30
Multi-scale modelling of generalised continua and architectured materials
Minisymposium organized by Igor A. Rodrigues Lopes, Francisco M. Andrade Pires and Eduardo de Souza Neto

MS24A
Room: O – 3
Chair: Igor Rodrigues Lopes

On combined elasticity and plasticity theories in the framework of first and second strain gradient continuum mechanics
Sergei Khakalo and Anssi Laukkanen

Finite element analysis of micromorphic elastic media
Jalal Tarabi and Jarkko Niiranen

Improving the finite-element modelling of strain-gradient models
Stefanos-Aldo Papanicolopulos

Crack initiation from arbitrary 2D notches: efficient multi-scale models using the finite fracture mechanics concept
Matthias Rettl, Martin Pletz and Clara Schuecker

Data driven multiscale modeling of architected materials
Eduard MARENIC and Jean-Charles Passieux

DeepBND: Using a hybrid ROM-NN approach to accelerate Computational Homogenisation in Solid Mechanics
Felipe Rocha, Simone Deparis, Pablo Antolin and Annalisa Buffa

Macroscopic Length Scale Parameter in Second-Order Computational Homogenisation
Igor A. Rodrigues Lopes and Francisco M. Andrade Pires

6/6/22 16:30 - 18:30
HPC methods for eigenvalue problems in applied science and engineering
Minisymposium organized by Ali Hashemian, David Pardo, Victor Calo, Carla Manni and Quanling Deng

MS107A
Room: O – 4
Chair: Ali Hashemian

On the Tracking of eigensolutions to parametric partial differential equations
Moataz Alghamdi, Daniele Boffi and Francesca Bonizzoni

Eigenvalue approximation with the Discontinuous Petrov-Galerkin Method
Fleurianne Bertrand, Daniele Boffi and Henrik Schneider

Approximation of eigenvalue problems with VEM
Lucia Gastaldi

Performance of Refined Isogeometric Analysis in Solving Generalized and Quadratic Eigenvalue Problems
Ali Hashemian, Daniel Garcia, David Pardo and Victor Calo

Outlier-free isogeometric discretizations
Carla Manni, Espen Sande and Hendrik Speleers

Global Stability Analysis Of Industrial Compressible Fluid Flows
Valentin Fer, Cédric Content, Sébastien Bourasseau, Samir Beneddine, Denis Sipp and Jean-Christophe Robinet

Kohn-Sham density functional theory calculations with isogeometric analysis
Kaan Karaça and Ilker Temizer

19:00 - 21:00
Welcome Reception at Nova Spektrum Hall B1

CONFERENCE PROGRAMME & TECHNICAL SESSIONS

Tuesday	9:00 - 10:30	11:00 - 13:00	14:00 - 16:00	16:30 - 18:30
Hedmark (GF)		STS04A		STS03A
Nord – Norge (GF)		MS2D	SPL3	MS2E
Nordland (GF)		MS23B		MS133A
Oslo 1 (GF)		ECOA	CF1	ECOB
Oslo 2 (GF)		MS135A	CF2	MS135B
Rogaland (GF)		MS26A		MS26B
Romerike (GF)		MS4A		MS4B
Sør – Norge (GF)		MS99D	SPL4	MS99E
Akershus (1F)		MS127A		MS127B
Buskerud (1F)		MS145B		MS78A
Hordaland 1 (1F)		MS149A		MS149B
Hordaland 2 (1F)		MS7A		MS7B
Oppland (1F)		MS18A		MS60A
Vestfold (1F)		MS95A		MS95B
A1 – 1		MS21D		MS63A
A1 – 2		MS72D		MS72E
A1 – 3		MS161D		MS31A
A1 – 4		MS45D		MS45E
A1 – 5		MS137A		MS138A
A1 – 6		MS51A		MS22A
B1 – 1		MS56A		MS56B
B1 – 2		MS52A		MS52B
B3 + B4	PL1	MS12D	SPL1	MS12E
Jan Mayen 1		MS44D		MS44E
Jan Mayen 2		MS153D		MS153E
Jan Mayen 3		MS117D		MS64A
Lounge A2		MS54A		MS54B
Spitsbergen		MS123A		MS123B
Svalbard		MS6D	SPL2	MS6E
O – 3		MS144A		MS68A
O – 4		MS20A		MS93A

Thon Hotel Arena NOVA Spektrum Center

Tuesday, June 7th

7/6/22 09:00 - 10:30
Plenary Lectures I

PL1
Room: B3 + B4
Chair: Trond Kvamsdal

The Finite Element Method and Computational Mechanics: Past, Present and a Vision of the Future
Thomas J.R. Hughes

Computational mechanics and the green transition: motivation and examples
Pål G. Bergan

10:30 - 11:00
Coffee Break

11:00 - 13:00 | TECHNICAL SESSIONS

6/6/22 11:00 - 13:00
Application of Hybrid Laminar Flow Control for Drag Reduction of Transport Aircraft

STS04A
Room: Hedmark (GF)
Chair: Geza Schrauf

Airbus A320 flight tests of the AFLoNext project with the vertical tail plane equipped by a hybrid laminar flow control system
Geza Schrauf and Heiko von Geyr

Laminar wing manufacturing developments and demonstrators for validation
Miguel Castillo, Federico Martín de la Escalera and David Cruz

Laminar Flow Control along the Attachment Line of a Swept Wing
Jeanne Methel, Fabien Mery, Olivier Vermeersch and Maxime Forte

Verification of transition prediction for flows with suction using linear stability theory and eN-method
Normann Krimmelbein and Andreas Krumbein

Impact of Boundary Layer Suction on the Prediction of Drag and Transition for Transport Aircraft with Hybrid Laminar Flow Control
Martin Kruse

7/6/22 11:00 - 13:00
Isogeometric Methods IV
Minisymposium organized by Alessandro Reali, Yuri Bazilevs, David J. Benson, René de Borst, Thomas J.R. Hughes, Trond Kvamsdal, Giancarlo Sangalli and Clemens V. Verhoosel

MS2D
Room: Nord – Norge (GF)
Chair: Simone Morganti

A Neural network-enhanced reproducing kernel approximation for modeling strain localization
Jiun-Shyan Chen, Jonghyuk Baek and Kristen Susuki

An effcient collocation method for cardiac muscle simulations
Michele Torre, Simone Morganti, Alessandro Nitti, Marco de Tullio, Francesco Pasqualini and lessandro Reali

Mixed isogeometric analysis for linear elasticity
Jeremias Arf and Bernd Simeon

A One-Dimensional Model for Developable Elastic Strips with Isogeometric Discretisation
Benjamin Bauer, Michael Roller, Joachim Linn and Bernd Simeon

Isogeometric analysis of diffusion problems on random surfaces
Wei Huang and Michael Multerer

Adaptive Control Volume Isogeometric Analysis for numerical modelling of engineering problems
Hrvoje Gotovac, Grgo Kamber and Vedrana Kozulić

7/6/22 11:00 - 13:00
Unstructured mesh adaptation: from mesh generation to applications II
Minisymposium organized by Nicolas Barral, Hugues Digonnet, Algiane Froehly and Jeroen Wackers,

MS23B
Room: Nordland (GF)
Chair: Hugues Digonnet

Multiobjective optimization algorithms for untangling and mesh quality improvement of quadrilateral meshes
Moein Moradi and Suzanne M. Shontz

On optimal approaches for mesh adaptation
Serge Prudhomme, Kenan Kergrene and Jonathan Vacher

A Metric-based Adaptive Mesh Refinement method for elliptic multigrid solvers based on quadtree/octree grids
Lucas Prouvost, Anca Belme and Daniel Fuster

A R&D software platform for shape and topology optimization using body-fitted meshes
Chiara Nardoni, David Danan, Felipe Bordeu, Julien Cortial , Chetra Mang , Christian Rey , Grégoire Allaire and Xavier Lorang

Improving the performance of CFD solvers for quenching simulations using Hessian based a-potseriori error estimator
Ghaniyya Medghoul

Axial Green function method for the incompressible Navier-Stokes flows
Junhong Jo and Do Wan Kim

7/6/22 11:00 - 13:00
ECCOMAS Olympiad I

ECOA
Room: Oslo 1 (GF)
Chair: Konrad Perzynski

Asymptotic analysis of high-contrast subwavelength resonator structures
Erik O. Hiltunen and Habib Ammari

Numerical Modelling of Electrostatic Spray Painting Process with a Rotating Bell Cup for Automotive Painting
Mohammad-Reza Pendar and José Carlos Páscoa

Monolithic matrix-free solver for fluid-structure interaction problems: time integration scheme and preconditioning
Michał Wichrowski, Piotr Krzyżanowski, Stanisław Stupkiewicz and Luca Heltai

Mathematical and computational modeling of flexoelectricity at mesoscopic and atomistic scales
David Codony

Numerical analysis of some nonlinear hyperbolic systems of Partial Differential Equations arising from Fluid Mechanics
Ernesto Pimentel-García

Gaseous transport phenomena in rarefied conditions via deterministic and stochastic methods with applications in vacuum and fusion engineering
Nikos Vasileiadis and Dimitris Valougeorgis

7/6/22 11:00 - 13:00
Multiphysics modelling by the lattice boltzmann method I
Minisymposium organized by Alessandro De Rosis

MS135A
Room: Oslo 2 (GF)
Chair: Alessandro De Rosis

Lattice-Boltzmann simulations of traffic-related atmospheric pollutant dispersion in urban areas
Mathis Pasquier, Stéphane Jay and Pierre Sagaut

Compressible lattice Boltzmann method for rotating overset grids
Heesik YOO, Julien Favier and Pierre Sagaut

Finite volume Lattice Boltzmann compressible approach for boundary conditions
Thomas Coratger, Pierre Boivin and Pierre Sagaut

Large Eddy Simulation of Forced Plumes Using Lattice Boltzmann Method
Mostafa Taha, Song Zhao, Aymeric Lamorlette, Jean-louis consalvi and Pierre Boivin

Pseudo-potential Lattice-Boltzmann Method applied to wetting on anisotropic surfaces
Alexandre Epalle, Manuel Cobian and Stéphane Valette

7/6/22 11:00 - 13:00
Polygonal and Polyhedral Discretizations For Partial Differential Equations I
Minisymposium organized by Joe Bishop, Michele Botti, Gianmarco Manzini and N. Sukumar

MS26A
Room: Rogaland (GF)
Chair: Joe Bishop
CoChair: Gianmarco Manzini

Refinement of polygonal grids using Convolutional Neural Networks with applications to polygonal Discontinuous Galerkin and Virtual Element methods
Paola F. Antonietti and Enrico Manuzzi

A space-time virtual element method for parabolic problems
Sergio Gómez, Lorenzo Mascotto, Andrea Moiola and Ilaria Perugia

Extended virtual element method for two-dimensional fracture modeling in linear elasticity
Andrea Chiozzi, Gianmarco Manzini, N. Sukumar and Elena Benvenuti

Nonconforming virtual element methods for fourth-order problems
Alice Hodson and Andreas Dedner

Quality preserving polygonal mesh refinement algorithm for Virtual Element Methods
Stefano Berrone and Alessandro D'Auria

Weakly imposed Dirichlet boundary conditions for 2D and 3D Virtual Elements
Silvia Bertoluzza, Micol Pennacchio and Daniele Prada

7/6/22 11:00 - 13:00
Advanced materials: computational analysis of properties and performance I
Minisymposium organized by Vadim V. Silberschmidt and Valery P. Matveenko

MS4A
Room: Romerike (GF)
Chair: Vadim Silberschmidt

Microstructurally-Based Statistical Predictions of Failure in Hydrided Zirconium Materials (Keynote Lecture)
Tamir Hasan, Laurent Capolungo and Mohammed Zikry

Effect of graphite-particle morphology on thermomechanical performance of compacted graphite iron: Numerical modelling
Minghua Cao, Evangelia Nektaria Palkanoglou, Konstantinos P. Baxevanakis Baxevanakis and Vadim V. Silberschmidt

Dislocation-Density-Based Crystal Plasticity Modeling of Halite at Different Temperatures and Orientations
Timothy J. Truster, Wadi H. Imseeh, Ran Ma, Amirsalar Moslehy and Khalid A. Alshibli

Data-led Mechanical and Thermal Analysis of Layered Structures Based on Parametric Finite Element Analysis and Neural Network
James Ren

Voxel-based density registration of trabecular bone: a longitudinal HR-pQCT study of postmenopausal women
Juan Du, Mengen Huang, Simin Li and Vadim Silberschmidt

7/6/22 11:00 - 13:00
Biological fluid mechanics: modeling, simulation, and analysis IV
Minisymposium organized by Boyce Griffith, Sookkyung Lim and Sarah Olson

MS99D
Room: Sør – Norge (GF)
Chair: Owen Lewis

Secondary flow in helical square ducts with cochlea-like curvature and torsion
Noëlle C. Harte, Dominik Obrist, Marco D. Caversaccio and Wilhelm Wimmer

Development of a Fluid-Structure Interaction Model to Capture Displacements During Flow Through Deformable Bodies
Aleksander Sinek, Mateusz Mesek, Marek Rojczyk, Wojciech Adamczyk, Jan Juszczyk, Ziemowit Ostrowski and Ryszard Bialecki

Neuromechanical wave resonance in fluid pumping
Alexander Hoover

Impact of flow rate on wall vibration in intracranial aneurysms
David Bruneau, Kristian Valen Sendstad and David Steinman

Characterization of left atrial flow patterns by proper orthogonal decomposition in universal atrial coordinates
Jorge Dueñas-Pamplona, Alejandro Gonzalo, Savannah Bifulco, Patrick Boyle, Elliot McVeigh, Andrew M. Kahn, Pablo Martínez-Legazpi, Javier Bermejo, José Sierra-Pallares, Manuel García-Villalba, Óscar Flores, Javier García García and Juan Carlos del Álamo

7/6/22 11:00 - 13:00
Advances in Numerical Methods for Fluid-Structure Interaction I
Minisymposium organized by Bernhard Müller, Wolfgang Schröder, Arthur Rizzi, Joris Degroote and Stein Tore Johansen

MS127A
Room: Akershus (1F)
Chair: Bernhard Müller
CoChair: Jesper Oppelstrup

Unstructured cut-cell method for flow problems with moving surfaces (Keynote Lecture)
Wolfgang Schröder, Tim Wegmann and Matthias Meinke

Computation of ship motion in waves, using cartesian cut-cells
Elena-Roxana Popescu, Song T. Dang and Stein Tore Johansen

Accelerating quasi-Newton methods using various types of surrogate models
Nicolas Delaissé, Dieter Fauconnier and Joris Degroote

Modular programming approach to aircraft static aeroelasticity
Arthur Rizzi, Jesper Oppelstrup and Mengmeng Zhang

High fidelity fluid-structure interaction simulation of a multi-megawatt airborne wind energy reference system in cross-wind flight
Niels Pynaert, Jolan Wauters, Guillaume Crevecoeur and Joris Degroote

7/6/22 11:00 - 13:00
Advances in structure-preserving methods and applications II
Minisymposium organized by Joubine Aghili and Francesco Bonaldi

MS145B
Room: Buskerud (1F)
Chair: Joubine Aghili
CoChair: Francesco Bonaldi

H 1 -conforming finite element cochain complexes n cartesian meshes
Francesca Bonizzoni and Guido Kanschat

Hamiltonian models of the macroscopic Maxwell equations: continuous and discrete
William Barham, Philip J. Morrison and Eric Sonnendrücker

Structure-preserving time integration of constrained thermomechanical systems based on the GENERIC formalism
Vanessa Valdes y Beck and Peter Betsch

A new segregated-explicit staggered scheme for lagrangian hydrodynamics
Nicolas Therme

Conservative and consistent iterative methods
Viktor Linders and Philipp Birken

Mixed finite element formulations and energy-momentum time integrators for thermo-viscoelastic gradient-based fiber-reinforced continua
Julian Dietzsch, Michael Groß and Iniyan Kalaimani

7/6/22 11:00 - 13:00
Computational Structural Stability I
Minisymposium organized by Herbert A. Mang and Yeong-Bin Yang

MS149A
Room: Hordaland 1 (1F)
Chair: Yeong-Bin Yang

Significance of exact geometry in stability analyses of shells
Bastian Oesterle, Florian Geiger, Manuel Fröhlich, David Forster, Ekkehard Ramm and Manfred Bischoff

A hybrid-Trefftz finite element for the postbuckling analysis of composite shell structures
Francesco S. Liguori and Antonio Madeo

Shell buckling with uncertainty quantification under limited data
Marc Fina, Werner Wagner and Freitag Steffen

Buckling and postbuckling performance of composite fuselage panels with cutouts using continuous streamline fibres
Ahmad Alhajahmad and Christian Mittelstedt

Impact of input uncertainty on film delamination driven by thermal induced instability
Nachman Malkiel and Oded Rabinovitch

Nonlinear 3D analysis of laminated composite structures using variable kinematics elements
Sander van den Broek, Mayank Patni, Aewis Hii, Peter Greaves, Paul Weaver and Alberto Pirrera

7/6/22 11:00 - 13:00
Multiscale modeling and simulation of surfaces in contact: mechanics of contact, friction, and wear I
Minisymposium organized by Ramin Aghababaei, David Kammer and Lucia Nicola

MS7A
Room: Hordaland 2 (1F)
Chair: David Kammer

From molecular to multi-asperity contacts: the role of roughness in the transient friction response
Lucas Frerot, Alexia Crespo, Jaafar El-Awady, Mark Robbins, Juliette Cayer-Barrioz and Denis Mazuyer

Functional Multilayer Coatings, Simultaneous Experimental and Modeling Approach seeking Ultra-durability
Narguess Nemati, Li Ma, Ramin Aaghababaei and Dae-Eun Kim

Wear modelling in elasto-plastic wheel-rail contact problems
Andrzej Myśliński and Andrzej Chudzikiewicz

The degraded surface layer of a tyre tread: A numerical model combining discrete and continuum approaches
Kévin Daigne, Guilhem Mollon, Nicolas Fillot, Sylvie Descartes, Romain Jeanneret-Dit-Grosjean and Frederic *Biesse*

Quantifying errors due to the Hertzian contact model in multi-sphere Discrete Element Modelling simulations
Stephanos Constandinou, Jane Blackford and Kevin Hanley

A dual-scale method to address plastic deformation in contact problems
Mohammad Aramfard, Yaswanth Murugesan, Francisco Perez Rafols and Lucia Nicola

7/6/22 11:00 - 13:00
Inverse Problems, Design & Optimization in Heat Transfer
Minisymposium organized by Helcio Orlande, George Dulikravich, Marcelo Colaço and Zbigniew Bulinski

MS18A
Room: Oppland (1F)
Chair: Helcio Orlande
CoChair: Zbigniew Bulinski

Using Gaussian Process Regression with Coupled Multiphysics FEA Simulations to Enhance Sparse Experimental Data
Rhydian Lewis, Llion M. Evans, Ruben Otin, A. David. L Hancock, Andrew Davis and Permual Nithiarasu

Optimization of extrusion dies comprised of CAD-compliant microstructures
Jacques Zwar and Stefanie Elgeti

Structural shape optimization of the thermal concentrator by isogeometric analysis and particle swarm optimization method
Chintan Jansari, Elena Atroshchenko and Stephane P.A. Bordas

Stable numerical reconstruction of non-smooth boundary data in steady-state anisotropic heat conduction
Mihai Bucataru, Iulian Cimpean and Liviu Marin

Application of the bayesian inverse methods to estimate initial condition for heat transfer problems
Zbigniew Buliński and Helcio R.B. Orlande

Design of the thermal ablation treatment of skin cancer
Luiz Ferreira, Leonardo Varon, Helcio Orlande and Bernard Lamien

7/6/22 11:00 - 13:00
Multi-Scale and Multi-Physic Interface Models I
Minisymposium organized by Michele Serpilli, Maria Letizia Raffa, Raffaella Rizzoni, Serge Dumont, Frédéric Lebon, Mikhail Poluektov and Lukasz Figiel

MS95A
Room: Vestfold (1F)
Chair: Frédéric Lebon
CoChair: Serge Dumont

Modeling imperfect interfaces in layered beams through multi- and single-variable zigzag kinematics (Keynote Lecture)
Roberta Massabò and Ilaria Monetto

On modeling hard adhesives with micro-cracking damage
Maria Letizia Raffa, Raffaella Rizzoni and Frédéric Lebon

Multiphysics Virtual Design Tool for biodegradable Magnesium implants
Mohammad Marvi Mashhadi, Dirk Steglich and Christian J. Cyron

New soft interface conditions for flexoelectric composites
Michele Serpilli, Raffaella Rizzoni, Reinaldo Rodrìguez-Ramos, Frédéric Lebon and Serge Dumont

Multiphysics modeling of adhesive interface with damage and healing
Sébastien D'andréa, Stéphane Lejeunes, Frédéric Lebon, Victor Blanc and Lainet Marc

Multi-physics simulation of heat harvest in fusion reactors with Alya HPC software
Pedro Bonilla, Hadrien Calmet, Oriol Fernández, Ezequiel Goldberg, Samuel Gómez, Xavier Granados, Guillaume Houzeaux, Oriol Lehmkuhl, Jordi Manyer, Mervi Mantsinen, Pol Pastells, Xavier Sáez and Alejandro Soba

7/6/22 11:00 - 13:00
Mechanics of wood and biocomposites in engineering IV
Minisymposium organized by Ani Khaloian, Markus Lukacevic and Jan-Willem van de Kuilen

MS21D
Room: A1 – 1
Chair: Markus Lukacevic
CoChair: Franziska Seeber

Quantification of spatial inhomogeneous material properties: Wooden laser scanned fibre deviations modelled by Gaussian processes
Catharina Czech, Franziska Seeber, Fabian Duddeck and Ani Khaloian Sarnaghi

Parameter identification for a cross-laminated timber slab by Bayesian inference
Michael Kawrza, Thomas Furtmüller and Christoph Adam

Generation of artificial timber boards with realistic appearance for application of deep-learning algorithms in the wood manufacturing industry
Tadios Habite, Anders Olsson and Osama Abdeljaber

Multi-objective optimization for understanding tree design rules with finite element modelling.
Ezequiel Moreno-Zapata, José M. Cabrero-Ballarín, Germán Ramos-Ruiz and Gustavo Vargas-Silva

Finite element analysis of natural fibre composites under impact loading
Simonetta Boria, Giulia Del Bianco and Valentina Giammaria

A micromechanics-informed beam model of growing wood structures
Antonia Wagner and Stefan Scheiner

7/6/22 11:00 - 13:00
Model order reduction - Challenges in engineering and industrial applications IV
Minisymposium organized by Annika Robens-Radermacher, Wil Schilders, Karen Veroy and Chady Ghnatios

MS72D
Room: A1 – 2
Chair: Annika Robens-Radermacher
CoChair: Karen Veroy

Model Order Reduction for State-Space Neural Networks
Anna Shalova

Model order reduction applied to a transient heat transfer simulation of a Selective Laser Melting process
Mohamed amine ben yahmed and frank naets

PGD model with domain mapping of bead-on-plate weld simulation for wire arc additive manufacturing
Dominic Strobl, Annika Robens-Radermacher, Chady Ghnatios, Michael Rethmeier, Andreas Pittner and Jörg F. Unger

A stochastic interface scheme for mechanical substructuring problems with large interfaces: an application in electronics
Frank Naets and Sander Neeckx

On the stability of PGD reduced-order models for structural dynamics applications
Clément Vella and Serge Prudhomme

7/6/22 11:00 - 13:00
Modeling and simulation of highly flexible slender structures IV
Minisymposium organized by Martin Arnold, Olivier Brüls, Elena Celledoni, Brynjulf Owren, Damien Durville, José Escalona, Johannes Gerstmayr, Gordan Jelenić, Sigrid Leyendecker, Joachim Linn, Tomaž Šuštar , Olivier Thomas and Dejan Zupan

MS161D
Room: A1 – 3
Chair: Damien Durville

Third-order time integration scheme for dynamic analysis of cosserat rods
Eva Zupan and Dejan Zupan

Inverse Dynamics of Geometrically Exact Beams
Timo Ströhle and Peter Betsch

Dynamic cable simulation using a damped Cosserat rod model with measured stiffness and damping parameters
Joachim Linn, Fabio Schneider-Jung, Dominik Jungkenn and Fredrik Andersson

Efficient assessment of noise transmission through highly flexible slender structures
Fabio Schneider-Jung, Lilli Burger and Joachim Linn

Simulating Nonlinear Elastic Behaviour of Cables Using an Iterative Method
Tian Zhao, Fabio Schneider-Jung, Joachim Linn and Ralf Müller

7/6/22 11:00 - 13:00
Innovative Methods for Fluid-Structure Interaction IV
Minisymposium organized by Harald van Brummelen, Trond Kvamsdal and Roger Ohayon

MS45D
Room: A1 – 4
Chair: Harald van Brummelen

Space-time fluid-structure interaction with adjoint-based methods for error estimation and optimization (Keynote Lecture)
Julian Roth, Jan Philipp Thiele, Thomas Wick and Winnifried Wollner

An arbitrary Lagrangian-Eulerian formulation for Navier-Stokes flow on deforming surfaces
Roger A. Sauer

Conjugate Heat Transfer Between a Solid and Rarefied Gas
Daan A.M. van der Woude, Jochem M.W. van Heumen, Michael R.A. Abdelmalik, Benjamin Uekermann and E. *Harald van Brummelen*

Boudary Element Methor for fluid-structure coupling: application to airship aeroelastic stability
Robin Le Mestre, Jean-Sébastien Schotté and Olivier Dooré

Boundary Element Method for Fluid-Structure coupling: application to aerospace structures
Jean-Sébastien SCHOTTE and Robin LE MESTRE

7/6/22 11:00 - 13:00
Computational Vascular Biomechanics
Minisymposium organized by T. Christian Gasser, Michael Gee, Thomas Franz and Daniela Valdez-Jassov

MS137A
Room: A1 – 5
Chair: T.Christian Gasser

A finite Element Analysis Pipeline for In Silico Annuloplasty on Barlow's Diseased Mitral Valve
Hans Martin Aguilera, Robert Persson, Rune Haaverstad, Stig Urheim, Bjørn Skallerud and Victorien Prot

Design of Stents Using Geometrically and Materially Nonlinear Topology Optimization
Lukas Rinderer and Michael W. Gee

Finite Element Simulation of a Human Left Ventricle using with implanted Ventricular Assist Device
Maximilian R. Schuster and Marek Behr

A data-informed, patient-specific framework for the quantification of abdominal aortic aneurysm rupture risk
Michael Gee, Lukas Bruder, Jaroslav Pelisek and Hans-Henning Eckstein

Analysis of wall shear stress and residence time as risk factors in stented arteries
Anna M. Ranno and Marek Behr

Modeling pathological blood clotting for the development of next-generation anticoagulants
Tobias Bongartz, Alessia Piergentili, Giulia Rosetti and Marek Behr

7/6/22 11:00 - 13:00
Enabling Industrial Applications Towards Exascale Computing
Minisymposium organized by Bastian Koller and Andreas Wierse

MS51A
Room: A1 – 6
Chair: Andreas Wierse

Enabling Swedish SMEs and the public sector on EuroHPC JU systems
Lilit Axner and Jeanette Nilsson

Modelization of a molten salt thermal energy storage for concentrated solar power.
Jordi Vera Fernandez, Guillem Colomer, Oriol Sanmartí and Carlos David Perez

Towards a European Energy System Virtual Twin:The cost of Renewable integration and value of flexibilities
Sandrine Charousset, Wim van Ackooij, Antonio Frangioni, Alfio Lazzaro and Utz-Uwe Haus

Next-generation HPC models for future Rotorcraft applications
Tommaso Benacchio, Nicoletta Sanguini, Federico Cipolletta, Daniele Malacrida, Francesco Rondina, Antonio *Sciarappa, Ivan Spisso and Luigi Capone*

NCC Norway: Use-Cases and Success Stories
Klaus Johannsen, Espen Flage-Larsen, Paal Skjetne and Roger Kvam

Wind turbine simulations using Xcompact3D toward exascale computing
Flavio C. C. Galeazzo and Andreas Ruopp

7/6/22 11:00 - 13:00
Recent Advances in Exact Model Reduction for Mechanics Problems I
Minisymposium organized by Shobhit Jain and Mingwu Li

MS56A
Room: B1 – 1
Chair: Shobhit Jain
CoChair: Mingwu LI

Reduction of Non-Linearizable Dynamics to Spectral Submanifolds (Keynote Lecture)
George Haller

Non-intrusive Model Reduction via Spectral Submanifolds in Structural and Fluid Dynamics
Mattia Cenedese, Bálint Kaszás, Shobhit Jain and George Haller

Variational Autoencoder-boosted physics-based ROM for the treatment of parametric dependencies in nonlinear problems
Konstantinos Vlachas, Thomas Simpson, Anthony Garland, Carianne Martinez and Eleni Chatzi

Using spectral submanifolds for nonlinear control
Florian Mahlknecht, John I. Alora, Shobhit Jain, Edward Schmerling, Riccardo Bonalli, George Haller and Marco Pavone

7/6/22 11:00 - 13:00
Efficient solution techniques for nonstationary flow problems exploiting space-time concurrency I
Minisymposium organized by Stefan Turek and Christoph Lohmann

MS52A
Room: B1 – 2
Chair: Stefan Turek
CoChair: Christoph Lohmann

On the design of global-in-time Newton-Pressure Schur complement solvers for incompressible flow problems (Keynote Lecture)
Christoph Lohmann and Stefan Turek

Multigrid reduction in time for high-order advection via dissipatively corrected coarse-grid operators
Hans De Sterck, Robert Falgout and Oliver Krzysik

Application of a modified multigrid waveform relaxation method as a time-simultaneous approach to convection-diffusion equations
Jonas Dünnebacke and Stefan Turek

Vectorized implicit time discretion
Christian Engwer and Nils-Arne Dreier

7/6/22 11:00 - 13:00
Complex fluid flow in engineering: modeling, simulation and optimization IV
Minisymposium organized by Fabian Key, Marek Behr and Stefanie Elgeti

MS12D
Room: B3 + B4
Chair: Marek Behr

Topology optimization of particle-laden flow problems
Casper S. Andreasen, Lukas C. Høghøj and Brice R

A reformulation of the level set equation with built-in redistancing
Mathis Fricke, Tomislav Marić and Dieter Bothe

A numerical vinaigrette: effect of surfactants on the oil-water emulsification
Fuyue Liang, Juan P. Valdes, Lyes Kahouadji and Omar K. Matar

Direct numerical simulation of the dispersion dynamics of complex flows in static mixers
Juan Pablo Valdes, Fuyue Liang, Lyes Kahouadji and Omar Matar

Extended Hybridizable Discontinuous Galerkin (X-HDG) Method for Incompressible Two-Phase Flows
Ahmed Sherif, Michel Visonneau, Ganbo Deng and Luís Eça

Topology optimisation of fluid flow in MATLAB: a detailed introduction
Joe Alexandersen

7/6/22 11:00 - 13:00
Recent advances in immersed boundary and fictitious domain methods IV
Minisymposium organized by Alexander Idesman, Guglielmo Scovazzi , Antonia Larese , Riccardo Rossi , André Massing, Santiago Badia and Francesc Verdugo

MS44D
Room: Jan Mayen 1
Chair: Guglielmo Scovazzi
CoChair: Andre Massing

Phi-FEM: a finite element method on domains defined by level-sets (Keynote Lecture)
Michel Duprez, Alexei Lozinski and Vanessa Lleras

A cutfem method for a mechanistic modelling of astrocytic metabolism in 3D physiological morphologies
Sofia Farina, Valérie Voorsluijs, Susanne Claus, Alexander Skupin and Stéphane P. A. Bordas

Unfitted Hybrid High-order Methods for the Acoustic Wave Equation
Erik Burman, Omar Duran and Alexandre Ern

A comparison between IBM with feedback forcing and a volume penalization method for compressible flows
Lucas Ménez, Eric Goncalves, Philippe Parnaudeau and Damien Colombet

A cartesian discontinuous Galerkin solver with immersed boundaries
tNayan Levaux, Amaury Bilocq, Pierre Schrooyen, Vincent Terrapon and Koen Hillewaert

7/6/22 11:00 - 13:00
Robust and scalable numerical methods for wave propagation: design, analysis and application IV
Minisymposium organized by Hélène Barucq, Théophile Chaumont-Frelet, Rabia Djellouli and Axel Modave

MS44D
Room: Jan Mayen 1
Chair: Guglielmo Scovazzi
CoChair: Andre Massing

Efficient computation of modal outgoing Green's kernels in helioseismology.
Helene Barucq, Florian Faucher, Damien Fournier, Laurent Gizon and Ha Pham

Atmospheric radiation boundary conditions for the wave equation in helioseismology
Helene Barucq, Florian Faucher, Damien Fournier, Laurent Gizon and Ha Pham

Low Mach preconditioned non-reflecting boundary conditions for the harmonic balance solver
Pierre Sivel and Christian Frey

An automatic PML for convex domains of general shape in time-harmonic acoustics
Axel Modave and Hadrien Bériot

Domain decomposition preconditioners for non-self-adjoint or non-positive-definite problems
Marcella Bonazzoli, Xavier Claeys, Frédéric Nataf and Pierre-Henri Tournier

Towards an efficient domain decomposition solver for industrial time-harmonic flow acoustics
Philippe Marchner, Hadrien Bériot, Xavier Antoine and Christophe Geuzaine

7/6/22 11:00 - 13:00
Deep Learning Approaches for Applied Sciences and Engineering IV
Minisymposium organized by M. Giselle Fernández-Godino, Charles F. Jekel and Christian Gogu

MS117D
Room: Jan Mayen 3
Chair: M. Giselle Fernandez-Godino

Development of the Defects Detection System for Carbon Fiber Reinforced Plastic by Using Infrared Stress Analysis and Machine Learning
Yuta Kojima, Kenta Hirayama, Katsuhiro Endo, Kazuya Hiraide, Mayu Muramatsu and Yoshihisa Harada

Health indicator learning for predictive maintenance based on a triplet loss and deep siamese network
Etienne Jules, Cecille Mattrand and Jean-Marc Bourinet

Understanding Vehicle Reliability and Safety with Multivariate Sensory Data: A Tire Wear Case Study
Thabang Lebese, Cécile Mattrand, David Clair, Jean-Marc Bourinet, François Deheeger and Rodrigue Decatoire

Application of multiresolution analysis and deep learning to obtain failure pressure of corroded pipelines
Adriano D. Marques Ferreira, Silvana M. Bastos Afonso and Ramiro B. Willmersdorf

Remaining Useful Life prediction with a Deep Self-Supervised Learning Approach
Anass Akrim, Christian Gogu, Rob Vingerhoeds and Michel Salaün

A framework for neural network based constitutive modelling of inelastic solid materials
Eugenio J. Muttio-Zavala, Reem Alhayki, Wulf G. Dettmer and Djordje Peric

7/6/22 11:00 - 13:00
Advanced Large-Eddy Simulation-based techniques for complex turbulent flows I
Minisymposium organized by F.Xavier Trias, Alexey Duben and Roel Verstappen

MS54A
Room: Lounge A2
Chair: Roel Verstappen

A nonlinear subgrid drift velocity model for filtered drag in turbulent fluidization
Firas Dabbagh and Simon Schneiderbauer

Discretize first, filter next – a new closure model approach
Syver Døving Agdestein and Benjamin Sanderse

A-priori Analysis of Static and Dynamic Sub-Grid Scale Closures Conditional on the Coherent Structure of the Flow
Josef Hasslberger, Marcel Hampp and Markus Klein

On the effect of Prandtl number to subgrid-scale heat flux models
F.Xavier Trias, Daniel Santos, Jannes Hopman, Andrey Gorobets and Assensi Oliva

Pressure coupling of multiple representative interactive linear eddy models for turbulent combustion spray simulation
Nidal Doubiani, Michael Oevermann and Alan Kerstein

7/6/22 11:00 - 13:00
Physics-based and data-driven methods for computational cardiology I
Minisymposium organized by Pasquale C. Africa, Marco Fedele, Ivan Fumagalli, Stefano Pagani and Francesco Regazzoni

MS123A
Room: Spitsbergen
Chair: Pasquale Claudio Africa
CoChair: Francesco Regazzoni

Boundary integral discretization of the cell-to-cell bidomain model of cardiac electrophysiology
Simone Pezzuto, Giacomo rosilho de Souza and Rolf Krause

OPTIMA: Personalized treatment of persistent atrial fibrillation in a simulation-driven clinical trial
Ryan P. Bradley, Rheeda L. Ali, Carolyna Y.A. Pinto, Adityo Prakosa, Patrick M. Boyle, Syed Y. Ali, David D. Spragg, Hugh Calkins and Natalia A. Trayanova

The role of scar and border zone geometric features on the genesis and maintenance of re-entrant ventricular tachycardia in patients with previous myocardial infarction: a simulation study
Simone Scacchi, Vincenzo Gionti, Piero Colli Franzone, Luca F. Pavarino, Roberto Dore and Cesare Storti

mathematical modelling and learning in electro-physiology
Damiano Lombardi and Fabien Raphel

Efficient identification of biomechanical properties in cardiac models based on physics-informed neural networks
Federica Caforio, Francesco Regazzoni, Stefano Pagani, Alfio Quarteroni, Gernot Plank and Gundolf Haase

Myocardial material parameter estimation in the presence of unknown boundary tractions
Anastasia Nasopoulou, David Nordsletten, Steven Niederer and Pablo Lamata

7/6/22 11:00 - 13:00
Multiscale Computational Homogenization for Bridging Scales in the Mechanics and Physics of Complex Materials IV
Minisymposium organized by Julien Yvonnet, Kenjiro Terada, Peter Wriggers, Marc Geers, Karel Matous and Paul Steinmann

MS6D
Room: Svalbard
Chair: Frédéric Legoll

A deep learning approach for stress tensor field prediction and multiscale modeling of fiber- reinforced composite materials
Ashwini Gupta, Anindya Bhaduri and Lori Graham-Brady

Simulation of phase transformations in polycrystalline shape memory alloys using fast Fourier transforms
Johanna Waimann, Christian Gierden and Stefanie Reese

Microscale numerical simulation of yarn tensile behavior using a high-fidelity geometrical fiber model extracted from micro-CT imaging
Axel Bral, Lode Daelemans and Joris Degroote

Prediction of Mechanical Properties of Additively Manufactured Short Fiber Reinforced Composites by Homogenization
Facundo Sosa-Rey

Modeling error estimation based on asymptotic homogenization
Fergoug Mouad, Forest Samuel, Marchand Basile, Feld Nicolas and Parret-Fréaud Augustin

Comparison between direct numerical simulation and homogenization of continuous fiber reinforced woven composites
ANQI LI, Joris J.C. Remmers, Marc G. D. Geers and Thierry J. Massart

7/6/22 11:00 - 13:00
Mathematical and computational modeling of fluid flow and transport in the brain and central nervous system
Minisymposium organized by Vegard Vinje and Timo Koch

MS144A
Room: O – 3
Chair: Vegard Vinje
CoChair: Timo Koch

Computational Model of Passive Water Transport Through the Choroid Plexus
Pooya Razzaghi, Vasileios Charitatos and Vartan Kurtcuoglu

The pulsating brain: an interface-coupled fluid-poroelastic model of the cranial cavity
Marius Causemann, Vegard Vinje and Marie E. Rognes

Quantifying the relationship between spreading depolarization and the glymphatic system
Saikat Mukherjee and Jeff Tithof

Multi-scale models of fluid transport in the brain
Xi Chen, Tamas Jozsa and Stephen Payne

Modeling fluid flow in perivascular networks
Cécile Daversin-Catty, Vegard Vinje, Ingeborg Gjerde, Kent-André Mardal and Marie Rognes

Towards data-integrated simulation of tumours in brain tissue
Marlon Suditsch, Lena Lambers, Tim Ricken and Arndt Wagner

7/6/22 11:00 - 13:00
Locally refined spline spaces – Properties and structures for different refinement frameworks
Minisympo Minisymposium organized by Tor Dokken, Jessica Zhang, Hendrik Speleers and Falai Chen

MS20A
Room: O – 4
Chair: Tor Dokken

The effect on spline spaces structures and B-spline scaling factors on different approaches to locally refined splines
Tor Dokken

A different take on adaptive splines
andrea bressan, giancarlo sangalli and massimiliano martinelli

Exploiting Tchebycheffian splines in Isogeometric discretizations
Krunal Raval, Carla Manni and Hendrik Speleers

Refinement techniques for spline spaces with cloud-based geomiso TNL software
Panagiotis Karakitsios, Panagiotis Kolios, Athanasios Leontaris and George Karaiskos

Refinement strategies for locally linearly independent LR B-splines
Francesco Patrizi

Scattered data approximation by LR B-spline surfaces. A study on refinement strategies for efficient approximation
Vibeke Skytt

13:00 - 14:00
Lunch Time

7/6/22 14:00 - 16:00
EYIC Career Forum (limited to 100 pre-registered participants)

CF1
Room: Oslo 1 (GF)
Chair: Lorenzo Tamellini
CoChair: Leevi Annala

Panel discussion: Annalisa Buffa, Gianluigi Rozza, Alex Gorodetsky, Bastian Oesterle and Josef Kiendl

7/6/22 14:00 - 16:00
EYIC Career Forum (limited to 100 pre-registered participants)

CF2
Room: Oslo 2 (GF)
Chair: Dave Kammer
CoChair: Leo Nouveau

Panel discussion: Ramin Aghababaei, Helene Baruq, Carmen Rodrigo, Jessica Zhang and Emilio Martinez-Paneda

7/6/22 11:00 - 13:00 **Semi-Plenary Lectures I**	SPL1 Room: B3 + B4 Chair: Mats G. Larson

Space-time finite element methods
Olaf Steinbach

Super-localized numerical homogenization and its links to variational multiscale and isogeometric analysis
Daniel Peterseim

Recent results on Virtual Element Methods
Donatella Marini

Modeling and simulation of mixed-dimensional problems
Jan Martin Nordbotten

7/6/22 11:00 - 13:00 **Semi-Plenary Lectures II**	SPL2 Room: Svalbard Chair: Stefan Turek

Towards data-driven high-fidelity Computational Fluid Dynamics
Andrea Beck

Breakthroughs in The Modeling of Shell Structures: IGA and Beyond
Yuri Bazilev

Fluid-structure interactions: multiple lock-ins
Sanjay Mittal

Recent advances in computational elasto-capillary fluid-solid interaction
Harald Van Brummelen

7/6/22 14:00 - 16:00 **Semi-Plenary Lectures III**	SPL3 Room: Nord – Norge (GF) Chair: Peter Wriggers

Applying AI techniques to Model Fluid Flows
Christopher Pain

Multi-scale models for mixed human-driven and autonomous vehicles
Paola Goatin

Nanoscale thermal transport
Jianying He

Computational Models and Experimental methods for the Human Cornea
Anna Pandolfi

7/6/22 14:00 - 16:00 **Semi-Plenary Lectures IV**	SPL4 Room: Sør – Norge (GF) Chair: Kjell M. Mathisen

Architected materials as a playground for homogenization
Dennis Kochmann

Efficient finite element procedures for bridging the scales in solid mechanics
Fredrik Larsson

Modelling of plasticity and fracture across the scales – applications to aluminium alloys
Odd Sture Hopperstad

Numerical simulations of powder metallurgy processes
Jerzy Rojek

16:00 - 16:30
Coffee Break

16:00 - 16:30 | TECHNICAL SESSIONS

7/6/22 16:30 - 18:30 **Unsteady Simulation of High-Lift System Aerodynamics**	STS03A Room: Hedmark (GF) Chair: Jochen Wild

A Validation Program for Dynamic High-Lift System Aerodynamics
Jochen Wild, Henning Strüber, Frédéric Moens, Bart v.an Rooijen and Hans Maseland

Krueger High-Lift System Design Optimization
Emiliano Iuliano, Domenico Quagliarella and Jochen Wild

Lessons Learnt from Chimera Method Application to a Deploying Krueger Device
Apurva Hasabnis, Hans Maseland, Frédéric Moens, Aleš Prachař and Jochen Wild

Scale-resolved simulations of the deployment and retraction of a Krueger high-lift device
Stefan Wallin, Matteo Montecchia, Peter Eliasson and Ales Prachar

Lattice Boltzmann simulation of a deploying Krueger device
Jorge Ponsin and Carlos Lozan

7/6/22 16:30 - 18:30
Isogeometric Methods V
Minisymposium organized by Alessandro Reali, Yuri Bazilevs, David J. Benson, René de Borst, Thomas J.R. Hughes, Trond Kvamsdal, Giancarlo Sangalli and Clemens V. Verhoosel

MS2E
Room: Nord – Norge (GF)
Chair: Thomas JR Hughes

Space-time IGA (Keynote Lecture)
Giancarlo Sangalli, Gabriele Loli, Monica Montardini and Mattia Tani

Adaptive analysis-aware defeaturing
Annalisa Buffa, Ondine Chanon and Rafael Vázquez

An isogeometric solver for tensor-product multi-patch geometries
Michal Bosy, Monica Montardini, Giancarlo Sangalli and Mattia Tani

Matrix free weighted quadrature for ultra-fast isogeometric thermal modelling
Joaquin Cornejo Fuentes, David Dureisseix, Arnaud Duval and Thomas Elguedj

Weighted quadrature rules for hierarchical B-splines
Carlotta Giannelli, Tadej Kanduč, Massimiliano Martinelli, Giancarlo Sangalli and Mattia Tani

7/6/22 16:30 - 18:30
Structure-Preserving Reduced Order Models for Fluid Flows
Minisymposium organized by Benjamin Sanderse, Giovanni Stabile

MS133A
Room: Nordland (GF)
Chair: Benjamin Sanderse
CoChair: Giovanni Stabile

POD stabilized methods for incompressible flows: Error analysis and computational results
Julia Novo and Samuele Rubino

Data-driven identification of encoding on quadratic-manifolds for high-fidelity dynamical models
Peter Benner, Pawan Goyal, Jan Heiland and Igor Pontes Duff

Momentum-conserving ROMs for the incompressible Navier-Stokes equations
Henrik Rosenberger and Benjamin Sanderse

Structure-preserving discretization and model order reduction of multi-phase fluid dynamical systems
Harshit Bansal, Wil Schilders and Nathan van de Wouw

Conservative stochastic reduced order models for real-time fluid flow data assimilation
Guillaume Le Pape, Agustin M. Picard, Matheus Ladvig, Valentin Resseguier, Dominique Heitz and Laurent Bessard

Structure-preserving POD-based forcing for the two-dimensional Euler equations
Sagy R. Ephrati, Paolo Cifani, Erwin Luesink, Arnout D. Franken and Bernard J. Geurts

Structure-preserving hyper-reduction of parametric Hamiltonian systems
Federico Vismara and Cecilia Pagliantini

7/6/22 16:30 - 18:30
ECCOMAS Olympiad II

ECOB
Room: Oslo 1 (GF)
Chair: Konrad Perzynki

Data-driven parameter and model order reduction for industrial optimisation problems
Marco Tezzele

Peridynamic Galerkin methods for nonlinear solid mechanics
Tobias Bode, Christian Weißenfels and Peter Wriggers

Direct Numerical Simulations of hypersonic turbulent boundary layers with thermochemical non-equilibrium effects
Donatella Passiatore

Acoustic and elastic wave propagation in microstructured media with interfaces: homogenization, simulation and optimization
Marie Touboul

Numerical model reduction using POD and spectral decomposition for computational homogenization of porous media
Fredrik Ekre, Fredrik Larsson, Kenneth Runesson and Ralf Jänicke

7/6/22 16:30 - 18:30
Multiphysics modelling by the lattice boltzmann method II
Minisymposium organized by Alessandro De Rosis

MS135B
Room: Oslo 2 (GF)
Chair: Alessandro De Rosis

A comparative study of 3D Cumulant and Central Moments lattice Boltzmann schemes with interpolated boundary conditions for the simulation of thermal flows in high Prandtl number regime
Grzegorz Gruszczyński and Łukasz Łaniewski-Wołłk

Importance of scalar source term discretization on the second-order convergence of the Lattice Boltzmann Method for reaction-diffusion equation systems
Michał Dzikowski, Grzegorz Gruszczyński and Łukasz Łaniewski-Wołłk

A systematic study of uncertainty quantification for the lattice Boltzmann method in bifurcating geometries
Jon W.S. McCullough and Peter V. Coveney

How do bubble curtains protect environment from pollutants? A lattice Boltzmann study
Yang Zhou, Alessandro De Rosis and Alistair Revell

Modeling and simulation of a Bingham fluid in a rheometer with the Cumulant lattice Boltzmann method
Konstantin Kutscher, Martin Geier and Manfred Krafczyk

D2Q9 model of upwind lattice Boltzmann scheme for hyperbolic scalar conservation laws
Megala Anandan and Raghurama Rao Suswaram

Numerical simulation of industrial relevant applications by the ALSIM™ platform
Ernesto Monaco, Rattandeep Singh and Alexander Stadik

7/6/22 16:30 - 18:30
Polygonal and Polyhedral Discretizations For Partial Differential Equations II
Minisymposium organized by Joe Bishop, Michele Botti, Gianmarco Manzini and N. Sukumar

MS26B
Room: Rogaland (GF)
Chair: Gianmarco Manzini
CoChair: Michele Botti

A polyhedral finite element formulation using projected gradients and the dual basis with applications to nonlinear solid mechanics
Joseph Bishop

General mesh discontinuous Galerkin methods and adaptivity
Andrea Cangiani, Zhaonan Dong and Emmanuil H. Georgoulis

A Mixed Finite Element Formulation for Arbitrary Element Geometries and Nearly-Incompressible Finite Elasticity
Bjorn Sauren, Simon Klarmann and Sven Klinkel

The MH2M method
Franklin Barros, Alexandre Madureira and Frederic Valentin

An h-multigrid method for Hybrid High-Order discretizations
Daniele A. Di Pietro, Frank Hülsemann, Pierre Matalon, Paul Mycek, Ulrich Rüde and Daniel Ruiz

Energy-Momentum Preserving Time Integration Schemes for Petrov-Galerkin EAS Mixed Finite Elements
Robin Pfefferkorn, Antonio J. Gil, Rogelio Ortigosa and Peter Betsch

Efficient Solvers based on Hybrid High Order (HHO) methods for flow simulations in fractured rocks
Alexandre Ern, Florent Hédin, Géraldine Pichot and Nicolas Pignet

7/6/22 16:30 - 18:30
Advanced materials: computational analysis of properties and performance II
Minisymposium organized by Vadim V. Silberschmidt and Valery P. Matveenko

MS4B
Room: Romerike (GF)
Chair: Vadim Silberschmidt

Investigate the capability of microstructure based computational model to predict the inelastic properties of biopolymer aerogels
Rajesh Chandrasekaran, Markus Hillgärtner, Barbara Milow, Mikhail Itskov and Ameya Rege

Mechanical and morphological analysis of silica aerogels using a reinforcement learning approach
Rasul Abdusalamov, Prakul Pandit, Mikhail Itskov, Barbara Milow and Ameya Rege

Plastic-damage model for cyclic loading: phenomenological rule of mixtures approach
Sergio Jiménez, Alejandro Cornejo, Lucia Barbu, Sergio Oller and Eugenio Oñate

A computational analysis of the influence of micro-scale material imperfections on impact performance of FRP composites
Christopher Gorsky

Probabilistic analysis of composite materials with hyperelastic components and interface defects
Damian Sokolowski and Marcin Kaminski

Parametric study of ultrasonic wave propagation in 3D-printed microstructures using the discontinuous Galerkin FE method
Hossein Kamalinia, Andrea Barbarulo, Elsa Vennat, Frederic Champ and Bing Tie

Photoelasticity of YVO4 through first-principle calculation
amin mirzai

7/6/22 16:30 - 18:30
Biological fluid mechanics: modeling, simulation, and analysis V
Minisymposium organized by Boyce Griffith, Sookkyung Lim and Sarah Olson

MS99E
Room: Sør – Norge (GF)
Chair: Thomas Fai

Functional implications of renal adaptations in gestational hypertension
Melissa Stadt and Anita Layton

Fluid dynamics of the whole human heart: a multiphysics and multiscale computational model
Alberto Zingaro, Luca Dede' and Alfio Quarteroni

A Multi-Dimensional, Multi-Modality Approach to Optimise Perfusion in Vascular Stent-Grafts
Scott Black, Craig Maclean, Pauline Hall Barrientos, Konstantinos Ritos and Asimina Kazakidi

Integrating in-vivo data in numerical and in-vitro analyses of the hemodynamic in healthy and pathologic thoracic aorta
Alessandro Mariotti , Emanuele Vignali, Emanuele Gasparotti, Simona Celi and Maria Vittoria Salvetti

Variability of atrial blood stasis estimates from patient-specific CFD simulations
Eduardo Duran, Manuel Garcia-Villalba, Oscar Flores, Pablo Martinez-Legazpi, Alejandro Gonzalo, Elliot McVeigh, Andrew M. Kahn, Javier Bermejo and Juan C. del Alamo

Pulmonary hypertension assessed using a fluid mechanics model
Mette Olufsen, Michelle Bartolo, Mitchel Colebank, Naomi Chesler and Nick Hill

7/6/22 16:30 - 18:30
Advances in Numerical Methods for Fluid-Structure Interaction II
Minisymposium organized by Bernhard Müller, Wolfgang Schröder, Arthur Rizzi, Joris Degroote and Stein Tore Johansen

MS127B
Room: Akershus (1F)
Chair: Wolfgang Schröder
CoChair: Joris Degroote

Direct and sampling-based flutter solution methods in the SU2 solver
Nikolaos Simiriotis and Rafael Palacios

Fluid-structure interaction tool for morphing blades
Giada Abate and Johannes Riemenschneider

A mass conserving implicit volume penalty method for moving-body flows
Iason Tsetoglou, Mélody Cailler, Pierre Bénard, Vincent Moureau, Ghislain Lartigue and Julien Reveillon

Application of the Generalized-alpha time integration scheme in PFEM for solving the incompressible Navier-Stokes equations
Eduardo Fernandez, Simon Fevrier, Martin Lacroix, Romain Boman and Jean-Philippe Ponthot

An Optimally Stabilized Meshless Method for Compressible Flows Accelerated with Machine Learning
Ricardo Puente

Novel immersed boundary method for fluid-structure interaction of compressible flow
Frederik Kristoffersen, Martin Larsson, Sverre G. Johnsen, Wolfgang Schröder and Bernhard Müller

7/6/22 16:30 - 18:30
Computational Intelligence Techniques and Applications in Civil Engineering
Minisymposium organized by Vagelis Plevris, German Solorzano and Mohamed El Amine Ben Seghier

MS78A
Room: Buskerud (1F)
Chair: German Solorzan

ANN-based surrogate model for predicting the lateral load capacity of RC shear walls
German Solorzano and Vagelis Plevris

A machine learning based approach to predict the stress intensity factors in 2D linear elastic fracture mechanics
Peijun Zhang

Machine-learning driven prediction model for strength reduction of fire-damaged RC column based on numerical analysis
HyunKyoung Kim

Dynamic characterization of offshore wind turbines supported on a jacket using Artificial Neuran Networks
Román Quevedo-Reina, Guillermo M. Álamo, Luis A. Padrón and Juan J. Aznárez

Using artificial intelligence techniques for the accurate estimation of the ultimate pure bending of steel circular tubes
Mohamed El Amine Ben Seghier, Vagelis Plevris and German Solorzano

Investigation of performance metrics in regression analysis and machine learning-based prediction models
Vagelis Plevris, German Solorzano, Nikolaos Bakas and Mohamed El Amine Ben Seghier

Mode shapes-based multicriteria optimization of thin-walled composite cylinders using Deep Learning
Bartosz Miller and Leonard Ziemiański

Topology Optimization Through Machine Learning
MD Imrul Reza Shishir and Alireza Tabarraei

7/6/22 16:30 - 18:30
Computational Structural Stability II
Minisymposium organized by Herbert A. Mang and Yeong-Bin Yang

MS149B
Room: Hordaland 1 (1F)
Chair: Herbert A. Mang

Effect of various end moments on lateral buckling of cantilevered circular arches
Y.B. Yang and Y.Z. Liu

Efficient robust shape optimization of imperfection sensitive structures using a second-order approximation of the variance
Jan C. Krüger and Benedikt Kriegesmann

Snap-through instability during transmission of rotation by a flexible shaft with intrinsic curvature
Yury Vetyukov and Evgenii Oborin

Theoretical procedure to predict the local buckling resistance of aluminium members in elastic-plastic range
Vincenzo Piluso and Alessandro Pisapia

Form-finding of tensegrity structures via Rank minimization formulations
Anton Tkachuk

Are the terms stiffening/softening structures mechanically unambigous?
Johannes Kalliauer and Herbert Mang

Role of non-uniform confinement on buckling of rods
Ankur Patel and Sumit Basu

7/6/22 16:30 - 18:30
Multiscale modeling and simulation of surfaces in contact: mechanics of contact, friction, and wear II
Minisymposium organized by Ramin Aghababaei, David Kammer and Lucia Nicola

MS7B
Room: Hordaland 2 (1F)
Chair: Ramin Aghababaei
CoChair: Lucia Nicola

Adhesion and Fracture of Biological and Bio-inspired Soft Two-Dimensional Materials
Daniele Liprandi, Federico Bosia and Nicola M. Pugno

Computational framework for simulation of triboelectric nanogenerators accounting for surface roughness
Andrei G. Shvarts, Ignatios Athanasiadis, Lukasz Kaczmarczyk, Charchit Kumar, Guanbo Min, Yang Xu, Daniel M. Mulvihill and Chris J. Pearce

Consequences of third body vorticity on first bodies
Olivier Bouillanne, Guilhem Mollon, Aurélien Saulot, Sylvie Descartes, Nathalie Serres, Guillaume Chassaing *and Karim Demmou*

Simple modeling for stiffness evaluation of bolted joints using interfacial element
Yoshinao Kishimoto and Yukiyoshi Kobayashi

Modelling of two-scale contact - Investigation of leakage in polymer seals at cryogenic temperatures
Katharina Martin, Johanna Waimann and Stefanie Reese

Topology optmized structures exploiting internal contact
Andreas Frederiksen

Rich statistics in multi-layered frictional systems: do they come from rich frictional properties?
Tom W.J. de Geus, Samuel Poincloux and Pedro M. Reis

7/6/22 16:30 - 18:30
Bone-implant systems: from experiment and simulation to clinical application
Minisymposium organized by Michael Roland, Marcel Orth, Benedikt Braun and Stefan Diebels

MS60A
Room: Oppland (1F)
Chair: Michael Roland

A protocol to evaluate and validate implant internal forces and moments
Mischa Mühling, Sabrina Sandriesser and Peter Augat

A methodology for patient-specific simulation of the bone-healing process based on the Cartesian Grid Finite Element Method – cgFEM
Antolín Martínez-Martínez, Enrique Nadal, Héctor Navarro-García, Carlos Gutierrez, Juan José Ródenas and Olivier Allix

Comparison of five implants for treatment of supracondylar periprosthetic femoral fracture by finite element model
Magdalena Jansova, Tomas Malotin, Jiri Kren, Petr Votapek, Libor Lobovsky and Ludek Hyncik

Multiscale optimization of porous implants with a Voronoi based microstructure
Lucas Colabella, Guillaume Haiat, Salah Naili and Adrian Cisilino

Experimental determination of material parameters of the human tibia
Kerstin Wickert, Michael Roland, Annchristin Andres and Stefan Diebels

Individualized determination of the mechanical fracture environment in lower extremity non-unions - A simulation-based study
Annchristin Andres, Michael Roland, Kerstin Wickert, Stefan Diebels, Tina Histing and Benedikt Braun

A simulation-based virtual laboratory for the determination of minimal fusion areas in tibia pseudarthrosis
Michael Roland, Stefan Diebels, Bertil Bouillon and Thorsten Tjardes

7/6/22 16:30 - 18:30
Multi-Scale and Multi-Physic Interface Models II
Minisymposium organized by Michele Serpilli, Maria Letizia Raffa, Raffaella Rizzoni, Serge Dumont, Frédéric Lebon, Mikhail Poluektov and Lukasz Figiel

MS95B
Room: Vestfold (1F)
Chair: Michele Serpilli
CoChair: Maria-Letizia Raffa

Derivation of imperfect interface laws for multi-physic composites by a multiscale approach: theoretical and numerical studies
Serge Dumont, Frédéric Lebon, Raffaella Rizzoni and Michele Serpilli

Crack propagation in finite elements augmented with embedded interphases
Marianna Puccia, Antonino Spada and Giuseppe Giambanco

A multi-physics finite element framework for diffusion-assisted intergranular fracture of polycrystals
Kim Louisa Auth, Jim Brouzoulis and Magnus Ekh

Interface-enriched generalized finite element methods for coupling meshes, contact, and topology optimization
Alejandro M. Aragón, Jian Zhang, Dongyu Liu, Angelo Simone and Fred van Keulen

A generalized multigrid method for contact problems in Lagrange multiplier based unfitted finite element method
Hardik Kothari and Rolf Krause

Numerical studies of kinetics and stability of chemical reaction fronts in solids
Aleksandr Morozov, Mikhail Poluektov, Alexander Freidin, Lukasz Figiel and Wolfgang H. Müller

Interface conditions for Stokes-Darcy problems derived via homogenization and boundary layers
Elissa Eggenweiler and Iryna Rybak

7/6/22 16:30 - 18:30
Heterogeneous material modelling: statistical characterization, digital reconstruction, and numerical simulation
Minisymposium organized by Chenfeng Li, George Stefanou and Sei-ichiro Sakata

MS63A
Room: A1 – 1
Chair: Chenfeng Li
CoChair: S. Sakata

Response variability of composite structures with random spatially varying material properties
George Stefanou, Dimitrios Savvas, Iason Papaioannou and Panagiotis Gavallas

Microstructure-informed reduced modes for simulations with fully resolved modular microstructures
Martin Doškář, Jan Novák, Petr Krysl and Jan Zeman

Random field modelling of local strength in randomly arranged unidirectional FRP plate under transverse tensile loading
Sei-ichiro Sakata, George Stefanou, Shin Tanimasu and Shungo Araki

A Machine-Learning Approach for Digital Reconstruction of Heterogeneous Microstructures
Jilong Fu and Chenfeng Li

A computational framework for modelling graphene nanoplatelets
Panagiotis Gavallas, Dimitrios Savvas and George Stefanou

Image-based 3D Reconstruction and Modelling of heterogeneous battery electrode microstructure
Vinit Nagda, Artem Kulachenko, Stefan Lindström and Henrik Ekström

Strength estimation of composite material by peridynamics considering random field modelling of inclusions
Yuki Arai and Sei-ichiro Sakata

7/6/22 16:30 - 18:30
Model order reduction - Challenges in engineering and industrial applications V
Minisymposium organized by Annika Robens-Radermacher, Wil Schilders, Karen Veroy and Chady Ghnatios

MS63A
Room: A1 – 1
Chair: Chenfeng Li
CoChair: S. Sakata

The Relay Race Method: Application of DEM extrapolation to pharmaceutical processes
Peter Toson, Marko Matic, Stefan Enzinger, Johan Remmelgas, Dalibor Jajcevic, Thomas O'Connor, Abdollah *Koolivand, Geng Tian, Scott M. Krull and Johannes Khinast*

Alternative error estimate of POD-based reduced order model for the prediction of continuous fibre-*reinforced* composite responses
Arada Jamnongpipatkul, Ruben Sevenois, Wim Desmet, Frank Naets and Francisco Gilabert

Structural analysis considering uncertainties using polynomial chaos expansions and proper orthogonal decomposition
Lukas Panther, Werner Wagner and Steffen Freitag

Efficient model identification using a PGD forward model - influence of surrogate accuracy and convergence approach
Annika Robens-Radermacher, Isabela Coelho Lima, Thomas Titscher and Jörg F. Unger

Equivalence of a FE numerical model and a reduced model of soil-structure interaction, defined numerically using artificial neural networks
Artur Góral, Marek Lefik and Marek Wojciechowski

7/6/22 16:30 - 18:30
Well-balanced schemes for hyperbolic systems with source terms
Minisymposium organized by Christophe Berthon, Manuel J. Castro Díaz and Victor Michel-Dansa

MS31A
Room: A1 – 3
Chair: Victor Michel-Dansac
CoChair: Manuel Castro

A fully well-balanced scheme for shallow-water equations with Coriolis force
Vivien Desveaux and Alice Masset

Well-balanced semi-implicit Lagrange-projection-type schemes for the one-dimensional shallow water system
Celia Caballero Cárdenas, Manuel J. Castro Díaz, Tomás Morales de Luna and María de la Luz Muñoz Ruiz

Bound-preserving and entropy-stable algebraic flux correction schemes for the shallow water equations with topography
Hennes Hajduk and Dmitri Kuzmin

Well-balanced methods for one-dimensional blood flow model with discontinuous mechanical and geometrical properties
Ernesto Pimentel-García, Carlos Parés, Lucas O. Müller and Eleuterio F. Toro

Modeling and numerical approach of dispersive waves in goephysical flows
Cipriano Escalante and Tomás Morales de Luna

Well-balanced high-order schemes for hyperbolic systems with stiff relaxation
Irene Gómez Bueno, Sebastiano Boscarino, Manuel Jesús Castro, Carlos Parés and Giovanni Russo

Towards entropy–stable finite element moment methods for the Boltzmann equation
Michael Abdelmalik, Irene Gamba, Torsten Kessler and Sergej Rjasanow

7/6/22 16:30 - 18:30
Innovative Methods for Fluid-Structure Interaction V
Minisymposium organized by Harald van Brummelen, Trond Kvamsdal and Roger Ohayon

MS45E
Room: A1 – 4
Chair: Harald van Brummelen

A monolithic Finite Element formulation for the hydroelastic analysis of Very Large Floating Structures
Oriol Colomés, Francesc Verdugo, Ido Akkerman and Sjoerd van Hoof

A partitioned approach for strongly coupled fluid-structure interaction in an industrial valve system
Ahmed Aissa Berraies, Harald van Brummelen and Ferdinando Auricchio

Simulation of wind induced excitation of a membrane structure with ponding water
Navaneeth Kodunthirappully Narayanan, Roland Wüchner and Joris Degroote

FSI co-simulation around elongated bodies with a minimal intrusive interface for the beam solver
Alban Leroyer, Gan Bo Deng, Emmanuel Guilmineau, Patrick Queutey, Michel Visonneau and Jeroen Wackers

Fluid-Structure Interaction (FSI) simulation for Thermo-elasto-plastic treatment
Joe Khalil, Ramy Nemer, Aurelien Larcher, Rudy Valette and Elie Hachem

Wall-resolved LES simulation of vortex-induced vibration ofwind turbine blades
Mohsen Lahooti, Rafael Palacios and Spencer Sherwin

7/6/22 16:30 - 18:30
Modelling Diffusion in Solids
Minisymposium organized by Andrés Díaz

MS138A
Room: A1 – 5
Chair: Andrés Díaz

Deformation, fracture, and diffusion in solids: formulation of continuum theories
Fernando Duda

A finite element model for diffusion-induced fracture in dual graphite battery electrodes
Eduardo Roque, Javier Segurado and Francisco Montero-Chacón

Full simulation of electrolyte and metals including boundary interactions
Tim Hageman and Emilio Martínez-Pañeda

Impact of the nature and the distribution of triple junctions on the diffusion of hydrogen in micro and nano structured Nickel
Mohamad el sayed, Jamaa Bouhattate, Abdelali Oudriss, Antoine Falaize and Xavier Feaugas

Diffusion-convection-reaction framework for coupled hydrogen transport in metals: implementation in Comsol and stabilization analysis
Andrés Díaz, Iván Cuesta, Jesús Manuel Alegre and Emilio Martínez-Pañeda

7/6/22 16:30 - 18:30
Advances on computational methods for multiphase flows with phase change I
Minisymposium organized by Luca Brandt, Marica Pelanti and Maria Giovanna Rodio

MS22A
Room: A1 – 6
Chair: Marica Pelanti

Numerical methods for diffuse interface multifluid models
Clément Le Touze and Nicolas Rutard

Derivation of models and numerical methods for homogenized multiphase flows based on stochastic ideas
Vincent Perrier

An acoustic/transport splitting method for the isentropic Baer-Nunziato two-phase flow model
Katia Ait Ameur, Samuel Kokh, Marc Massot, Marica Pelanti and Teddy Pichard

Two-phase flow reduced-order model with polydisperse oscillating droplets
Arthur Loison, Marc Massot, Teddy Pichard and Samuel Kokh

Mathematical and numerical analysis of a simplified model for boiling flows
Teddy Pichard

Cluster-induced turbulence modelling of mass transfer in gas-particle flows
Stefanie Rauchenzauner and Simon Schneiderbauer

Effect of Laser Beam Scattering in SPH-Simulation of Deep Penetration Laser Beam Welding
Daniel Sollich, Florian Fetzer and Peter Eberhard

7/6/22 16:30 - 18:30
Recent Advances in Exact Model Reduction for Mechanics Problems II
Minisymposium organized by Shobhit Jain and Mingwu Li

MS56B
Room: B1 – 1
Chair: Mingwu LI
CoChair: Shobhit Jain

Exact nonlinear model reduction via direct computation of spectral submanifolds in finite element problems
Shobhit Jain and George Haller

Data-driven modeling of the transition across equilibrium states in plane Couette flow
Bálint Kaszás, Mattia Cenedese and George Haller

Recent advances on spectral-submanifold-based model reduction: internal resonances and configuration constraints
Mingwu Li, Shobhit Jain and George Haller

Reduced-order model for large amplitude vibrations of flexible structures coupled with a flow
Théo Flament, Jean-François Deü, Antoine Placzek, Mikel Balmaseda and Duc-Minh Tran

7/6/22 16:30 - 18:30
Efficient solution techniques for nonstationary flow problems exploiting space-time concurrency II
Minisymposium organized by Stefan Turek and Christoph Lohmann

MS52B
Room: B1 – 2
Chair: Christoph Lohmann
CoChair: Stefan Turek

Parallel time-stepping for fluid-structure interactions
Nils Margenberg and Thomas Richter

Investigating time-scale conditions for the time-parallelization of turbulent flows simulation
Thibaut Lunet

Scalability analysis and performance modelling of layer-parallel training of deep residual networks using a non-linear multigrid-in-time algorithm
Chinmay Datar and Harald Köstler

Higher order space-time discretizations of the Navier-Stokes equations on evolving and fixed domains
Mathias Anselmann and Markus Bause

7/6/22 16:30 - 18:30
Complex fluid flow in engineering: modeling, simulation and optimization V
Minisymposium organized by Fabian Key, Marek Behr and Stefanie Elgeti

MS12E
Room: B3 + B4
Chair: Stefanie Elgeti

Shape Optimisation of Turbomachinery Components
Bernhard Semlitsch

Comparison of gradient-based and genetic algorithms for infinite-swept wing airfoil shape optimization
Daniel Simanowitsch, Anand Sudhi, Alexander Theiss, Camli Badrya and Stefan Hein

Optimising the Design and Operation of Ultrasound-based Flow Meters using Computational Fluid Dynamics
Mario J. Rincon, Martino Reclari and Abkar Mahdi

Topology optimization of turbulent flow manifolds
Lukas C. Høghøj, Ole Sigmund and Casper Schousboe Andreasen

Topology optimization of conjugate heat transfer in microchannel heatsinks
Brice Rogie and Casper Schousboe Andreasen

Topography optimisation for parallel plate heat exchangers
Yupeng Sun and Joe Alexandersen

7/6/22 16:30 - 18:30
Recent advances in immersed boundary and fictitious domain methods V
Minisymposium organized by Alexander Idesman, Guglielmo Scovazzi , Antonia Larese , Riccardo Rossi , André Massing, Santiago Badia and Francesc Verdugo

MS44E
Room: Jan Mayen 1
Chair: Andre Massing
CoChair: Guglielmo Scovazzi

A novel cutcell method and its application to the incompressible Navier-Stokes equations
Alejandro Quirós Rodríguez, Tomas Fullana, Vincent Le Chenadec and Taraneh Sayadi

Penalized direct-dorcing method and power-law-based wall model for immersed-boundary numerical simulations of obstacles in turbulent flow
Idris Hamadache, Michel Belliard and Pierre Sagaut

Coastal enginering applications of CutFEM for fluid-structure interaction
Christopher E. Kees

High-Order simulations of droplets and bubbles employing extended methods
Florian Kummer

Towards a better prediction of aerodynamic coefficients in an immersed boundary context
Benjamin Constant, Stéphanie Péron, Héloïse Beaugendre and Benoit Christophe

Anisotropic adaptive body-fitted meshes for CFD
Sacha El Aouad, Aurelien Larcher and Elie Hachem

7/6/22 16:30 - 18:30
Robust and scalable numerical methods for wave propagation: design, analysis and application V
Minisymposium organized by Hélène Barucq, Théophile Chaumont-Frelet, Rabia Djellouli and Axel Modave

MS153E
Room: Jan Mayen 2
Chair: T. Chaumont-Frelet
CoChair: A. Modave

Advances in Time-Dependent Wave-Based Obstacle Identification Methods
Dan Givoli, Daniel Rabinovich, Amit Sayag and Eli Turkel

Stabilization of the high-order discretized wave equation for data assimilation problems
Tiphaine Delaunay, Sébastien Imperiale and Philippe Moireau

Explicit time-stepping for electromagnetic wave propagation through structure-preserving spline differential forms
Bernard Kapidani and Rafael Vázquez

Finite element procedure for wave propergation of nearly incompressible elasticity using mixed time integrator
Takahiro Yamada

Explicit Hybrid High-Order (HHO) methods for the wave equation
Morgane Steins, Alexandre Ern, Olivier Jamond and Florence Drui

Fast mass lumped multiscale wave propagation modelling
Sjoerd Geevers and Roland Maier

Heterogeneous asynchronous time integrator in nonlinear dynamics: seismic nonlinear analysis of crane bridge and concrete gravity dams through co-simulation
Michael Brun, Sijia Li, Florent DE Martin, Fatima Fekak, Nicolas Richart and Anthony Gravouil

7/6/22 16:30 - 18:30
Computational Problems for Charge Transport in Low Dimensional Structures
Minisymposium organized by Luigi Barletti, Giovanni Mascali and Vittorio Romano

MS64A
Room: Jan Mayen 3
Chair: Luigi Barletti
CoChair: Giovanni Mascali

Quantum corrections to electron hydrodynamics in graphene
Luigi Barletti, Lucio Demeio and Sara Nicoletti

Thermal and electro-thermal properties of a graphene sheetThermal and electro-thermal properties of a graphene sheet
Giovanni Mascali

Hydrodynamical model for charge transport in a graphene FET
Vito Dario Camiola and Vittorio Romano

Simulation of a GNR-FET
Giovanni Nastasi and Vittorio Romano

Implementation on GPU of a solver for the Schroedinger-Poisson block in confined devices
Francesco Vecil and José Miguel Mantas Ruiz

7/6/22 16:30 - 18:30
Advanced Large-Eddy Simulation-based techniques for complex turbulent flows II
Minisymposium organized by F.Xavier Trias, Alexey Duben and Roel Verstappen

MS54B
Room: Lounge A2
Chair: F.Xavier Trias

On the assessment of wall-modeled LES strategies for the CRM-HL
O Lehmkuhl, S Gomez and A. Lozano-Duran

Wall-modelled les of boundary layer separation from a smooth ramp
Timofey Mukha and Philipp Schlatter

Large-eddy simulations of turbulent compressible supersonic jet flows using discontinuous Galerkin methods
Diego F. Abreu, Carlos Junqueira-Junior, Eron T. V. Dauricio and João Luiz F. Azevedo

Towards proper subgrid-scale model for jet aerodynamics and aeroacoustics
Alexey P. Duben, Jesus Ruano, F. Xavier Trias and Andrey V. Gorobets

Towards efficient prediction of near-wall transition in scale-resolving simulations
Eike Tangermann and Markus Klein

7/6/22 16:30 - 18:30
Physics-based and data-driven methods for computational cardiology II
Minisymposium organized by Pasquale C. Africa, Marco Fedele, Ivan Fumagalli, Stefano Pagani and Francesco Regazzoni

MS123B
Room: Spitsbergen
Chair: Marco Fedele
CoChair: Ivan Fumagalli

Fast automatic segmentation of mitral valve structures from 3D transesophageal echocardiography for transcatheter procedures: training and validation of a 3D U-Net convolutional neural network
Simone Saitta, Riccardo Munafò and Emiliano Votta

Non-invasive pressure estimation in cerebral aneurysm: comparison among 4D flow MRI, CFD and 4DVar
Riccardo Munafo, Simone Saitta and Alberto Redaelli

A numerical investigation of haemodynamic abnormalities in Turner syndrome aortae
Lauren Johnston, Ruth Allen, Avril Mason and Asimina Kazakidi

Noninvasive Assessment of Ventricular-Arterial Coupling: from Theory to Applications
Mohamed Zaid, Salman Ahmad, Laurel Despins, Mihail Popescu, James Keller, Marjorie Skubic, Craig A. Emter and Giovanna Guidoboni

Energy preserving reduced-order cardiovascular models for augmented hemodynamics monitoring
Francois Kimmig, Jessica Manganotti, Sebastien Imperiale and Philippe Moireau

Time calibration of a novel phenomenological thrombus formation model through global sensitivity analysis and a Bayesian approach
Gian Marco Melito, Alireza Jafarinia, Sascha Ranftl, Wolfgang von der Linden, Thomas Hochrainer and Katrin *Ellermann*

An accurate, robust, and efficient finite element framework for anisotropic, nearly and fully incompressible elasticity
Elias Karabelas, Matthias Gsell, Gundolf Haase, Gernot Plank and Christoph Augustin

7/6/22 16:30 - 18:30
Multiscale Computational Homogenization for Bridging Scales in the Mechanics and Physics of Complex Materials V
Minisymposium organized by Julien Yvonnet, Kenjiro Terada, Peter Wriggers, Marc Geers, Karel Matous and Paul Steinmann

MS6E
Room: Svalbard
Chair: Jean-Francois Ganghoffer

Numerically efficient two-scale modelling of the electro-chemically coupled transport of electroactive species
Vinh Tu, Kenneth Runesson, Fredrik Larsson and Ralf Jänicke

Variationally consistent computational homogenization of the chemo-mechanical properties of nano-porous electrode materials with application to Li-ion batteries
David R. Rollin, Fredrik Larsson, Kenneth Runesson and Ralf Jänicke

Thermo-mechanically coupled transient two-scale analysis for dissipative composites
Seishiro Matsubara, So Nagashima, Dai Okumura and Kenjiro Terada

Thermo-electrochemistry-swelling-flow analysis of battery cells: an interdisciplinary multi-scale challenge
Omar Bettinotti, Youngwon Hahn and Victor Oancea

Numerical homogenization and the Arlequin method
Frederic Legoll

Improved mutliscale finite element methods for advection-diffusion problems
Rutger A. Biezemans

Non-intrusive two-scale coupling strategy of non-compatible models for the tolerance analysis of composite structures to local features
Pierre-Alain Guidault, Maxence Wangermez, Olivier Allix, Oana Ciobanu and Christian Rey

7/6/22 16:30 - 18:30
Inelasticity at finite strains: models, identification and numerics
Minisymposium organized by Ralf Landgraf, Bernhard Eidel and Alexey V. Shuto

MS68A
Room: O – 3
Chair: Ines Wollny
CoChair: Łukasz Kaczmarczy

A mixed Finite Element method for 3D in-elasticity problems at large strains with weakly imposed symmetry
Lukasz Kaczmarczyk, Christophe-Alexandre CHALONS-MOURIESSE and Chris Pearce

Multifield plasticity approach for scalable large strain simulations of Incremental Cold Flow Forming
Karol Lewandowski, Daniele Barbera, Andrew McBride, Paul Steinmann, Chris Pearce and Lukasz Kaczmarczyk

Inelastic finite strain asphalt model including damage and healing – implementation into coupled tire-pavement-simulations
Ines Wollny and Michael Kaliske

Multidimensional Rank-One Convexification of Incremental Damage Formulations: Algorithmic Treatment, Implementation Aspects, and Numerical Analysis
Maximilian Köhler, Timo Neumeier, Malte A. Peter, Daniel Peterseim and Daniel Balzani

Systematic regularization of finite strain elastoplastic models
Mohamed Abatour, Samuel Forest, Kais Ammar, Cristian Ovalle, Nikolay Osipov and Stéphane Quilici

A gradient-extended anisotropic damage-plasticity model in the logarithmic strain space
Hagen Holthusen, Tim Brepols, Jaan-Willem Simon and Stefanie Reese

Influence of uncertainties in material parameters on finite element simulations of sandwich structures
Pranav Kumar Dileep, Stefan Hartmann, Wei Hua, Heinz Palkowski, Tobias Fischer and Gerhard Ziegmann

7/6/22 16:30 - 18:30
Advanced Beam Models - Development and Application
Minisymposium organized by Ioannis Tsiptsis, Evangelos Sapountzakis and Kai-Uwe Bletzinge

MS93A
Room: O – 4
Chair: Ioannis Tsiptsis

An extended beam element for piping analysis - Application to pipe whip phenomena
Youri Pascal-Abdellaoui, Claude Stolz, Frédéric Daude, Philippe Lafon and Pascal Galon

Tangential differential calculus for curved, linear Kirchhoff beams with systematic convergence studies
Michael Kaiser and Thomas-Peter Fries

The influence of beam kinematic assumptions in a beam contact benchmark
Armin Bosten, Vincent Denoël, Alejandro Cosimo, Joachim Linn and Olivier Brüls

Efficient geometrically exact formulation for curved beams
Emma La Malfa Ribolla, Martin Horák and Milan Jirásek

Wednesday	9:00 - 10:30	11:00 - 13:00	14:00 - 16:00	16:30 - 18:30
Hedmark (GF)		STS08A	STS08B	STS06A
Nord – Norge (GF)		MS2F	MS32A	MS32B
Nordland (GF)		MS156A	MS156B	MS160A
Oslo 1 (GF)		JWA	JWB	JWC
Oslo 2 (GF)		MS19A	MS19B	MS19C
Rogaland (GF)		MS38A	MS38B	MS152A
Romerike (GF)		MS67A	MS67B	MS67C
Sør – Norge (GF)		MS71A	MS71B	MS71C
Akershus (1F)		MS41A	MS41B	MS41C
Buskerud (1F)		MS132A	MS132B	MS17A
Hordaland 1 (1F)		MS126A	MS126B	MS126C
Hordaland 2 (1F)		MS159A	MS159B	MS159C
Oppland (1F)		MS33A	MS33B	MS119A
Vestfold (1F)		MS47A	MS47B	MS140A
A1 – 1		MS14A	MS14B	MS14C
A1 – 2		MS69A	MS69B	MS69C
A1 – 3		MS28A	MS28B	MS28C
A1 – 4		MS74A	MS74B	MS74C
A1 – 5		MS34A	MS34B	MS34C
A1 – 6		MS22B	MS22C	MS77A
B1 – 1		MS125A	MS125B	MS35A
B1 – 2		MS82A	MS82B	MS82C
B3 + B4	PL2	MS12F	MS116A	MS116B
Jan Mayen 1		MS85A	MS121A	MS121B
Jan Mayen 2		MS100A	MS100B	MS100C
Jan Mayen 3		MS3A	MS3B	MS3C
Lounge A2		MS110A	MS110B	MS110C
Spitsbergen		MS39A	MS39B	MS128A
Svalbard		MS6F	MS115A	MS115B
O – 3		MS142A	MS142B	MS76A
O – 4		MS48A	MS48B	MS114A

Thon Hotel Arena NOVA Spektrum Center

Wednesday, June 8th

8/6/22 09:00 - 10:30
Plenary Lectures II

PL2
Room: B3 + B4
Chair: Leszek F. Demkowicz

Approximating functions, functionals and operators with neural networks for diverse applications
George Karniadakis

Nonlinear Preconditioning for Implicit Solution of Discretized PDEs
David Keyes

10:30 - 11:00
Coffee Break

11:00 - 13:00 | TECHNICAL SESSIONS

8/6/22 11:00 - 13:00
EU-Funded Research and Innovation on Computational Methods towards Climate Neutrality of Aviation I

STS08A
Room: Hedmark (GF)
Chair: Dietrich Knoerzer

Contributions of EU-funded projects managed by CINEA towards climate neutrality of aviation
Leonidas Siozos-Rousoulis

Aero-acoustic installation effects in disruptive aircraft architectures
Christophe Schram, Alessandro Zarri, Julien Christophe and Hadrien Beriot

Aeroacoustic analysis of a landing-gear configuration for noise reduction using porous fairings in the INVENTOR project
P. Alexandros Koutsoukos, Daniele Ragni and Francesco Avallone

Uncertainty Quantification of Composite Structures with Manufacturing Defects within the SuCoHS Project
Benedikt Kriegesmann, Georgios Balokas and Tobias Wille

8/6/22 11:00 - 13:00
Isogeometric Methods VI
Minisymposium organized by Alessandro Reali, Yuri Bazilevs, David J. Benson, René de Borst, Thomas J.R. Hughes, Trond Kvamsdal, Giancarlo Sangalli and Clemens V. Verhoosel

MS2F
Room: Nord – Norge (GF)
Chair: JS Chen

Optimization methods and inverse approaches for molding processes
Florian Zwicke and Stefanie Elgeti

A Parallel Adaptive Arc-Length Method
Hugo Verhelst, Matthias Möller and Henk Den Besten

Genuinely nonlinear stabilization techniques for fluid flow problems
Bohumir Bastl, Marek Brandner, Kristyna Slaba and Eva Turnerova

PSYDAC: a high-performance finite element library in Python
Yaman Güçlü, Said Hadjout and Ahmed Ratnani

Isogeometric Analysis of Acoustic Scattering with Perfectly Matched Layers
Jon Vegard Venås and Trond Kvamsdal

8/6/22 11:00 - 13:00
Computational Analysis of Concrete in an Experimental-Virtual-Lab I
Minisymposium organized by Jörg Schröder, Steffen Anders, Dominik Brands, Günther Meschke and Michael Kaliske

MS156A
Room: Nordland (GF)
Chair: Stefan Löhnert

Phase-Field Modeling for Damage in Steel-Fiber Reinforced High Performance Concrete at Low Cycle Fatigue: Numercial Calibration And Experimental Validation
Dominik Brands, Mangesh Pise, Jörg Schröder, Gregor Gebuhr and Steffen Anders

A multi-scale approach to localized damage indicators of a short-fibre reinforced high-performance concrete
Ursula Weiss, Philipp Lauff, Oliver Fischer, Polina Pugacheva, Christian U. Grosse, Michael Engelhard, Dirk Volkmer and Malte A. Peter

Numerical and experimental investigations of high-performance fiber-reinforced concrete under cyclic tensile loading
Vladislav Gudžulić, Niklas Schäfer, Rolf Breitenbücher and Günther Meschke

A microplane model for textile reinforced concrete at finite strains.
Jakob Platen and Michael Kaliske

Re-anchoring of the cut wires of a grouted seven-wire strand: experimental and numerical studies
Jonas Aparicio, Tien Hoang, Gwendal Cumunel, Gilles Foret, Yannick Jeanjean and Julien Castres Saint Martin

Computational generation of mesoscale concrete finite element models from voxel dataset
Koussay Daadouch, Vladislav Gudžulić and Günther Meschke

8/6/22 11:00 - 13:00
EYIC Junior Workshop I
(limited to 100 pre-registered participants)

JWA
Room: Akershus (1F)
Chair: Bastian Oesterle

Introduction to shape optimization
Stefania Elgeti

8/6/22 11:00 - 13:00
Data-driven numerical and reduced order modeling of flows I
Minisymposium organized by Nikolaus Adams and Jörg Schumacher

MS19A
Room: Oslo 2 (GF)
Chair: Nikolaus Adams

Reservoir computing of three-dimensional turbulent convection
Florian Heyder and Jörg Schumacher

Data-driven thermochemical model for simulating hypersonic reacting flows
Clément Scherding, Taraneh Sayadi, Georgios Rigas, Denis Sipp and Peter J. Schmid

Modal analysis of a 3D gravitational liquid sheet
Antonio Colanera, Alessandro Della Pia, Matteo Chiatto and Luigi de Luca

Solving natural convection problems in annulus pipes using physics informed neural network
Ehsan Fattahi, Seyedalborz Manavi and Thomas Becker

Multi-fidelity modeling of single dendritic crystal growth of binary alloys
Josef M. Winter, Jakob W. J. Kaiser, Meike Tütken, Stefan Adami and Nikolaus A. Adams

A physics-based neural network for learning non-Boussinesq thermal diffusivity from numerical simulations and experiments
Diane Salim, David Sondak, Blakesley Burkhart, Miles Cranmer and Shirley Ho

8/6/22 11:00 - 13:00
Block preconditioning for challenging multiphysics systems I
Minisymposium organized by Peter Ohm, John N. Shadid and Matthias Mayr

MS38A
Room: Rogaland (GF)
Chair: Peter Ohm
CoChair: John Shadid

Augmented Lagrangian block preconditioners for incompressible resistive magnetohydrodynamics (Keynote Lecture)
Fabian Laakmann, Patrick Farrell and Lawrence Mitchell

Parallel space-time multilevel methods with application to electrophysiology
Pietro benedusi, carlo garoni, patrick zulian, paola ferrari, stefano Serra-Capizzano, michael minion and rolf krause

Block Preconditioning of a Semi-Implicit Gyrokinetic Model of Fusion Plasmas
Lee Ricketson, Milo Dorr, Debojyoti Ghosh and Mikhail Dorf

On Scalable Preconditioners for Implicit Continuum Multiphysics Plasma Systems
John Shadid, Jesus Bonilla, Peter Ohm, Ray Tuminaro, Jonathan Hu, Michael Crockatt and Roger Pawlowski

Block preconditioning and a monolithic AMG method for magnetic confinement fusion relevant resistive MHD simulations
Peter Ohm, Jesus Bonilla, Jonathan J. Hu, John N. Shadid and Raymond S. Tuminaro

8/6/22 11:00 - 13:00
Recent developments and current issues in the phase-field modeling of fracture I
Minisymposium organized by Dhananjay Phansalkar, Paras Kumar, Pietro Carrara, Sigrid Leyendecker, Julia Mergheim, Laura De Lorenzis and Paul Steinmann

MS67A
Room: Romerike (GF)
Chair: Pietro Carrara

An anisotropic damage model with crack orientation director and gradient-extension (Keynote Lecture)
Stephan Wulfinghoff and Christian Dorn

A phase-field model with an extended hydrostatic-deviatoric strain energy density splitting scheme
Parnian Hesammokri, Haiyang Yu and Per Isaksson

Phase-field fracture model with new hybrid spectral-directional energy split based on gradient smoothing technique
Krešimir Jukić, Tomislav Jarak and Zdenko Tonković

Phase-field Modeling of Fracture in Materials with Anisotropic Fracture Energy
Sindhu Nagaraja, Ulrich Römer, Hermann G Matthies and Laura De Lorenzis

8/6/22 11:00 - 13:00
Advanced Modelling Procedures for Masonry Structures I
Minisymposium organized by Daniela Addessi, Miguel Cervera and Elio Sacco

MS71A
Room: Sør – Norge (GF)
Chair: Daniela Addessi
CoChair: Miguel Cervera

A shell-based computational framework for the static limit analysis of masonry domes under horizontal forces
Nicola A. Nodargi and Paolo Bisegna

Limit analysis of non-periodic masonry by means of Discontinuity Layout Optimization
Mattia Schiantella, Matthew Gilbert, Colin C. Smith, Linwei He, Federico Cluni and Vittorio Gusella

Minimum thickness of masonry domes and vaults subjected to vertical loads: a parametric study by thrust surface analysis
Francesco Barsi, Riccardo Barsotti and Stefano Bennati

On the existence of compression-only discrete force networks that support assigned sets of nodal forces
A. Amendola, O. Mattei, A. Fortunato, P. Seppecher, F. Fraternali and G.W. Milton

A finite-element-based unit cell approach for simulating vertically perforated clay block masonry
Raphael Reismüller, Markus Lukacevic, Thomas Kiefer and Josef Füssl

8/6/22 11:00 - 13:00
Recent Trends in Scientific Computing for Computational Fluid Dynamics and Solid Mechanics I
Minisymposium organized by Stefan Turek, Axel Klawonn and Uli Rüde

MS41A
Room: Oslo 1 (GF)
Chair: Axel Klawonn
CoChair: Stefan Turek

Massively Parallel & Lower Precision Accelerator Hardware as Trends in HPC and its Application to CFD (Keynote Lecture)
Stefan Turek, Dustin Ruda and Dirk Ribbrock

RACE: Speeding up sparse iterative solvers using level-based parallelization and blocking techniques
Christie Alappat, Georg Hager and Gerhard Wellein

Hardware-optimized numerics for a discontinuous Galerkin shallow water model
Sara Faghih-Naini and Vadym Aizinger

A Factorization Algorithm for Sparse Matrix with Mixed Precision Arithmetic
Atsushi Suzuki

Very fast FEM Poisson solvers on lower precision accelerator hardware
Dustin Ruda, Stefan Turek, Dirk Ribbrock and Peter Zajac

8/6/22 11:00 - 13:00
Modelling of environment-assisted fracture I
Minisymposium organized by Haiyang Yu and Zhiliang Zhang

MS132A
Room: Buskerud (1F)
Chair: Sakari Pallaspuro
CoChair: Danial Molavitabrizi

Exploring the role of H-induced stress fields and H-H interactions in hydrogen embrittlement by atomistic simulations (Keynote Lecture)
Ali Tehranchi, Tilmann Hickel and Joerg Neugebauer

Hydrogen-induced transgranular to intergranular fracture transition in bi-crystalline Nickel
Yu Ding, Haiyang Yu, Jianying He and Zhiliang Zhang

Internal-stress-induced 3D brittle crack propagation within the configurational mechanics framework
Ignatios Athanasiadis, Lukasz Kaczmarczyk, Andrei Shvarts, Karol Lewandowski and Chris Pearce

Single-edge notched tension testing for assessing hydrogen embrittlement: a numerical study of test parameter influences
Robin Depraetere, Margo Cauwels, Wim De Waele, Tom Depover, Kim Verbeken and Stijn Hertelé

A predictive model unifying hydrogen enhanced plasticity and decohesion
Meichao Lin, Haiyang Yu, Yu Ding, Vigdis Olden, Antonio Alvaro, Jianying He and Zhiliang Zhang

8/6/22 11:00 - 13:00
Towards Next Generation of Industrial Aerodinamical Simulation Tools I
Minisymposium organized by Oriol Lehmkuhl, Eusebio Valero and Jordi Pons

MS126A
Room: Hordaland 1 (1F)
Chair: Oriol Lehmkuhl

Alya towards Exascale: efficient finite element assembly on GPUs for LES
Herbert Owen, Oriol Lehmkuhl, Guillaume Houzeaux, Guillermo Oyarzun, Georg Hager, Gerhard Wellein and Dominik Ernst

An Immersed Boundary Method for the CFD Solver Airbus-CODA
Víctor J. Llorente, Diego Lodares, Esteban Ferrer and Eusebio Valero

Critical evaluation of feature detection algorithms based on modal decomposition methods
Beka Begiashvili, Jesús Garicano Mena, Soledad Le Clainche and Eusebio Valero Sánchez

Efficient implementation of a high-order compressible Navier-Stokes equations solver running on Graphics Processing Units
Fernando Gisbert, Adrián Sotillo and Jesús Pueblas

A runtime-based dynamic mesh partitioning approach
Giacomo Baldan, Ricard Borrell and Jens Jägersküpper

8/6/22 11:00 - 13:00
Innovations in phase-field modeling, computation and Experimental Validation I
Minisymposium organized by FADI Aldakheel, Yousef Heider, Thomas Wick, Roberto Alessi and WaiChing Sun

MS159A
Room: Hordaland 2 (1F)
Chair: Fadi Aldakheel
CoChair: Yousef Heider

Analysis of nonsmooth multigrid for phasefield brittle fracture (Keynote Lecture)
Oliver Sander, Carsten Gräser and Daniel Kienle

Phase field modelling of hydrogen assisted fracture
Emilio Martinez-Paneda, Philip Kristensen, Alireza Golahmar and Christian Niordson

Level-set topology optimization of fracture-resistance of macro structure undergoing ductile failure
Nima Noii, Hassan Ali Jahangiry, Fadi Aldakheel and Peter Wriggers

Regularised Fracture Models Based on Representative Crack Elements
Johannes Storm and Michael Kaliske

Virtual Elements for Phase Field Modelling of Fracture in K-L Plates
Blaž Hudobivnik, Fadi Aldakheel and Peter Wriggers

8/6/22 11:00 - 13:00
Advances in high-order discretisation methods and model reduction methods for CFD problems I
Minisymposium organized by T. Taddei and A. Ferrero

MS33A
Room: Oppland (1F)
Chair: Tommaso Taddei

Efficient hyperreduction of high-order discontinuous Galerkin methods (Keynote Lecture)
Masayuki Yano

Model order reduction for physics-based machine learning
Laura Mainini

An adaptive projection-based model reduction method for nonlinear meachanics with internal variables: application to thermo-hydro-mechanical systems
Angelo Iollo, Giulia Sambataro and Tommaso Taddei

A reduced order model for the optimisation-based domain decomposition algorithm for the incompressible Navier-Stokes equations
Ivan Prusak, Monica Nonino, Francesco Ballarin and Gianluigi Rozza

An entropy-stable discontinuous Galerkin approximation of the Spalart-Allmaras turbulence model for the compressible Reynolds Averaged Navier-Stokes equations
Diego Lodares, Juan Manzanero, Esteban Ferrer and Eusebio Valero

8/6/22 11:00 - 13:00
Reliability analysis and rare event simulation. I
Minisymposium organized by Max Ehre, Iason Papaioannou, Edoardo Patelli, Daniel Straub and Bruno Sudret

MS47A
Room: Vestfold (1F)
Chair: Max Ehre

Estimating Approximate Control Variate Weights: with Applications in Importance Sampling and Rare Event Simulation
Alex Gorodetsky and Trung Pham

Reliability updating of engineering systems by multi-level cross entropy method
Oindrila Kanjilal, Iason Papaioannou and Daniel Straub

Rare event probability estimation through high-dimensional elliptical distribution modeling
Marie Chiron, Christian Genest, Jérôme Morio, Sylvain Dubreuil and Michel Salaün

Sensitivity of reliability-based optimum designs: Implementation to stochastic linear systems
Danko J. Jerez, Hector A. Jensen and Michael Beer

Rare event uncertainty quantification based on Hamiltonian MCMC approaches and the Approximate Sampling Target with Post-processing Adjustment (ASTPA) framework
Kostas G. Papakonstantinou, Elsayed Eshra and Hamed Nikbakht

Rare event estimation using sequential directional importance sampling
Kai Cheng and Iason Papaioannou

8/6/22 11:00 - 13:00
Multiphase flows with surface tension and capillarity I
Minisymposium organized by Julien Bruchon, Nicolas Moulin, Modesar Shakoor and Luisa Silva

MS14A
Room: A1 – 1
Chair: Nicolas Moulin

A level-set model for two-phase flow with variable surface tension: Thermocapillary and surfactants
Nestor Vinicio Balcazar Arciniega, Joaquim Rigola and Assensi Oliva

Computational homogenization of unsteady incompressible two-phase flows with obstacles
Modesar Shakoor and Chung Hae Park

Multiscale simulation of void growth using automatic anisotropic adaptive meshing and a level finite element approach
Lorys Le Gohebel, Luisa Silva, Steven Le Corre, Hugues Digonnet, Tuan-Linh Nguyen and Stéphanie Colliou

Regularizing curvature for the unstructured VOF method
Jun Liu, Luise Nagel, Tobias Tolle, Anja Lippert and Tomislav Maric

A discrete differential geometric formulation of multiphase surface interfaces for scalable multiphysics equilibrium simulations.
Stefan Endres, Lutz Mädler and Marc Avila

A robust SPH-based surface tension scheme for laser melting simulations
Mamzi Afrasiabi, Christof Lüthi and Markus Bambach

8/6/22 11:00 - 13:00
Data-driven and projection-based reduced order models for computational sciences and engineering I
Minisymposium organized by Gianluigi Rozza and Giovanni Stabile

MS69A
Room: A1 – 2
Chair: Gianluigi Rozza
CoChair: Giovanni Stabile

ANN-reconstruction of nonlinear operator in projection-based ROM for elastic structures
Christophe Hoareau, Lan Shang and Andreas Zilian

Nonlinear manifold ROM with Convolutional Autoencoders and Reduced Over-Collocation method
Francesco Romor, Giovanni Stabile and Gianluigi Rozza

Projection-based reduced order models for nonlinear thermal simulations of automotive battery packs
Bartosz Górecki, Michał Kurzynka and Robert Tykocki-Crow

A Reduced-Order Model based in nonlinear multidimensionality reduction: a kernel Proper Orthogonal Decomposition.
Pedro Díez, Alba Muixí, Alberto García-González and Sergio Zlotnik

A novel non-linear ROM strategy for steady-state elastohydrodynamic line contact problems and its applicability to lubricated contact in multibody
Leoluca Scurria, Tommaso Tamarozzi, Pavel Jiranek and Dieter Faucconier

A symplectic model order reduction method for large-scale seismic wave propagation
Muhammad Hamza Khalid, Rhys Hawkins, Matthias Schlottbom and Kathrin Smetana

8/6/22 11:00 - 13:00
Discrete conservtion properties for fluid flows: from fundamentals to applications I
Minisymposium organized by N. Valle, F. X. Trias, F. Capuano, G. Coppola and R.W.C.P. Verstappen

MS28A
Room: A1 – 3
Chair: N. Valle

Matrix properties associated with discrete conservation in flow simulations (Keynote Lecture)
Arthur E.P. Veldman and Gennaro Coppola

An energy-preserving unconditionally stable fractional step method on collocated grids
Daniel Santos Serrano, F. Xavier Trias Miquel, Guillem Colomer Rey and Assensi Oliva Llena

A modified Navier-Stokes model: Validation cases and a convergent numerical scheme
Magnus Svärd

Convergence of a finite-volume method with strong-weak imposition of boundary conditions
Anita Gjesteland and Magnus Svärd

Discrete Conservation in Meshfree Methods for Fluid Flows
Pratik Suchde

8/6/22 11:00 - 13:00
Computational Analysis of Advanced Materials and Structures I
Minisymposium organized by Efstathios E. Theotokoglou and Ioannis K. Giannopoulos

MS74A
Room: A1 – 4
Chair: Efstathios Theotokoglou
CoChair: C. Findeisen

Postbuckling failure mechanism of square aluminum plates under shear loading (Keynote Lecture)
Costas D. Kalfountzos, George S.E. Bikakis and Efstathios E. Theotokoglou

A mechanically consistent damage model based on the representation theory of invariant tensor functions
Claudio Findeisen

Thermal and structural modelling of thermoset composite repairs towards optimization of the cure cycle for minimum distortion
Tim P.A. Koenis, Niels van Hoorn and Marie Moghadasi

Crack Propagation Simulation using communicating user subroutines to predict complex crack growth
Lukas Münch, Philip Rose, Peter Middendorf and Markus Linke

A method for communication between user materials during runtime in Abaqus®
Philip F. Rose, Lukas Münch, Markus Linke and Peter Middendorf

8/6/22 11:00 - 13:00
Simulation-based optimization considering dynamic systems and/or uncertainty I
Minisymposium organized by Thomas Rung, Benedikt Kriegesmann, Kathrin Welker, MArtin Siebenborn, Robert Seifired and Alexander Düster

MS34A
Room: A1 – 5
Chair: Martin Siebenborn
CoChair: Benedikt Kriegesmann

The iPGDZ+ technique for compressing primal solution time-series in unsteady adjoint - applications & assessment (Keynote Lecture)
Andreas-Stefanos Margetis, Evangelos Papoutsis-Kiachagias and Kyriakos Giannakoglou

Adjoint shape optimization of arterial bypass-graft anastomoses considering fluid-structure interaction
Lars Radtke, Georgios Bletsos, Thomas Rung and Alexander Düster

Unsteady Aerodynamic Sensitivity Analysis with FEniCS
Carlos Ruiz, Miguel Ch´avez-Modena, Alejandro Mart´ınez-Cava and Eusebio Valero

Adjoint-based Shape Sensitivities of Ducted Blood Flows with Non-Newtonian Fluid Properties
Thomas Rung and Georgios Bletsos

Gradient-Based Optimization of Structures Immersed in an Acoustic Cavity Using XFEM, ROM and Surrogate Model
Luc Laurent and Antoine Legay

8/6/22 11:00 - 13:00
Advances on computational methods for multiphase flows with phase change II
Minisymposium organized by Luca Brandt, Marica Pelanti and Maria Giovanna Rodio

MS22B
Room: A1 – 6
Chair: Sébastien Tanguy

Numerical simulations of cavitation near an elastic object
Mauro Rodriguez, Spencer H. Bryngelson and Tim Colonius

Application of interface capturing schemes on multiphase/multicomponent compressible flow of underwater explosion
Ebenezer Adebayo, Panagiotis Tsoutsanis and Karl Jenkins

Modelling the evaporation of CO2 during depressurization using physics-based mass-transfer source terms
Alexandra M. Log, Svend T. Munkejord and Morten Hammer

A diffuse interface method with non-instantaneous relaxation for two-phase flows described by generic equations of state
Barbara Re and Rémi Abgrall

A time-staggered CFD scheme for variable density moist air Flow
Hector Amino, Cédric Flageul, Bertrand Carissimo and Martin Ferrand

A novel cutcell method for interfacial flows - application to phase change
Tomas Fullana, Alejandro Quirós Rodríguez, Taraneh Sayadi and Vincent Le Chenadec

8/6/22 11:00 - 13:00
Reduced order modeling of dynamical systems through deep learning techniques I
Minisymposium organized by Andrea Manzoni, Mengwu Guo and Paris Perdikaris

MS125A
Room: B1 – 1
Chair: Andrea Manzoni

Simultaneous learning of dynamics and coordinates, with examples in fluid dynamics (Keynote Lecture)
Steven Brunton

Bayesian inference for the learning of reduced-state dynamics
Mengwu Guo

Model reduction of parameterized PDEs using deep bases
Eric Parish, Yukiko Shimizu and Kookjin Lee

Deep learning of dynamical systems using geometry and thermodynamics
Quercus Hernández, Alberto Badías, David González, Francisco Chinesta and Elías Cueto

Physics-constrained deep learning-based reduced order models for parametrized PDEs
Stefania Fresca, Federico Fatone, Mengwu Guo and Andrea Manzoni

8/6/22 11:00 - 13:00
Mechanics of soft, multifunctional materials: Experiment, modeling and simulation I
Minisymposium organized by Mokarram Hossain, Daniel Garcia-Gonzalez and Ruike Zhao

MS82A
Room: B1 – 2
Chair: Rogelio Ortigosa
CoChair: Michael Gross

Magnetomechanical deformations and instabilities in soft magnetoactive materials
(Keynote Lecture)
Stephan Rudykh, Nitesh Arora and Parag Pathak

Weakly coupled electro-magneto-thermo-mechanical model for shape memory polymer composites employing mixed-FEM
Vinayak Gholap, Ludovic Noels and Christophe Geuzaine

Simulation of soft robots with nonlinear material behavior using the cosserat rod theory
Malte Grube and Robert Seifried

Magneto-pseudoelasticity emerging from multistable microstructures of extremely soft magnetorheological elastomers
Matthias Rambausek, Michael Neunteufel and Joachim Schöberl

Modeling and analysis of electro-magneto-elastic membrane structures
Awantika Mishra, Yadwinder Singh Joshan and Sushma Santapuri

8/6/22 11:00 - 13:00
Complex fluid flow in engineering: modeling, simulation and optimization VI
Minisymposium organized by Fabian Key, Marek Behr and Stefanie Elgeti

MS12F
Room: B3 + B4
Chair: Fabian Key

Flow diodes for application in turbulent flows
Christian Jordan, Bahram Haddadi, Johannes Wintersperger, Johannes Szivacz and Michael Harasek

A mixed midelity conceptual design process for Boundary Layer Ingestion concepts
Olivier Atinault, Michaël Méheut and Sébastien Defoort

Objective identification of local vortices
Bjørn Holmedal and Lars Erik Holmedal

Numerical Investigation of Oleo-Pneumatic Shock Absorber: A Multifidelity Approach
Ahmed A. Sheikh Al-Shabab, Bojan Grenko, Dimitrios Vitlaris, Panagiotis Tsoutsanis, Antonis Antoniadis and Martin Skote

High fidelity simulations of flow and acoustic fields around rotating tire toward aeroacoustic noise reduction
Kengo Asada, Keita Hizen, Atsushi Toyoda, Kozo Fujii, Toshiyuki Ikeda and Masataka Koishi

8/6/22 11:00 - 13:00
Near-Wall Reactive Flows: Simulation, Modelling And Validation
Minisymposium organized by Amsini Sadiki, Suad Jakirlic, Christian Hasse and Andreas Dreizler

MS85A
Room: Jan Mayen 1
Chair: Marius Schmidt
CoChair: Christina Strassacker

Boundary layer flow measurements in a motored IC engine at engine speeds up to 2500 rpm
Marius Schmidt, Cooper Welch, Lars Illmann, Andreas Dreizler and Benjamin Böhm

Flame surface density and mean reaction rate measurements in a side-wall quenching flame at elevated pressure
Pascal Johe, Florian Zentgraf, Max Greifenstein, Robert Barlow, Benjamin Böhm and Andreas Dreizler

Modelling of the joint probability function in turbulent flame-wall interaction of premixed flames using Quadrature-based Moment Methods and tabulated chemistry.
Matthias Steinhausen, Thorsten Zirwes, Federica Ferraro, Sebastian Popp, Feichi Zhang, Henning Bockhorn and Christian Hasse

REDIM reduced kinetics for Flame-Wall Interactions including Flame Retardants and the investigation of its Sensitivity with respect to the gradient estimation
Christina Strassacker, Tobias Kern and Ulrich Maas

REDIM based model reduction of the decomposition of urea-water-solutions in films and droplets
Etele Berszány, Marcus Stein, Viatcheslav Bykov and Ulrich Maas

Numerical investigation of Hydrogen self-ignition and deflagration-to-detonation phenomena using automated meshing approach and detailed chemistry
Marius Gabriel Cojocaru, Lorenzo Sufrà and Pietro Scienza

8/6/22 11:00 - 13:00
Computational Plasticity in Crystals and Polycrystals I
Minisymposium organized by Luiza Angheluta, Jorge Vinals, Marco Salvalaglio and Stefanos Papanikolaou

MS100A
Room: Jan Mayen 2
Chair: Luiza Angheluta

Microscopically Informed Continuum Dislocation Dynamics
Benedikt Weger, Satyapriya Gupta and Thomas Hochrainer

Modeling elastic and plastic deformations using the amplitude expansion of the phase-field crystal model
Marco Salvalaglio

A comparison of an efficient crystal plasticity finite element method and a spectral solver
Tomas Manik, Arash I. Aria, Hassan M. Asadkandi and Bjørn Holmedal

A phase field crystal theory of the kinematics and dynamics of dislocation lines
Vidar Skogvoll, Luiza Angheluta, Audun Skaugen, Marco Salvalaglio and Jorge Viñals

Field Dislocation Mechanics and Phase Field Crystal models
Luiza Angheluta and Jorge Vinals

8/6/22 11:00 - 13:00
Multiphase Flow and non-Newtonian Fluid – Modelling and Applications I
Minisymposium organized by Chenfeng Li

MS3A
Room: Jan Mayen 3
Chair: Eduardo de Souza Neto
CoChair: Chenfeng Li

A CFD-DEM Approach for Modelling Fresh Concrete Flow (Keynote Lecture)
Sizeng You and Chenfeng Li

Cell-centered Lagrangian scheme for multi-material flows with equal pressure assumption
Rémi Chauvin, Guisset Sébastien, Manach-Perennou Bastien and Llor Antoine

Computational modelling and characterization of non-Newtonian visco-plastic cementitious building materials
Mareike Thiedeitz, Jithender J. Timothy and Thomas Kränkel

CFD-DEM simulation of large particle behaviour in slurry pumps: effect of outlet orientation
Nicolas Torino, Konstantinos Ritos and William Dempster

Fluidization by gas pore pressure of dense granular flows: numerical simulations versus experiments
Alvaro Aravena, Laurent Chupin, Thierry Dubois and Olivier Roche

8/6/22 11:00 - 13:00
Deep Learning in Scientific Computing I
Minisymposium organized by Manuel Jesus Castro Diaz, Siddharta Mishra and David Pardo

MS110A
Room: Lounge A2
Chair: David Pardo
CoChair: Manuel J. Castro

Variational Physics Informed Neural Networks: an a priori error estimate
Stefano Berrone , Claudio Canuto and Moreno Pintore

Parametrized Flow Predictions using Physics Informed Neural Networks
Simon Wassing, Stefan Langer and Philipp Bekemeyer

On quadrature rules for solving Partial Differential Equations with Neural Networks
Jon Ander Rivera, Ángel Javier Omella, Jamie M. Taylor and David Pardo

A Deep r-Adaptive Mesh Method for solving Partial Differential Equations
Ángel J. Omella and David Pardo

Accelerating High Order Discontinuous Galerkin solvers using neural networks
Esteban Ferrer, Fernando Manrique de Lara and Kheir-eddine Otmani

A Generative Adversarial Networks approach for solving Partial Differential Equations
Carlos Uriarte, David Pardo, Judit Muñoz-Matute and Ignacio Muga

8/6/22 11:00 - 13:00
Multi-fidelity methods for uncertainty quantification and optimization I
Minisymposium organized by Lorenzo Tamellini, Matteo Diez, John Jakeman and Alex Gorodetsky

MS39A
Room: Spitsbergen
Chair: Lorenzo Tamellini

Advanced Experiments on Gaussian Process-based Multi-fidelity Methods over Diverse Mathematical Characteristics
Sihmehmet Yildiz, Hayriye Pehlivan-Solak, Matteo Diez, Omer Goren and Melike Nikbay

Multi-Fidelity Sparse Polynomial Chaos and Kriging Surrogate Models for Uncertainty Quantification
Markus P. Rumpfkeil and Phil Beran

Multifidelity ductile failure model by cokriging between simulations on unit cells and random microstructures
Clément Cadet, Jacques Besson, Sylvain Flouriot, Samuel Forest, Pierre Kerfriden, Laurent Lacourt and Victor de Rancourt

Domain-aware multifidelity learning for design optimization
Francesco Di Fiore and Laura Mainini

Multi-fidelity active learning for shape optimization problems affected by noise
Jeroen Wackers, Riccardo Pellegrini, Matteo Diez, Andrea Serani and Michel Visonneau

Comparing two multi-fidelity methods for forward uncertainty quantification of ship resistance
Chiara Piazzola , Lorenzo Tamellini, Riccardo Pellegrini, Riccardo Broglia, Andrea Serani and Matteo Diez

8/6/22 11:00 - 13:00
Multiscale Computational Homogenization for Bridging Scales in the Mechanics and Physics of Complex Materials VI
Minisymposium organized by Julien Yvonnet, Kenjiro Terada, Peter Wriggers, Marc Geers, Karel Matous and Paul Steinmann

MS6F
Room: Svalbard
Chair: Farzin Mozafari

Hierarchy of generalized continua issued from micromorphic medium constructed by homogenization
Jean-François Ganghoffer, Ehsan Alavi and Mojtaba Sadighi

Homogenization of higher-order continua
Felix Schmidt and Christian Hesch

Meshfree Modelling of Coupled Mechanical-Thermal-Chemical Phenomena in Energetic Aggregates at Multiple Length Scales
Judith Brown, Frank Beckwith, Wolf Ki Tae, Joel Clemmer, Caleb Overstreet and Marcial Gonzalez

Efficient coarse-graining of boundary surface for solving Atomistic/Continuum multiscale problems using Green's function
Ankit Gupta and william Curtin

An investigation of the effects of change in crystal structure on the mechanical properties of nanocrystalline aluminum using a continuum-atomic multiscale bridging method
Yusuke Yamazaki, Takahiro Murashima and Mayu Muramatsu

Microstructure-informed modelling of open-porous cellular materials
Shivangi Aney, Barbara Milow and Ameya Rege

8/6/22 11:00 - 13:00
Structure-Preserving Finite Element Methods in Computational Fluid Dynamics I
Minisymposium organized by Philip Lederer and Christian Merdon

MS142A
Room: O – 3
Chair: Philip Lederer
CoChair: Christian Merdon

Direct numerical simulations of turbine blade cascades for the improvement of turbulence models through database generation
Michel Rasquin, Jean-François Thomas, Koen Hillewaert, Patrick Bechlars and Matthias Franke

Turbulence Modeling Approach for Exactly Mass-conserving Finite Element Methods
Xaver Mooslechner

A new projection method for Navier-stokes equations by using Raviart-thomas finite element
Giacomo Barbi, Andrea Chierici, Antonio Cervone, Valentina Giovacchini, Sandro Manservisi, Lucia Sirotti and Ruben Scardovelli

A gradient-robust well-balanced scheme for the compressible Navier-Stokes problem
Christian Merdon

Finite element exterior calculus applied to incompressible Navier-Stokes equations
Marien-Lorenzo Hanot

8/6/22 11:00 - 13:00
Modeling complex fluid and solid dynamics during earthquake ruptures I
Minisymposium organized by Fabian Barras, Gaute Linga, François Renard, Omar Duran and Eirik Keilegavlen

MS48A
Room: O – 4
Chair: Eirik Keilegavlen
CoChair: Omar Duran

Numerical simulations of mixed shear and opening modes fluid driven fracture propagation on pre-existing discontinuities
Brice Lecampion, Alexis Sáez and Regina Fakhretdinova

Reduced dimension fracture flow – Beyond Poiseuille flow models
Bruce Gee and Robert Gracie

Reduced dimension fracture flow – Deformable fractures coupled with inertial and transient fluid behaviour
Bruce Gee and Robert Gracie

The Transient Phase of Planar, Three-Dimensional Buoyant Hydraulic Fractures Emerging from a Point Source
Andreas Möri, Carlo Peruzzo and Brice Lecampion

When, and for how long, two tough layers can contain the propagation of a fracture driven by the injection of a viscous fluid
Carlo Peruzzo, Judith Capron and Brice Lecampion

Coupling solid and fluid dynamics within rapidly growing fractures
Fabian Barras, Gaute Linga, Eirik Grude Flekkøy and François Renard

13:00 - 14:00
Lunch Time

14:00 - 16:00 | TECHNICAL SESSIONS

8/6/22 14:00 - 16:00 **EU-Funded Research and Innovation on Computational Methods towards Climate Neutrality of Aviation II**	STS08B Room: Hedmark (GF) Chair: Dietrich Knoerzer

SENECA project: Climate effects assessment of supersonic aviation
Etienne Terrenoire, Sigrun Matthes, Robin Thor, David Lee, Ruben Rodriguez de Leon, Ling Lim, Bethan Owen, Agnieska Skrowron, Pénélope Leyland, David Marsh and Kateryna Synylo

The Role of Computational Methods for a Multi-Fidelity Aerodynamic Characterization of Supersonic Aircraft
Marco Marini, Pietro Roncioni, Santiago Hernandez, F Nieto, Davide Ferretto, Oscar Gori, Gilbert Stoican, *Dumitru Pepelea, Victor Pricop, Bayindir H. Saracoglu, Guillaume Grossir, Bora O. Cakir and Matthew* Clay

Reduced order computational methods for the development of the propulsive technologies for supersonic aviation to achieve climate neutrality
Ali Can Ispir, Bora Orcun Cakir, Karel Van den Borre, Francesco Civerra, Alessandro Tognelli and Bayindir H. Saracoglu

The role of computational methods to predict pollutant and GHG emissions from future supersonic civil aircraft using biofuels or H2
Christer Fureby, Arvid Åkerblom, Thommie Nilsson, Martin Passad, Elna Heimdal-Nilsson, Guido Saccone, *Bayindir Saracoglu, Nicole Viola and Roberta Fusaro*

8/6/22 14:00 - 16:00 **Bayesian inference of engineering models: advances in theory and applications I** *Minisymposium organized by Oindrila Kanjilal, Iason Papaioannou, Dainiel Straub, Geert Lombaert and Costas Papadimitriou*	MS32A Room: Nord – Norge (GF) Chair: Oindrila Kanjila

A Bayesian inference approach for parametric identification through optimal control method
Mainak Bhattacharyya and Pierre Feissel

Parameter identification in dynamic fracture model by using Bayesian inference
Mijo Nikolic, Andjelka Stanic, Noemi Friedman and Hermann Matthies

Bayesian system identification and dynamic virtualization using incomplete noisy measurements
Daniz Teymouri, Omid Sedehi, Lambros S. Katafygiotis and Costas Papadimitriou

Bayesian uncertainty quantification and model selection for complex fluids
Aricia Rinkens, Clemens V. Verhoosel and Nick O. Jaensson

A Reduced Basis Ensemble Kalman Method
Francesco Silva, Cecilia Pagliantini, Martin Grepl and Karen Veroy

A theoretical and numerical study on the Scaled Spherical Simplex filter with n+2 sigma points and its UKF equivalency for recursive Bayesian estimation
Kostas G. Papakonstantinou, Gordon P. Warn and Mariyam Amir

8/6/22 14:00 - 16:00 **Computational Analysis of Concrete in an Experimental-Virtual-Lab II** *Minisymposium organized by Jörg Schröder, Steffen Anders, Dominik Brands, Günther Meschke and Michael Kaliske*	MS156B Room: Nordland (GF) Chair: Dominik Brands

Accelerating high-cycle fatigue life estimation using XFEM and gradient enhanced damage model
Jian Sun and Stefan Löhnert

A gradient-enhanced fatigue damage model to simulate compressive fatigue behaviour of high-strength concrete
Stefan Loehnert and Nadja Oneschkow

Confined cyclic shear behavior of concrete studied using the microplane model MS1
Mario Aguilar, Abedulgader Baktheer, Henrik Becks, Martin Classen and Rostislav Chudoba

8/6/22 14:00 - 16:00 **EYIC Junior Workshop II (limited to 100 pre-registered participants)**	JWB Room: Akershus (1F) Chair: Konrad Perzynski

Parallel Schwarz domain decomposition preconditioning and an introduction to FROSch
Alexander Heinlein

8/6/22 14:00 - 16:00 **Data-driven numerical and reduced order modeling of flows II** *Minisymposium organized by Nikolaus Adams and Jörg Schumacher*	MS19B Room: Oslo 2 (GF) Chair: Nikolaus Adams

Reinforcement learning for discretization-aware LES models
Marius Kurz and Andrea Beck

Correcting the discretization error of coarse grid CFD simulations with machine learning
Anna Kiener, Stefan Langer and Philipp Bekemeyer

Learning and Inference assisted by Feature Space Engineering (LIFE): A generalizable approach for data-driven augmentation of Physical Models
Karthik Duraisamy, Vishal Srivastava and Niloy Gupta

Data set generation at novel test-rig for validation of numerical models using in-house algorithms
Agata Widuch, Marcin Nowak, Dawid Sukiennik, Kari Myöhänen, Markku Nikku, Alessandro Parente and Wojciech Adamczyk

Solving partial differential equations using physics informed cascade neural network
Seyedalborz Manavi, Ehsan Fattahi and Thomas Becker

Exploration of data-driven numerical methods for fluid flows by end-to-end optimization
Aaron Buhendwa, Deniz Bezgin and Nikolaus Adams

8/6/22 14:00 - 16:00
Block preconditioning for challenging multiphysics systems II
Minisymposium organized by Peter Ohm, John N. Shadid and Matthias Mayr

MS38B
Room: Rogaland (GF)
Chair: Peter Ohm
CoChair: John Shadid

Using AMG as an eigensolver to improve smoothed aggregation for AMG
Silvia Ehrmann

A block preconditioner for equilibrium equations in mechanics with a second gradient of dilatation regularization
Ana C. Ordonez, Carola Kruse, Nicolas Tardieu and Daniel Ruiz

A Scalable Block Preconditioner for Coupled Thermo-Hydro-Mechanics Problems
Ana Ordonez, Nicolas Tardieu, Carola Kruse and Daniel Ruiz

An accelerated deflation preconditioner for parametric systems based on subspace recycling
Dionysios Panagiotopoulos, Wim Desmet and Elke Deckers

8/6/22 14:00 - 16:00
Recent developments and current issues in the phase-field modeling of fracture II
Minisymposium organized by Dhananjay Phansalkar, Paras Kumar, Pietro Carrara, Sigrid Leyendecker, Julia Mergheim, Laura De Lorenzis and Paul Steinmann

MS67B
Room: Romerike (GF)
Chair: Paras Kumar
CoChair: Stephan Wulfinghoff

On the generalization of gradient-based models from 1d to 3d: Curvature-dependence of phase-field modeling of brittle fracture
Patrick Kurzeja, Kai Langenfeld and Jörn Mosler

Continuous-discontinuous modeling of crack growth with the thick level set method
L.A.T. Mororó, A. Poot and F.P. van der Meer

A phase-field framework for cohesive fracture
Henning Lammen and Jörn Mosler

Phase-field modeling of brittle fracture in heterogeneous bars
Pietro Carrara, Francesco Freddi and Laura De Lorenzis

Numerical modeling of fracture propagation in bi-layered materials using an adaptively refined phase-field method
Salman Khan, Alba Muixí, Chandrasekhar Annavarapu and Antonio Rodríguez-Ferran

A Hybrid High Order method for gradient damage models
David Siedel, Helfer Thomas, Fandeur Olivier, Besson Jacques, Forest Samuel and Ammar Kais

8/6/22 14:00 - 16:00
Advanced Modelling Procedures for Masonry Structures II
Minisymposium organized by Daniela Addessi, Miguel Cervera and Elio Sacco

MS71B
Room: Sør – Norge (GF)
Chair: Elio Sacco

Applied element modelling for seismic assessment of masonry buildings with flexible roofs
Ahsana Parammal Vatteri, Rohit Kumar Adhikari and Dina D'Ayala

Dynamic response of masonry walls: from harmonic to non-stationary excitations
Daniela Addessi, Cristina Gatta and Fabrizio Vestroni

Distinct element modelling of the seismic response of historical masonry constructions: insight on the out-of-plane collapse of façades
Pietro Meriggi, Rebecca Fugger, Francesca Gobbin, Stefano De Santis and Gianmarco de Felice

Architectural and environmental impact of retrofitting techniques to prevent in-plane «domino» failure modes of unreinforced *masonry* buildings
Riccardo Liberotti, Federico Cluni, Francesco Faralli and Vittorio Gusella

8/6/22 14:00 - 16:00
Recent Trends in Scientific Computing for Computational Fluid Dynamics and Solid Mechanics II
Minisymposium organized by Stefan Turek, Axel Klawonn and Uli Rüde

MS41B
Room: Oslo 1 (GF)
Chair: Stefan Turek

Robust coarse spaces for domain decomposition methods
Alexander Heinlein, Axel Klawonn, Martin Lanser, Adam Wasiak and Janine Weber

Large scale computational homogenization using the FE^2 method for contact problems
Axel Klawonn, Martin Lanser, Oliver Rheinbach and Matthias Uran

Application of FROSch - the Fast and Robust Overlapping Schwarz Preconditioner framework - to Chemo-Mechanics
Björn Kiefer, Stefan Prüger, Oliver Rheinbach and Friederike Röver

Globalization of Nonlinear FETI-DP Methods
Stephan Köhler and Oliver Rheinbach

ParaSiF_CF: A Partitioned Fluid-Structure Interaction Framework for Exascale
Wendi Liu, Alex Skillen and Charles Moulinec

Implicitly extrapolated geometric multigrid for the gyrokinetic Poisson equation
Carola Kruse, Martin Kuehn, Philippe Leleux, Ulrich Ruede and Christina Schwarz

8/6/22 14:00 - 16:00
Modelling of environment-assisted fracture II
Minisymposium organized by Haiyang Yu and Zhiliang Zhang

MS132B
Room: Buskerud (1F)
Chair: Xuewei Li
CoChair: Haiyang Yu

Towards a better understanding of hydrogen embrittlement in austenitic steels: the role of hydrogen characteristics and fracture mechanisms (Keynote Lecture)
Lisa Claeys, Kim Verbeken and Tom Depover

Ductile-brittle transition in ultrahigh-strength steels – estimation & application
Sakari Pallaspuro, Yang Li, Haiyang Yu, Zhiliang Zhang and Jukka Kömi

Hydrogen induced degradation in lattice material
Danial Molavitabrizi, Haiyang Yu and S. Mahmoud Mousavi

Modelling mechanical behavior of steel in marine environment
Goran Vukelic, Goran Vizentin and Darko Pastorcic

8/6/22 14:00 - 16:00
Towards Next Generation of Industrial Aerodinamical Simulation Tools II
Minisymposium organized by Oriol Lehmkuhl, Eusebio Valero and Jordi Pons

MS126B
Room: Hordaland 1 (1F)
Chair: Oriol Lehmkuhl

Algorithmic Differentiation for an effcient CFD solver
Bruno Maugars, Sébastien Bourasseau, Cédric Content, Bertrand Michel, Bérenger Berthoul, Jorge Nunez *Ramirez, Itham Salah el Din, Pascal Raud and Laurent Hascoët*

Identifying stability constraints of high-order methods on distorted meshes through a von-Neumann analysis framework
Saumitra Joshi, Gonzalo Rubio and Esteban Ferrer

A Machine Learning based Expert System for Optimizing CFD Solver Parameters
Lina El Zaatari, Tobias Leicht, Stefan Langer, Philipp Bekemeyer and Stefan Görtz

On the GPU-enabling techniques for Finite Elements CFD codes
Lucas Gasparino, Guillaume Houzeaux, Filippo Spiga and Oriol Lehmkuhl

Aerodynamics predictions of a NACA0012 in LES simulations using a high order discontinuous Galerkin solver
Oscar Marino, Esteban Ferrer, Eusebio Valero and Jon Errasti

8/6/22 14:00 - 16:00
Innovations in phase-field modeling, computation and Experimental Validation II
Minisymposium organized by FADI Aldakheel, Yousef Heider, Thomas Wick, Roberto Alessi and WaiChing Sun

MS159B
Room: Hordaland 2 (1F)
Chair: Fadi Aldakheel
CoChair: Yousef Heider

Phase-field modelling of fatigue fracture in aluminium sheets
Martha Seiler and Markus Kästner

A micromorphic phase-field model for fracture in porous media
Ritukesh Bharali, Fredrik Larsson and Ralf Jänicke

A spatially adaptive phase-field model for dynamic fracture
Dhananjay Phansalkar, Kerstin Weinberg, Michael Ortiz and Sigrid Leyendecker

Micromechanics-based variational phase-field modeling of Brazilian tests on mortar samples
Mina Sarem, Jacinto Ulloa, Nuhamin E. Deresse, Els Verstrynge and Stijn François

Direction-dependent orthogonal decomposition of an orthotropic constitutive model for phase field approach to fracture
Vahid Ziaei-Rad, Mostafa Mollaali, Thomas Nagel, Olaf Kolditz and Keita Yoshioka

8/6/22 14:00 - 16:00
Advances in high-order discretisation methods and model reduction methods for CFD problems II
Minisymposium organized by T. Taddei and A. Ferrero

MS33B
Room: Oppland (1F)
Chair: Andrea Ferrero

High-order adaptive finite elements for time-harmonic acoustics (Keynote Lecture)
Hadrien BERIOT and Gwenael GABARD

Analysis of high-order interpolation schemes for the finite-volume resolution of linear problems on unstructured meshes
Pablo Castrillo, Eugenio Schillaci, Joaquim Rigola and Carlos-David Pérez-Segarra

P-adaptive LDG method applied to LES of parallel blade-vortex interaction on NACA23012 airfoil
Antonella Abba'

Vectorial limitation for multislope MUSCL schemes
Arthur Tételin, Clément Le Touze and Philippe Villedieu

Discontinuous-continuous Galerkin fluid-structure interaction algorithm for elastic structures with large deformations
Aleš Pecka, Ondřej Bublík and Jan Vimmr

8/6/22 14:00 - 16:00
Reliability analysis and rare event simulation. II
Minisymposium organized by Max Ehre, Iason Papaioannou, Edoardo Patelli, Daniel Straub and Bruno Sudret

MS47B
Room: Vestfold (1F)
Chair: Max Ehre

Quantization applied to the visualization of low-probability flooding events
Charlie Sire, Rodolphe Le Riche, Didier Rulliere, Jérémy Rohmer, Yann Richet and Lucie Pheulpin

Modeling the resilience of power distribution systems against ice storms.
Guangyang Hou and Muralee Muraleetharan

The effects of noise on reliability analysis
Anderson Pires, Maliki Moustapha, Stefano Marelli and Bruno Sudret

Risk Assessment for Transpiration Cooling
Ella Steins and Michael Herty

System reliability assessment of an offshore wind turbine jacket by using adaptive Kriging and composite active learning approaches
Chao Ren, Younes Aoues, Didier Lemosse and Eduardo Souza de cursi

8/6/22 14:00 - 16:00
Multiphase flows with surface tension and capillarity II
Minisymposium organized by Julien Bruchon, Nicolas Moulin, Modesar Shakoor and Luisa Silva

MS14B
Room: A1 – 1
Chair: Modesar Shakoor

Navier-Stokes Cahn-Hilliard modeling of multi-phase flow in an immersed finite element setting
Stein Stoter, Tom van Sluijs and Harald van Brummelen

Investigation of the Navier–Stokes–Cahn–Hilliard diffuse interface model for numerical simulations of unstable liquid filaments
Tom B. van Sluijs, Tristan H.B. Demont, Stein K.F. Stoter, Harald. E. van Brummelen and Herman M.A. Wijshoff

A unified analysis framework of Navier-Stokes Cahn-Hilliard models with different densities
Marco ten Eikelder, Kris van der Zee, Ido Akkerman and Dominik Schillinger

Free response of a gravitational liquid sheet by means of three-dimensional Volume-of-Fluid simulations
Alessandro Della Pia, Luigi Grande, Antonio Colanera, Matteo Chiatto and Luigi de Luca

8/6/22 14:00 - 16:00
Data-driven and projection-based reduced order models for computational sciences and engineering II
Minisymposium organized by Gianluigi Rozza and Giovanni Stabile

MS69B
Room: A1 – 2
Chair: Giovanni Stabile
CoChair: Gianluigi Rozza

Preconditioned Least-Squares Petrov-Galerkin Reduced Order Models for Solid and Fluid Mechanics Problems (Keynote Lecture)
P. Lindsay, J. Fike, I. Tezaur and K. Carlberg

An Efficient Reduction Scheme for Contact Problems in Linear Elasticity
Diana Manvelyan, Bernd Simeon and Utz Wever

Reduced order models for the solution of geometrically-parametrised turbulent flow problems.
Vasileios Tsiolakis, Trond Kvamsdal, Adil Rasheed, Eivind Fonn and Harald van Brummelen

Finite element approximation of wave problems with correcting terms based on training artificial neural networks with fine solutions
Arnau Fabra, Joan Baiges and Ramon Codina

Dictionary-based approximations for reduced order models in contact mechanics
Kiran S. Kollepara, José V. Aguado, Yves Le Guennec and Luisa Silva

8/6/22 14:00 - 16:00
Discrete conservtion properties for fluid flows: from fundamentals to applications II
Minisymposium organized by N. Valle, F. X. Trias, F. Capuano, G. Coppola and R.W.C.P. Verstappen

MS28B
Room: A1 – 3
Chair: R.W.C.P Verstappen

Linear and quadratic invariants preserving discretization of Euler equations
Gennaro Coppola and Arthur E. P. Veldman

High order entropy split methods employing compact central spatial discretizations
Bjorn Sjogreen and H.C. Yee

An assessment of various discretizations of the energy equation in compressible flows
Carlo De Michele and Gennaro Coppola

Variational approaches to various numerical schemes for fluid and multi-fluid flows with geometry--energy--entropy compatibility
Antoine Llor

Energy-preserving stable computations of high-pressure supercritical fluids turbulence
Marc Ollé-Bernades, Francesco Capuano, F. Xavier Trias and Lluís Jofre

A fully-discrete entropy conserving/stable discretization for inviscid unsteady flows
Alessandro Colombo, Andrea Crivellini and Alessandra Nigro

8/6/22 14:00 - 16:00
Computational Analysis of Advanced Materials and Structures II
Minisymposium organized by Efstathios E. Theotokoglou and Ioannis K. Giannopoulos

MS74B
Room: A1 – 4
Chair: S. Tveit
CoChair: K. Anam

Computationally efficient simulation of low velocity impact and compression after impact response in laminated composites
Khairul Anam, Melanie Todt and Heinz E. Pettermann

Integrated deep drawing and high-cycle fatigue analysis using a continuous-time approach
Sigbjørn Tveit, Aase Reyes and Emrah Erduran

Investigation of higher harmonic Lamb waves for facilitating delamination characterization
Akhilendra Gangwar and Dhanashri M. Joglekar

Non-deterministic characterization of the damage tolerance of metal/composite structure
Stephanie TerMaath and Corey Arndt

Influence of doping atoms on twinning stress in Ni2MnGa alloy
Petr Šesták, Martin Heczko and Martin Zelený

Quantification of geometrically non-linear cross-sectional deformations for wind turbine rotor blades
Julia Gebauer and Claudio Balzani

8/6/22 14:00 - 16:00
Simulation-based optimization considering dynamic systems and/or uncertainty II
Minisymposium organized by Thomas Rung, Benedikt Kriegesmann, Kathrin Welker, MArtin Siebenborn, Robert Seifired and Alexander Düste

MS34B
Room: A1 – 5
Chair: Thomas Rung
CoChair: Martin Siebenborn

Applicability of discrete adjoints for wind comfort optimization
Suneth Warnakulasuriya, Máté Péntek, Kai-Uwe Bletzinger and Roland Wüchner

A Scalable Algorithm for Geometric Constrained Shape Optimization in Banach Spaces
Peter Marvin Müller, Jose Alfonso Pinzon Escobar and Martin Siebenborn

Sensitivity enhancement of the generalized polynomial chaos for efficient optimization under uncertainty
Kyriakos Dimitrios Kantarakias and George Papadakis

Learning a mesh motion technique with applications to fluid-structure interaction and shape optimization
Johannes Haubner

A fluid-structure interaction study of hemodynamics in arterial bypass-graft anastomoses
Georgios Bletsos, Lars Radtke, Alexander Düster and Thomas Rung

8/6/22 14:00 - 16:00
Advances on computational methods for multiphase flows with phase change III
Minisymposium organized by Luca Brandt, Marica Pelanti and Maria Giovanna Rodio

MS22C
Room: A1 – 6
Chair: Luca Brandt

A pressure-based method for low Mach number two-phase flows with mass transfer
Andreas D. Demou, Nicolo Scapin, Marica Pelanti and Luca Brandt

Direct numerical simulation of two-phase compressible flowswith phase change
Marie Bibal, Annafederica Urbano and Sebastien Tanguy

A volume-of-fluid method for multicomponent evaporating two-phase flow
Salar Zamani Salimi, Nicolo Scapin, Andrea Gruber and Luca Brandt

Investigation of Interfacial Mass Transfer During Dropwise Condensation Using the Navier-Stokes-Korteweg Equations with a van der Waals Fluid
Julián N. García Hahn, Carlos A. Dorao and Maria Fernandino

Diffuse interface method for direct numerical simulation of nucleate boiling
Giada Minozzi, Alessio Lavino, Edward Smith, Jionghui Liu, Tassos Karayiannis, Khellil Sefiane, Omar Matar, *David Scott, Timm Krueger and Prashant Valluri*

Direct numerical simulation of bubble growth in a nanocavity
Arnoldo Badillo, Alessio D. Lavino, Annalisa Manera, Victor Petrov, Edward Smith, Mirco Magnini and Omar *K. Matar*

8/6/22 14:00 - 16:00
Reduced order modeling of dynamical systems through deep learning techniques II
Minisymposium organized by Andrea Manzoni, Mengwu Guo and Paris Perdikaris

MS125B
Room: B1 – 1
Chair: Andrea Manzoni

On the employ of inductive biases for the development of learned simulators
Quercus Hernandez, Alberto Badias, Francisco Chinesta and Elias Cueto

Physics-informed neural networks as reduced simulation models for bioreactor and crystallisation modeling
Daniel Wolff, Konstantin Key, Eric von Lieres and Stefanie Elgeti

Deep-HyROMnet: a deep learning-based operator approximation for model order reduction in structural mechanics
Ludovica Cicci, Stefania Fresca and Andrea Manzoni

Active learning and time-series prediction for non-intrusive model reduction
Harshit Kapadia, Lihong Feng and Peter Benner

Machine learning accelerated dynamic analysis of stochastic nonlinear structures
Stefanos Nikolopoulos, Ioannis Kalogeris and Vissarion Papadopoulos

8/6/22 14:00 - 16:00
Mechanics of soft, multifunctional materials: Experiment, modeling and simulation II
Minisymposium organized by Mokarram Hossain, Daniel Garcia-Gonzalez and Ruike Zhao

MS82B
Room: B1 – 2
Chair: Jesus Martinez-Frutoz
CoChair: Daniel Garcia-Gonzalez

On thermo-electro-viscoelasticity of dielectric elastomers: A comprehensive experimental study meets numerical modelling
Mokarram Hossain, Markus Mehnert and Paul Steinmann

A variational-based mixed finite element formulation for liquid crystal elastomers
Michael Gross, Julian Dietzsch and Francesca Concas

Thymos - A portable open hardware testing device
Jan Novak, Jan Havelka and Jozef Michalek

Taut domain analysis of transversely isotropic dielectric elastomer membranes
Aman Khurana, Giuseppe Zurlo and Manish M. Joglekar

Dynamic modeling of a soft pneumatic actuator
Rebecca Berthold and Stephanie Kahms

Electro-mechanical aging of 3D printed PLA conductive composites
Javier Crespo, Daniel Garcia, Juan Manuel Martinez, Guillermo Robles and Angel Arias

8/6/22 14:00 - 16:00
Emerging methods for large-scale and robust multidisciplinary optimization (MDO) for industrial applications I
Minisymposium organized by Jens-Dominik Mueller, Arthur Stueck and Marcus Meyer

MS116A
Room: B3 + B4
Chair: Jens-Dominik Mueller

Multidisciplinary Design Optimization of Lifting Surfaces: State-of-the-Art and Industrial Applications (Keynote Lecture)
Joaquim Martins

A framework approach integrating high-fidelity analysis methods for gradient-based design optimization of aircraft
Thomas Backhaus, Sebastian Gottfried, John T. Hwang, Andrei Merle and Arthur Stueck

Challenges of integrating adjoint simulations in industrial turbomachinery mdo
Jan Backhaus, Christian Voß and Christian Frey

Aeroelastic Adjoint-Based Optimisation of Highly Flexible Aircraft Wing Configuration
Michael Meheut, Marco Carini and Christophe Blondeau

LES-aided shape optimization of U-Bend channel
Russell Quadros and Jens Mueller

8/6/22 14:00 - 16:00
Model-based approaches and data-centric models for digital manufacturing I
Minisymposium organized by Rekha Rao, Jeremy Lechman, Kevin Long, Scott Roberts, Elie Hachem and Patrick Anderson

MS121A
Room: Jan Mayen 1
Chair: Rekha Rao
CoChair: Elie Hachem

Intelligent Numerical Design of Components and their Production Processes (Keynote Lecture)
Stefanie Elgeti, Sebastian Hube, Jaewook Lee and Daniel Wolff

Anomaly Forecast of Sensor Data in Energy Intensive Industries
Nidhi Sawhney, Sricharan Poundarikapuram, Denis Malov and Rafael Pacheco

Training the Layer Image Auditing System with Simulated Images in Additive Manufacturing
Jinwoo Song and Heung Soo Kim

Multiphysics modeling of coupled chemical-thermal-mechanical phenomena in polyurethane foams during manufacturing
Rekha Rao, Kevin Long, Judy Brown and Christine Roberts

Evaporative front kinetics in random 3D topologies. Application to the Lost Foam casting process
Cynthia Hayek, Elie Hachem and Rudy Valette

8/6/22 14:00 - 16:00
Computational Plasticity in Crystals and Polycrystals II
Minisymposium organized by Luiza Angheluta, Jorge Vinals, Marco Salvalaglio and Stefanos Papanikolaou

MS100B
Room: Jan Mayen 2
Chair: Marco Salvalaglio

Multiphase-field method accounting for crystal plasticity
Andreas Prahs, Lukas Schöller, Daniel Schneider and Britta Nestler

A unified non-linear energy dissipation-based plastic-damage model for cyclic loading
Alejandro Cornejo, Sergio Jiménez, Lucia G. Barbu, Sergio Oller and Eugenio Oñate

Computational atomistic dislocation plasticity modelling of pristine and irradiated crystals
F. Javier Dominguez Gutierrez, Stefanos Papanikolaou, Pawel Sobkowicz and Mikko Alava

The interplay of short-range order and exceptional mechanical properties in fcc VCoNi concentrated solid solutions: A combined molecular simulation study of dislocation defect dynamics and thermal aging effects
Amin Esfandiarpour, Rene Alvarez, Stefanos Papanikolaou and Mikko Alava

8/6/22 14:00 - 16:00
Multiphase Flow and non-Newtonian Fluid – Modelling and Applications II
Minisymposium organized by Chenfeng Li

MS3B
Room: Jan Mayen 3
Chair: Chenfeng Li
CoChair: Eduardo de Souza Neto

The X-Mesh method applied to Multiphase Flows
Quiriny Antoine, Jean-François Remacle, Jonathan Lambrechts and Nicolas Moes

Multi-scale Computational Modeling of Flow of Hybrid Composites
Nazih Assaad Al Ayoubi, Hugues Digonnet, Luisa Rocha Da Silva, Christophe Binetruy and Sebastien Comas-Cardona

Non-newtonian viscous elongation and shear fluid model based on optimal triple tensor decomposition
Markus Rütten

Numerical simulation of the micro-extrusion process of printable biomaterials
Ahmad Amani, Deniz Kizildag, Jesus Castro, Laura del Mazo, Marta Pegueroles and Maria-Pau Ginebra

An efficient strategy of parcel modeling for polydispersed multiphase turbulent flows
Linda Bahramian, Jordi Muela, Carles Oliet, C. David Pérez-Segarra and F. Xavier Trias

A Finite Element formulation for pyroclastic flow simulations
Andrea Montanino, Alessandro Franci, Riccardo Rossi and Giulio Zuccaro

8/6/22 14:00 - 16:00
Deep Learning in Scientific Computing II
Minisymposium organized by Manuel Jesus Castro Diaz, Siddharta Mishra and David Pardo

MS110B
Room: Lounge A2
Chair: Manuel J. Castro
CoChair: David Pardo

Geosteering using Deep Learning
Mostafa Shahriari, David Pardo and Jon Ander Rivera

Learning Operators via Mesh-Informed Neural Networks
Nicola R. Franco, Andrea Manzoni and Paolo Zunino

Can deep learning diagnose neurodegenerative diseases with retinal ganglion cell layer?
Alberto Montolío, José Cegoñino, Elena Garcia-Martin and Amaya Pérez del Palomar

Enhanced Bayesian model updating for structural health monitoring via deep learning
Matteo Torzoni, Andrea Manzoni and Stefano Mariani

Damage detection in bridge structures using an unsupervised Deep Autoencoder
Ana Fernandez-Navamuel, Diego Zamora-Sánchez, David Garcia-Sánchez, Filipe Magalhaes and David Pardo

Deep learning methods for liquid crystal driven transformation optics
Jamie M. Taylor, Guilhem Poy, Miha Ravnik and Arghir Zarnescu

8/6/22 14:00 - 16:00
Multi-fidelity methods for uncertainty quantification and optimization II
Minisymposium organized by Lorenzo Tamellini, Matteo Diez, John Jakeman and Alex Gorodetsky

MS39B
Room: Spitsbergen
Chair: Alex Gorodetsky

Multifidelity uncertainty quantification for non-deterministic models
Bryan W. Reuter, Gianluca Geraci, Timothy M. Wildey and Michael S. Eldred

Goal-oriented adaptive MLMC for elliptic random PDEs
Joakim Beck, Yang Liu, Erik von Schwerin and Raul Tempone

Multilevel Delayed Acceptance MCMC: Cascading Distributions, Variance Reduction and Adaptive Error Models
Mikkel B. Lykkegaard, Tim J. Dodwell, Colin Fox, Grigorios Mingas and Robert Scheichl

A combination technique for optimal control problems under uncertainty
Fabio Nobile and Tommaso VanzanE

Surrogates in PDE-constrained one-shot optimization under uncertainty
Philipp A. Guth, Claudia Schillings and Simon Weissmann

A CFD-based multi-fidelity surrogate model for prediction of flow parameters in a ventilated room
Nina Morozova, F. Xavier Trias, Valdimir Vanovskiy, Carles Oliet and Evgeny Burnaev

8/6/22 14:00 - 16:00
Advances in shock capturing strategies for high order methods I
Minisymposium organized by Jonas Zeifang, Deep Ray and Andrea Beck

MS115A
Room: Svalbard
Chair: Andrea Beck

Shock-capturing for high-order discontinuous Galerkin solvers (Keynote Lecture)
Yu Pan, Zheng-Guo Yan, Spencer Sherwin and Joaquim Peiro

Data-driven shock capturing for the discontinuous Galerkin spectral element method
Jonas Zeifang, Andrea Beck, Anna Schwarz and Jens Keim

FC-based shock-dynamics solver with neural-network localized artificial-viscosity assignment
Oscar P. Bruno, Jan S. Hesthaven and Daniel V. Leibovici

Maximum-order data-driven Weighted Essentially Non-Oscillatory (WENO) schemes
Deniz A. Bezgin, Steffen J. Schmidt and Nikolaus A. Adams

An extended discontinuous Galerkin method for high-order shock treatment
Jakob Sebastian and Florian Kummer

8/6/22 14:00 - 16:00 **Structure-Preserving Finite Element Methods in Computational Fluid Dynamics II** *Minisymposium organized by Philip Lederer and Christian Merdon*	MS142B Room: O – 3 Chair: Philip Lederer

Mass Conserving Mixed Stress-Strain rate Finite Element Methods for Non-Newtonian Fluid Simulations
Jan Ellmenreich and Philip L. Lederer

Comparison of different entropy stabilization techniques for discontinuous Galerkin spectral element methods
Johannes Markert and Gregor Gassner

A really pressure-robust virtual element method for the Stokes problem
Derk Frerichs-Mihov and Christian Merdon

Performance and Scalability of the CFD Solver CODA
Michael Wagner

A variational finite element discretization for compressible fluids
François Gay-Balmaz and Evan Gawlik

A geometric finite element method for MHD that preserves energy, cross-helicity, magnetic helicity, incompressibility, and div B = 0
Evan S. Gawlik and Francois Gay-Balmaz

8/6/22 14:00 - 16:00 **Modeling complex fluid and solid dynamics during earthquake ruptures II** *Minisymposium organized by Fabian Barras, Gaute Linga, François Renard, Omar Duran and Eirik Keilegavlen*	MS48B Room: O – 4 Chair: Fabian Barras CoChair: Gaute Linga

Dynamics, radiation and overall energy budget of earthquake rupture with coseismic off-fault damage
Harsha Bhat, Kurama Okubo and Esteban Rougier

A Multibody Meshfree Approach for the simulation of gouge melting in seismic faults
Guilhem Mollon

Time and space evolution of R-bands in a dense granular material, relation to the evolution of the entire fault gouge.
Nathalie Casas, Guilhem Mollon and Ali Daouadji

Implementation of a bounding surface constitutive model for fully coupled dynamic analysis of soil and its validation using dynamic triaxial test
Junxiang Wang, Giovanna Xotta, Nico De Marchi and Valentina Salomoni

Mixed-dimensional hydromechanical modelling of an in situ hydroshearing experiment
Ivar Stefansson, Haakon L. L. Ervik, Mohammadreza Jalali, Antonio P. Rinaldi, Thomas Driesner and Inga Berre

A fully implicit collocated finite volume scheme for modelling induced seismicity
Aleksei Novikov, Denis Voskov, Hadi Hajibeygi and Jan Dirk Jansen

16:00 - 16:30
Coffee Break

16:30 - 18:30 | TECHNICAL SESSIONS

8/6/22 16:30 - 18:30 **Disruptive Aircraft's Wing Configurations towards Climate Neutrality**	STS06A Room: Hedmark (GF) Chair: Marianna Braza

Numerical simulation of a morphing wing of A320 type, through multi-parametric wobulation in the vicinity of the trailing edge in subsonic regimes
Clément Rouaix, César Jimenez-Navarro, Abderahmane Marouf and Marianna Braza

Numerical simulation of the aerodynamic performance of a supercritical wing subjected to a hybrid electroactive morphing associating cambering and multi-parametric vibration effects
Clément Rouaix, César Jimenez-Navarro, Abderahmane Marouf, Mateus Carvalho, Jean-François Rouchon, *Yannick Hoarau, Rajaa El Akoury and Marianna Braza*

Numerical simulation of the aerodynamic performance of a morphing wing in the transonic regime
Cesar Jimenez Navarro, Clement Rouaix, Abderrahmane Marouf, Alexandre Ninet, Yannick Hoarau and Marianna Braza

Electroactive morphing effects through travelling wave actuation on the aerodynamic performance of a morphing wing by means of numerical simulation.
Abderahmane Marouf , Rajaa El Akoury , César Jimenez-Navarro , Alexandre Ninet, Yannick Hoarau and Marianna Braza

Flow analysis around a high-lift wing-flap system and application of Active Flow Control to enhance the aerodynamic performances at high Reynolds number
Yannick Hoarau, Abderahmane Marouf, Hung D. Truong, Alain Gehri, Dominique Charbonnier and Jan B. Vos

8/6/22 16:30 - 18:30
Bayesian inference of engineering models: advances in theory and applications II
Minisymposium organized by Oindrila Kanjilal, Iason Papaioannou, Daniel Straub, Geert Lombaert and Costas Papadimitriou

MS32B
Room: Nord – Norge (GF)
Chair: Kostas Papakonstantinou

Certified Dimension Reduction for Bayesian Updating with the Cross-Entropy Method
Max Ehre, Rafael Flock, Iason Papaioannou and Daniel Straub

Multilevel Markov chain Monte Carlo methods for Bayesian full-field data assimilation with application to structural health monitoring
Pieter Vanmechelen, Geert Lombaert and Giovanni Samaey

Bayesian Optimal Sensor Placement for Virtual Sensing and Strain Reconstruction
Tulay Ercan, Omid Sedehi, Costas Papadimitriou and Lambros Katafygiotis

Greedy sensor placement for Bayesian inverse problems via model order reduction
Nicole Aretz, Nada Cvetkovic, Francesco Silva and Karen Veroy

Variational Bayesian Approximation of Inverse Problems using Sparse Precision Matrices
Jan Povala, Ieva Kazlauskaite, Eky Febrianto, Fehmi Cirak and Mark Girolami

Scalable statistical finite elements via partial differential equation representation of Matérn fields
Kim Jie Koh, Eky Febrianto and Fehmi Cirak

8/6/22 16:30 - 18:30
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Scalable statistical finite elements via partial differential equation representation of Matérn fields
Kim Jie Koh, Eky Febrianto and Fehmi Cirak

8/6/22 16:30 - 18:30
Fluid-Structure Interaction and Structural Health Monitoring of Offshore Structures and Mechanical Systems
Minisymposium organized by Dimitrios Pavlou, George Lampeas, Pantelis Nikolakopoulos and Sudath Siriwardane

MS160A
Room: Nordland (GF)
Chair: Dimitrios Pavlou
CoChair: Sudath Siriwardane

Fluid-structure interaction problem of two coaxial vibrating flexible cylinders separated by a thin layer of fluid
Maria Adela Puscas and Romain Lagrange

Wave Based Method for 2D Unsaturated Elastodynamic Soil under Harmonic Loading
Mirjam Lainer and Gerhard Müller

Dynamic Response of Offshore Wind Turbines under Nonlinear Irregular Ocean Waves
Hadi Pezeshki, Dimitrios Pavlou and Sudath C. Siriwardane

A weak coupled model for the fluid-structure interactions on a cross-flow tidal turbine model
Timo Bennecke, Karla Ruiz Hussmann, Paul Joedecke, Christian-Toralf Weber, Pierre-Luc Delafin, Cyrille Bonamy and Stefan Hoerner

Uncertainties of Parameters Quantification in SHM
Mohammad S. Miah and Werner Lienhart

Inner flow-induced buckling of offshore pipelines
Dimitrios Pavlou

S-N-based Fatigue Damage Modelling of Offshore Structures
Fredrik Bjørheim, Sudath C. Siriwardane and Dimitrios Pavlou

8/6/22 16:30 - 18:30
Data-driven numerical and reduced order modeling of flows III
Minisymposium organized by Nikolaus Adams and Jörg Schumacher

MS19C
Room: Oslo 2 (GF)
Chair: Nikolaus Adams

Active flow control on airfoils through deep reinforcement learning
Pol Suarez, Pau Varela, Juan Echevarría, Jean Rabault, Maxence Deferrez, Bernat Font, Luis Miguel García-Cuevas, Arnau Miró, Andrés Tiseira, Oriol Lehmkhul and Ricardo Vinuesa

Data-Driven Surrogate Modelling of Aerodynamic Forces on the Superstructure of Container Vessels
Rupert Pache and Thomas Rung

Deep-learning based aeroelastic modeling for transient flows and non-linear dynamics
Avicene Chaarane, Maxime Casanova, Taraneh Sayadi and Jean-Camille Chassaing

Surrogate modeling of unsteady aerodynamic loads acting on a plunging airfoil
Rahul Sundar, Virendra Kumar, Dipanjan Majumdar, Chhotelal Shah and Sunetra Sarkar

Wind flow field predictions over high-rise buildings using machine learning framework
Onkar Jadhav, Anina Glumac and Stephane Bordas

Efficient data-driven control of fluids using autonomous surrogate models
Sebastian Peitz and Katharina Bieker

8/6/22 16:30 - 18:30
EYIC Junior Workshop III (limited to 100 pre-registered participants)

JWC
Room: Akershus (1F)
Chair: Enrique Nadal Soriano

Data-driven fracture mechanics
Pietro Carrara

8/6/22 16:30 - 18:30
Recent developments and current issues in the phase-field modeling of fracture III
Minisymposium organized by Dhananjay Phansalkar, Paras Kumar, Pietro Carrara, Sigrid Leyendecker, Julia Mergheim, Laura De Lorenzis and Paul Steinmann

MS67C
Room: Romerike (GF)
Chair: Patrick Kurzeja

Dynamic phase-field fracture with a first-order discontinuous Galerkin method for elastic waves
(Keynote Lecture)
Christian Wieners and Kerstin Weinberg

Phase field model for simulating fracture of ice
Rabea Sondershaus and Ralf Müller

A unified phase-field model of fracture in rate-dependent materials
Franz Dammaß, Marreddy Ambati and Markus Kästner

Phase-field modeling of large strain ductile fracture: an AT1 effective stress approach
Alessandro Marengo and Umberto Perego

A numerical framework for the electro-mechanical analysis of conductive tracks in printed electronics
Britt Cordewener, Jeroen Knippenberg, Marc Geers and Joris Remmers

8/6/22 16:30 - 18:30
Advanced Modelling Procedures for Masonry Structures III
Minisymposium organized by Daniela Addessi, Miguel Cervera and Elio Sacco

MS71C
Room: Sør – Norge (GF)
Chair: Daniela Addessi

Nonlinear macroelement based on Bouc-Wen formulation with degradation for the equivalent frame modelling of masonry walls
Domenico Liberatore, Daniela Addessi and Alessandra Paoloni

Multiscale finite element modeling linking shell elements to 3D continuum
Daniela Addessi, Paolo Di Re, Cristina Gatta and Elio Sacco

Rocking Analysis for the bell tower of Sant'anna in Cervino
Antonio Gesualdo and Mariateresa Guadagnuolo

3D energy-based detection of settlement induced mechanisms for masonry-like structures
Antonino Iannuzzo, Francesco Ranaudo, Tom Van Mele, Antonio Gesualdo and Philippe Block

Climate-based and response-based indices for the assessment of frost damage on historic brick walls in Tønsberg, Norway
Petros Choidis and Dimitrios Kraniotis

8/6/22 16:30 - 18:30
Recent Trends in Scientific Computing for Computational Fluid Dynamics and Solid Mechanics III
Minisymposium organized by Stefan Turek, Axel Klawonn and Uli Rüde

MS41C
Room: Oslo 1 (GF)
Chair: Stefan Turek

A cross-platform, high-performance SPH toolkit for image-based flow simulations on the pore scale of porous media
Dominik Goeddeke, David Krach, Daniel Rostan, Malte Schirwon and Holger Steeb

Vectorised spectral/hp element matrix-free operator for anisotropic heat transport in tokamak edge plasma
Bin Liu, Chris Cantwell, David Moxey, Mashy Green and Spencer Sherwin

The neural network multigrid solver for the Navier-Stokes equations and its application to 3D simulation
Nils Margenberg, Christian Lessig and Thomas Richter

Physically-Guided Neural Networks with Internal Variables in solid mechanics: fast predictions and constitutive equations discovery
Jacobo Ayensa-Jiménez, Mohamed H. Doweidar, Manuel Doblaré, Javier Orera and Álvaro Ruiz del Tiempo

Performance Portability in the Extreme-scale Scientific Software Development Kit
Ulrike Meier Yang

Evaluation of the performance portability layer of different linear solver packages with ALIEN, an open generic and extensible linear algebra framework
Jean-Marc Gratien, Cédric Chevalier, Thomas Guignon, Xavier Tunc, Pascal Have and Stéphane De Chaisemartin

Numerical Solution of 3D Diffusion Equations Via a Non-Linear Flux Limited Splitting Using the Multipoint Flux Approximation Method with a Diamond Stencil Satisfying the Discrete Maximum Principle
Artur C. R. Souza, Darlan K. E. Carvalho, Túlio M. Cavalcante, Filipe A. C. S. Alves, Michael G. Edwards and *Paulo R. M. Lyra*

8/6/22 16:30 - 18:30
Computational Mechanics in high strain rate and impact dynamics
Minisymposium organized by Patrice Longère and Eric Deletombe

MS17A
Room: Buskerud (1F)
Chair: Patrice Longère

Numerical Simulation of Crack Arrest in Impact Loaded Shock-Resistant PMMA using SPH
Kean Sheng Tan, Patrice Longère and Norazrina Mat Jali

Stochastic Simulation of the Head Impact on Windscreens
Christopher Brokmann, Christian Alter and Stefan Kolling

New predictive models for ballistic limit of spacecraft honeycomb-core sandwich panels subjected to hypervelocity impact
Riley Carriere and Aleksandr Cherniaev

Analytical modeling of shock wave stresses and spall caused by laser plasma in a material interface – application to paint stripping on aluminum substrates
Kosmas Papadopoulos and Konstantinos Tserpes

Large Deformation Plasticity in Reproducing Kernel Particle Method penetration into soil
Craig Foster, Sheng-Wei Chi, Mohammad Atif and Milad Parvaneh

Strain rate dependent material model for dynamic damage evolution in unidirectional composites
Vivekendra Singh, Robin Olsson, Erik Marklund and Ragnar Larsson

Reduced arlequin coupling operators for solution of localized-HF multiscale dynamic problems
Hachmi Ben Dhia and Khalil Abben

8/6/22 16:30 - 18:30
Towards Next Generation of Industrial Aerodinamical Simulation Tools III
Minisymposium organized by Oriol Lehmkuhl, Eusebio Valero and Jordi Pons

MS126C
Room: Hordaland 1 (1F)
Chair: Oriol Lehmkuhl

Turbulence models assessment using finite-volume and high-order methods for aeronautical applications
Bernat Font, Fabio Naddei and Oriol Lehmkuhl

On highly scalable 2-level-parallel unstructured CFD
Jens Jaegerskuepper

Efficient time marching methodologies for a p-adaptive discontinuous Galerkin approximation
Gerasimos Ntoukas, Wojciech Laskowski, Gonzalo Rubio and Esteban Ferrer

A multigrid immersed boundary method for the CFD solver Horses3D
Stefano Colombo, Esteban Ferrer and Eusebio Valero

Exploring new models for Explicit Algebraic Reynolds Stress Modelling using Multi-Expression Programming
Arnau Miro, Dirk Wunsh, Stefan Wallin and Oriol Lehmkuhl

Analysis of the effect of holes on the heat transfer analysis of gas turbine blade cooling using CFD
Eshwar Ramasetti and Volker Mehrmann

8/6/22 16:30 - 18:30
Innovations in phase-field modeling, computation and Experimental Validation III
Minisymposium organized by FADI Aldakheel, Yousef Heider, Thomas Wick, Roberto Alessi and WaiChing Sun

MS159C
Room: Hordaland 2 (1F)
Chair: Fadi Aldakheel
CoChair: Yousef Heider

Numerical study of finite element based micromagnetic phase-field simulations of heterogeneous microstructures
Maximilian Reichel and Jörg Schröder

Phase-field modelling of evolving adhesive interfaces
Anne M. Boschman, Bindi S. Brook, Matteo Icardi and Kristoffer G. van der Zee

Modelling ductile fracture by the phase-field approach under consideration of isotropic hardening
Anne-Sophie Sur, Odd Sture Hopperstad and David Morin

Generalized gradient flow structure of the Cahn-Hilliard-Biot model
Erlend Storvik, Jakub W. Both, Jan M. Nordbotten and Florin A. Radu

From freezing-induced to injection-induced non-isothermal saturated porous media fracture
Yousef Heider

Phase-Field Fracture Models for Polymer Nano-Composites
Paras Kumar and Julia Mergheim

8/6/22 16:30 - 18:30
Data-driven methods in computational fluid dynamics
Minisymposium organized by Celio Fernandes

MS119A
Room: Oppland (1F)
Chair: Celio Fernandes

SPDE-Net: Neural Network based prediction of stabilization parameter for SUPG technique
Sangeeta Yadav and Sashikumaar Ganesan

Tabulation of thermochemical states in reactive flows via machine learning algorithms
Xi Chen, Cédric Mehl, Thibault Faney and Florent Di Meglio

Comparative analysis of machine learning methods for active flow control
Fabio Pino, Lorenzo Schena, Jean Rabault, Alexander Kuhnle and Miguel Alfonso Mendez

Fast, data-assisted simulations of multi-scale flows based on extrapolated time series
Thomas Lichtenegger, Sanaz Abbasi and Stefan Pirker

Determination of distinct dynamical process in the flow using machine learning
Serena Costanzo, Taraneh Sayadi, Miguel Fosas de Pando, Peter Schmid and Pascal Frey

8/6/22 16:30 - 18:30
Vem in Engineering Science
Minisymposium organized by Fadi Aldakheel and Peter Wriggers

MS140A
Room: Vestfold (1F)
Chair: Fadi Aldakheel

Modeling of flexible particles with the Virtual Element Method
Alfredo Gay Neto, Blaž Hudobivnik, Tiago Fernandes Moherdaui and Peter Wriggers

2D cohesive fracture evolution within virtual element formulation
Sonia Marfia, Elisabetta Monaldo and Elio Sacco

Computational Crystal Plasticity based on the Virtual Element Method
Fadi Aldakheel, Christoph Böhm, Blaž Hudobivnik and Peter Wriggers

Adaptive mesh refinement procedures for the virtual element method
Daniel van Huyssteen, Felipe Lopez Rivarola, Guillermo Etse and Paul Steinmann

Hybridization of the virtual element method for linear elasticity problems
Franco Dassi, Carlo Lovadina and Michele Visinoni

A Virtual Element Method for 3D Contact
Mertcan Cihan, Blaz Hudobivnik and Peter Wriggers

Coupled problems at dissipative microstructures: Modelling and computational homogenization via the Virtual Element Method
Christoph Böhm, Blaž Hudobivnik, Fadi Aldakheel, Marc-André Keip and Peter Wriggers

8/6/22 16:30 - 18:30
Multiphase flows with surface tension and capillarity III
Minisymposium organized by Julien Bruchon, Nicolas Moulin, Modesar Shakoor and Luisa Silva

MS14C
Room: A1 – 1
Chair: Luisa Silva

An implicit-explicit lagrange projection splitting scheme with capillarity effects and wetting
Lucas Tallois, Simon Peluchon and Philippe Villedieu

Simulation of Coated Bubbles in Cavitation
Ahmed Basil KOTTILINGAL and Stephane Zaleski

Effect of surfactants on the flow dynamics of liquid drops in complex microchannel geometries
Paula Pico, Lyes Kahouadji and Omar K. Matar

The impact of slip for regime transitions in capillary rise
Suraj Raju, El Assad Ouro-Koura, Joël De Coninck, Dieter Bothe and Mathis Fricke

Statistical upscaling from numerical simulations of transient two-phase flow within random fibrous media
Aubin Geoffre, Nicolas Moulin, Sylvain Drapier and Julien Bruchon

Numerical study of droplet behaviour in complex flow conditions using an optimised feedback deceleration technique (FDT)
Veronika Krämer, Martin Rohde, Sebastian Burgmann, Simon Rentschler, Christopher Holzknecht, Christoph *Gmelin and Uwe Janoske*

Capillary Droplet Breakup and the Influence of Wetting
Patrick Giefer and Udo Fritsching

8/6/22 16:30 - 18:30
Data-driven and projection-based reduced order models for computational sciences and engineering III
Minisymposium organized by Gianluigi Rozza and Giovanni Stabile

MS69C
Room: A1 – 2
Chair: Gianluigi Rozza
CoChair: Giovanni Stabile

Model order reduction for high dimensional parametric systems
Manisha Chetry and Domenico Borzacchiello

Interpolated models for non-intrusive affinization of reduced basis methods
Eivind Fonn, Harald van Brummelen, Jens Eftang, Trond Kvamsdal and Adil Rasheed

Reduced order source model for railway induced vibration based on the Proper Generalized Decomposition
Geertrui Herremans, Stijn François and Geert Degrande

Computing Green's functions in two-dimensional wave propagation using Proper Generalized Decomposition
Thomas Alexiou, Pieter Reumers, Geert Degrande and Stijn François

Extending the capabilities of data-driven reduced-order models to make predictions for unseen scenarios
Claire E. Heaney, Xiangqi Liu, Hanna Go, Zef Wolffs, Pablo Salinas, I. Michael Navon and Christopher C. Pain

A strategy to optimal block-incremental singular value decomposition for unsteady high-fidelity simulation data
Xiaodong Li, Steven Hulshoff and Stefan Hickel

8/6/22 16:30 - 18:30
Discrete conservtion properties for fluid flows: from fundamentals to applications II
Minisymposium organized by N. Valle, F. X. Trias, F. Capuano, G. Coppola and R.W.C.P. Verstappen

MS28C
Room: A1 – 3
Chair: F. Capuano

DNS and LES on unstructured grids: playing with matrices to preserve symmetries using a minimal set of algebraic kernels
F.Xavier Trias, Xavier Álvarez-Farré, Àdel Alsalti-Baldellou, Andrey Gorobets and Assensi Oliva

Casimir preserving numerical simulation of 2d homogeneous turbulence
Paolo Cifani, Sagy R. Ephrati, Erwin Luesink, Arnout D. Franken and Bernard J. Geurts

Comparative Study on a Variety of Structure-Preserving High Order Spatial Discretizations with Entropy Split Methods for MHD
HC Yee

Symmetry-preserving discretisation methods for magnetohydrodynamics
Jannes Hopman, Xavier Trias and Joaquim Rigola

Nonlinear stability with the energy method: shallow water models and beyond
Tomas Lundquist, Andrew R. Winters and Jan Nordström

Energy-conserving discretization of the pressure-free two-fluid model for one-dimensional flow in ducts
Jurriaan Buist, Benjamin Sanderse, Svetlana Dubinkina, Ruud Henkes and Cornelis Oosterlee

On the conservation of primary and secondary properties in the simulation of multiphase flows
Nicolas Valle, Francesc X. Trias and Roel Verstappen

8/6/22 16:30 - 18:30
Computational Analysis of Advanced Materials and Structures III
Minisymposium organized by Efstathios E. Theotokoglou and Ioannis K. Giannopoulos

MS74C
Room: A1 – 4
Chair: I. Guz
CoChair: C. Espinosa

Coupled thermomechanical analysis of thermoplastic composite pipe by FEM simulations (Keynote Lecture)
Igor Guz, James Hastie and Maria Kashtalyan

A material interpolation technique using the simplex polytope
Konstantinos I. Ypsilantis, Matthias G.R. Faes, Jan Ivens and David Moens

Simulating a laser induced shock wave to help understanding direct damage of aeronautic composite structures under lightning strikes
Christine Espinosa, Audrey Bigand, Michel Boustie, Jean-Marc Bauchire and Didier Zagouri

Nonlinear Behavior of Laminated Glass Plates with Hinged-Free Boundary Conditions
Deniz Can Elci, Ebru Dural and Mehmet Zulfu Asik

A computational study of the prestress state caused by activated shape memory fibers in ultra high performance concrete
Stefan Descher, Sebastian Wolf, Alexander Wetzel, Philipp Krooß and Detlef Kuhl

Closed - form expressions for the optimum winding angles of fibres in laminated pressure vessels subjected to internal pressure and axial force
Husain J. Al-Gahtani

8/6/22 16:30 - 18:30
Simulation-based optimization considering dynamic systems and/or uncertainty III
Minisymposium organized by Thomas Rung, Benedikt Kriegesmann, Kathrin Welker, MArtin Siebenborn, Robert Seifried and Alexander Düster

MS34C
Room: A1 – 5
Chair: Benedikt Kriegesmann
CoChair: Lars Radtke

Topology and shape optimization for transient vibroacoustic problems
Niels Aage

Robust Topology Optimization using Reciprocal First-Order Approximations
Micah Kranz, Julian K. Lüdeker and Benedikt Kriegesmann

Topology Optimization using the Discrete Element Method
Connor O'Shaughnessy and Enrico Masoero

Robust design optimization of a discharging hopper with DEM-based and experiment-based metamodels
Marc P. Fransen, Matthijs Langelaar and Dingena L. Schott

Multi-shape optimization for fluid mechanics under uncertainties
Caroline Geiersbach, Tim Suchan and Kathrin Welker

Robust Topology Optimization of Static Systems with Unilateral Frictional Contact
Timo Schmidt, Benedikt Kriegesmann and Robert Seifried

8/6/22 16:30 - 18:30
Simulation-based optimization considering dynamic systems and/or uncertainty III
Minisymposium organized by Thomas Rung, Benedikt Kriegesmann, Kathrin Welker, MArtin Siebenborn, Robert Seifired and Alexander Düster

MS34C
Room: A1 – 5
Chair: Benedikt Kriegesmann
CoChair: Lars Radtke

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Robust Topology Optimization of Static Systems with Unilateral Frictional Contact
Timo Schmidt, Benedikt Kriegesmann and Robert Seifried

8/6/22 16:30 - 18:30
New Challenges in Instabilities of Structures and Soft Materials
Minisymposium organized by ZAHROUNI Hamid, LIMAM Ali and XU Fan

MS77A
Room: A1 – 6
Chair: Hamid Zahrouni

Immersed Boundary Analysis of Models with Internal State Variables: Applications to Hydrogels
Jorge Luis Barrera Cruz and Kurt K. Maute

The effect of additional masses on the dynamic buckling of a like-beam structure
Amine ALAOUI-TAHIRI, Claude Stolz, Mathieu Corus and Pierre Badel

Computational modeling of fingering in stretched hydrogel cylinders
Daniel Pickard, Adam Śliwiak, Anwar Koshakji, Bianca Giovanardi and Raúl Radovitzky

Study on the strength of thin perforated plate on dimple supports subject to high-pressure loadings
Meisam Mohmmadi Amin and Ulrich Krühne

BUCKLING OF METALLIC CYLINDRICAL SHELLS UNDER LATERAL LOADING INDUCED BY AN EXTERNAL SOLID MEDIUM
Ali Limam, Hamid Zahrouni, Tan Trung BUI and Frédéric Bumbiele

8/6/22 16:30 - 18:30
Atomization and fragmentation of fluids
Minisymposium organized by Stéphane Zaleski, Leonardo Chirco, Shiyi Chen, Junji Shinjo and Gretar Tryggvason

MS35A
Room: B1 – 1
Chair: Stephane Zaleski

Surfactant-induced Marangoni effects in turbulent jets
Lyes Kahouadji, Cristian Constante-Amores and Omar Matar

Manifold death: the implementation of controlled topological changes in thin sheets by the signature method
Leonardo Chirco, Jacob Maarek, Stephane Popinet and Stephane Zaleski

Direct Numerical Simulations of fuel secondary atomization
Cesar Pairetti, Leonardo Chirco, Santiago Marquez Damian, Norberto Nigro and Stephane Zaleski

Numerical simulation of spinning disc atomization
Yulii Shikhmurzaev, Grigori Sisoev and Yuan Li

Large Eddy Simulation of Primary Breakup Processes in Dual Fuel Internal Combustion Engines Using a Fully Compressible Multicomponent Approach
Yu Jiao, Steffen J. Schmidt and Nikolaus A. Adams

Numerical and optical investigation of flash boiling of highly volatile e-fuel microdroplets in a monodisperse stream
Avijit Saha, Leif Schumacher, Peter Augustin, Abhishek Y. Deshmukh, Manuel A. Reddemann, Reinhold Kneer *and Heinz Pitsch*

8/6/22 16:30 - 18:30
Mechanics of soft, multifunctional materials: Experiment, modeling and simulation III
Minisymposium organized by Mokarram Hossain, Daniel Garcia-Gonzalez and Ruike Zhao

MS82C
Room: B1 – 2
Chair: Mokarram Hossain
CoChair: Sushma Santapuri

Intelligent system based on magnetorheological elastomers to stimulate biological materials
(Keynote Lecture)
Miguel Angel Moreno-Mateos, Jorge Gonzalez-Rico, Emanuel Nunez-Sardinha, Clara Gomez-Cruz, Maria Luisa Lopez-Donaire, Sergio Lucarini, Angel Arias, Arrrate Muñoz-Barrutia, Diego Velasco and Daniel Garcia-Gonzalez

On the formulation and computational implementation of polyconvex electro-mechanics: phenomenologically invariant-based approaches and homogenised rank-n models
Antonio Gil, Rogelio Ortigosa, Jesus Martinez-Frutos, Martin Horak and Martin Kruzik

Topology optimisation of robust flexible flexoelectric energy harvesters at finite strains
Rogelio Ortigosa, Jesús Martínez-Frutos and Antonio J. Gil

Programming shape-morphing of dielectric elastomers through Multifunctional Topology Optimization
Jesús Martínez-Frutos, Rogelio Ortigosa and Antonio J. Gil

Computational modeling of responsive nematic elastomers
Roberto Brighenti and Mattia P. Cosma

8/6/22 16:30 - 18:30
Emerging methods for large-scale and robust multidisciplinary optimization (MDO) for industrial applications II
Minisymposium organized by Jens-Dominik Mueller, Arthur Stueck and Marcus Meyer

MS116B
Room: B3 + B4
Chair: Jens-Dominik Mueller

Extension of the GEMSEO MDO library to a MPI parallel coupled adjoint capability
Jean-Christoph Giret, François Gallard and Marco Cisternino

The impact of tube corrugation within the multi-disciplinary design optimization of a charge air cooler.
Atul Singh, David Toal, Edward Richardson, Claus Ibsen, Kevin Jose and Atul Bhaskar

Shape Signature Subspace: A shapewise-supervised dimension-reduction approach for shape optimisation
Shahroz Khan, Panagiotis Kaklis , Andrea Serani, Matteo Diez and Konstantinos Kostas

Large-scale Topology Optimization on a desktop using the GPU
Erik A. Träff, Niels Aage and Ole Sigmund

Data-fitted constraint aggregation schemes
Olaf Ambrozkiewicz and Benedikt Kriegesmann

Quasi-static sizing optimization for stability of stiffened shell structures under manufacturing uncertainty
Kai Steltner, Benedikt Kriegesmann and Claus Pedersen

8/6/22 16:30 - 18:30
Model-based approaches and data-centric models for digital manufacturing II
Minisymposium organized by Rekha Rao, Jeremy Lechman, Kevin Long, Scott Roberts, Elie Hachem and Patrick Anderson

MS121B
Room: Jan Mayen 1
Chair: Patrick Anderson
CoChair: Jeremy Lechman

The conforming transient h-r unstructured adaptive mesh refinement (cThruAMR) method for multiphysics simulations of manufacturing processes
David R. Noble

A real-time variational data assimilation method with hybrid modelling: Application to additive manufacturing
Willy Haik, Yvon Maday and Ludovic Chamoin

Data-driven analysis of failure mechanisms in FDM printed parts
Joris Remmers, Sifra Kramer, Luc van de Plas and Hans Gommans

Modeling Influences of Printing Defects on Mechanical Properties of Additively Manufactured Silicone Structures
Craig M. Hamel, Kevin N. Long, Devin Roach and Adam W. Cook

Simulation of the direct ink write process using finite elements and cThruAMR
Alec Kucala, Rekha Rao and Anne Grillet

Crystallization modeling for polymer injection molding in a space-time framework
Blanca Ferrer Fabón, Linda Gesenhues and Marek Behr

Studying fracture and yield surfaces of granular systems using mesoscale particle-based models
Joel Clemmer, Dan Bolintineanu, Judith Brown and Jeremy Lechman

8/6/22 16:30 - 18:30
Computational Plasticity in Crystals and Polycrystals III
Minisymposium organized by Luiza Angheluta, Jorge Vinals, Marco Salvalaglio and Stefanos Papanikolaou

MS100C
Room: Jan Mayen 2
Chair: Vidar Skogvoll

Solute Strengthening Mechanisms in Concentrated SolidSolutions: Role of Short Range Order
Kamran Karimi and Stefanos PapanikolAou

We present a data-driven surrogate model for the plasticity of pure Mg
Yannick Hollenweger and Burigede Liu

On the interaction of dislocations with phase boundaries: theory and modeling with the phase field method
Michael Budnitzki and Stefan Sandfeld

Crystal plasticity modeling of cast irons
Viacheslav Balobanov, Matti Lindroos, Tom Andersson and Anssi Laukkanen

8/6/22 16:30 - 18:30
Multiphase Flow and non-Newtonian Fluid – Modelling and Applications III
Minisymposium organized by Chenfeng Li

MS3C
Room: Jan Mayen 3
Chair: Chenfeng Li
CoChair: Eduardo de Souza Neto

Numerical simulation of multiphase flows with incompressible viscoelastic flows and elastic solids
Alexandre Caboussat

Numercal modeling of a high-speed wedge entry in aerated water
Martin van der Eijk and Peter R. Wellens

Dispersion of Viscoelastic Fluids in Porous Structures: An Experimental and Computational Investigation
Apostolos Kyrloglou and Udo Fritsching

Numerical Modelling of Landslide-Generated Waves
Alessandro Franci, Massimiliano Cremonesi, Umberto Perego, Giovanni Crosta, Miguel Masó, Ignasi De Pouplana and Eugenio Oñate

Geometry Influence of Particles Depositing in Realistic Human Lung Replicas
Jana Wedel, Mitja Strakl, Jure Ravnik, Matjaz Hribersek and Paul Steinmann

8/6/22 16:30 - 18:30
Deep Learning in Scientific Computing III
Minisymposium organized by Manuel Jesus Castro Diaz, Siddharta Mishra and David Pardo

MS110C
Room: Lounge A2
Chair: Manuel J. Castro
CoChair: David Pardo

A machine learning minimal residual method for solving quantities of interest of parametric PDEs
Ignacio Brevis, Ignacio Muga, David Pardo, Oscar Rodríguez and Kristoffer G. van der Zee

Using Graph Neural Network for gas-liquid interface reconstruction in Volume Of Fluid methods
Michele-Alessandro BUCCI, Jean-Marc GRATIEN, Thibault FANEY and Tamon NAKANO

Long-time prediction of nonlinear parametrized dynamical systems by deep learning-based reduced order models
Federico Fatone, Stefania Fresca and Andrea Manzoni

Parameter estimation for differential problems through multi-fidelity physics-informed neural networks
Francesco Regazzoni, Stefano Pagani, Alessandro Cosenza, Alessandro Lombardi and Alfio Quarteroni

A collocation method based on single-layer feedforward neural network for the resolution of Elliptic PDEs
Francesco Calabrò

A Physics-Informed Deep Learning approach to computing solutions of hyperbolic problems
Rafael Carniello, João Florindo and Eduardo Abreu

A novel Machine Learning method for accurate and real-time numerical simulations of cardiac electromechanics
Luca Dede', Francesco Regazzoni, Matteo Salvador and Alfio Quarteroni

8/6/22 16:30 - 18:30
Dakota Software for Optimization, Uncertainty Quantification and Model Calibration
Minisymposium organized by D. Thomas Seidl, Brian M. Adams, J. Adam Stephens and Gianluca Geraci

MS128A
Room: Spitsbergen
Chair: Adam Stephens

Overview of the latest features and capabilities in the Dakota software
J. Adam Stephens, D. Thomas Seidl , Brian M. Adams and Gianluca Geraci

Hybrid physics-based, data-driven surrogate modeling for digital twins
Karthik Duraisamy and Jasmin Lim

Elastic Model Calibration using Dakota
J. Derek Tucker, Michael S. Eldred and Devin Francom

Uncertainty quantification of the multiphase Discrete Element Model at novel test-rig using in-house algorithms
Marcin Nowak, Agata Widuch, Dawid Sukiennik, Kari Myöhänen, Markku Nikku, Alessandro Parente and Wojciech Adamczyk

Model tuning for multifidelity sampling in Dakota
Michael Eldred, Gianluca Geraci, Bryan Reuter, Teresa Portone, John Jakeman and Alex Gorodetsky

Multifidelity UQ workflows with Dakota's graphical user interface
Gianluca Geraci, Elliott M. Ridgway, Brian M. Adams, Bryan W. Reuter and Michael S. Eldred

Multilevel Monte Carlo derivative-free optimization under uncertainty of wind power plants
Friedrich Menhorn, Gianluca Geraci, D. Thomas Seidl, Ryan King, Michael Eldred, Hans-Joachim Bungartz *and Youssef Marzouk*

8/6/22 16:30 - 18:30
Advances in shock capturing strategies for high order methods II
Minisymposium organized by Jonas Zeifang, Deep Ray and Andrea Beck

MS115B
Room: Svalbard
Chair: Jonas Zeifang

A Unified Framework to Construct Robust High-Order Discontinuous Galerkin Schemes (Keynote Lecture)
Andrés M Rueda-Ramírez, Will Pazner and Gregor J Gassner

Positivity-preserving entropy-based adaptive filtering for discontinuous spectral element methods
Tarik Dzanic and Freddie Witherden

Hybridisation of Discontinuous Galerkin methods for shock capturing in scale resolving simulations
Amaury Bilocq, Nayan Levaux, Vincent E. Terrapon and Koen Hillewaert

Hybrid High-Order Finite Volume/Discontinuous Galerkin Methods for Turbulent Flows
Dean Yuan, Panagiotis Tsoutsanis and Karl W. Jenkins

Adaptive Stabilized Finite Elements for Compressible Flows
Thibaut Devos, Aurélien Larcher, Francesco Delloro and Elie Hachem

8/6/22 16:30 - 18:30
Modeling and Simulation of Concrete Structures: Recent Advances
Minisymposium organized by Mahdi Kioumarsi and Vagelis Plevris

MS76A
Room: O – 3
Chair: Mahdi Kioumarsi
CoChair: Leila Farahzadi

Molecular dynamics investigation of the effect of interlayer cavities of the structure of calcium silicate hydrate at the atomistic scale
Davoud Tavakoli and Mohammad Hajmohammadian Baghban

Application of an adaptive stable GFEM for fracture propagation in plain concrete
Abdelrahman El-Tohfa and Faisal Mukhtar

FEM analysis of FRCM strengthened RC columns exposed to fire
Reem Talo, Salem Khalaf, Muhammad Kyaure and Farid Abed

Integrated approach to probabilistic nonlinear assessment of concrete bridges
Drahomír Novak, David Lehky, Radomir Pukl, Ondrej Slowik and Novak Lukas

Nonlinear seismic analysis of reinforced concrete structures using POD reduced order method
Naim Ayoub, Walid Larbi and Jean-François Deü

Eigenerosion approach for fracture modeling of concrete under impact load using the material point method
Ahmad Chihadeh and Michael Kaliske

Surface roughness and shear resistance in cracked concrete
Mohit Pundir and Guillaume Anciaux

8/6/22 16:30 - 18:30
Multiphysics modelling and simulation strategies for processes in fractured porous media
Minisymposium organized by Kundan Kumar and Sorin Pop

MS76A
Room: O – 3
Chair: Mahdi Kioumarsi
CoChair: Leila Farahzadi

A mixed-dimensional model for reactive transport: modeling and computational aspects
Luca Formaggia, Alessio Fumagalli and Anna Scotti

Modelling fracture propagation in poro-elastic media combining phase-field and discrete fracture models
Samuel Burbulla, Luca Formaggia, Anna Scotti and Christian Rohde

Fluid flow through naturally fractured reservoirs using an embedded fracture model
Cristian Mejia, Julio Rueda and Deane Roehl

Impacts of fractures on hydrodynamic trapping for CO2 storage in deep saline aquifers
Yuhang Wang, Cornelis Vuik and Hadi Hajibeygi

A numerical analysis of CO2 storage by adsorption using ZIF-8
Guilherme Fonseca da Silva, Lucas Rodrigues Capello Silva, Marcos Oliveira Pelic, Bruno Galelli Chieregatti *and João de Sá Brasil Lima*

Averaged models for two-phase flow at the pore scale: The effect of surface tension and contact angle dynamics
Stephan B. Lunowa, Arjen Mascini, Carina Bringedal, Tom Bultreys, Veerle Cnudde and Iuliu Sorin Pop

The Undrained Split Iterative Coupling Scheme for a Fractured Biot Model: Theoretical and Numerical Considerations
Tameem Almani and Kundan Kumar

Thursday	9:00 - 10:30	11:00 - 13:00	14:00 - 16:00	16:30 - 18:30
Hedmark (GF)		STS01B		STS10A
Nord – Norge (GF)		MS32C	SPL7	MS27A
Nordland (GF)		MS102A		MS102B
Oslo 1 (GF)		MS46A		MS46B
Oslo 2 (GF)		MS120A		MS120B
Rogaland (GF)		MS83A		MS83B
Romerike (GF)		MS67D		MS97A
Sør – Norge (GF)		MS148A	SPL8	MS9A
Akershus (1F)		MS96A		MS96B
Buskerud (1F)		MS66A		MS66B
Hordaland 1 (1F)		MS73A		MS73B
Hordaland 2 (1F)		MS118A		MS118B
Oppland (1F)				
Vestfold (1F)		MS13A		CS03A
A1 – 1		MS124A		MS124B
A1 – 2		MS111A		MS111B
A1 – 3		MS70A		MS70B
A1 – 4		MS30D		MS129A
A1 – 5		MS157A		MS157B
A1 – 6		MS25A		MS25B
B1 – 1		MS59A		MS59B
B1 – 2		MS106A		MS106B
B3 + B4	PL3	MS84A	SPL5	MS84B
Jan Mayen 1		MS103A		MS109A
Jan Mayen 2		MS88A		MS79A
Jan Mayen 3		MS154A		MS154B
Lounge A2		MS75A		MS75B
Spitsbergen		MS50A		MS50B
Svalbard		MS115C	SPL6	MS158A
O – 3		MS87A		MS87B
O – 4		MS122A		MS104A

Thon Hotel Arena NOVA Spektrum Center

Thursday, June 9th

9/6/22 09:00 - 10:30
Plenary Lectures III

PL3
Room: B3 + B4
Chair: Ferdinando Auricchio

The impact of defeaturing on the accuracy of PDE solutions
Annalisa Buffa

The Advent of Continuum-Kinematics-Inspired Peridynamics: A Novel Take on Nonlocal Continuum Modelling and Simulation
Paul Steinmann

10:30 - 11:00
Coffee Break

11:00 - 13:00 | TECHNICAL SESSIONS

9/6/22 11:00 - 13:00
The Combined Role of Modelling, Simulation, Optimization, Control and Digitalization for Solving New Computational Challenges of Aviation, Transport and Renewable Energy II

STS01B
Room: Hedmark (GF)
Chair: Jaques Periaux

An overview on future challenges of aerodynamic configuration design for distributed propulsion vehicle
Shaojun Luo, Zhili Tang, Tianzi Eng, Qianrong Ma, Jinyou Su, Gabriel Bugeda and Jacques Periaux

Transportation and the Global Spread of Infectious Disease
William Fitzgibbon and Jef J. Morgan

Large eddy simulations of atmospheric turbulence and complex wind turbine wakes
Ning Zhao

High-fidelity CFD in the cloud as a key enabler for transport and renewable energy challenges
Charles Mockett

9/6/22 11:00 - 13:00
Bayesian inference of engineering models: advances in theory and applications III

MS32C
Room: Nord – Norge (GF)
Chair: Giovanni Samaey

Bayesian identification of oil spill source parameters from image contours
Samah El Mohtar, Olivier Le Maître, Omar Knio and Ibrahim Hoteit

Hierarchical Bayesian model for simulating the mechanical behavior of bare printed circuit boards with fixing
Hendrik Schmidt, Markus Kaess, Moritz Huelsebrock and Roland Lichtinger

Bridging POMDPs and Bayesian decision making for robust maintenance planning for railway systems
Giacomo Arcieri, Cyprien Hoelzl, Oliver Schwery and Eleni Chatzi

Polynomial Surrogates For Bayesian Traveltime Tomography
Pierre Sochala, Alexandrine Gesret and Olivier Le Maître

Model calibration and damage detection for a digital twin
Thomas Titscher, Annika Robens-Radermacher and Jörg F. Unger

A probabilistic incompressible hyperelastic material constitutive model for human brain tissue
M. Zeraatpisheh and L. Beex

9/6/22 11:00 - 13:00
Advances in SHM guided by artificial intelligence and data fusion I
Minisymposium organized by Ilaria Venanzi, Filippo Ubertini and Simon Laflamme

MS102A
Room: Nordland (GF)
Chair: Ilaria Venanzi
CoChair: Noemi Friedman

Advanced deep learning comparisons for non-invasive tunnel lining assessment from ground penetrating radar profiles
Marco Martino Rosso, Giulia Marasco, Leonardo Tanzi, Salvatore Aiello, Angelo Aloisio, Raffaele Cucuzza, Bernardino Chiaia, Giansalvo Cirrincione and Giuseppe Carlo Marano

Classification of compromised DOFS data with LSTM neural networks
Valeria Usenco and Kaspar Lasn

Machine learning for explainability of structural health monitoring data of a viaduct
Noemi Friedman, Zeynep Tasci, Uros Bohinc and Jan Kalinc

Deep neural networks for unsupervised damage detection on the Z24 bridge
Valentina Giglioni, Ilaria Venanzi, Valentina Poggioni, Alina Elena Baia, Alfredo Milani and Filippo Ubertini

Enabling supervised learning in structural health monitoring by simulating damaged structure responses through physics based models
Luca Rosafalco, Andrea Manzoni, Stefano Mariani and Alberto Corigliano

9/6/22 11:00 - 13:00
Multi-physics simulations with the coupling library preCICE I
Minisymposium organized by Benjamin Uekermann, Miriam Schulte and Gerasimos Chourdakis

MS46A
Room: Oslo 1 (GF)
Chair: Benjamin Uekermann

An introduction to the preCICE coupling library
Frédéric Simonis and Benjamin Benjamin

Simulation of multi-physics porous-media applications using partitioned black-box methods
Alexander Jaust and Miriam Schulte

Heat and mass transfer between XDEM \& OPENFOAM using preCICE coupling library
Prasad Adhav , Xavier Besseron , Alban Rousset , Alvaro Antonio Estupinan and Bernhard Peters

Coupling 1D thermohydraulics with 3D CFD via preCICE
Gerasimos Chourdakis, Kin-Wing Wong, Fabian Weyermann and Benjamin Uekermann

Adaptive and flexible macro-micro coupling software
Ishaan Desai, Benjamin Uekermann and Carina Bringedal

MaMiCo-preCICE coupling for hybrid molecular-continuum flow simulations
Louis Viot and Philipp Neumann

9/6/22 11:00 - 13:00
Mathematical and Computational aspects of Mixed-Dimensional Coupling Problems I
Minisymposium organized by Cécile Daversin-Catty, Ingeborg Gjerde and Luca Possenti

MS120A
Room: Oslo 2 (GF)
Chair: Ingeborg Gjerde
CoChair: Luca Possenti

Finite strain poromechanics for fractured porous media
Wietse M. Boon and Jan M. Nordbotten

Linear and nonlinear 1d-3d models for flow and transport in porous media with embedded tubular networks
Timo Koch, Martin Schneider and Kent-André Mardal

3D-1D coupled problems with a PDE-constrained optimization method
Stefano Berrone, Denise Grappein, Stefano Scialò and Fabio Vicini

Forming a well-posed model of poroelasticity in the presence of fractures
Wietse M. Boon and Jan M. Nordbotten

9/6/22 11:00 - 13:00
Advances in solution strategies for physical processes in porous media with complex geometries I
Minisymposium organized by Alessio Fumagalli, Elyes Ahmed and Michele Starnoni

Room: Rogaland (GF)
Chair: Elyes Ahmed
CoChair: Alessio Fumagall

Dynamic coarsening for efficient, high-resolution simulation of geothermal systems (Keynote Lecture)
Øystein Klemetsdal

Potential reconstruction techniques for a posteriori error estimation: a guided tour
Jhabriel Varela, Elyes Ahmed, Eirik Keilegavlen, Jan Martin Nordbotten and Florin Adrian Radu

Energy-stable discretization of two-phase flows in deformable porous media with frictional contact at matrix-fracture interfaces
Francesco Bonaldi, Jérôme Droniou, Roland Masson and Antoine Pasteau

Model adaptation in a discrete fracture network: existence of solutions and numerical strategies
Francesco Patacchini and Alessio Fumagalli

Model verification for flow in fractured media
Jakub W. Both, Bergit Brattekås, Martin Fernø, Eirik Keilegavlen and Jan M. Nordbotten

9/6/22 11:00 - 13:00
Recent developments and current issues in the phase-field modeling of fracture IV
Minisymposium organized by Dhananjay Phansalkar, Paras Kumar, Pietro Carrara, Sigrid Leyendecker, Julia Mergheim, Laura De Lorenzis and Paul Steinmann

MS67D
Room: Romerike (GF)
Chair: Dhananjay Phansalkar

Nonlinear additive and multiplicative preconditioning strategies for monolithic phase-field fracture models
Alena Kopanicakova, Hardik Kothari and Rolf Krause

Isogeometric space-time adaptivity for phase field-based fracture of shells
Karsten Paul, Thomas J.R. Hughes, Chad M. Landis and Roger A. Sauer

An enriched phase-field method for the efficient simulation of fracture processes, part 1: phase-field approximation
Verena Klempt, Christian Krüger and Stefan Loehnert

An enriched phase-field method for the efficient simulation of fracture processes, part 2: displacement-field approximation
Christian Krüger, Verena Klempt and Stefan Loehnert

9/6/22 11:00 - 13:00
Modelling at different scales of processes involving melting and solidification of metals
Minisymposium organized by Jose Cesar de Sa and Michel Bellet

MS148A
Room: Sør – Norge (GF)
Chair: Jose Cesar de Sa

Hybrid discrete element and raytracing framework for the analysis of powder-bed additive manufacturing
Bram J.A. Dorussen, Marc G.D. Geers and Joris J.C. Remmers

Peridynamics for Selectiv Laser Melting
Mikhail Zverlov and Michael W. Gee

Particle Finite Element Method for simulations of Selective Laser Melting with vaporization
Simon Février, Romain Boman and Jean-Philippe Ponthot

The numerical investigation of thermal cycle of laser surface hardening
Janusz Pikuła, Marek St. Węglowski and Jerzy Dworak

Kinetic Modelling of Phase Fraction Prediction on an Additive Manufacturing Process
Roya Darabi, Ana Reis and Jose Cesar de Sa

9/6/22 11:00 - 13:00
Low Reynolds number flows: from microswimmers to microdrones I
Minisymposium organized by Matteo Giacomini, Manuel García-Villalba and Ignazio Maria Viola

MS96A
Room: Akershus (1F)
Chair: Manuel García-Villalba
CoChair: Ignazio Maria Viola

A computational tool for parametric design of microswimmers (Keynote Lecture)
Matteo Giacomini and Antonio Huerta

A Computational Framework for Micro-Swimming: Benchmarks and Applications
Christophe Prud'homme, Luca Berti, Vincent Chabannes and Laetitia Giraldi

A finite element method for the Cosserat rod to describe undulatory locomotion
Lukas Deutz

The flight of Alsomitra macrocarpa
Daniele Certini, Cathal Cummins, Francesco Giorgio-Serchi, Yunjie Yang, Naomi Nakayama and Ignazio Maria Viola

Comparison of low and high fidelity models for the analysis of flapping wing micro air vehicles
Romain Poletti, Lilla Koloszar, Miguel Mendez, Jeroen van Beeck and Joris Degroote

9/6/22 11:00 - 13:00
Laminar to Turbulence Transition in Aero/Hydrodynamics I
Minisymposium organized by Mostafa Safdari Shadloo and Abdellah Hadjadj

MS66A
Room: Buskerud (1F)
Chair: Mostafa Shadloo

Control of oblique breakdown using streak employment method (Keynote Lecture)
Muhittin Celep , Abdellah Hadjadj and Mostafa Safdari Shadloo

Investigation of interactions between suction chamber and boundary layer over suction walls using direct numerical simulations
Richard von Soldenhoff and Heinrich Lüdeke

The interaction between an isolated roughness element and free-stream turbulence
Masumeh Gholamisheeri, Kristina Durovic, Santhosh Mamidala, Jens Fransson, Ardeshir Hanifi and Dan Henningson

Transition of separated flow over a bump under unsteady inflow conditions
Himpu Marbona, Alejandro Martínez-Cava Aguilar and Daniel Rodríguez Alvarez

On the algebraic modifications of traditional turbulence models to predict by-pass and separation induced transition
Alessandro Colombo, Andrea Crivellini, Antonio Ghidoni, Alessandra Nigro and Gianmaria Noventa

9/6/22 11:00 - 13:00
Physics- and Data-Driven Modelling Techniques for Digital Twins I
Minisymposium organized by Oliver Barrowclough, Jeroen Broekhuijsen, Kjetil Johannessen and Andre Stork

MS73A
Room: Hordaland 1 (1F)
Chair: Georg Muntingh

Physics-driven digital twin for laser powder bed fusion on GPUs
Stephanie Ferreira, Benjamin Klein and André Stork

A comparison of equation-based and machine learning models of industrial scale deposition processes
Paris Papavasileiou, Eleni D. Koronaki, Gabriele Pozzetti, Martin Kathrein, Christoph Czettl, Andreas G. Boudouvis and Stéphane P.A. Bordas

Digitization Principles for Application Scenarios towards Digital Twins of Organizations
Anna Sumereder and Robert Woitsch

Interpretable and scalable Reduced Order Modelling for Digital Twins in manufactoring
Valentina Zambrano, Salvador Izquierdo and Manuel Laspalas

Digital twins for cyber-physical systems
Peter Gorm Larsen, Jalil Boudjadar, Lukas Esterle, Mirgita Frasheri, Claudio Gomes, Alexandros Iosifidis, Hugo *Macedo, Emil Madsen, Carl Schultz, Prasad Talasila, Casper Thule and Jim Woodcock*

Geometric reconstruction for digital twins
Oliver Barrowclough, Sverre Briseid and Georg Muntingh

9/6/22 11:00 - 13:00
Mathematical and Numerical Modelling of COVID-19 Epidemic I
Minisymposium organized by Luca Dede', Nicola Parolini and Christian Vergara

MS118A
Room: Hordaland 2 (1F)
Chair: Nicola Parolin

Uncertainty quantification and identifiability of SIR-like dynamical systems for epidemiology
Lorenzo Tamellini, Chiara Piazzola and Raul Tempone

Multi-patched epidemic models with partial mobility, residency, and demography
Akuno A. O , L. Leticia Ramirez Ramirez , Chahak M , C. G. Krishnanunni , Van Hai Nguyen , Montoya J. A and *Tan Bui-Thanh*

System inference via field inversion for the spatio-temporal progression of infectious diseases: Studies of COVID-19 in Michigan and Mexico
Krishna Garikipati, Mariana Carrasco-Teja, Zhenlin Wang, Gregory Teichert and Xiaoxuan Zhang

A numerical set-up for the simulation of infection probability from SARS- CoV-2 in public transport vehicles
Eugenio Schillaci, Jordi Vera, Nina Morozova and Joaquim Rigola

A Multi-Physics Model for the Prediction of Coronavirus Inactivation in Populated Rooms using 222 nm Far-UVC
Andrew G Buchan, Caumaghen Sannassy, Liang Yang, Kirk D. Atkinson, David Welch and David J. Brenner

Modelling the COVID-19 pandemic: variants and vaccines
Alicja Kubik, Angel M. Ramos, Benjamin Ivorra, María Vela-Pérez and Miriam R. Ferrández

9/6/22 11:00 - 13:00
Deep learning for Hamitonian problemS and variational analysis
Minisymposium organized by Emmanuel Franck, Laurent Navoret and Yannick Privat

MS13A
Room: Vestfold (1F)
Chair: Emmanuel Franck
CoChair: Laurent Navoret

Learning an optimal feedback operator semiglobally stabilizing semilinear parabolic equations
Sergio S. Rodrigues

Structure-Preserving Neural Networks for the N-body Problem
Philipp Horn, Barry Koren and Simon Portegies Zwart

Data driven reduced modelling of the Vlasov-Poisson equation
Guillaume Steimer, Emmanuel Franck, Laurent Navoret, Nicolas Crouseilles and Vincent Vigon

A Tensor Gradient Cross for Hamilton-Jacobi-Bellman equations
Sergey Dolgov, Dante Kalise and Luca Saluzzi

Towards model reduction of individual-based models in epidemiology: when reinforcement learning meets control theory.
Clémentine Courtès, Emmanuel Franck, Killian Lutz, Laurent Navoret and Yannick Privat

Structure-preserving Scientific Machine Learning
Michael Kraus

9/6/22 09:00 - 10:30
Computational Modelling with OpenFOAM I
Minisymposium organized by Gavin Tabor and Fred Mendonca

MS124A
Room: A1 – 1
Chair: Gavin Tabor

Characterization of polymeric mixing processes with non-conforming methods in OpenFOAM
giorgio negrini, nicola parolini, marco verani and daniele cerroni

Diurnal cycles of slope winds with OpenFOAM
Adeline Montlaur, Rathan B Athota , Santiago Arias and Jose I. Rojas

Remeshing – CFD simulation of moving objects with overlapping trajectories
Bahram Haddadi, Christian Jordan and Michael Harasek

Effect of hydrogen addition to methane-air jet flame based on Sandia flame D
Jiannan Liu, Carlos David Pérez-Segarra, Joaquim Rigola and Francesc Xavier Trias

9/6/22 09:00 - 10:30
Knowledge- and data-driven model order reduction I
Minisymposium organized by Alaa Armiti-Juber, André Mielke, Felix Fritzen, Benjamin Unger and Tim Ricken

MS111A
Room: A1 – 2
Chair: Alaa Armiti-Juber

A two-scale phase-field model for reactive transport in porous media with evolving pore-scale geometry (Keynote Lecture)
Manuela Bastidas, Carina Bringedal, Iuliu Sorin Pop and Lars von Wolff

Registration-based model reduction of parameterized PDEs with spatio-parameter adaptivity.
Tommaso Taddei

Application of model order reduction to the analysis of polymer processing problems
Fabian Key and Stefanie Elgeti

A hybrid knowledge- and data-driven reduced model for almost thin porous materials
Alaa Armiti-Juber, André Mielke and Tim Ricken

A PBDW approach to Hamilton-Jacobi-Bellman equations
Samuel Knaus and Karsten Urban

9/6/22 09:00 - 10:30
Female Pelvic Floor Biomechanics I
Minisymposium organized by Rita Rynkevic, Dulce Oliveira and Elisabete Silva

MS70A
Room: A1 – 3
Chair: Rita Rynkevic

Uterine prolapse repair surgery: a finite element analysis
Elisabete Silva, Marco Parente, Teresa Mascarenhas, Renato Natal Jorge and António Fernandes

Towards a tissue model based on tissue mechanics and histological data
Pedro Martins, Rita Rynkevic and João Ferreira

Improving childbirth biomechanics
Duce Oliveira and Teresa Mascarenhas

On the mechanical behavior of early gestation fetal membranes
Serjosha Robmann, Simen Vergote, Jan Deprest and Edoardo Mazza

Biomechanical study of abnormal uterine activity during a vaginal delivery using an electro-chemo-mechanical constitutive model
Daniel Fidalgo, Margarida Borges, Maria Vila-Pouca, Dulce Oliveira, Ewelina Malanowska, Kristin Myers, Marco Parente and Renato Natal

9/6/22 09:00 - 10:30
Simulations of Polymers and Polymer Composites IV
Minisymposium organized by Sebastian Pfaller, Fabrice Detrez and Hans van Dommelen

MS30D
Room: A1 – 4
Chair: Christof Bauer

Impact of the matrix/filler interfacial properties on the local damage and macroscopic behavior of propellants
Julie Diani

Finite element analyses of shear yielding and crazing in glassy polymers under cyclic mode I loading
Tobias Laschuetza and Thomas Seelig

A modified cohesive zone model for the simulation of mixed-mode fracture of co-consolidated thermoplastic laminates considering fiber bridging
Ioannis Sioutis and Konstantinos Tserpes

A mixed mode cohesive law for delamination in GRP laminates with large scale bridging
Reidar K. Joki, Frode Grytten, Jens K. Jørgensen and Bent F. Sørensen

An invariant-based finite strain constitutive model accounting for the viscous-damage behaviour of polymer composites
Igor A. Rodrigues Lopes, Pedro P. Camanho, Francisco M. Andrade Pires and Albertino Arteiro

Efficient calibration of a crystallization model for injection moulding simulation using surrogate modelling
Sandra Saad, Camilo Cruz, Gilles Regnier and Amine Ammar

9/6/22 09:00 - 10:30
Mathematics of Sea Ice, Ice Sheets and Ice Shelves I
Minisymposium organized by Carolin Mehlmann and Clara Burgard

MS157A
Room: A1 – 5
Chair: Carolin Mehlmann
CoChair: Clara Burgard

Efficient Discontinuous Galerkin Method for Maxwell Elasto-Brittle Sea Ice Model
Piotr Minakowski and Thomas Richter

Robust and scalable Newton-type methods for visco-plastic sea-ice models
Yu-Hsuan Shih, Carolin Mehlmann and Georg Stadler

Generalization of hydrodynamic sea ice dynamics using kinetic theory and the Boltzmann equation
Andrew Davis, Dimitris Giannakis, Sam Stechmann and Georg Stadler

A primal-dual formulation for numerical simulations of marine ice sheets with various friction laws
Thomas Gregov, Frank Pattyn and Maarten Arnst

The effect of the tracer staggering on sea ice deformation fields
Carolin Mehlmann

Comparative study on finite element methods for modeling sea ice dynamics
Carina Schwarz and Jörg Schröder

9/6/22 09:00 - 10:30
Robust and reliable numerical methods in poromechanics I
Minisymposium organized by Fleurianne Bertrand and Jakub Both

MS25A
Room: A1 – 6
Chair: Fleurianne Bertrand
CoChair: Jakub Both

A posteriori error estimates by weakly symmetric stress reconstruction for the Biot problem
Gerhard Starke and Fleurianne Bertrand

Robust discretizations for the biphasic Theory of Porous Media
Maximilian Brodbeck, Fleurianne Bertrand and Tim Ricken

Polytopal nonconforming discretization methods for multiple-network poroelasticity and thermo-poroelasticity
Paola F. Antonietti, Stefano Bonetti, Michele Botti and Daniele A. Di Pietro

On space-time finite element approximations of the dynamic biot system
Markus Bause, Uwe Köcher and Florin A. Radu

Coupling of flow and mechanics in fractured porous media
Kundan Kumar

A global/local approach for parameter estimation in phase-field fracture problems
Amirreza Khodadadian, Nima Noii, Maryam Parvizi and Thomas Wick

9/6/22 09:00 - 10:30
Soft biological tissue: microstructure-based modeling and simulation I
Minisymposium organized by Bjørn Skallerud and Gerhard A. Holzapfel

MS59A
Room: B1 – 1
Chair: Gerhard Holzapfel
CoChair: Bjørn Skallerud

Predictive Constitutive Modeling of Arteries by Deep Learning (Keynote Lecture)
Christian Cyron , Kevin Linka, Selda Sherifova, Cristina Cavinato, Gerhard Holzapfel and Jay Humphrey

Patient-specific simulation of degenerative mitral valve apparatus
Mohammad Javad Sadeghinia, Hans Martin Aguilera, Robert Matongo Persson, Stig Urheim, Vegard Skalstad *Ellensen, Rune Haaverstad, Gerhard A. Holzapfel, Bjørn Skallerud and Victorien Prot*

Numerical model of the human trachea based on layer specific material models: application to healthy, diseased and stented trachea.
Venkat Ayyalasomayajula and Bjørn Skallerud

Mechanical characterisation and modelling of the layer-dependent, anisotropic behaviour of the human oesophagus
Ciara Durcan, Mokarram Hossain, Grégory Chagnon, Djordje Perić and Édouard Girard

The importance of intraluminal thrombus on abdominal aortic growth – a numerical study
Igor Karšaj, Nino Horvat and Lana Virag

9/6/22 09:00 - 10:30
Advances in numerical methods for inhomogeneous viscous flows: non-Newtonian, viscoelastic, multi-phase, eddy-viscosity and other complex models I
Minisymposium organized by Douglas Pacheco and Richard Schussnig

MS106A
Room: B1 – 2
Chair: Douglas R. Q. Pacheco

A finite element modeling of two-phase variable density surface fluids (Keynote Lecture)
Maxim Olshanskii, Yerbol Palzhanov and Annalisa Quaini

Reduced-order modeling of generalized Newtonian fluids including engineering applications
Ernesto Castillo and Camilo Bayona

A semi-implicit method for thrombus formation in haemodynamic fluid-structure interaction
Richard Schussnig, Simon Dreymann, Alireza Jafarinia, Thomas Hochrainer and Thomas-Peter Fries

Newton-multigrid fem solver for the simulation of thixo-viscoplastic flow problems
Naheed Begum, Abderrahim Ouazzi and Stefan Turek

9/6/22 09:00 - 10:30
Current Trends in Modelling and Simulation of Turbulent Flows I
Minisymposium organized by Suad Jakirlic

MS84A
Room: B3 + B4
Chair: Suad Jakirlic
CoChair: Sebastian Wegt

The P-DNS Method to Solve Particle-Laden Turbulent Fluid Flows (Keynote Lecture)
Sergio Idelsohn, Juan Gimenez and Eugenio Oñate

Towards scale-resolved simulation of airfoil stall at high Reynolds numbers using the lattice Boltzmann method
Sam Mitchell, Sina Stapelfeldt, Christoph Brandstetter and Ricardo Puente

Investigation of the PANS Method for the Prediction of Aerodynamic Noise Around a Circular Cylinder
Arezoo Moosavifard, Elena Kolb, Michael Schäfer and Suad Jakirlic

On the development of a discontinuous Galerkin solver for the composite RANS-(I)LES
Francesco Bassi, Alessandro Colombo, Antonio Ghidoni, Francesco Carlo Massa and Gianmaria Noventa

9/6/22 09:00 - 10:30
Probabilistic methods for model inadequacy
Minisymposium organized by Teresa Portone, Kathryn Maupin and Rebecca Morrison

MS103A
Room: Jan Mayen 1
Chair: Teresa Portone

Hyper-differential sensitivity analysis with respect to model discrepancy
Joseph Hart

Informing missing physics with model form error and model selection
Kathryn Maupin, Jaideep Ray and Teresa Portone

Data-Driven Model-Form Uncertainty with Bayesian Statistics and Neural Differential Equations
Teresa Portone, Erin Acquesta, Christopher Rackauckas and Raj Dandekar

Bayesian Surrogate Analysis and Uncertainty Propagation in the light of Model (In)Adequacy
Sascha Ranftl and Wolfgang von der Linden

Accounting for model uncertainty in the identification of partially known models
Nicholas Galioto and Alex Gorodetsky

Wake Redirection Control for Optimization of Wind Farm Power Production
Jeferson Almeida, Iago Chaves, Vinicius Silvestre and Fernando Rochinha

9/6/22 09:00 - 10:30
Multi-Scale and Multi-Level Numerical Methods for Non-linear Solids
Minisymposium organized by Frédéric Lebon and Isabelle Ramière

MS88A
Room: Jan Mayen 2
Chair: I. Ramière
CoChair: F. Lebon

Multiscale modelling of repeated impacts: case of ultrasonic shot peening
Cécile Nouguier-Lehon, Thomas Rousseau, Philippe Gilles and Thierry Hoc

Enhanced Non-Uniform Transformation Field Analysis
Akanksha Mishra, Pietro Carrara, Sonia Marfia, Elio Sacco and Laura De Lorenzis

Efficiency of boundary conditions on the computation of local fields in a Representative Volume Element
Louis Belgrand, Isabelle Ramière, Rodrigue Largenton and Frédéric Lebon

Multi-model structural coupling in non-linear statics: a robustness study
Stéphane Guinard, Omar Bettinotti, Victor Oancea, Olivier Allix, Pierre-Alain Boucard and Pierre Gosselet

A discrete element method for granular solids with a level set shape description
Jerome Duriez, Cedric Galusinski, Frederic Golay and Stephane Bonelli

Large deformation multi-scale analysis of thin nanocomposite shell structures
Gerasimos Sotiropoulos and Vissarion Papadopoulos

9/6/22 09:00 - 10:30
Interdisciplinary challenges towards exascale fluid dynamics I
Minisymposium organized by Niclas Jansson, Stefano Markidis, Philipp Schlatter, Matts Karlsson and Erwin Laure

MS154A
Room: Jan Mayen 3
Chair: Niclas Jansson
CoChair: Martin Karp

Large-scale direct numerical simulations of low-Prandtl-number convection (Keynote Lecture)
Dmitry Krasnov, Ambrish Pandey, Katepalli Sreenivasan and Joerg Schumacher

Implementation of Hybrid CFD/CAA methods for the Prediction of Aeroacoustic Sound on HPC Systems
Matthias Meinke, Miro Gondrum, Sutharsan Satcunanathan, Gonzalo Brito-Gadeschi and Wolfgang Schroeder

Load Balancing and Scalability with Code Coupler JMxx
Dario Amirante, Vlad Ganine, Nick Hills and Paolo Adami

Nonlinear Dimensionality Reduction for Three-dimensional Flow Field Around Circular Cylinder with Distributed Parallel Machine Learning on Fugaku
Kazuto Ando, Keiji Onishi, Bale Rahul, Akiyoshi Kuroda and Makoto Tsubokura

Computer Architectures for Exascale Computational Fluid Dynamics
Martin Karp, Niclas Jansson, Artur Podobas, Philipp Schlatter and Stefano Markidis

9/6/22 09:00 - 10:30
Advanced HPC algorithms for large-scale simulations I
Minisymposium organized by Xavier Álvarez-Farré, F. Xavier Trias, Andrey Gorobets and Takayuki Aoki

MS75A
Room: Lounge A2
Chair: Xavier Álvarez Farré

Language agnostic performance portability solution for heterogeneous applications
Anshu Dubey and Tom Klosterman

GPU accelerated linear algebra packages/solvers for large scales simulations using heterogenous clusters
Ivan Spisso, Luigi Capone, Federico Cipolletta, Tommaso Benacchio, Marco Jacopo Ferrarotti and Carlo Janna

Development of a low-level, algebra-based library to provide platform portability on hybrid supercomputers
Xavier Álvarez-Farré, Àdel Alsalti-Baldellou, Guillem Colomer, Andrey Gorobets, F. Xavier Trias and Assensi *Oliva*

Parallel Finite Volume Code for Plasma with Unstructured Adaptive Mesh Refinement
Imad kissami, souhail maazioui and fayssal benkhaldoun

Immersed boundaries in hypersonic flows with considerations about high-fidelity and massive parallelism
Florent Nauleau, Thibault Bridel-Bertomeu, Fabien Vivodtzev and Héloïse Beaugendre

Non-Statistical Uncertainty Quantification Analysis with Parallel CAE Solvers, ADVENTURE
Shinobu Yoshimura, Sota Goto, Shigeki Kaneko and Amane Takei

9/6/22 09:00 - 10:30
Data-driven Reduced Simulation Models for Industrial Applications I
Minisymposium organized by Norbert Hosters, Daniel Wolff and Daniel Hilger

MS50A
Room: Spitsbergen
Chair: Norbert Hosters
CoChair: Daniel Wolf

N, ROM, ML, PINNs – Four approaches for real-time temperature estimation in electric motors in comparison
Henning Sauerland, Akiyasu Miyamoto, Anthony Ohazulike, Huihui Xu and Rik W. De Doncker

Adaptation of multi-fidelity optimization schemes to nonlinear structural dynamics applications
Arne Kaps, Tobias Lehrer, Koushyar Komeilizadeh and Fabian Duddeck

Reduced Order Models for Interdisciplinary Optimization of a Compressor Blade
Lisa Pretsch, Ilya Arsenyev and Fabian Duddeck

Physical Inspired Data-Driven Models using Evolutionary Approach
Somayeh Hosseinhashemi, Christoph Thon, Marvin Röhl and Carsten Schilde

A Data-Driven Reduced Order Modeling Approach Applied in Context of Numerical Analysis and Optimization of Plastic Profile Extrusion
Daniel Hilger and Norbert Hosters

Data-driven Machine Learning (ML) and Reduced Order Modeling (ROM) Approaches in Industrial Finite Element (FEA) Applications
Vasiliki Tsianika, Mariyappa Manohara and Kambiz Kayvantash

9/6/22 09:00 - 10:30
Advances in shock capturing strategies for high order methods III
Minisymposium organized by Jonas Zeifang, Deep Ray and Andrea Beck

MS115C
Room: Svalbard
Chair: Andres Rueda-Ramirez

Implicit LES of the Transonic Flow Over A High-Pressure Turbine Cascade using DG Subcell Shock Capturing
Bjoern F. Klose, Christian Morsbach and Edmund Kügeler

High-order high-fidelity simulation of unsteady shock-wave/boundary layer interaction using flux reconstruction
Nicolas Goffart, Benoît Tartinville, Charles Hirsch and Sergio Pirozzoli

Unstructured high-order solutions of hovering rotors with and without ground effect
Paulo A. S. F. Silva, Panagiotis Tsoutsanis, Antonis F. Antoniadis and Karl Jenkins

A three-dimensional FVC scheme on non-uniform tetrahedron meshes: application to the 3D Euler equation
Moussa Ziggaf, Imad Kissami, Mohamed Boubekeur, Fayssal Benkhaldoun and Imad El mahi

Robustness and consistency of potentially-stiff multi-way pressure couplings in compressible multi-fluid models
Antoine Llor, Eric Heulhard de Motigny and Bastien Manach-Perennou

A posteriori MOOD limiting approach for multicomponent flows on unstructured meshes
Panagiotis Tsoutsanis and Pericles Farmakis

9/6/22 09:00 - 10:30
Multiscale Methods for Composites and Heterogeneous Materials I
Minisymposium organized by Paul Steinmann, Guillermo Etse, Daya Reddy and Osvaldo Manzoli

MS87A
Room: O – 3
Chair: S. Hellebrand
CoChair: M. Krause

RVE-based Homogenisation of Shell Structures using Scaled Boundary Isogeometric Analysis
Leonie Mester, Simon Klarmann and Sven Klinkel

Variationally consistent homogenisation of shell elements
Elias Börjesson, Martin Fagerström, Fredrik Larsson and Joris Remmers

Multiscale simulation of the fracture behavior of fiber reinforced concrete under impact loads
Hannah Knobloch and Stefan Loehnert

A model for paper-water interaction and the resulting swelling
Nik Dave, Ron Peerlings, Thierry Massart and Marc Geers

Multiscale modeling of heterogeneous structures based on a localized model order reduction approach
Philipp Diercks, Karen Veroy, Annika Robens-Radermacher and Jörg F. Unger

9/6/22 09:00 - 10:30
Computational Methods in Contact Mechanics
Minisymposium organized by Tom Gustafsson, Rolf Stenberg and Juha Videman

MS122A
Room: O – 4
Chair: Tom Gustafsson
CoChair: Rolf Stenberg

Towards a Gauß-Seidel solver for problems involving line-to-line beam contact
Armin Bosten, Olivier Brüls, Alejandro Cosimo and Joachim Linn

Comparison of the Arbitrary Lagrangian Eulerian and the Total Lagrangian formulation in Rolling Contact Tire Simulations
Lukas Bürger, Wim Desmet and Frank Naets

Efficient numerical computation of chemical-mechanical coupled contact problems for battery active particles
Raphael Schoof, Fabian Castelli and Willy Dörfler

Parallel communication and dynamic load balancing of mortar finite element methods for computational contact mechanics
Matthias Mayr, Christopher Steimer and Alexander Popp

Multi-physical modelling and analysis of lubricated transmissions using a coupled finite element approach
Sander Neeckx, Bart Blockmans, Ward Rottiers and Wim Desmet

Finite element analysis of the effect of contact forces in heat conduction of composite materials
Konstantinos Margaronis, Vasileios Merevis and Vissarion Papadopoulos

13:00 - 14:00
Lunch Time

9/6/22 14:00 - 16:00
Semi-Plenary Lectures V

SPL5
Room: B3 + B4
Chair: Serge Prudhomme

Deep neural networks for accelerating fluid-dynamics simulations
Thomas Richter

Digital Twin Cities: Multi-Disciplinary Modeling and High-Performance Simulation of Cities
Anders Logg

Modeling and Simulation Tools for Industrial and Societal Research Applications: Digital Twins and Genome-based Machine-learning
Tarek Zohdi

9/6/22 14:00 - 16:00
Semi-Plenary Lectures VI

SPL6
Room: Svalbard
Chair: Eugenio Oñate

Computing at the Exascale
Garth Wells

Towards FAIR principles in mathematical research data
Dominik Göddeke

Isogeometric Methods in Structural Analysis: Recent Advances and Applications
Josef Kiendl

9/6/22 14:00 - 16:00
Semi-Plenary Lectures VII

SPL7
Room: Nord – Norge (GF)
Chair: Knut-Andreas Lie

Mathematical modelling of the human brain: from medical images to biophysical simulation
Marie Elisabeth Rognes

Robust preconditioners for poromechanics
Carmen Rodrigo Cardiel

Lagrangian approaches for free-surface fluid flows and fluid-structure interaction problems
Massimiliano Cremonesi

9/6/22 14:00 - 16:00
Semi-Plenary Lectures VIII

SPL8
Room: Sør – Norge (GF)
Chair: Ernst Rank

On the usefulness of ultra-high resolution topology optimization methods
Niels Aage

Adjoint-based optimization for industrial applications
Andrea Walther

Machine Learning Enhanced Simulation and PDE-Constrained Optimization for Material Transport Control in Neurons
Jessica Zhang

16:00 - 16:30
Coffee Break

16:30 - 18:30| TECHNICAL SESSIONS

9/6/22 16:30 - 18:30 **Additive Manufacturing, Applications and Numerical Modelling**	STS10A Room: Hedmark (GF) Chair: Tero Tuovinen

Laser welding of AM metal parts as solution to provide new innovations for separation industry
Heidi Piili, Saeid Parchegani, Markku Lindqvist, Eetu Kivirasi and Antti Salminen

Review of Micro and Mesoscale simulation methods for Laser Powder Bed Fusion
Aditya Gopaluni, Heidi Piili and Antti Salminen

Thermomechanical modeling of L-PBF 3D printing
Juha Jeronen, Tero Tuovinen and Matti Kurki

Strategic application of digital tools to enhance lifecycle cost: product design and optimization in metal based powder bed fusion
Patricia Nyamekye, Rohit Lakshmanan and Heidi Piili

9/6/22 16:30 - 18:30 **New Trends in Computational Poromechanics at Finite Strain** *Minisymposium organized by Pedro Navas, Jinhyun Choo and Lorenzo Sanavia*	MS27A Room: Nord – Norge (GF) Chair: Pedro Navas CoChair: Jinhyun Choo

CFD-DEM simulation of fluid-gas two-phase flow in granular media
Zhengshou Lai, Shiwei Zhao and Jidong Zhao

Coupled CFD-MPM simulation of submarine landslides
Quoc Anh Tran, Gustav Grimstad and Seyed Ali Ghoreishian Amiri

A new incompressibility-compliant stress-strain relationship for bi-phase materials
Giuliano Pretti, William M. Coombs and Charles E. Augarde

Full dynamic partially saturated formulation at large strain
Pedro Navas, Miguel M. Stickle, Ángel Yagüe, Miguel Molinos and Diego Manzanal

9/6/22 16:30 - 18:30 **Advances in SHM guided by artificial intelligence and data fusion II** *Minisymposium organized by Ilaria Venanzi, Filippo Ubertini and Simon Laflamme*	MS102B Room: Nordland (GF) Chair: Ilaria Venanzi CoChair: Araliya Mosleh

A new data assimilation framework using the modified Constitutive Relation Error for online structural monitoring: application to shaking-table experiments
Matthieu Diaz, Pierre-Etienne Charbonnel and Ludovic Chamoin

Early Detection of Train Wheel Flats based on a Wavelet Approach
Araliya Mosleh, Andreia Meixedo, Diogo Ribeiro, Pedro Aires Montenegro and Rui Calçada

Maneuver identification and fatigue damage regression for predictive maintenance using the scattering transform
Leonhard Heindel, Peter Hantschke and Markus Kästner

9/6/22 16:30 - 18:30 **Multi-physics simulations with the coupling library preCICE II** *Minisymposium organized by Benjamin Uekermann, Miriam Schulte and Gerasimos Chourdakis*	MS46B Room: Oslo 1 (GF) Chair: Gerasimos Chourdakis

Coupled heat transfer and gas flow simulation in Czochralski crystal growth
Arved Enders-Seidlitz, Iason Tsiapkinis and Kaspars Dadzis

A Benchmark for Fluid-Structure Interaction in Hybrid Manufacturing: Simulation with preCICE in OpenFOAM
Sarah Dietrich, Julian Seuffert, Henrik Werner, Nils Meyer, Christian Poppe, Constantin Krauß and Luise Kärger

Simulation of the flow-acoustic-structural interaction in flow ducts using a partitioned approach in the time domain
Jurgen Kersschot, Hervé Denayer, Wim De Roeck and Wim Desmet

Evaluation of Radial Basis Function Mapping for Fluid-Structure Interaction Simulations
Kyle Davis, David Schneider, Frederic Simonis, Benjamin Uekermann and Miriam Schulte

A fluid structure interaction study of a large-scale wind turbine blade using preCICE
Rachael Smith, Gerasimos Chourdakis, Gavin Tabor and Benjamin Uekerman

9/6/22 16:30 - 18:30
Mathematical and Computational aspects of Mixed-Dimensional Coupling Problems II
Minisymposium organized by Cécile Daversin-Catty, Ingeborg Gjerde and Luca Possenti

MS120B
Room: Oslo 2 (GF)
Chair: Cécile Daversin-Catty

A framework for upscaling and modelling fluid flow for discrete fractures using conditional generative adversarial networks
Carlos Augusto Soares Ferreira, Teeratorn Kadeethum, Nikolaos Bouklas and Hamid M. Nick

Mixed-dimensional modelling of neuronal group interplay
Eirill Hauge and Marie E. Rognes

Modeling microcirculation at the mesoscale using mixed-dimensional PDEs
Luca Possenti, Alessandro Cicchetti, Piermario Vitullo, Maria Laura Costantino, Tiziana Rancati and Paolo Zunino

1D-0D-3D coupled models for simulating blood flow and transport processes in breast tissue
Tobias Koeppl, Andreas Wagner, Marvin Fritz, Barbara Wohlmuth and Chengyue Wu

9/6/22 16:30 - 18:30
Advances in solution strategies for physical processes in porous media with complex geometries II
Minisymposium organized by Alessio Fumagalli, Elyes Ahmed and Michele Starnoni

MS83B
Room: Rogaland (GF)
Chair: Alessio Fumagalli
CoChair: Elyes Ahmed

A non-conforming and a conforming approach for non stationary flow simulations in DFMs with complex geometries
Stefano Berrone, Andrea Borio, Alessandro D'Auria, Stefano Scialò and Fabio Vicini

Numerical simulation of carbon mineralization in the presence of fractures
Luca Formaggia, Alessio Fumagalli and Anna Scotti

Contact mechanics and fracture flow: A stabilized formulation and a scalable preconditioning framework
Andrea Franceschini, Laura Gazzola and Massimiliano Ferronato

A comparison of different time integration schemes in the context of image-based NMR relaxation simulations using explicit FEM
Luiz F. Bez, Ricardo Leiderman and André M. B. Pereira

Using MRST for modeling and optimization of operational strategies for a geothermal storage plant in Asker, Norway
Odd Andersen, Øystein Klemetsdal, Halvor Nilsen, Olav Møyner, Stein Krogstad and Robbert van der Ven

9/6/22 16:30 - 18:30
Enabling Technologies and Simulation Practices for Advanced Scientific and Engineering Computation
Minisymposium organized by Alvaro Coutinho, WILLIAM Barth, Guillaume Houzeaux and Charles Moulinec

MS97A
Room: Romerike (GF)
Chair: Alvaro Coutinho

Development of an HPC Multi-Physics Biomass Furnace Simulation and Integration in a Cloud-based Workflow (Keynote Lecture)
Xavier Besseron, Henrik Rusche and Bernhard Peters

Quantum Monte-Carlo integration for uncertainty quantification in structural problems: An early attempt
Constantinos Atzarakis and Vissarion Papadopoulos

Design And Analysis Of Task-based Parallelization Of A Discontinuous Galerkin Euler Flow Solver On Heterogeneous Architectures
Sangeeth Simon, Vincent Perrier, Jonathan Jung and Matthieu Haefele

Efficient mesh deformation based on randomized RBF solvers
Wael Bader, Augustin Parret-Freaud, Sébastien Da Veiga and Youssef Mesri

9/6/22 16:30 - 18:30
Brain mechanics across scales
Minisymposium organized by Silvia Budday, Kristian Franze, Jochen Guck and Paul Steinmann

MS9A
Room: Sør – Norge (GF)
Chair: Silvia Budday

Modelling the multiphysics of ultrasound neuromodulation (Keynote Lecture)
Antoine Jerusalem, Haoyu Chen, Ciara Felix, Davide Folloni, Lennart Verhagen and Jerome Sallet

Exploring the role of different progenitor cell types during human brain development through a physics-based multifield model.
M. Saeed Zarzor, Ingmar Blümcke and Silvia Budday

On the importance of identifying region-dependent hyperelastic material parameters for human brain tissue through finite element analyses
Jan Hinrichsen, Nina Reiter, Friedrich Paulsen, Stefan Kaessmair and Silvia Budday

Viscoelastic stiffness and relaxation of CNS tissue and its impact on neural and glial cells
Katarzyna Pogoda and Paul Janmey

Towards in vivo tissue mechanics
Stephanie Möllmert, Marcus Gutmann, Paul Müller, Kyoohyun Kim, Lorenz Meinel and Jochen Guck

9/6/22 16:30 - 18:30
Low Reynolds number flows: from microswimmers to microdrones - II
Minisymposium organized by Matteo Giacomini, Manuel García-Villalba and Ignazio Maria Viola

MS96B
Room: Akershus (1F)
Chair: Matteo Giacomini
CoChair: Ignazio Maria Viola

Influence of yawing and other fast-timescale motion on low-Reynolds swimmers trajectories
Benjamin J. Walker, Kenta Ishimoto, Eamonn A. Gaffney, Clément Moreau and Mohit P. Dalwadi

Flow-field transition in the wake of a flexible foil at low reynolds number
Chhote Lal Shah, Dipanjan Majumdar, Chandan Bose and Sunetra Sarkar

Modelling of strain localization of a liquid-core capsule in flow
Nicolas Grandmaison, Delphine Brancherie and Anne-Virginie Salsac

Numerical simulation of bioinspired fluid-structure interaction problems using a multi-body structural model
Cayetano Martínez-Muriel, Gonzalo Arranz, Oscar Flores and Manuel Garcia-Villalba

9/6/22 16:30 - 18:30
Laminar to Turbulence Transition in Aero/Hydrodynamics II
Minisymposium organized by Mostafa Safdari Shadloo and Abdellah Hadjadj

MS66B
Room: Buskerud (1F)
Chair: Mostafa Shadloo

Investigation of Early Natural Transition Using the SA-Gamma-ReThetaT Turbulence Model
Charles Bilodeau-Bérubé and Éric Laurendeau

Influence of boundary layer tripping on the flow and sound field produced by a turbulent jet
Daniel Lindblad, Ganlin Lyu, Spencer Sherwin, Chris Cantwell, Anderson Proenca, Jack Lawrence and Margarida Moragues Ginard

Stable, entropy-pressure compatible subsonic Riemann boundary condition for embedded DG compressible flow simulations
Ganlin Lyu, Chao Chen, Xi Du and Spencer Sherwin

Kinetic-energy instability of flows with slip boundary conditions
Ingeborg Gjerde and L. Ridgway Scott

Instability of a flow of a reacting fluid in a vertical fluid layer
Armands Gritsans, Valentina Koliskina, Andrei Kolyshkin and Felix Sadyrbaev

9/6/22 16:30 - 18:30
Physics- and Data-Driven Modelling Techniques for Digital Twins II
Minisymposium organized by Oliver Barrowclough, Jeroen Broekhuijsen, Kjetil Johannessen and Andre Stork

MS73B
Room: Hordaland 1 (1F)
Chair: Stephanie Ferreira

Wind Turbine Control using Machine Learning techniques
Lorenzo Schena

Digital twins of electric machines
Karim Cherifi, Philipp Schulze and Volker Mehrmann

Using data assimilation to address complex parameter modeling of physics-based digital twins
Katleya Medrano and Tatsurou Yashiki

Isogeometric representations for digital twins subjected to dynamic excitations with GEOMISO DNL software
Panagiotis Karakitsios, Ioannis Prentzas and Athanasios Leontaris

An efficient mCRE-DDM based approach for model updating in structural dynamics with industrial applications
Zouhair Samir, Ludovic Chamoin and Mickael Abbas

Adjoint framework and digital twin for smart placement of depolluting panels in urban areas
Julien Waeytens, Fatiha Chabi, Tsubasa Hamada, Rachida Chakir and Delphine Lejri

Predicting the behaviour of woody biomass particles using deep hidden physics based models.
Fateme Darlik and Bernhard Peters

9/6/22 16:30 - 18:30
Mathematical and Numerical Modelling of COVID-19 Epidemic II
Minisymposium organized by Luca Dede', Nicola Parolini and Christian Vergara

MS118B
Room: Hordaland 2 (1F)
Chair: Luca Dede´

Mortality containment vs. economics opening: optimal policies in a SEIARD model.
Elena Beretta, Andrea Aspri, Alberto Gandolfi and Etienne Wasmer

Analysis of the Italian vaccination campaign against COVID-19 using the SUIHTER model
Nicola Parolini

Numerical modelling of optimal vaccination strategies for SARS-CoV-2
Giovanni Ziarelli

Assessment of the impact of the COVID-19 vaccination campaign in Italy through epidemiological data-assimilation
Damiano Pasetto, Joseph C. Lemaitre, Mario Zanon, Enrico Bertuzzo, Lorenzo Mari, Stefano Miccoli, Renato *Casagrandi, Patrizio Pezzotti, Stefano Merler and Andrea Rinaldo*

Multiscale kinetic transport models for the spread of epidemics with uncertain data
Giulia Bertaglia

Modeling to support decision-making against COVID-19: the Italian experience
Giorgio Guzzetta, Valentina Marziano, Flavia Riccardo, Martina Del Manso, Piero Poletti, Mattia Manica, Filippo Trentini, Bruna Maria Rondinone, Fabio Boccuni, Patrizio Pezzotti, Silvio Brusaferro, Giovanni Rezza, *Sergio Iavicoli, Marco Ajelli and Stefano Merler*

9/6/22 16:30 - 18:30
Computational Nanotechnology and Ice Adhesion

CS03A
Room: Vestfold (1F)
Chair:

Ice adhesion measurement impact of experimental method
Ute Bergmann and Sabine Apelt

Probing the Intrinsic Ice Adhesion at the Nanoscale
Senbo Xiao, Jianying He and Zhiliang Zhang

Comparing atomistic hydrate and ice adhesion on solid surfaces
rui ma, Senbo Xiao, Jianying He and Zhiliang Zhang

Displacement of Trapped Oil on Rough Surfaces by Nanoparticles
yuanhao chang, senbo xiao, zhiliang zhang and jianying he

Intelligent Design of 2D Nanostructures Based on Molybdenum
Tadeusz Burczyński, Wacław Kuś and Adam Mrozek

9/6/22 16:30 - 18:30
Computational Modelling with OpenFOAM II
Minisymposium organized by Gavin Tabor and Fred Mendonca

MS124B
Room: A1 – 1
Chair: Gavin Tabor

Development of a Framework for Internal Combustion Engine Simulations in OpenFOAM
Clemens Gößnitzer and Stefan Posch

A continuous forcing immersed boundary approach to solve the VARANS equations in a volumetric porous region
Marco Vergassola and Oriol Colomés

OpenFOAM model of fluid-structure interaction in dry wire drawing
Mathieu Vervaecke, Dieter Fauconnier and Joris Degroote

Developing a DEM-Coupled OpenFOAM solver for multiphysics simulation of additive manufacturing process
Navid Aminnia, Alvaro Antonio Estupinan Donoso and Bernhard Peters

Super-grid Linear Eddy Model as chemical closure for turbulent combustion
Abhilash Menon, Alan Kerstein and Michael Oevermann

9/6/22 16:30 - 18:30
Knowledge- and data-driven model order reduction II
Minisymposium organized by Alaa Armiti-Juber, André Mielke, Felix Fritzen, Benjamin Unger and Tim Ricken

MS111B
Room: A1 – 2
Chair: André Mielke

Solving parametric PDEs with an enhanced model reduction method based on Linear/Ridge expansions
Constantin Greif, Philipp Junk and Karsten Urban

Neural networks with embedded physics-based material models to accelerate multiscale finite element simulations
Marina Maia, Iuri Rocha and Frans van der Meer

Active-learning-based non-intrusive model order reduction
Qinyu Zhuang, Dirk Hartmann, Hans -J. Bungartz and Juan M. Lorenzi

Machine-learning prediction of microscopic bubble-growth characteristics
Jan Bureš, Lubomír Bureš, Mattia Bucci and Matteo Bucci

9/6/22 16:30 - 18:30
Female Pelvic Floor Biomechanics
Minisymposium organized by Rita Rynkevic, Dulce Oliveira and Elisabete Silva

MS70B
Room: A1 – 3
Chair: Rita Rynkevic

Fluid-Structure Interaction Analyses of Amniotic Fluid with a Comprehensive Fetus Model Exposed to External Loading
Gregory Kurgansky, Jonathan Arias and Milan Toma

Biomechanical interaction between mother and fetus during vaginal delivery
Rita Moura, Margarida Borges, Dulce Oliveira, Marco Parente, Teresa Mascarenhas and Renato Natal Jorge

Biomechanical female pelvic floor model
Hana Čechová, Linda Havelková, Luděk Hynčík, Martin Němec, Ladislav Krofta and Vladimír Kališ

Shape Morphing Techniques to Adapt Pelvic Structures
Margarida Chiote, Elisabete Silva, Sofia Brandão, Marco Parente and António Fernandes

Numerical simulation of the onset of the second stage of labor
Alice M. Collier, Ghaidaa A. Khaid, Mike D. Jones, Kristin Myers and Antione Jerusalem

9/6/22 16:30 - 18:30
Recent Advances in Numerical Simulation of Landslides and Debris Flows
Minisymposium organized by Pavel A. Trapper

MS129A
Room: A1 – 4
Chair: Pavel Trapper
CoChair: Avshalom Ganz

A scalable parallel depth-integrated adaptive numerical framework with application to flow-like landslides
Federico Gatti, Simona Perotto, Carlo De Falco and Luca Formaggia

Material point method for large deformation seismic response analysis
Marc Kohler, Andreas Stöcklin and Alexander M. Puzrin

A role of a trigger mechanism in a prediction of submarine landslide consequences on a nearby infrastructure
Pavel A. Trapper, Avshalom Ganz and Miriam R. Gindis

Filtering spurious high-frequency modes in landslide impact on an offshore infrastructure
Avshalom Ganz, Pavel Trapper and Miriam Gindis

9/6/22 16:30 - 18:30
Mathematics of Sea Ice, Ice Sheets and Ice Shelves II
Minisymposium organized by Carolin Mehlmann and Clara Burgard

MS157B
Room: A1 – 5
Chair: Clara Burgard
CoChair: Carolin Mehlmann

Modeling of small scale processes in Antarctic sea ice - a bio-physical coupled bi-scale approach
Andrea Thom, Tim Ricken and Silke Thoms

Freezing processes in atmosphere and polar ocean
Bernd Kutschan and Silke Thoms

Computation Fluid Dynamics based model for a better prediction of fluid forces acting on iceberg capsize
Alban Leroyer, Julie Meunier, Anne Mangeney, Olivier Castelnau, Vladislav Yastrebov and Pauline Bonnet

Parameterising ocean-induced melt of an idealised Antarctic ice shelf using deep learning
Clara Burgard and Nicolas C. Jourdain

Phase field viscoelastic fracture models for ice sheet dynamics
Jakub Stocek, Robert Arthern and Oliver Marsh

Coupled modeling of ice, subglacial sediment, and glacier hydrology
Anders Damsgaard

9/6/22 16:30 - 18:30
Robust and reliable numerical methods in poromechanics II
Minisymposium organized by Fleurianne Bertrand and Jakub Both

MS25B
Room: A1 – 6
Chair: Jakub Both
CoChair: Fleurianne Bertrand

Abstract stability result for perturbed saddle-point problems: Construction and analysis of iterative splitting schemes and preconditioners in poromechanics
Johannes Kraus, Qingguo Hong, Maria Lymbery and Fadi Philo

A multigrid method for the Biot system of poroelasticity on logically rectangular grids
Javier Zaratiegui , Carmen Rodrigo, Andrés Arrarás and Laura Portero

Splitting schemes for different poromechanics models
Florin A. Radu

Reverse constraint preconditioning for poromechanical simulations in fractured media
Massimiliano Ferronato, Andrea Franceschini, Matteo Frigo and Carlo Janna

Parameter-robust monolithic solvers for Stokes-Darcy/Biot systems
Wietse Boon, Martin Hornkjøl, Timo Koch, Miroslav Kuchta, Kent-Andre Mardal and Ricardo Ruiz-Barier

A review of coupling strategies for modeling fluid flow and geomechanics
Roberto Quevedo and Deane Roehl

9/6/22 16:30 - 18:30
Soft biological tissue: microstructure-based modeling and simulation II
Minisymposium organized by Bjørn Skallerud and Gerhard A. Holzapfel

MS59B
Room: B1 – 1
Chair: Cristian Cyron
CoChair: Venkat R K Ayyalasomayajula

Modeling coupled interaction of lipid Membranes with embedded filaments
Sanjay Dharmavaram and Basant Lal Sharma

Coarse-grained Steered Molecular Dynamics Simulations of Collagen Fibrils
Julia Kamml and David Kammer

Local micromorphic non-affine anisotropy describing relative elastic fibre-matrix kinematics
Sebastian Skatulla, Carlo Sansour and Georges Limbert

An arterial constitutive model accounting for collagen cross-linking
Gerhard A. Holzapfel, Stephan Teichtmeister and Ray W. Ogden

Linking biophysical muscle models with finite element solver
Bogdan Milicevic, Momcilo Prodanovic, Danica Prodanovic, Miljan Milosevic, Boban Stojanovic, Srboljub Mijailovich, Milos Kojic and Nenad Filipovic

9/6/22 16:30 - 18:30
Advances in numerical methods for inhomogeneous viscous flows: non-Newtonian, viscoelastic, multiphase, eddy-viscosity and other complex models II
Minisymposium organized by Douglas Pacheco and Richard Schussnig

MS106B
Room: B1 – 2
Chair: Richard Schussnig

A coupled projection scheme for the Navier-Stokes/Allen-Cahn model
Jean Deteix, Driss Yakoubi and Gérard Lionel Ndetchoua Kouamo

Anisotropic mesh adaptation for viscoelastic fluid flows
Stefan Wittschieber, Ajay Rangarajan, Leszek Demkowicz and Marek Behr

Pressure Poisson fractional-step schemes for incompressible two-phase flows: Eliminating artificial boundary conditions and inf-sup compatibility restrictions
Douglas Ramalho Queiroz Pacheco and Richard Schussnig

Rheological properties of a two-phase system with second-order suspending fluid using a cell model approach
Liam Escott and Helen Wilson

Sustaining pressure gradients in molecular dynamics simulations of fluid-flow through slab geometries
Mohamed T. Elewa, Lars Pastewka and Peter Gumbsch

9/6/22 16:30 - 18:30
Current Trends in Modelling and Simulation of Turbulent Flows II
Minisymposium organized by Suad Jakirlic

MS84B
Room: B3 + B4
Chair: Suad Jakirlic
CoChair: Sebastian Wegt

Validation on a new anisotropic four-parameter turbulence model for low Prandtl number fluids
Lucia Sirotti, Giacomo Barbi, Andrea Chierici, Valentina Giovacchini and Sandro Manservisi

Near-wall Reynolds stress modelling based on elliptic blending: physical rationale and application to separated flows
Sebastian Wegt, Robert Maduta and Suad Jakirlic

Development of a discontinuous Galerkin solver for the simulation of turbine stages
Alessandro Colombo, Antonio Ghidoni, Edoardo Mantecca, Gianmaria Noventa, Stefano Rebay and David *Pasquale*

Assessment of numerical frameworks for turbulence transition modelling in pulsatory flows
Philipp Milovic, Igor Karšaj and Željko Tuković

Simulation of massively separated flows and rotating machine flows using hybrid models
Florian Miralles, Bastien Sauvage, Stephen Wornom, Bruno Koobus and Alain Dervieux

9/6/22 16:30 - 18:30
Computational Methods for Inverse Wave Problems
Minisymposium organized by Dan Givoli and Marc Bonnet

MS109A
Room: Jan Mayen 1
Chair: Dan Givoli
CoChair: Marc Bonne

Seismic Inversion and Optimal Transport (Keynote Lecture)
Bjorn Engquist

A Multi-Stage Numerical Procedure for Computing all the Parameters of Elastic scatterers from its FFP measurements
Izar Azpiroz, Helene Barucq, Julien Diaz and Rabia Djellouli

Seismic Imaging using Full Reciproity-gap Waveform Inversion
Florian Faucher, Maarten V. de Hoop and Otmar Scherzer

Detection of Voids and Cracks with Mono- and Multi-Parameter Full Waveform Inversion
Tim Bürchner, Philipp Kopp, Stefan Kollmannsberger and Ernst Rank

Analysis of topological derivative for qualitative identification using elastic waves
Marc Bonnet

An Inverse Convolution Method for Source and Damage Detection in Periodic and Homogeneous Media
Régis Boukadia, Luca Sangiuliano, Claus Claeys, Mohamed Ichchou, Wim Desmet and Elke Deckers

9/6/22 16:30 - 18:30
Mathematical models and simulation tools for functional coatings
Minisymposium organized by Natalia Konchakova, Peter Klein, Ulf Schoeneberg, Daniel Hoeche and Heinz A. Preisig

MS79A
Room: Jan Mayen 2
Chair: Dr. Peter Klein
CoChair: Dr. Natalia Konchakova

Multiscale Simulation of Functional Coatings For Catalytic Applications
Glenn Jones

Computational modelling of plasma electrolytic oxidation process induced damage in extruded Mg material
Eugen Gazenbiller, Sohail Mansoor, Natalia Konchakova, Maria Serdechnova, Carsten Blawert, Mikhail Zheludkevich and Daniel Höche

Wear Models for plastic injection moulds failures
Amaya Igartua, Borja Zabala and Raquel Bayon

On the way to digitalization of coating industry
Natalia A. Konchakova, Peter Klein and Heinz A. Preisig

Model topology of active protective coating
Heinz A Preisig, Peter Klein and Natalia Konchakova

Reliable materials modelling translation for interfacial and transport phenomena
Martin T. Horsch, Silvia Chiacchiera, Christoph Niethammer, Björn Schembera, Felix Diewald, Peter Klein, *Simon Stephan, Heinz A. Preisig, Natalia A. Konchakova and Welchy L. Cavalcanti*

Business decisions modelling in a multi-scale material selection & design framework: case of VIPCOAT H2020 project
Salim Belouettar, Peter Klein, Natalia Konchakova and Carlos Kavka

9/6/22 16:30 - 18:30
Interdisciplinary challenges towards exascale fluid dynamics II
Minisymposium organized by Niclas Jansson, Stefano Markidis, Philipp Schlatter, Matts Karlsson and Erwin Laure

MS154B
Room: Jan Mayen 3
Chair: Niclas Jansson
CoChair: Martin Karp

Evaluation of infection risk due to airborne virus transmission in an restaurant environment (Keynote Lecture)
Rahul Bale, Ching-Gang Li, Hajime Fukudome, Saori Yumino, Akiyoshi Iida and Makoto Tsubokura

Preparing a Fortran legacy code for the upcoming exascale architectures
Joeffrey Legaux and Gabriel Staffelbach

Large-scale DNS of turbulence with efficient and accurate particle tracking
Cristian C. Lalescu, Bérenger Bramas, Markus Rampp and Michael Wilczek

Refactoring legacy Fortran applications to leverage modern heterogenous architectures in extreme-scale CFD
Niclas Jansson, Martin Karp, Artur Podobas, Stefano Markidis and Philipp Schlatter

9/6/22 16:30 - 18:30
Advanced HPC algorithms for large-scale simulations II
Minisymposium organized by Xavier Álvarez-Farré, F. Xavier Trias, Andrey Gorobets and Takayuki Aoki

MS75B
Room: Lounge A2
Chair: Francesc Xavier Trias

Highly parallel multi-level preconditioners for incompressible flow problems
Sven Baars, Alexander Heinlein, Jonas Thies and Fred W. Wubs

A Parallel Solver for CFD based on the Alternating Anderson-Richardson Method
Li Juan Chan, Simão Marques and Nicholas Hills

Role of rounding in implementing gradient descent with low-precision representation
Lu Xia, Stefano Massei, Michiel Hochstenbach and Barry Koren

Efficient strategies for solving the variable Poisson equation with large contrasts in the coefficients
Àdel Alsalti-Baldellou, Xavier Álvarez-Farré, Andrey Gorobets and F. Xavier Trias

Computational solution of the linearized Boltzmann equation with ab initio potential
Thanasis Basdanis and Dimitris Valougeorgis

9/6/22 16:30 - 18:30
Data-driven Reduced Simulation Models for Industrial Applications II
Minisymposium organized by Norbert Hosters, Daniel Wolff and Daniel Hilger

MS50B
Room: Spitsbergen
Chair: Norbert Hosters
CoChair: Daniel Hilger

Resolving dispersion coefficients in reduced order chromatography models
Jayghosh S. Rao, Marek Behr and Eric von Lieres

Hybrid process modelling combining mechanistic equations with machine learning
Jazib Hassan, Jayghosh Rao and Eric von Lieres

Physics-aware convolutional neural networks for computational fluid dynamics simulations
Viktor Grimm, Alexander Heinlein and Axel Klawonn

Optimized graph-based methods for subsurface flow simulations
Stein Krogstad, Øystein Klemetsdal, August Johansson and Knut-Andreas Lie

A grey box approach for online process monitoring
Lars Bogaerts, Arnout Dejans, Patrick Van Rymenant, Matthias Faes and David Moens

In silico clinical trials: SILICOFCM – Coupling of physical based and data driven modeling
Nenad Filpovic

9/6/22 16:30 - 18:30
Predicitive Modelling for Multi-Physics Problems in Engineering: Methods, Algorithms and Challenges
Minisymposium organized by Andrew Buchan and Jeff Gomes

MS158A
Room: Svalbard
Chair: Jeff Gomes
CoChair: Andrew Buchan

A CFD-Radiation model for the simulation of UV photoreactors for drinking water treatment (Keynote Lecture)
Liang Yang, Andrew G. Buchan and Peter Jarvis

Fuzzy logic based rapid visual screening methodology for structural damage state determination of URM buildings
Nurullah Bektaş and Orsolya Kegyes-Brassai

A tensor-based geology preserving formulation for upscaling heterogeneous permeability fields
Temiloluwa A. Onimisi, Babatunde O. Lashore and Jefferson LMA. Gomes

Fluid-structure interaction simulation of a wire-wrapped tube array using overset grids
Henri Dolfen, Dieter Van Hauwermeiren, Axel Bral and Joris Degroote

Coupled analysis for flow-driven energy harvester
Shigeki Kaneko and Shinobu Yoshimura

9/6/22 16:30 - 18:30
Multiscale Methods for Composites and Heterogeneous Materials II
Minisymposium organized by Paul Steinmann, Guillermo Etse, Daya Reddy and Osvaldo Manzoli

MS87B
Room: O – 3
Chair: L. Mester
CoChair: E. Börjesson

Imperfect interface modeling of potential and elasticity problems with thin layers: recent theoretical and computational developments
Sofia Mogilevskaya, Svetlana Baranova, Zhilin Han, Dominik Schillinger and Volodymyr Kushch

On the analysis of targeted cooling processes and resulting residual stresses
Sonja Hellebrand, Lisa Scheunemann, Dominik Brands and Jörg Schröder

Estimating stress fluctuations in polycrystals with an improved maximum entropy method
Maximilian Krause and Thomas Böhlke

Local surrogate responses in Schwarz alternating method for elastic problems on random domains
Martin Drieschner, Robert Gruhlke, Yuri Petryna, Martin Eigel and Dietmar Hömberg

Multi-scale numerical investigation to predict the irradiation-induced change in engineering properties of fusion reactor materials
Salahudeen Mohamed, Rhydian Lewis and LLion Evans

9/6/22 16:30 - 18:30
Unexplored avenues of computational modeling of living systems, from in silico to the clinics
Minisymposium organized by Alessio Gizzi and Alessandro Veneziani

MS104A
Room: O – 4
Chair: Alessio Gizzi
CoChair: Alessandro Veneziani

Complex biomechanics: from atoms to patients
Christian Hellmich, Stefan Scheiner, Johannes Kalliauer and Niketa Ukaj

Fluid-structure interaction calibration from 4d-flow MRI
Mocia Agbalessi, Muriel Boulakia, Miguel Fernandez, Damiano Lombardi and Mihai Nechita

Patient-specific simulation and data analysis for diagnosis and treatment of heart valve disease
Johan Hoffman and Joel Kronborg

A thermodynamics-based thermoelastic constitutive model of cardiac radiofrequency ablation
Alessio Gizzi, Leonardo Molinari and Luca Gerardo-Giorda

18:30 - 19:00: Aperitif served (Nova Spektrum Hall B3+B4)
19:00 - 19:30: Closing remarks (Nova Spektrum Hall B3+B4)
19:30 - 20:00: Time to walk from Hall B to Hall E
20:00 - 23:00: Dinner at Nova Spektrum Hall E