Coupled Problems 2025
Technical Programme

Last updated: 2026-04-13 11:22

Sunday, 25/05/2025

Sun, 25/05/2025 17:00 - 19:00
Pre-Registration

Sun, 25/05/2025 19:15 - 20:30
Welcome Reception

Monday, 26/05/2025

Mon, 26/05/2025 07:45 - 08:45

Registration

Mon, 26/05/2025 08:45 - 09:00 Sala Ibisco

Opening Ceremony

Mon, 26/05/2025 09:00 - 10:30 Sala Ibisco

PL1 - Plenary Lectures I

Chaired by: Prof. Bernhard Schrefler (University of Padua, Italy)

Coupled Problems: Marking 20 Years of Advancement and Continued Impact

***P. Wriggers**

Brain membranes and vasculature - a computational mathematics tale of dimensional gaps

***M. Rognes**

Mon, 26/05/2025 10:30 - 11:00

Coffee Break

Mon, 26/05/2025 11:00 - 13:00 Sala Ibisco

IS001A - Advances in Iterative Solution Methods for Solving Coupled Problems I

Main Organizer: Dr. Patrick Zulian (Università della Svizzera italiana)
Chaired by: Dr. Patrick Zulian (Università della Svizzera italiana), Dr. Pietro Benedusi (USI, Euler Institute)

A fictitious domain approach to FSI: computational challenges and solution methods

***D. Boffi,** F. Credali, L. Gastaldi

Staggered schemes for fluid-structure interaction based on Dirichlet-Neumann coupling

***E. Alhayki,** W. Dettmer

A Reverse Constrained Preconditioner for the Lagrange Multipliers Method in Contact Mechanics

***A. Franceschini,** C. Janna

An Innovative Numerical Method To Assess Elastic And Viscoelastic Lubricated Contacts

***C. Putignano,** M. Santeramo

Convergence acceleration vector methods for divergent fixed point iterations

***I. RAMIERE**

A coupled finite-discrete element method based on accelerated fixed-point iterations for frictionless contact problems

***D. Koliesnikova,** I. Ramière, L. Amarsid

Mon, 26/05/2025 11:00 - 13:00 Sala Gardenia

IS030A - Efficient solvers for coupled flow and deformation in porous media I

Main Organizer: Prof. Florin Adrian Radu (University of Bergen)
Chaired by: Dr. Wietse Boon (NORCE Norwegian Research Centre), Prof. Alessio Fumagalli (Politecnico di Milano)

Robust splitting schemes for different poromechanics models

***F. Radu**

On a decoupled solver for Biot's model

A. Pe, C. Rodrigo, ***F. Gaspar,** X. Hu, J. Adler, L. Zikatanov

Fixed Stress-Based Preconditioner for Non-Isothermal Fracture Contact Poromechanics Problem

***Y. Zabegaev,** E. Keilegavlen, K. Kumar, I. Berre

Efficient and robust solvers for a poroelastic multi-cell model of cerebral tissue mechanics

***M. Causemann,** M. Kuchta

Dynamic Poroelasticity: Formulations, Error Analysis and Algebraic Solver

***M. Bause,** M. Anselmann, N. Margenberg, P. Shamko

Mon, 26/05/2025 11:00 - 13:00 Sala Begonia

IS037A - Mixed-Dimensional Modeling: Discretizations, Solvers and Multi-Physics Applications I

Main Organizer: Dr. Matthias Mayr (Universität der Bundeswehr München)
Chaired by: Dr. Matthias Mayr (Universität der Bundeswehr München), Mr. Paolo Zunino (MOX, Department of Mathematics, Politecnico di Milano)

Natural mixed-dimensional couplings in Cosserat continua via tangential differential calculus

***A. Sky,** J. Hale, A. Zilian, S. Bordas, P. Neff

Mixed Discontinuous Galerkin Method for Coupled 1D-3D Diffusion Problems

***M. Rötzer,** A. Rupp, N. Ray

A mixed-dimensional 3D-1D model of Partial Discharges and Electrical Treeing

***B. Crippa,** A. Scotti, A. Villa

Modeling Soil-Root Interactions: Virtual Elements for 3D-1D Coupling

***S. Berrone,** S. Ferraris, D. Grappein, G. Teora, F. Vicini

Mon, 26/05/2025 11:00 - 13:00 Sala Azalea

IS047A - New Challenges for Unfitted Methods in Coupled and Multiphysics Problems I

Main Organizer: Dr. Fabio Credali (King Abdullah University of Science and Technology)
Chaired by: Prof. Daniele Boffi (KAUST)

The Virtual Element Method on pixel based domain approximations

***S. Bertoluzza,** M. Montardini, M. Pennacchio, D. Prada

phi-FD : A finite difference scheme with an optimal convergence for elliptic PDEs on domains defined by a level-set function

***M. Duprez,** V. Lleras, A. Lozinski, V. Vigon, K. Vuillemot

Finite element discretization of FSI with distributed Lagrange multiplier

D. Boffi, F. Credali, ***L. Gastaldi**

Matrix-Free Kernels and Preconditioning Techniques for Immersed Boundary Solvers

M. Benzi, ***M. Feder,** L. Heltai, F. Mugnaioni

Asymptotic Preserving (AP) and Asymptotic Accurate (AA) numerical scheme for a two-species multiscale model

***C. Astuto,** G. Russo

Mon, 26/05/2025 11:00 - 13:00 Sala Magnolia

IS009A - Advances in Numerical Methods for Multiphysics Problems Involving Moving Boundaries and Interfaces I

Main Organizer: Dr. Navid Valizadeh (Leibniz Universität Hannover)
Chaired by: Dr. Han Hu (Leibniz University Hannover), Dr. Navid Valizadeh (Leibniz Universität Hannover)

X-Mesh -- An eXtreme mesh deformation method to follow sharp physical interfaces. Keynote

***J. Remacle**

Towards a coupled sharp-diffuse interface approach for metal additive manufacturing melt pool modeling with rapid evolution

***N. Much,** M. Schreter-Fleischhacker, C. Meier

Adaptive Numerical Simulation of Electro Discharge Machining finishing operations using and embedded approach

***J. Baiges,** H. Venghaus, M. Dias

Fully Eulerian Multiphase Fluid-Structure Interaction: A Monolithic Finite Element Framework

***N. Valizadeh,** X. Zhuang, T. Rabczuk

Mon, 26/05/2025 11:00 - 13:00 Sala di Vetro

IS004A - Advanced Numerical Methods for Coupled Particle-Laden Flow Problems I

Main Organizer: Prof. Célio Fernandes (University of Porto)
Chaired by: Dr. Jonas Knoch (Friedrich-Alexander-Universität Erlangen-Nürnberg), Prof. Célio Fernandes (University of Porto)

Numerical Simulation of Viscoelastic Suspensions using a Coupled Immersed Boundary – Finite Volume – Discrete Element Method

Keynote

***C. Fernandes**

Particle dynamics in low-Reynolds-number fluids under general geometries

***X. Jiang,** J. de Pablo

Efficient Methods for Coupled Problems based on Cartesian Hierarchical Meshes

***T. Wegmann,** T. Kiwitt, D. Krug, M. Meinke, W. Schröder

Pore-scale Modelling of Shear Rheology of Wet Granular Materials

***L. Fei,** D. Derome, J. Carmeliet

Mon, 26/05/2025 11:00 - 13:00 Sala Ginestra

IS006A - Advances in Computational Methods for Digital Twins in Coupled Systems I

Main Organizer: Dr. Marco Tezzele (Emory University)
Chaired by: Dr. Marco Tezzele (Emory University)

High-Fidelity Digital Twinning Approaches for Coupled Field Problems

***R. Wüchner,** S. Warnakulasuriya, I. Antonau, T. Ansari, F. Airaudo, R. Löhner, H. Antil

On the feasibility of foundational models for neural simulation

***A. Tierz,** M. Martinez Iparraguirre, I. Alfaro, D. Gonzalez, F. Chinesta, E. Cueto

Reduced-order Surrogate Modeling as Foundation for Catalyzing Digital Twins in Process and Chemical Engineering

***L. Peterson,** A. Forootani, E. Sanchez Medina, I. Gosea, P. Benner, K. Sundmacher

Thermodynamics-informed Graph Neural Networks for Digital Twin simulation

***A. Tierz,** I. Alfaro, D. González, F. Chinesta, E. Cueto

Development of a Strong Form Meshless Solution Procedure for Thermo-Mechanical Modelling of Steel Production Processes

***G. Vuga,** T. Dobravec, B. Mavri?, U. Hanoglu, B. Šarler

Mon, 26/05/2025 11:00 - 13:00 Sala delle Ceramiche

IS015A - Computational Models and Methods for Multiphysics Processes in Multiphase Porous Media I

Main Organizer: Prof. Lorenzo Sanavia (University of Padova)
Chaired by: Prof. Claudio Tamagnini (University of Perugia), Prof. Lorenzo Sanavia (University of Padova)

Modelling coarse-grained aggregate collapse on wetting by relative humidity and water activity changes

***J. Torres-Serra,** E. Romero

Investigation of Retention Behaviour in Hierarchical Multiscale Porosity Domains

***V. Kumar,** S. Beese, T. Nagel

Image-based modeling of concrete behavior at high temperature

***S. Pastore,** S. Dal Pont, D. Lasseux, G. Sciumè

Lattice-particle Model for the Characterization of Advanced Cementitious Composites in Thermal Energy Storage Applications

***F. Montero-Chacón,** L. Ortiz-Vasquez, J. Endrino

Coupled modelling of phase change processes in soil – a peridynamics approach

***P. Nikolaev,** A. Jivkov, M. Sedighi

Multiphysics Modelling of Fracture in Non-Isothermal Multiphase Clayey Soils with the Crack Phase-Field Approach: Preliminary Investigations

***L. Sanavia,** Z. Chen, L. De Lorenzis

Mon, 26/05/2025 11:00 - 13:00 Samarcanda

IS039A - Modeling of Coupled Phenomena in Fractured Quasi-Brittle Materials, and Implementation in HPC Environment I

Main Organizer: Dr. Ignacio Carol (UPC)
Chaired by: Prof. Massimiliano Ferronato (University of Padova)

Deflation dynamics of hydraulic fractures in porous elastic media

***A. Peirce**

A multi-physics multi-domain coupled simulation tool in porous media with non-conforming fracture surfaces

***M. Ferronato,** A. Franceschini, D. Moretto

New Physically-Based Exponential Water Retention Curve for Rock Fractures with Damage Coupling Using Zero-Thickness Interface Elements

***L. Barandiarán,** C. López, I. Carol

Modeling Fractures Using the Finite Volume Approach for Practical Reservoir Applications

A. Novikov, ***D. Voskov**

Mon, 26/05/2025 13:00 - 14:00

Lunch Break

Mon, 26/05/2025 14:00 - 16:00 Sala Ibisco

IS001B - Advances in Iterative Solution Methods for Solving Coupled Problems II

Main Organizer: Dr. Patrick Zulian (Università della Svizzera italiana)
Chaired by: Dr. Alena Kopanicakova (Toulouse-INP), Prof. Rolf Krause (KAUST)

Scalable non-linear solvers for finite elements discretizations of the Cai-Hu model **Keynote**

***S. Zampini,** P. Markowich, J. Hascovec

Scalability of algebraic multigrid methods for block matrices arising from monolithic multi-physics solvers

***M. Mayr,** M. Firmbach, A. Popp

Decoupling Stokes

***P. Brubeck,** C. Parker, P. Farrell

Application of the monolithic, parallel FROSch solver framework to a saddle-point formulation in chemo-mechanics

***A. Balachandran Jeeja,** B. Kiefer, S. Prüger, O. Rheinbach, F. Röver

Efficient Techniques For Barely Coupled Multiphysics

***R. Lohner,** J. Cebral, H. Antil, S. Schoeps

Mon, 26/05/2025 14:00 - 16:00 Sala Gardenia

IS030B - Efficient solvers for coupled flow and deformation in porous media II

Main Organizer: Prof. Florin Adrian Radu (University of Bergen)
Chaired by: Prof. Alessio Fumagalli (Politecnico di Milano), Prof. Florin Adrian Radu (University of Bergen)

Polytopal discontinuous Galerkin methods for coupled low-frequency poroelasticity and unsteady Stokes flow **Keynote**

***M. Botti,** I. Fumagalli, I. Mazzieri

Hybrid-Dimensional Biot Problem with an Optimization Based Domain Decomposition Approach

***S. Scialò**

Fully-Mixed Virtual Element Method for the Biot Problem

M. Botti, D. Prada, A. Scotti, ***M. Visinoni**

Efficient solution of discontinuous Galerkin approximation of the non-linear thermo-poroelastic problem

***S. Bonetti,** M. Botti, P. Antonietti

Numerical Simulation of Wave Propagation in Viscoelastic Heterogeneous Materials of Kelvin-Voigt Type

***N. Crescenzio,** A. Larese, F. Piazzon, M. Putti

Mon, 26/05/2025 14:00 - 16:00 Sala Begonia

IS037B - Mixed-Dimensional Modeling: Discretizations, Solvers and Multi-Physics Applications II

Main Organizer: Dr. Matthias Mayr (Universität der Bundeswehr München)
Chaired by: Prof. Kent-Andre Mardal (Simula Research Laboratory / University of Oslo), Dr. Matthias Mayr (Universität der Bundeswehr München)

Block preconditioning for mixed-dimensional beam/solid coupling

***M. Firmbach,** I. Steinbrecher, A. Popp, M. Mayr

Solvers for mixed finite element methods based on spanning trees

***W. Boon**

A Neural Preconditioner for Mixed-Dimensional PDEs

N. Dimola, N. Franco, P. Zunino

Domain Decomposition with Nonlinear Model Order Reduction for Multiscale Mixed-Dimensional Problems

P. Vitullo, N. Dimola, V. Brenzone, P. Zunino

Robust nonlinear solution of coupled flow and deformation in fractured porous media under contact

***J. Both,** I. Berre

Numerical analysis and well-posedness of the Shear Alfvén wave problem

***M. Renoldner,** T. Miehling, M. Picasso, A. Buffa, P. Ricci

Mon, 26/05/2025 14:00 - 16:00 Sala Azalea

IS047B - New Challenges for Unfitted Methods in Coupled and Multiphysics Problems II

Main Organizer: Dr. Fabio Credali (King Abdullah University of Science and Technology)
Chaired by: Prof. Lucia Gastaldi (Università di Brescia)

Interaction of incompressible fluids and shells disregarding the shell thickness in the flow dynamics and using a solid model for the shell
***R. Codina,** A. Aguirre, R. Zorrilla, J. Baiges

Parallel overlapping Schwarz algorithms for discontinuous problems in biomechanics
***N. Huynh,** L. Pavarino, S. Scacchi

High-Order Ghost Point Methods for Complex-Shaped Domains: Accurate Boundary Condition Discretization and Multigrid Solvers
***A. Coco,** G. Russo

Solving PDEs in non-conforming multidomain settings: the Internodes method
***P. Gervasio**

A high-order conservative cut finite element method for problems in time-dependent domains
***S. Myrbäck,** S. Zahedi

Achieving the Optimal Approximation Rate of Nonlinear Shallow Neural Networks through Simple Linearization
X. Liu, T. Mao, J. Xu

Mon, 26/05/2025 14:00 - 16:00 Sala Magnolia

IS009B - Advances in Numerical Methods for Multiphysics Problems Involving Moving Boundaries and Interfaces II

Main Organizer: Dr. Navid Valizadeh (Leibniz Universität Hannover)
Chaired by: Dr. Navid Valizadeh (Leibniz Universität Hannover), Dr. Han Hu (Leibniz University Hannover)

A Unified Peridynamics for Solids and Fluids: Coupled Total- and Semi-Lagrangian formulation
***C. Yang,** J. Zhao, F. Zhu

Insulator-Dielectric and Conductor-Dielectric Contact Problems in Finite Deformation Flexoelectricity
***H. Hu,** X. Zhuang

Adaptive Stabilised Finite Elements to Model Reactive Transport in Porous Media
***J. Giraldo,** T. Poulet, S. Vialle, V. Calo

Grid Deformation Challenges during Partitioned Simulation of Constrained Melting
***V. Van Riet,** W. Beyne, J. Degroote

Mon, 26/05/2025 14:00 - 16:00 Sala di Vetro

IS004B - Advanced Numerical Methods for Coupled Particle-Laden Flow Problems II

Main Organizer: Prof. Célio Fernandes (University of Porto)
Chaired by: Prof. Célio Fernandes (University of Porto), Dr. Jonas Knoch (Friedrich-Alexander-Universität Erlangen-Nürnberg)

Neural Network Model Implementation for Flow-Induced Drag in Dense Particle-Laden Flows Keynote
***N. Vovk,** J. Ravnik

Large numbers of non-spherical soft particles in dilute flows
***J. Wedel,** P. Steinmann, M. Hribersek, J. Ravnik

FEM-DEM model of a water droplet digging in hot granular bed
***M. Henry,** N. Coppin, S. Dorbolo, V. Legat, J. Lambrechts

Modeling and simulation of magneto two-phase flow for magnetic drug targeting
***J. Knoch,** E. Bänsch, N. Neuß, C. Gräser, M. Neuss-Radu

Mon, 26/05/2025 14:00 - 16:00 Sala Ginestra

IS006B - Advances in Computational Methods for Digital Twins in Coupled Systems II

Main Organizer: Dr. Marco Tezzele (Emory University)
Chaired by: Dr. Marco Tezzele (Emory University)

Towards modelling full contact of Fluid Structure Acoustics Interaction in Human Phonation
***S. Schoder,** T. Brunnder, B. Tur, S. Kniesburges

A Digital Twin of the Human Liver
***T. Ricken,** S. Gerhäusser, L. Mandl, A. Mielke, M. Suditsch

A study on the message passing mechanism in Graph Neural Network Simulators
***L. Tesán,** D. González, P. Martins, E. Cueto

Physical Surrogate for Large Parametrized Loosely Coupled Multiphysics Problems: Application to Power Transformers
***R. Cloarec,** S. Rodriguez, L. Achour, F. Hafid, P. Langlois, X. Kestelyn, F. Chinesta

Real-Time Simulation through Hybrid AI for the Creation of Digital Human Twins
***L. Tesan,** D. Gonzalez, P. Martins, E. Cueto

Development, Experimental Validation, and Uncertainty Quantification Analysis of a Multiphysics Digital Twin for Predicting Thermal Behavior in Automotive Lithium Batteries
***D. Fedeli,** M. Lagnoni, C. Scarpelli, F. Quilici, A. Bertei, G. Lutzemberger, M. Salvetti, A. Mariotti

Mon, 26/05/2025 14:00 - 16:00 Sala delle Ceramiche

IS015B - Computational Models and Methods for Multiphysics Processes in Multiphase Porous Media II

Main Organizer: Prof. Lorenzo Sanavia (University of Padova)
Chaired by: Prof. Lorenzo Sanavia (University of Padova), Prof. Claudio Tamagnini (University of Perugia)

Modelling and Calibration of a Bi-Phasic Electrolyte for Structural Battery Applications

***C. Larsson,** F. Larsson, K. Runesson, L. Asp

On Hydromechanics of Rock Mass Containing a Discrete Fracture Network

***S. Pietruszczak,** A. Jameei

Towards a surrogate model for debris flow events

***E. Spricigo,** K. Deependra, M. Putti, D. Pasetto, A. Larese

The role of large strain fibre kinematics in the mechanical response of peat

***L. Parra-Gómez,** S. Muraro, C. Jommi

A 3D model for caisson breakwater foundations

***P. MIRA,** J. Fernandez-Merodo, M. Pastor, D. Manzanal, M. Martín-Stickle, A. Yagüe, J. Lopez-Maldonado, A. Tomás, G. Barajas, J. Lopez-Lara

PFEM simulation of the effects of destructuration induced by cone penetration in CPTu tests in a natural structured clay

***K. Oliynyk,** M. Ciantia, C. Tamagnini

Mon, 26/05/2025 14:00 - 16:00 Samarcanda

IS059A - Structure-Preserving Discretization of Coupled Problems I

Main Organizer: Prof. Peter Betsch (Karlsruhe Institute of Technology (KIT))
Chaired by: Prof. Peter Betsch (Karlsruhe Institute of Technology (KIT)), Prof. Sigrid Leyendecker (Friedrich-Alexander-Universität Erlangen-Nürnberg)

Optimal control of multibody systems with dielectric elastomer actuators

D. Dengpeng Huang, D. Holz, ***S. Leyendecker**

Nonlinear viscoelasticity: Green-Naghdi kinematic assumption and structure-preserving schemes

***J. Liu,** J. Guan, J. Luo

A Petrov-Galerkin EAS Formulation for the FE-Simulation of Thermo-Elastomechanical Problems

***F. Zähringer,** P. Betsch

A Provably Stable Method for Solving the Anisotropic Diffusion Equation in Magnetic Fields.

***D. Muir,** K. Duru, S. Hudson, M. Hole

Time integration schemes for discrete multi-physical systems based on GENERIC

***P. Reiff,** P. Betsch

On Structure Preserving Properties of a Polyconvexity-Inspired, Mixed GENERIC Formalism to Simulate Nonlinear Coupled Thermo-Elastodynamical Problems
M. Hille, M. Franke, ***P. Betsch**

Mon, 26/05/2025 16:00 - 16:30

Coffee Break

Mon, 26/05/2025 16:30 - 17:15 Sala Ibisco

PL2 - Plenary Lecture II

Chaired by: Prof. Peter Wriggers (Leibniz University of Hannover)

Multiscale modeling of coupled thermo-hydro-mechanical problems in granular media

***J. Zhao**

Mon, 26/05/2025 17:30 - 18:50 Sala Ibisco

IS001C - Advances in Iterative Solution Methods for Solving Coupled Problems III

Main Organizer: Dr. Patrick Zulian (Università della Svizzera italiana)
Chaired by: Dr. Pietro Benedusi (USI, Euler Institute), Dr. Suvranu De (FAMU-FSU College of Engineering)

Modeling hiPSC-CM Electrophysiology on Multi-Electrode Arrays: A Coupled Bidomain and Electrode Approach

***S. Botti,** R. Krause, L. Pavarino

Scalable and Multilevel Preconditioners for Composite Discontinuous Galerkin Discretizations of the Cardiac EMI Model

***E. Centofanti**

Clinically Motivated Numerical Studies for the EMI Electrophysiology Model

***J. Steyer,** P. Benedusi, E. Centofanti, M. Potse, A. Loewe

Nonlinear Preconditioning Techniques for Efficient Phase-Field Fracture Modeling

***A. Kopani?áková,** H. Kothari, R. Krause

Mon, 26/05/2025 17:30 - 18:50 Sala Gardenia

IS030C - Efficient solvers for coupled flow and deformation in porous media III

Main Organizer: Prof. Florin Adrian Radu (University of Bergen)
Chaired by: Prof. Florin Adrian Radu (University of Bergen), Dr. Wietse Boon (NORCE Norwegian Research Centre)

Efficient solvers for coupled flow and reactive transport models arising from the carbonation reactions in concrete structures

***E. Javierre,** C. Rodrigo, F. Gaspar, F. Radu

Darcy's Law in Coupled Geomechanics and Multiphase Flow

***S. Nachum**

Finite Element Quasi-Dynamic Analysis of Fluid-Driven Slip on a Three-Dimensional Fault with Rate-and-State Friction

***N. Hosseini,** A. Paluszny, R. Zimmerman

Mon, 26/05/2025 17:30 - 18:50 Sala Begonia

IS037C - Mixed-Dimensional Modeling: Discretizations, Solvers and Multi-Physics Applications III

Main Organizer: Dr. Matthias Mayr (Universität der Bundeswehr München)
Chaired by: Mr. Paolo Zunino (MOX, Department of Mathematics, Politecnico di Milano), Dr. Matthias Mayr (Universität der Bundeswehr München)

Etherogeneous Dimensional Coupling of Vascularized Tissues: A Reduced Lagrange Multiplier Framework for Bidirectional Elastic Matrix-Fluid Inclusion Interactions

***L. Heltai,** C. Belponer, A. Caiazzo, L. Muller

Modelling of Vascular Influence on Brain Tissue Mechanics

***Y. Verma,** L. Heltai, P. Steinmann

An Optimization-Based 3D-1D Coupling Approach for the Simulation of the Exchanges Between Tissues and Thin Embedded Tubular Structures

***D. Grappein,** S. Berrone, C. Giverso, L. Preziosi, S. Scialò, F. Vicini, A. Arduino, O. Bottauscio, U. Zanovello, L. Zilberti

A Mixed-Dimensional Formulation for the Simulation of Slender Structures Immersed in an Incompressible Flow

***F. Lespagnol,** M. Boulakia, M. Fernández, C. Grandmont, P. Zunino

Mon, 26/05/2025 17:30 - 18:50 Sala Azalea

IS047C - New Challenges for Unfitted Methods in Coupled and Multiphysics Problems III

Main Organizer: Dr. Fabio Credali (King Abdullah University of Science and Technology)
Chaired by: Dr. Fabio Credali (King Abdullah University of Science and Technology)

Discretization and Multilevel Solution Methods for Contact Problems in an Unfitted Finite Element Framework

***R. Krause,** H. Kothari

A numerical scheme supporting polygonal meshes for a coupled Stokes/Maxwell problem

***A. Spadotto,** D. Di Pietro, S. Mendez

Advances on Interface Problems with Jumping Coefficients Using a Fictitious Domain Formulation with Distributed Lagrange Multipliers

***N. Alshehri,** D. Boffi, L. Gastaldi

Multigrid Methods for Ghost Finite Element Formulations

***H. Dilip,** A. Coco

Mon, 26/05/2025 17:30 - 18:50 Sala Magnolia

IS009C - Advances in Numerical Methods for Multiphysics Problems Involving Moving Boundaries and Interfaces III

Main Organizer: Dr. Navid Valizadeh (Leibniz Universität Hannover)
Chaired by: Dr. Navid Valizadeh (Leibniz Universität Hannover), Dr. Han Hu (Leibniz University Hannover)

Development of a Unified Numerical Approach for Conjugate Heat Transfer Using Immersed Boundary Methods with a Compressible Solver on High-Performance Computing Systems

***C. Li**

Phase Field Modeling with Neural Operators

***M. Eshaghi,** N. Valizadeh, X. Zhuang, T. Rabczuk

Development of an Advanced Coupled FSI Solver for Hydroelastic Energy Harvesting Applications

***K. Ahmed,** L. Chatellier, F. Auricchio, A. Reali

Controlled Limit Cycle Oscillations in Modified Glauert Airfoil

***V. Golubev,** W. MacKunis

Mon, 26/05/2025 17:30 - 18:50 Sala di Vetro

IS025A - Decoupling strategies for coupled flow problems and multiphysics I

Main Organizer: Dr. Douglas Pacheco (RWTH Aachen University)
Chaired by: Dr. Douglas Pacheco (RWTH Aachen University), Dr. Richard Schussnig (Ruhr University Bochum)

Higher-Order Projection Methods for Generalised Newtonian Fluids

***R. Schussnig,** D. Pacheco, M. Kronbichler

Decoupled Numerical Strategy to Predict the Performance of an Ejector Refrigeration System for Different Heat Input Conditions

***S. Valencia-Cañola,** F. Méndez, C. Bustamante

Numerical Coupling of a FVM and FEM Codes Applied to a Low-Prandtl Turbulent Square Cavity

S. Baldini, G. Barbi, A. Cervone, ***F. Giangolini,** S. Manservisi, L. Sirotti

A FEM-FVM Coupling Code for Numerical Simulation of a Liquid Metal Heat Exchanger

***L. Sirotti,** S. Baldini, G. Barbi, A. Cervone, F. Giangolini, S. Manservisi, V. La Salandra

Mon, 26/05/2025 17:30 - 18:50 Sala Ginestra

IS010A - Biological fluid structure interaction at low to intermediate Reynolds numbers I

Main Organizer: Prof. Alexander Hoover (Cleveland State University)
Chaired by: Prof. Alexander Hoover (Cleveland State University)

Emergent flow asymmetries from the metachronal motion of the soft flexible paddles of the gossamer worm

***A. Hoover,** J. Mills

Flows Generated by Jellyfish with Prominent Oral Arms

***L. Miller,** A. Hoover, M. Santiago

Locomotion of Cardiomyocytes-Powered Swimmers: a Numerical Study Based on Fluid-Structure-Electrophysiology-Interaction

***R. Santoriello,** F. Viola, V. Citro

Mechano-chemical Pattern Formation in an Immersed Boundary Framework

***O. Lewis,** B. Leathers, R. Guy

Mon, 26/05/2025 17:30 - 18:50 Sala delle Ceramiche

IS058A - Structure-Preserving and Asymptotic-Preserving Particle Methods for Plasma Simulation I

Main Organizer: Dr. Luis Chacon (Los Alamos National Laboratory)
Chaired by: Dr. Luis Chacon (Los Alamos National Laboratory), Prof. Andrew Christlieb (Michigan State University)

Hybrid particle-fluid exact models for plasmas and physics preserving discretization

***T. Mukhamet,** K. Kormann

A Massive Space-Time Parallel Particle-In-Fourier Framework for Kinetic Plasma Simulations

***S. Muralikrishnan,** R. Speck

Energy-stable spatial-temporal finite difference discretization of the two-fluid turbulent plasma model

***M. Bassanini,** S. Deparis, P. Ricci

Mesh aligned structure preserving particle-in-cell based on a the vector potential formulation under the Lorenz gauge condition.

A. Christlieb, S. Gong, W. Sands, ***S. White**

Mon, 26/05/2025 17:30 - 18:50 Samarcanda

IS040A - Modeling of Surface-Subsurface Coupled Problems across Temporal and Spatial Scales I

Main Organizer: Phd. Elena Bachini (University of Padua)

Forecasting and optimizing irrigation demands by physics-based and data-driven models

***M. Berardi,** R. Guglielmi, V. Schiano Di Cola, M. Bruni, A. Alla, L. Saluzzi, F. Difonzo

HydroCAL: a computationally efficient continuous ISSHM developed through the Cellular Automata paradigm

***L. Furnari,** A. De Rango, A. Senatore, G. Mendicino

Geometric shallow water and diffusive wave approximation for basin scale coupled surface-subsurface hydrological simulations

***E. Bachini,** M. Camporese, A. Larese, M. Putti

New energy and mass conservative three-dimensional approach for solving river hydrodynamic problems across different hydraulic regimes

***U. Chasco Goñi,** R. Zorilla, R. Rossi

Tuesday, 27/05/2025

Tue, 27/05/2025 08:00 - 09:00

Registration

Tue, 27/05/2025 09:00 - 11:00 Sala Ibisco

IS001D - Advances in Iterative Solution Methods for Solving Coupled Problems IV

Main Organizer: Dr. Patrick Zulian (Università della Svizzera italiana)
Chaired by: Prof. Joris Degroote (Ghent University), Dr. Patrick Zulian (Università della Svizzera italiana)

Iterative algorithms for solving finite element problems on quantum computers Keynote

***S. De,** O. Raisuddin

Verification and Validation of a Neutronics/Compressible-Thermal-Hydraulics Coupling Tool for Fast Transient Simulation in Molten Salt Reactors
***T. Vidril,** S. de Lambert, N. Lelong, F. Drui, C. Patricot, E. Merle

Numerical Methods for Coupling Problems in Porous Media Field

***J. Chen,** M. Schulte

Coupled mechanical-thermal-moisture AI driven optimisation for zero-emission building design

***Y. Wei,** M. Liang, S. Contera, A. Jérusalem

Analysis of Quasi-Newton Methods for Partitioned Solution of Coupled Problems with Nonlinearity in the Secant Conditions

***J. Degroote**

Tue, 27/05/2025 09:00 - 11:00 Sala Gardenia

IS022A - Coupling Stochastic Microstructure Modeling, Machine Learning and Multiphysical Numerical Methods for Virtual Materials Testing I

Main Organizer: Dr. Orkun Furat (Ulm University)
Chaired by: Dr. Orkun Furat (Ulm University)

Combining Stochastic Geometry and Neural Models of Electron Matter Interaction for the Simulation of Electron Imaging of Porous Materials
***T. Dahmen,** N. Rottmayer, K. Schladitz, M. Kronenberger, Z. He, M. Hommel, P. Gospodnetic, C. Redenbach

Data Driven Materials Characterisation: Novel Synchrotron Experimental Strategies

***J. Le Houx,** S. Ruiz, C. Green, D. McKay Fletcher, A. Leonardi, L. Perera, N. Melzack, K. Williams, J. Filik, A. James, R. Wills, T. Roose, D. Dini, S. Ahmed

Modeling Polycrystalline Structures via Anisotropic Power Diagrams: The Role of Parameters

***A. Alpers,** A. Saken

Synthetic Surface Defects modeled using 2d Voronoi Tessellations

***N. Jeziorski,** P. Gospodnetic, C. Redenbach

Using Machine Learning to Correlate Microstructure with Diffusion, Flow and Wetting: New Results Regarding Connectivity and Bottleneck Effects
S. Barman, T. Gebäck, E. Kaunisto, A. Särkkä

Tue, 27/05/2025 09:00 - 11:00 Sala Begonia

IS054A - Recent advances in continuum electromagnetism of multifunctional materials I

Main Organizer: Dr. Andreas Warkentin (University Kassel)
Chaired by: Dr. Maximilian Vorwerk (University of Duisburg-Essen), Dr. Andreas Warkentin (University Kassel)

Modeling and Simulation of Pyropiezoelectric Energy Harvesting

***M. Schwarz,** R. Yamamoto, K. Kakimoto, J. Mergheim

Identification of Ferroelectric Energy Harvesting Cycles: Considering Interactions between Electrical Circuit and a Multiscale Constitutive Framework
***A. Warkentin,** L. Behlen, A. Ricoeur

Coulomb's Law, but for Bound Charges? New Insights and Implications for Dielectric Fracture

***L. Behlen,** D. Wallenta, A. Ricoeur

Magnetic Hysteresis Tailoring of Additively Manufactured Fe-Ni Permalloy by Multiphysics-multiscale Simulation

***Y. Yang,** B. Xu

Tue, 27/05/2025 09:00 - 11:00 Sala Azalea

IS033A - High-Order and Innovative Methods for Coupled Problems in Life Science and Geophysics I

Main Organizer: Mr. Mattia Corti (Politecnico di MILANO (MILANO))
Chaired by: Prof. Stefano Pagani (Politecnico di Milano), Mr. Mattia Corti (Politecnico di MILANO (MILANO))

Assessing permafrost erosion and infrastructure destabilization using the Arctic Coastal Erosion (ACE) coupled thermo-mechanical model **Keynote**

J. Frederick, A. Mota, ***I. Tezaur,** D. Bull, E. Bayat

Structure Preserving Finite Volume and Discontinuous Galerkin Schemes for the Coupled Einstein-Euler System in 3+1 General Relativity

***E. Gaburro,** M. Dumbser, O. Zanotti, I. Peshkov

A high-order solver for NWP using non-conforming adaptive and curved meshes: applications to flows over orography

***G. Orlando,** T. Benacchio, L. Bonaventura

Seismic Imaging of a Dam-Rock Interface with Elasto-Acoustic Wave Propagation Models

***M. Boukraa,** L. Audibert, M. Bonazzoli, H. Haddar, D. Vautrin

A cylindrical axial-symmetric virtual element method for acoustic wave propagation

***F. Dassi,** A. Fumagalli, I. Mazzieri, G. Vacca

Tue, 27/05/2025 09:00 - 11:00 Sala Magnolia

IS048A - Nonlinear approximation methods for coupled problems I

Main Organizer: Dr. Silke Glas (University of Twente)
Chaired by: Dr. Silke Glas (University of Twente), Prof. Karsten Urban (Universität Ulm)

Enhanced Reduced-Order Models for Efficient and Accurate Simulations in CFD and FSI **Keynote**

***G. Rozza**

Data-free tools for rigorous nonintrusive model reduction of nonlinear systems

***S. Jain**

Dynamical Low-Rank Approximation for Parametric Nonlinear Feedback Control

***M. Strazzullo, *L. Saluzzi**

Deep Learning for Structure-Preserving Universal Stable Koopman-Inspired Embeddings for Nonlinear Canonical Hamiltonian Dynamics

***P. Goyal,** S. Y?ld?z, P. Benner

Model Order Reduction for the Problems with Fractional Order Differential Operators

***R. Aylwin Pincheira,** G. Oruc, K. Urban

Tue, 27/05/2025 09:00 - 11:00 Sala di Vetro

IS025B - Decoupling strategies for coupled flow problems and multiphysics II

Main Organizer: Dr. Douglas Pacheco (RWTH Aachen University)
Chaired by: Dr. Richard Schussnig (Ruhr University Bochum), Dr. Douglas Pacheco (RWTH Aachen University)

An In-Depth Comparison of One-Phase and Two-Phase Fluid-Structure Interaction Approaches for Hydrofoil Performance Evaluation

***D. Di Cristofaro,** A. Frangi, A. Van Damme, E. Lataire, J. Degroote, M. Cremonesi

Unconditionally stable, linearized IMEX schemes for incompressible flows with variable density

***N. Espinoza-Contreras,** D. Ramalho Queiroz Pacheco

A fully decoupled and unconditionally stable IMEX method for dispersed multi-phase flows

***D. Pacheco**

Modeling Fractures and Thin Heterogeneities as Interface Conditions

***M. Favino,** R. Krause

Spectral Methods for General Fractional Differential Equations

***P. Pranjivan Mehta,** G. Rozza

Tue, 27/05/2025 09:00 - 11:00 Sala Ginestra

IS010B - Biological fluid structure interaction at low to intermediate Reynolds numbers II

Main Organizer: Prof. Alexander Hoover (Cleveland State University)
Chaired by: Prof. Sookkyung Lim (University of Cincinnati)

Understanding the motility of bipolar magnetotactic bacteria

S. Lim, S. Kim, W. Lee, Y. Kim

Fluid-structure interaction of a simple ciliate in a general Stokes flow

***A. Nitti,** M. de Tullio

Dynamics of bipolar lophotrichous bacterial motility

***J. Park,** Y. Kim, W. Lee, S. Lim

Dynamics of particles in a low-Reynolds-number fluid in confined cavity

***Z. Sun,** J. de Pablo, X. Jiang

Tue, 27/05/2025 09:00 - 11:00 Sala delle Ceramiche

IS058B - Structure-Preserving and Asymptotic-Preserving Particle Methods for Plasma Simulation II

Main Organizer: Dr. Luis Chacon (Los Alamos National Laboratory)
Chaired by: Prof. Andrew Christlieb (Michigan State University), Dr. Luis Chacon (Los Alamos National Laboratory)

Exact local conservation of energy in fully implicit PIC algorithms

***L. Chacon,** G. Chen

An Explicit, Energy-Conserving Particle-in-Cell Scheme

***L. Ricketson,** J. Hu

Extending PIC using Scovel-Weinstein theory

***J. Burby,** M. Quashie, Q. Tang

Structure-preserving particle methods for collision operators in plasma physics

***S. Jeyakumar,** M. Kraus, D. Pfefferlé, M. Hole

Tue, 27/05/2025 09:00 - 10:00 Samarcanda

IS005A - Advances and applications of particle-based methods for the simulation of coupled problems I

Main Organizer: Prof. Massimiliano Cremonesi (Politecnico di Milano, ITALY)
Chaired by: Prof. Massimiliano Cremonesi (Politecnico di Milano, ITALY), Prof. Antonia Larese (University of Padua)

Multiscale data-driven framework for the thermomechanical modeling of granular media

***A. Franci,** R. Rangel, E. Oñate, J. Gimenez

Partitioned MPM-FEM Coupling Strategy to Simulate Granular Mass Flows Impacting Flexible Protective Structures

***V. Singer,** A. Larese, K. Bletzinger, R. Wüchner

A coupled PFEM-DEM formulation for the Simulation of Landslides Impacting Water

***T. Leyssens,** M. Henry, J. Lambrechts, V. Legat, J. Remacle

Tue, 27/05/2025 09:00 - 11:00 Mirto

IS018A - Coupled Problems in Hard Tissue Biomechanics I

Main Organizer: Prof. ZOHAR YOSIBASH (Tel Aviv University)
Chaired by: Prof. ZOHAR YOSIBASH (Tel Aviv University), Dr. Michael Roland (Saarland University)

Investigation of the influence of screw position and screw insertion on the local micro-mechanics of the fracture gap and the interfragmentary movement

Keynote

***M. Roland**

µFEA of a Rabbit Femur

***S. Martinez Weissberg,** Z. Yosibash, W. Pazner

Impact of Computational Models on the Outcome of FE Biomechanical Simulations

***K. Wickert,** A. Andres, M. Roland, B. Braun, T. Histing, S. Diebels

Coupling PFMs with p-FEMs for fracture predictions of heterogeneous bone tissues

***M. Levy,** Z. Yosibash

From Injury to Full Recovery: Monitoring Patient Progress Through Advanced Sensor and Motion Capture Technology

***A. Andres,** M. Roland, M. Orth, S. Diebels

Tue, 27/05/2025 10:00 - 11:00 Samarcanda

IS011A - Challenges and perspective in numerical methods for atmosphere and ocean modelling I

Main Organizer: Dr. Michele Girfoglio (SISSA, Trieste)

Filter Stabilization for the Mildly Compressible Euler Equations with Application to Atmosphere Dynamics Simulations

***N. Clinco,** M. Girfoglio, A. Quaini, G. Rozza

Modeling environmental flows with variational multiscale methods

***A. Korobenko,** S. Dave, A. Regmi

A comparative computational study of different formulations of the compressible Euler equations for mesoscale atmospheric flows in a Finite Volume environment

***M. Girfoglio,** A. Quaini, G. Rozza

Tue, 27/05/2025 11:00 - 11:30

Coffee Break

Tue, 27/05/2025 11:30 - 13:00 Sala Ibisco

PL3 - Plenary Lectures III

Chaired by: Dr. Marie Rognes (Simula Research Laboratory)

Coupled Problems Arising in the Design of Drug Carriers

***A. Quaini,** M. Olshanskii, S. Majd

Fast Solution Techniques for Polytopic hp-Discontinuous Galerkin Methods for Radiation Transport Problems

***P. Houston,** M. Hubbard, T. Radley, O. Sutton, R. Widdowson

Tue, 27/05/2025 13:00 - 14:00

Lunch Break

Tue, 27/05/2025 14:00 - 16:00 Sala Ibisco

IS020A - Coupling Image Processing and Computational Modeling and Simulation for Biomedical Applications I

Main Organizer: Prof. Suzanne Shontz (University of Kansas)
Chaired by: Dr. Cristian Linte (Rochester Institute of Technology), Prof. Suzanne Shontz (University of Kansas)

AI-assisted Robotic Endomicroscopy Tissue Scanning

***C. Xu,** S. Giannarou

From Medical Images to Patient-specific Emulating Phantoms for Image-guided Intervention and Simulation Applications

K. Merrell, Z. Yang, P. Jackson, N. Poudel, R. Simon, ***C. Linte**

Infimal Models for Denoising and Super-Resolution of Raw Sinograms in Tomographic Medical Imaging Problems

***E. Morotti,** G. Landi, L. Calatroni

Microvascular Modeling from Gigavoxel-Scale Images

***M. Niger,** H. Goharbavang, W. Moree, J. Eriksen, D. Mayerich

MRI-informed mechanistic model to guide patient-specific optimization triple-negative breast cancer response to neoadjuvant chemotherapy

***C. Wu,** E. Lima, C. Stowers, Z. Xu, C. Yam, J. Son, J. Ma, G. Rauch, T. Yankeelov

Personalized Radiotherapy through Mathematical and AI Models: Advancing Cancer Care from Prediction to Intervention

J. Li, ***J. Han,** C. Yang, Z. Chen, Y. Zhu, C. Wang, W. Zhang, H. Gao

Tue, 27/05/2025 14:00 - 16:00 Sala Gardenia

IS022B - Coupling Stochastic Microstructure Modeling, Machine Learning and Multiphysical Numerical Methods for Virtual Materials Testing II

Main Organizer: Dr. Orkun Furat (Ulm University)
Chaired by: Prof. Thomas Carraro (Helmut Schmidt University / University of the Federal Armed Forces Hamburg)

Two-scale Geometric Modeling of Wood Fiber Insulation Boards Based on Computed Tomography Images

***A. Keilmann,** A. Nair, C. Redenbach, K. Schladitz, F. Willot

A Probabilistic Approach to Model Aggregation and Impregnation with Joint-Value-Driven Mathematical Morphology

***N. Goltiakov,** M. Corral Valero, M. Moreaud

Geometric Modelling of Corrosion Inhibitor Particles in Active Protective Coatings Based on 3D Images

***J. Zaninovic,** K. Schladitz, M. Godehardt, P. Klein, C. Jung, C. Redenbach, T. Nogatz, O. Müller, S. Flenner, I. Greving, N. Konchakova, P. Visser

Machine learning for the characterisation and design of battery electrode

***S. Cooper**

Stereological Multi-Scale Modeling of Li-Ion Battery Particles: From 2D Cross-Sections to 3D Nano- and Micro-Structures

***L. Fuchs,** O. Furat, D. Finegan, P. Weddle, J. Allen, K. Smith, V. Schmidt

Virtual Development of Battery Materials: A Tale of Transport Processes In And On Particles

***T. Danner,** P. Maidl, J. Hörmann, S. Hein, A. Latz

Tue, 27/05/2025 14:00 - 16:00 Sala Begonia

IS054B - Recent advances in continuum electromagnetism of multifunctional materials II

Main Organizer: Dr. Andreas Warkentin (University Kassel)
Chaired by: Dr. Andreas Warkentin (University Kassel), Mr. Lennart Behlen (University of Kassel)

Hamilton’s principle of stationary action for electro/magneto-mechanical materials

***S. Wolf,** P. Junker

Data-Driven Multiscale Modeling of Magnetorheological Elastomers Using Physics-Augmented Neural Networks

***H. Roth,** P. Gebhart, K. Kalina, T. Wallmersperger, M. Kästner

Multiphysical simulation of a permanent magnet assembly for magnetocaloric refrigeration

***B. Balouchev,** Y. Elbadry, M. Merkel, S. Schöps, O. Weeger

Variational-based modeling of hysteresis effects in hard magneto-active polymers

***P. Gebhart,** T. Wallmersperger

Magnetic simulations of heterogeneous microstructures based on FE micromagnetism

***M. Vorwerk,** J. Schröder

Tue, 27/05/2025 14:00 - 16:00 Sala Azalea

IS033B - High-Order and Innovative Methods for Coupled Problems in Life Science and Geophysics II

Main Organizer: Mr. Mattia Corti (Politecnico di MILANO (MILANO))
Chaired by: Prof. Francesca Bonizzoni (Politecnico di Milano)

Structure-preserving Local Discontinuous Galerkin methods for multi-component reaction-diffusion systems Keynote

***S. Gómez,** A. Jüngel, I. Perugia

Local Discontinuous Galerkin method for the heterodimer model of protein interaction

P. Antonietti, M. Corti, ***S. Gómez,** I. Perugia

Polytopal Methods for Multiphysics Flow Dynamics with Applications to the Human Brain

***I. Fumagalli,** M. Corti, M. Visinoni, N. Parolini, M. Verani, P. Antonietti

An adaptive high-order polytopal method for modeling neuronal electrophysiology

***C. Leimer Saglio,** S. Pagani, P. Antonietti

Tue, 27/05/2025 14:00 - 16:00 Sala Magnolia

IS048B - Nonlinear approximation methods for coupled problems II

Main Organizer: Dr. Silke Glas (University of Twente)
Chaired by: Prof. Karsten Urban (Universität Ulm), Dr. Silke Glas (University of Twente)

Reduced methods in hydrogen tracking over gas networks Keynote

***S. Grundel,** A. Nayak

Structure-preserving model reduction on manifolds for port-Hamiltonian systems

***S. Glas,** H. Mu

Nonlinear Variational Integrators

***M. Kraus,** Z. Li

Reduced Basis Methods for Domain Uncertainty Quantification of Periodic Gratings

***R. Aylwin,** J. Pinto, G. Silva-Oelker

Discontinuous Galerkin and Trefftz Methods for Model Reduction

***T. Born,** K. Urban

Tue, 27/05/2025 14:00 - 16:00 Sala di Vetro

IS055A - Recent Advances in Finite Element Methods for Coupled Problems in Incompressible Fluid Dynamics I

Main Organizer: Dr. LOIC CAPPANERA (University of Houston)
Chaired by: Dr. LOIC CAPPANERA (University of Houston), Dr. Giselle Saylor (Oakland University)

The cause and cure of spurious boundary forces in an Eulerian finite element method for moving boundary flow problems

***M. Olshanskii,** H. von Wahl

Embedded-Hybridized Discontinuous Galerkin for Magnetohydrodynamics

***T. Horvath,** J. Chen, T. Bui-Thanh

Numerical Analysis of a Discontinuous Galerkin Method for Multiphase Flow in Porous Media

***G. Saylor,** C. Trenchea, L. Cappanera, B. Riviere

Matrix-Free Discontinuous Galerkin Methods on Unstructured Tetrahedral Grids with Hybrid Multigrid Preconditioners

***D. Still,** N. Fehn, W. Wall, M. Kronbichler

Artificial Compressibility Techniques for Multiphase Flow with Applications to Turbulent Thermal Convection

***L. Cappanera,** A. Vu, S. Giordano, C. Nore

Coupling Systems with a Parameter-free Shifted Boundary Method

***R. Scott**

Tue, 27/05/2025 14:00 - 16:00 Sala Ginestra

IS032A - Enabling Digital Twins Through Efficient Solution And Coupling Algorithms For Multiphysics Problems I

Main Organizer: Dr. Paul Kuberry (Sandia National Laboratories)
Chaired by: Dr. Pavel Bochev (Sandia National Laboratories), Dr. Paul Kuberry (Sandia National Laboratories)

High-order accurate schemes for light propagation in multi-material dispersive media Keynote

***J. Banks**

Heterogeneous Optimisation-Based Domain Decomposition Coupling of Reduced-Order Models in Computational Fluid Dynamics

***I. Prusak,** D. Torlo, M. Nonino, G. Rozza

Finite element approximation of a 3D fluid-2D plate interaction system

***P. Geredeli,** H. Kunwar, H. Lee

Digital Twin Framework for Modular Electrification: Effective Temperature Estimation via Inverse Heat Conduction Problem

***L. Ji-won,** A. Chang-uk, K. Jin-Gyun

Corrected Refactorized Midpoint Method for Coupled Problems

***A. Labovsky**

Tue, 27/05/2025 14:00 - 16:00 Sala delle Ceramiche

IS052A - Design and Modeling of Structures and Materials in Additive Manufacturing I

Main Organizer: Dr. Nicola Ferro (Ca' Foscari University)
Chaired by: Dr. Massimo Carraturo (University of Pavia)

Hybrid processes by Additive Manufacturing **Keynote**

***M. Chiumenti,** C. Moreira, M. Caicedo, H. Venghaus

Structure-Property Relationships of Additively Manufactured AlSi10Mg: the Correlation between Fatigue Life and Underlying Pore Characteristics
A. Raßloff, ***U. Gebhardt,** K. Narasimhan, N. Fuchs, M. Kästner

Controlling Hot Cracking in WC–NiCrBSiFe Coatings Produced by Laser Surface Cladding: A Multiphase Field Approach for Enhancing Process Repeatability
***R. Darabi,** A. Reis, J. Cesar de Sa

Tue, 27/05/2025 14:00 - 16:00 Samarcanda

IS042A - Multi-Physics and Multi-Scale Simulations With The Coupling Library preCICE I

Main Organizer: Dr. Benjamin Uekermann (University of Stuttgart)
Chaired by: Mr. Gerasimos Chourdakis (University of Stuttgart)

A quick introduction to the coupling library preCICE

***F. Neubauer,** G. Chourdakis, B. Uekermann

Magnetothermal Coupling with preCICE for Multiphysical Simulations of Electric Machines

***M. Wiesheu,** K. Roppert, B. Rodenberg, I. Cortes Garcia, S. Schöps

Standardizing the preCICE ecosystem

***G. Chourdakis,** B. Uekermann

G+Smo-preCICE: Coupling the Isogeometric Analysis-Based Structure Solver G+Smo with preCICE for Advanced Multi-Physics Simulations
***J. Li,** H. Verhelst, M. Möller, H. J den Besten

Dynamic Meshes for Partitioned Multi-Physics Simulations in preCICE

***F. Simonis,** B. Uekermann

Tue, 27/05/2025 14:00 - 16:00 Mirto

IS003A - Advanced Modelling of Dynamical Effects in Electro-Mechanical Systems I

Main Organizer: Prof. Hartmut Hetzler (University of Kassel)
Chaired by: Prof. Felix Boy (TH Nürnberg), Prof. Hartmut Hetzler (University of Kassel)

Electromechanical excitation of soft contacts for adhesion regulation

***M. Tricarico,** M. Ciavarella, A. Papangelo

Combination Resonsances In Electro-Mechanical Microsystems Through Invariant Manifolds

***A. Colombo,** A. Frangi

Rotordynamic Effects in Electrical Machines due to Unbalanced Magnetic Pull: Influence Factors and Aspects of Numerical Simulation

***F. Boy**

Modelling of Quasiperiodic Oscillations in Electro-Mechanical Systems due to Pulse-Width-Modulated (PWM) Excitations

***H. Hetzler**

Tue, 27/05/2025 16:00 - 16:30

Coffee Break

Tue, 27/05/2025 16:30 - 18:50 Sala Ibisco

IS020B - Coupling Image Processing and Computational Modeling and Simulation for Biomedical Applications II

Main Organizer: Prof. Suzanne Shontz (University of Kansas)
Chaired by: Prof. Suzanne Shontz (University of Kansas), Dr. Cristian Linte (Rochester Institute of Technology)

Generation of Patient-specific Meshes from Medical Images for Use in Cardiovascular Simulations

***S. Shontz**

Stochastic Tumor Growth Modeling Driven by Experimental Data: The Impact of Anti-PDL1 Immunotherapy

***V. Papadopoulos,** G. Sotiropoulos, K. Atzarakis

Model based time of death estimation in forensic medicine

***M. Weiser,** J. Sudau, M. Hubig, G. Mall, J. Subramaniam, S. Volkwein

Immersed domain approach for fluid-structure-contact interaction problems

***P. Zulian,** M. Nestola, R. Krause

Evaluation of Coupled Stented Baffle Deformation in Hybrid Comprehensive Stage-II Procedure

***A. Das,** A. Damon, R. Prather, A. Kassab, E. Divo, W. DeCampli

Towards Physiologically Realistic Vascular Fluid-Structure Interaction Analysis Based on Medical Images

***X. Yue,** J. Huang, Y. Sun, Q. Lu, X. Huang, J. Liu

Tue, 27/05/2025 16:30 - 18:50 Sala Gardenia

IS022C - Coupling Stochastic Microstructure Modeling, Machine Learning and Multiphysical Numerical Methods for Virtual Materials Testing III

Main Organizer: Dr. Orkun Furat (Ulm University)
Chaired by: Dr. Samuel Cooper (Imperial College London)

Bridging Scales: Investigating the Role of Conductive Additives in Lithium-Ion Battery Cathodes Using Microscopic and Multiscale Models

***J. Piruzjam,** P. Gräfensteiner, M. Osenberg, I. Manke, V. Schmidt, T. Carraro

Deep Bayesian Simulation-Based Inference for Cross-Model Training in Predictive Electrochemical Battery Models

***T. Nguyen,** J. Piruzjam, T. Carraro, U. Köthe

A Numerical Approach to Investigate the Microstructural Influence on the Design of Polymer-Based Battery Electrodes

***A. Yessim,** B. Prifling, L. Fuchs, P. Zimmer, M. Osenberg, I. Manke, U. Schubert, V. Schmidt, T. Carraro

Virtual materials testing of all-solid-state battery cathodes by coupling stochastic 3D modeling and numerical simulations

***O. Furat,** M. Luczak, S. Weber, E. Glatt, A. Wiegmann, V. Schmidt

Tue, 27/05/2025 16:30 - 18:50 Sala Begonia

IS034A - Immersed Boundary Methods: Theory, Implementation, and Applications I

Main Organizer: Prof. Mats G. Larson (Umea University)
Chaired by: Prof. Mats G. Larson (Umea University), Prof. Guglielmo Scovazzi (Duke University)

A new Neumann boundary condition for the Shifted Boundary Method

H. Collins, A. Lozinski, ***G. Scovazzi**

A generalized immersed boundary framework for flow simulations in sports applications

***R. Bale,** R. Fujiwara, S. Ikeda, Y. Hayashi, T. Shimada, K. Yamamoto, M. Tsubokura

phi-FEM method and particulate flows

***M. Duprez,** V. Lleras, A. Lozinski

Cut Discontinuous Galerkin Discretizations of the Incompressible Navier-Stokes Equations

***M. Bergbauer,** W. Wall, M. Kronbichler

A mortar-type approach for asymptotically correct mixed-dimensional coupling of 1D beams and 3D solids

***I. Steinbrecher,** A. Popp

Tue, 27/05/2025 16:30 - 18:50 Sala Azalea

IS044A - Multiphase flows with surface tension and capillarity I

Main Organizer: Prof. Julien Bruchon (Mines Saint-Étienne)
Chaired by: Prof. Julien Bruchon (Mines Saint-Étienne)

Finite Element Simulations of Capillary Flow in Fibrous Microstructures

***J. Bruchon,** N. Moulin, S. Drapier

Computational Homogenization of Two-phase fluid Flow with Surface Tension in Porous Media

***S. KPEREGUENI,** C. PARK, M. SHAKOOR

Two-phase fluid flow instabilities through porous media: a comparison between the phase-field and the dynamic capillary pressure based approaches to modeling of drainage processes
***S. Ommi,** F. Grondin, M. Saad, G. Sciarra

Sub-cycling strategy for a Lagrangian finite Volume methods, applied to fluid-structure interaction

T. Chantrait, N. Cheveaugeon, S. Del Pino, A. Gangloff, E. Labourasse

An Efficient and Versatile Method for Dealing with Surface Tension Effects with the Finite Element Method

***J. Leblond**

Numerical Simulation of the Wiping Process with Anisotropic Mesh Adaptation

***C. Gaultier,** R. Nemer, E. Hachem, M. Anderhuber, T. Coupez

Numerical simulation of the conduction welding of thermoplastic parts using a level-set method

Y. Jezequel, L. Silva, H. Digonnet, C. Binetruy, E. Verron, V. Motaharinejad

Tue, 27/05/2025 16:30 - 18:50 Sala Magnolia

IS002A - Advanced Modeling and Multiphysics Methods for the Health Monitoring Analysis of Composite Structures I

Main Organizer: Dr. Stefano Valvano (University of Derby)
Chaired by: Dr. Stefano Valvano (University of Derby), Prof. Raffaele Ciardiello (Politecnico di Torino)

Electro-Magneto-Elastic Coupling in 3D Static and Free Vibration Analysis of Multilayered Plates **Keynote**

***S. Brischetto,** D. Cesare, T. Mondino

Prediction of nano-reinforced coating properties in carbon fibre reinforced polymer via inverse analysis and optimisation

M. Pawlik, ***F. Marino,** Y. Lu

Structural Health Monitoring of Single Lap Joints: Combining Experimental Insights and Numerical Modeling

***R. Ciardiello,** M. Abbasi, L. Goglio

A 3D Finite Element Model for Layer-wise Analysis of Multilayered Plates via the Exponential Matrix Method

***D. Cesare,** S. Brischetto

Graphene nanoplatelets self-sensing adhesive for fibre reinforced plastics composite

***M. Pawlik,** F. Marino, S. Valvano

Tue, 27/05/2025 16:30 - 18:30 Sala di Vetro

IS046A - Multiscale Methods for CFD Problems I

Main Organizer: Dr. Juan Marcelo Gimenez (CIMNE)
Chaired by: Dr. Juan Marcelo Gimenez (CIMNE), Prof. Sergio Idelsohn (CIMNE)

Solving turbulent boundary-layer problems with the multiscale Pseudo-DNS framework

***J. Gimenez,** E. Oñate, S. Idelsohn

LES Study of a Variable Density Jet Subjected to Axial and Radial Velocity Excitations

K. Wawrzak, A. Wawrzak, ***A. Tyliszczak**

Multiscale and multiphysics simulation leveraging coupling techniques and state-of-the-art codes

S. Baldini, G. Barbi, ***A. Cervone,** F. Giangolini, S. Manservisi, L. Sirotti

Multiscale Coupled Urban Microclimate Model during Heat Waves

***D. Derome,** C. Nevers, A. Kubilay, J. Carmeliet

Hybrid interface tracking method of multi-phase flows, for additive manufacturing and welding applications

***C. Calonnec,** C. Nahed, A. Jaccon, Y. Saadlaoui, J. Bergheau

Fast prediction of multiphase flow in highly fractured porous media with a multiscale approach

J. Gimenez, ***S. Idelsohn,** E. Oñate

Tue, 27/05/2025 16:30 - 18:50 Sala Ginestra

IS032B - Enabling Digital Twins Through Efficient Solution And Coupling Algorithms For Multiphysics Problems II

Main Organizer: Dr. Paul Kuberry (Sandia National Laboratories)
Chaired by: Dr. Paul Kuberry (Sandia National Laboratories), Dr. Pavel Bochev (Sandia National Laboratories)

How preCICE Allows to Combine Heterogeneous Software, Discretization Techniques, and Modeling Approaches **Keynote**

***B. Rodenberg,** B. Uekermann, H. Bungartz

Dynamic interface surrogates for decoupled solution of multiphysics problems

***P. Bochev,** R. Pawar, P. Kuberry, J. Owen, J. Connors

Scalable Coupling of a Mesoscale Weather Research Forecasting Model and Microscale Solver

***O. Mahfoze,** W. Liu, D. Emerson

Higher-order implicit-explicit integrators for the residual-based variational multiscale modeling for turbulence using the half explicit Runge-Kutta method

***Y. Sun,** J. Liu

Modelling vascularized tissues: coupling 3D elastic matrix and 1D vascular tree

***C. Belponer,** A. Caiazzo, L. Heltai, L. Müller

Tue, 27/05/2025 16:30 - 18:50 Sala delle Ceramiche

IS052B - Design and Modeling of Structures and Materials in Additive Manufacturing II

Main Organizer: Dr. Nicola Ferro (Ca' Foscari University)
Chaired by: Dr. Nicola Ferro (Ca' Foscari University), Prof. Simona Perotto (MOX, Department of Mathematics, Politecnico di Milano)

Improving the mechanical properties of 3D-printed auxetic structures through design modifications

***N. Dialami,** S. Farshbaf, M. Cervera

Topology Optimization for Porous Substrates Design in Soilless Agriculture

***G. Speroni,** N. Mondini, N. Ferro, S. Perotto

Local Perimeter and Non-Linear Filtering for Minimum Length and Overhang Control in Topology Optimization

***J. Torres,** M. Esmail, F. Otero, A. Ferrer

An Overhang-like Constraint for the Design of Topologically Optimized Vascular Stents

***N. Ferro,** F. Mezzadri, D. Carbonaro, G. De Nisco, D. Gallo, E. Torta, U. Morbiducci, C. Chiastra, S. Perotto

Tue, 27/05/2025 16:30 - 18:50 Samarcanda

IS038A - Model Order Reduction, Scientific Machine Learning and Uncertainty Quantification for Large Scale, Complex Geometry and Multi-physics Problems I

Main Organizer: Prof. Giovanni Stabile (Sant'Anna School of Advanced Studies)
Chaired by: Prof. Giovanni Stabile (Sant'Anna School of Advanced Studies), Prof. Bojana Rosic (University of Twente)

Domain decomposition methods for large neural networks in high dimensional multi-physics problems

***B. Rosic,** T. Gödde, W. Schuttert

Chain-ROM: Fluid-Fluid Coupled Reduced Order Models (ROM) for Turbulent Flow

V. Tsiolakis, ***T. Kvamsdal,** A. Rasheed, E. Fonn, H. van Brummelen

Predicting the Onset and Progression of Atherosclerotic Plaques in Carotid Arteries through CFD simulations: UQ and Stochastic Sensitivity Analysis to Geometric and Clinical Parameters

***A. Mariotti,** J. Singh, F. Dell'Agnello, K. Capellini, M. Salvetti, S. Celi

Enhancing Patient-Specific Cardiovascular Flow Modeling with Stochastic Data Assimilation

***K. Bakhshaei,** S. Salavatidezfouli, G. Stabile, G. Rozza

Domain Decomposition Reduced Order Model for Large Scale Industrial Facilities Consisting of Repeating Subdomains

***S. Ruan,** A. Class, G. Stabile, G. Rozza

Graph-Based Machine Learning Approaches for Model Order Reduction

***F. Pichi,** B. Moya, O. Morrison, J. Hesthaven

Model-based Co-simulation of Non-smooth Mechanical Systems

***A. Raoofian,** J. Kovecses

Tue, 27/05/2025 16:30 - 18:50 Mirto

IS063A - Coupled Problems Associated with Liquid Jets I

Main Organizer: Prof. Božidar Šarler (University of Ljubljana, Faculty of Mechanical Engineering)
Chaired by: Prof. Božidar Šarler (University of Ljubljana, Faculty of Mechanical Engineering)

Liquid microjets, droplet streams, and nanosheets for ultrafast time-resolved x-ray solution scattering

***R. Kirian,** A. Ansari, R. Alvarez, D. Manatou, K. Karpos, P. Konold, F. Maia

Comparison of Numerical Model Results with Experimental Data of Gas-Focused Liquid Sheets

***K. Kova?i?,** R. Zahoor, S. Bajt, B. Šarler

The Evolution and Expansion of the Microjet Characterization Pipeline for X-Ray Laser Experiments from ASU to SLAC

***D. Manatou,** R. Sublett, Y. Willard, W. Chang, K. Karpos, R. Alvarez, S. Zaare, A. Ansari, R. Kirian

Simulation of double flow-focusing nozzles considering temperature dependence of water-ethanol system

***R. Zahoor,** S. Bajt, B. Šarler

Interface Treatment for Coupled Electro-Excited Multiphase Flows

***B. Zupan,** R. Zahoor, S. Bajt, B. Šarler

Numerical Modelling of Slot-Die Coating Sample Delivery System and Its Experimental Validation

***G. Vidic,** S. Bajt, B. Šarler

Meshless numerical modelling of gas-focused liquid micro-jets: Assessment of the gas compressibility effects

K. Rana, ***B. Šarler,** B. Mavri?, R. Zahoor

Tue, 27/05/2025 20:30 - 23:00

Banquet Dinner

Wednesday, 28/05/2025

Wed, 28/05/2025 08:00 - 09:00

Registration

Wed, 28/05/2025 09:00 - 10:30 Sala Ibisco

PL4 - Plenary Lectures IV

Chaired by: Dr. Annalisa Quaini (University of Houston), Prof. Paul Houston (University of Nottingham)

Accelerating continental-scale groundwater simulation with a fusion of machine learning, integrated hydrologic models and community platforms
***R. Maxwell,** L. E. Condon

Iterative and multilevel methods for PDE-constrained optimization under uncertainty
***F. Nobile,** T. Vanzan

Wed, 28/05/2025 10:30 - 11:00

Coffee Break

Wed, 28/05/2025 11:00 - 13:00 Sala Ibisco

IS020C - Coupling Image Processing and Computational Modeling and Simulation for Biomedical Applications III

Main Organizer: Prof. Suzanne Shontz (University of Kansas)
Chaired by: Dr. Cristian Linte (Rochester Institute of Technology), Prof. Suzanne Shontz (University of Kansas)

A General Framework for Whiteness-based Parameters Selection in Variational Models
***A. Lanza,** F. Bevilacqua, M. Pragliola, F. Sgallari

Separable hierarchical priors applied to analysis of synergies in human locomotion
***D. Calvetti,** A. Arnold, G. Davico, A. Hoover, E. Somersalo

Component Selection in Space-Time Independent Component Analysis of the Electroencephalogram for Functional Brain Imaging
***C. James**

An efficient hierarchical Bayesian method for EIT with blocky target
***M. Pragliola,** D. Calvetti, E. Somersalo

Biomechanical Evaluation of a Novel Compression Pin Fixation for Distal Humerus Transcondylar Fractures Using Finite Element Modeling
M. Gomez, J. Dhainaut, V. Hidalgo, R. Huffman, D. Eygendaal, A. Kachooei, ***V. Huayamave**

Radiative transfer equation-based radiotherapy treatment planning
X. Hong, H. Gao, C. Wang, ***J. Han**

Wed, 28/05/2025 11:00 - 13:00 Sala Gardenia

IS053A - Projection-Based and Data-Driven Reduced Order Modeling: Bridging Accuracy and Efficiency I

Main Organizer: Dr. Maria Strazzullo (Politecnico di Torino)
Chaired by: Dr. Federico Pichi (SISSA), Dr. Maria Strazzullo (Politecnico di Torino)

Certification of physics-informed neural networks for solving PDEs
***K. Urban**

Optimization-based model order reduction of fluid-structure interaction problems
***T. Taddei**

Towards an Arbitrary Lagrangian Eulerian MOR framework for advection dominated problems
***M. Nonino,** D. Torlo

Reduced-order models for advection-dominated problems based on nonlinear transformations
***G. Stabile**

Optimal Transport-Based Displacement Interpolation for Enhanced Reduced Order Modeling of Nonlinear Dynamical Systems
***M. Khamlich,** F. Pichi, M. Girfoglio, A. Quaini, G. Rozza

Wed, 28/05/2025 11:00 - 13:00 Sala Begonia

IS034B - Immersed Boundary Methods: Theory, Implementation, and Applications II

Main Organizer: Prof. Mats G. Larson (Umea University)
Chaired by: Prof. Guglielmo Scovazzi (Duke University), Prof. Mats G. Larson (Umea University)

High-fidelity Thermomechanical Modeling of Laser-based Powder Bed Fusion of Metals using an Immersed Boundary Method

***M. Carraturo,** P. Kopp

Implicitly extended BDF time stepping schemes for the Stokes equations on evolving domains

***S. Frei,** E. Burman, A. Massing

A shock-fitting cut-cell Discontinuous Galerkin scheme

***L. Monasse**

A Sharp Immersed Boundary Method for High-fidelity Spectral Element Flow Simulations

***N. Jansson,** R. Bale, M. Tsubokura

A cut-cell method for compressible multi-fluid flows

A. Vieira, L. Monasse

Unfitted Finite Element Modeling of Cell Migration in Viscous Fluids

***M. Gatti,** E. Neiva, H. Turlier

Wed, 28/05/2025 11:00 - 13:00 Sala Azalea

IS023A - Data-driven multiscale modelling and machine learning for biomedical, physical, engineering, and social coupled systems I

Main Organizer: Prof. Roderick Melnik (MS2Discovery, Wilfrid Laurier University)
Chaired by: Prof. Roderick Melnik (MS2Discovery, Wilfrid Laurier University), Dr. Hina Shaheen (University of Manitoba)

Sparsity-promoting dictionary learning algorithms based on hierarchical Bayesian models Keynote

***E. Somersalo,** D. Calvetti

Coupled Learning of Populational Inverse Problems and Physics-Informed Neural Operators

D. Akyildiz, M. Girolami, A. Stuart, ***A. Vadeboncoeur**

Multiscale Modelling with Data-Driven Brain Networks: Misfolded Proteins and Astrocytic Clearance in Alzheimer's Disease

***H. Shaheen,** R. Melnik

Geometric Control over Machine Learning Models for Visual Anomaly Detection

***J. Fulir,** C. Garth, P. Gospodneti?

ACBICI: Enhancing Bayesian Calibration for Computationally Intensive and Uncertain Systems

***C. Schenk,** I. Romero, Y. Liu

Wed, 28/05/2025 11:00 - 13:00 Sala Magnolia

IS002B - Advanced Modeling and Multiphysics Methods for the Health Monitoring Analysis of Composite Structures II

Main Organizer: Dr. Stefano Valvano (University of Derby)
Chaired by: Prof. Raffaele Ciardiello (Politecnico di Torino), Dr. Stefano Valvano (University of Derby)

FBG-Embedded Sensors for Structural Health Monitoring in Missile Fixed Wings: Enabling Reusability of Solid Rocket Thrusters

***M. Cafaro,** C. Ferro, S. valvano

Higher-Order Theories for Multifield Analysis of Curved Laminated Structures Made of Smart Materials

F. Tornabene, ***M. Viscoti,** R. Dimitri

Ultrasonic Guided Waves based SHM system to detect Barely Visible Impact Damages Growth in CFRP under fatigue loads

***A. De Luca,** C. Francesco, D. Perfetto, G. Lamanna

Design and fabrication of composite sandwich plates with piezoelectric wafer for structural health monitoring in rail applications

***U. Diala,** O. Ozioko, D. Odiyi, P. Wood

Advanced thermo-mechanical modelling of metal composite lattice structures for space applications

***S. Valvano,** A. Maligno

Wed, 28/05/2025 11:00 - 13:00 Sala di Vetro

IS013A - Computational Brain Multiphysics I

Main Organizer: Dr. Marie Rognes (Simula Research Laboratory)
Chaired by: Dr. Ivan Fumagalli (Politecnico di Milano), Dr. Marie Rognes (Simula Research Laboratory)

Computational Models of Brain Multiphysics at Multiple Time Scales

***S. Payne**

Estimating Fluid Exchange between Brain and Subarachnoid Space using Poroelasticity and Finite Elements

***F. Costanzo,** B. Ghitti, M. Jannesari, P. Drew

Computational Modelling of Coupled Electrophysiological, Hemodynamic and Cerebrospinal Fluid Pulsatility

***I. Devold,** M. Causemann, M. Rognes

Lagrangian Analysis of Motile-Cilia Mediated Flow and Transport in Brain Ventricles

***H. Herlyng,** S. Shadden

Generative Design of Hydrocephalus Shunts

***E. Hayman,** J. Jayamohan, J. Peña Sanchez, S. Waters, A. Jerusalem

Wed, 28/05/2025 11:00 - 13:00 Sala Ginestra

IS057A - Sharing Advances in Numerical and Modelling Techniques for Fluid-Structure Interaction I

Main Organizer: Prof. Vincent Faucher (CEA)
Chaired by: Prof. Vincent Faucher (CEA), Phd. Guillaume Ricciardi (Cea)

Numerical added mass correction for explicit partitioned coupling schemes

***V. Faucher,** A. Puscas

PFEM-VEM-FEM Coupling for the Simulation of Fast-Evolving Fluid-Structure Interaction Problems

***M. Cremonesi,** C. Fu, U. Perego

An updated-Lagrangian method for hyperelasto-plastic materials and fluid-structure interaction

***T. CHANTRAIT,** E. Labourasse

Evaluating Computational Methods for Predicting the Dynamic Response of Flexible Structures Under Blast Loading

***V. Aune,** F. Casadei, M. Larcher

Fluid-structure interaction using a partitioned coupling between Euler-Bernoulli beams and incompressible viscous Newtonian fluids

***M. Puscas,** R. Lagrange

An ALE framework for the fluid-structure interaction of freely moving soft and rigid bodies in complex environments

***C. Van Landeghem,** V. Chabannes, A. Chouippe, L. Giraldi, Y. Hoarau, C. Prud'homme

Wed, 28/05/2025 11:00 - 13:00 Sala delle Ceramiche

IS049A - Numerical methods that enable the heterogeneous coupling of conventional and data-driven models for multi-scale and multi-physics problems I

Main Organizer: Dr. Irina Tezaur (Sandia National Laboratories)
Chaired by: Dr. Irina Tezaur (Sandia National Laboratories), Dr. tommaso taddei (INRIA Bordeaux South-West)

Advancing Scientific Machine Learning for Coupled Problems in Industrial Engineering Keynote

***W. Schilders**

A non-overlapping optimization-based domain decomposition approach to model reduction of coupled problems

***L. Zhang,** T. Taddei, X. Xu

Decomposition and Model Selection Optimization for Schwarz-based Coupling of Data-driven Models

***C. Wentland,** A. Gruber, A. Mota, E. Parish, I. Tezaur

A time-adaptive solver for pressure dominated flows in CFD and FSI: domain decomposition and model reduction

***D. Torlo,** I. Prusak, M. Nonino, G. Rozza

DG-based domain decomposable reduced order models and repartitioning strategies: applications to biomedical models

***F. Romor,** A. Caiazzo

Wed, 28/05/2025 11:00 - 13:00 Samarcanda

IS060A - Thermomechanical Modeling of Large Deformation Processes I

Main Organizer: Prof. Jean Philippe Ponthot (University of Liège)
Chaired by: Prof. Jean Philippe Ponthot (University of Liège), Prof. Diego Celentano (Pontificia Universidad Católica de Chile)

Modeling and Experimental Validation of Laser Beam Forming Applied to Ti64 Sheets **Keynote**

***D. Cabezas,** N. Catalán, D. Celentano, M. Cruchaga, C. García

A Phase Transformation Model for Glass with Thermo-Mechanical Coupling Using Neighbor Element Method

***T. Rudolf,** M. Soleimani, T. Bode, P. Junker

Simulations of the hot forming and controlled cooling of steel products based on the stochastic model of the microstructure evolution

***D. Szeliga,** J. Forys, R. Nadolski, J. Kusiak, L. Rauch, M. Pietrzyk

Solution of Coupled Thermo-Mechanical Problem in Stamp Forming Process of Hybrid Composite Automotive Panels

***P. Akishin,** E. Barkanov, A. Makradi, C. Zopp, M. Ba?aran

Modeling Melt Pool Dynamics Using the Particle Finite Element Method for The Simulation of the Friction Melt Bonding

***E. Fernandez,** M. Lacroix, S. Février, L. papeleux, R. Boman, J. Ponthot

Wed, 28/05/2025 11:00 - 13:00 Mirto

IS017A - Coupled Multi-Scale and Multi-physics Computational Models for Electrochemical Systems I

Main Organizer: Dr. Mojtaba Barzegari (Eindhoven University of Technology)
Chaired by: Dr. Mojtaba Barzegari (Eindhoven University of Technology)

Coupled Electro-Chemo-Mechanical Modelling of Lithium Solid State battery Electrolytes with a Phase Field approach: insight of Mechanical Effect on Dendrites Formation

***N. Guy,** S. Abada, M. Merle, Y. Wang, N. Brusselle-Dupend, L. Cangémi

Combining 3D Microstructure-Resolved Electrochemical Simulations with a Physics-Informed Bayesian Optimization Approach for Virtual Testing of Battery Materials

***J. Hörmann,** Y. Kuhn, S. Hein, B. Horstmann, T. Danner, A. Latz

From Cell to Stack: Understanding Coupled Phenomena in Redox Flow Batteries with Multiphysics Simulations

***D. Bordignon,** M. Guarnieri, V. Maiorana, N. Zatta, A. Trovò

Ion transport and flow of ionic liquids in partially charged slits with finite length under electric fields

***W. Li,** X. Jiang

Understanding the impact of the electrode fiber geometry on mass transfer rates with coupled finite element modeling

***M. Barzegari,** P. de Carvalho, B. Liu, A. Forner-Cuenca

Wed, 28/05/2025 13:00 - 14:00

Lunch Break

Wed, 28/05/2025 14:00 - 16:00 Sala Ibisco

IS016A - Coupled Mechanics and Material Modelling in Multiphysics and Extreme Environments I

Main Organizer: Prof. Antonio Gil (Swansea University)
Chaired by: Dr. Rogelio Ortigosa (Technical University of Cartagena, Spain), Prof. Oliver Weeger (TU Darmstadt)

On the exploration of structural deformation, induced vibration and structure-borne noise of floating ship-like military structure subjected to underwater explosion

***J. Bardiani,** C. Sbarufatti, A. Manes

Field Couplings in Diffusive Processes in Metallic and Non-metallic Materials

***J. Gisy,** T. Böhlke

A Variational Integrator for the Simulation of Transient Stress-diffusion Problems of Hydrogen in Metals

***I. Romero,** E. Andrés, C. Schenk

Modelling Microstructure Sensitive Degradation of Electroplated Copper during Short Circuit Power Pulsing

***A. Huber,** T. Antretter, M. Petersmann

A new Arbitrary Lagrangian Eulerian (ALE) first order conservation computational framework for coupled thermo-mechanics

***A. Gil,** C. Lee, J. Bonet, T. Di Giusto, P. Refachinho de Campos, T. Richardson

Coupling Multi-Phase Flow Simulation with Dynamic Adaptative Ther-modynamic Surrogate Models

J. GRATIEN, T. FANEY, A. MICHEL, W. DU, B. DELHOM, R. GAYNO

Wed, 28/05/2025 14:00 - 16:00 Sala Gardenia

IS053B - Projection-Based and Data-Driven Reduced Order Modeling: Bridging Accuracy and Efficiency II

Main Organizer: Dr. Maria Strazzullo (Politecnico di Torino)
Chaired by: Dr. Maria Strazzullo (Politecnico di Torino), Dr. Federico Pichi (SISSA)

POD-ROM methods: from a finite set of snapshots to continuous-in-time approximations

B. García-Archilla, V. John, J. Novo

Boosting POD and reduced basis projection using data augmentation: producing artificial plausible snapshots.

***P. Díez**

Reducing the computational cost of ocean modeling with data-driven ROM

L. Besabe, M. Girfoglio, ***A. Quaini,** G. Rozza

Non-intrusive reduced-order modeling for dynamical systems with spatially localized features

L. Gkimisis, N. Aretz, ***M. Tezzele,** T. Richter, P. Benner, K. Willcox

Adaptive Localized Training and Enrichment based on a Residual Localization Strategy

T. Keil, M. Ohlberger, F. Schindler, ***J. Schleuß**

Optimal budget management for multi-fidelity approaches combining numerical solvers and deep learning surrogates

***P. Vitullo,** N. Franco, P. Zunino

Wed, 28/05/2025 14:00 - 16:00 Sala Begonia

IS034C - Immersed Boundary Methods: Theory, Implementation, and Applications III

Main Organizer: Prof. Mats G. Larson (Umea University)
Chaired by: Prof. Mats G. Larson (Umea University), Prof. Guglielmo Scovazzi (Duke University)

Thermo-Mechanical Simulation of Friction Stir Welding Process Using CAD Model-Based CutFEM Approach

***H. Venghaus,** M. Chiumenti, J. Baiges, D. Juhre, N. Dialami

A CFL Condition for the Finite Cell Method

***T. Bürchner,** L. Radtke, E. Rank, S. Kollmannsberger, P. Kopp

The Immersed Boundary Method: An Accelerated SIMPLE Approach for Moving Bodies

***R. Yovel,** E. Treister, Y. Feldman

Wed, 28/05/2025 14:00 - 16:00 Sala Azalea

IS023B - Data-driven multiscale modelling and machine learning for biomedical, physical, engineering, and social coupled systems II

Main Organizer: Prof. Roderick Melnik (MS2Discovery, Wilfrid Laurier University)
Chaired by: Dr. Sundeep Singh (University of Prince Edward Island), Prof. Roderick Melnik (MS2Discovery, Wilfrid Laurier University)

A Data-driven Machine Learning Framework for Modelling of Pulsed Field Ablation for Treating Cardiac Arrhythmias

***S. Singh**

Screening Energetically Stable Structures of LLZO garnets for Lithium-Ion Battery Applications

E. Akhmatskaya, A. Teruel, H. Cortés, M. Rincón Bonilla, ***R. Melnik**

A New Numerical Technique for Modeling of Light Scattering in Structures with Metal Nanoparticles

***J. Kaupužs**

Coupled Machine Learning and Computational Modeling for Enhancing Engineering Education: An RC Car-Based Framework

***C. Barriento,** L. Ferrando Quilez

Wed, 28/05/2025 14:00 - 16:00 Sala Magnolia

IS028A - Efficient and Scalable Methods for Multiscale and Multiphysics Problems I

Main Organizer: Dr. Ngoc Mai Monica Huynh (University of Pavia)
Chaired by: Dr. Ngoc Mai Monica Huynh (University of Pavia), Dr. Edoardo Centofanti (University of Pavia)

Efficient numerical solution of multiphysics hemodynamic problems

***C. Vergara,** E. Criseo, L. Crugnola, G. Montino Pelagi, F. Renzi

Partitioning and load-balancing for a parallel solver of cell-by-cell cardiac electrophysiology

J. Trotter, X. Cai

Polytopic agglomeration-based multigrid methods for the Discontinous Galerkin discretization of cardiac electrophysiology

***P. Africa,** M. Feder

BDDC with algebraic adaptivity and compressed communication for cardiac electrophysiology

***F. Chegini,** \. Steinke, M. Weiser

A BDDC Preconditioner for the EMI-Model in three Dimensions

F. Goebel, H. Anzt, N. Huynh

Scalable approximation and solvers for ionic electrodiffusion in cellular geometries

***P. Benedusi,** A. Ellingsrud, H. Herlyng, S. Serra, M. Rognes

Wed, 28/05/2025 14:00 - 16:00 Sala di Vetro

IS013B - Computational Brain Multiphysics II

Main Organizer: Dr. Marie Rognes (Simula Research Laboratory)
Chaired by: Dr. Marie Rognes (Simula Research Laboratory), Dr. Ivan Fumagalli (Politecnico di Milano)

Uncertainty Quantification in Spatially Extended Neurobiological Networks
***D. Avitabile,** F. Cavallini, S. Dubinkina, G. Lord

Insights into Epileptic Seizures Mechanisms via High-order Discontinuous Galerkin Numerical Simulations
***S. Pagani,** C. Leimer Saglio, M. Corti, P. Antonietti

Weaving the Neuronal Tapestry: Coupling Multiphysics in a Thermodynamically Consistent Variational Model for the Neuronal Membrane
***J. Giblin-Burnham,** S. Antoranz Contera, A. Jérusalem

Polytopal discontinuous Galerkin methods for neurodegeneration
***M. Corti,** P. Antonietti

Polytopal DG discretizations of neurodegenerative models
M. Corti, ***F. Bonizzoni,** P. Antonietti

On the inf-sup condition in slender geometries – mixed dimensions and application to brain fluid dynamics
***K. Mardal,** T. Koch, M. Kuchta, E. Sande

Wed, 28/05/2025 14:00 - 16:00 Sala Ginestra

IS057B - Sharing Advances in Numerical and Modelling Techniques for Fluid-Structure Interaction II

Main Organizer: Prof. Vincent Faucher (CEA)
Chaired by: Phd. Guillaume Ricciardi (Cea), Prof. Vincent Faucher (CEA)

Fast transient Fluid-Structure Interaction using Lattice Boltzmann Method (LBM) with applications to rupture and fragmentation
***H. Lerogeron,** V. Faucher, P. Boivin, J. Favier

The X-Mesh approach applied to fluid-structure interactions
***A. Quiriny,** J. Lambrechts, N. Moës, J. Remacle

Medium-Resolution Fluid-Structure Simulations of Tube Bundles Subjected to Turbulent Cross-Flow
***K. Zwijsen**

Application of a Hydraulic Network Approach to Achieve FSI Calculation Between Fuel Assemblies and Core's Coolant Within the Confines of Eudore Experimental Results
***T. Belazzouz,** V. Faucher, P. Badel, J. Curt

Hybrid multi time step conserving-energy approach for FSI problems through the coupling of Finite Volume method with Finite Element Method.
***R. Pulicani,** M. Brun, O. Allain, A. Gravouil

Vibration Prediction of a Rotating Structure Submerged in a Dense Fluid by Fluid-Structure Interaction
***K. Ceusters,** M. Iarmonov, K. Makhov, J. Pacio, T. Verstraete, J. Degroote

Wed, 28/05/2025 14:00 - 16:00 Sala delle Ceramiche

IS049B - Numerical methods that enable the heterogeneous coupling of conventional and data-driven models for multi-scale and multi-physics problems II

Main Organizer: Dr. Irina Tezaur (Sandia National Laboratories)
Chaired by: Dr. Ivan Prusak (Ruhr-University Bochum), Dr. tommaso taddei (INRIA Bordeaux South-West)

Localized model order reduction for parameter optimization with multiscale PDE constraints Keynote
***M. Ohlberger**

Modeling Parametric Mappings via Fokker-Planck Equation
***A. Iollo,** T. Taddei

Minimally Intrusive Data-Driven Approximation of Schur Complement-based Coupling Operators for Heterogeneous Numerical Methods
***A. de Castro,** P. Kuberry, P. Bochev

An Application-Agnostic Software Solution for Model Adaptivity of Two-Scale Coupled Problems
***I. Desai,** C. Bringedal, B. Uekermann

Wed, 28/05/2025 14:00 - 16:00 Samarcanda

IS024A - Data-Driven, Physics-Informed and Operator Learning Methods for Complex Dynamical Systems I

Main Organizer: Dr. Sourav Dutta (The University of Texas at Austin)
Chaired by: Prof. Valentina Ciriello (University of Bologna)

Physics Informed Neural Network for Multiphase Boiling Flows Keynote
***D. Jalili,** Y. Mahmoudi, S. Jang

Multiple Physics-Informed Neural Networks for Simulating Nonlinear Diffusion-Reaction Systems with Multiphysics Coupling
***A. Assi,** E. Goncalves da Silva, M. Beringhier

Decoding Spatiotemporal Patterns in Global-scale Data via Dynamic Mode Decomposition
***V. Ciriello,** G. Libero, D. Tartakovsky

Reduced Data-Driven Subgrid Scale model for Capturing Long-Term Statistics in 3D Turbulence
***R. Hoekstra,** D. Crommelin, W. Edeling

Wed, 28/05/2025 16:00 - 16:30

Coffee Break

Wed, 28/05/2025 16:30 - 18:30 Sala Ibisco

IS016B - Coupled Mechanics and Material Modelling in Multiphysics and Extreme Environments II

Main Organizer: Prof. Antonio Gil (Swansea University)
Chaired by: Prof. Antonio Gil (Swansea University), Mr. Dominik K. Klein (TU Darmstadt)

A non-intrusive data-driven approach towards optimal control of electroactive polymers via dimensionality reduction

***M. Barillas,** A. García-González, R. Ortigosa, J. Martinez-Frutos, J. Bonet

Bayesian Calibration and Uncertainty Quantification of the Strength Models

***J. Plohr,** D. Francom, L. VanDervort

A Novel Gradient Enhanced Gaussian Predictor Framework for the Formulation of Hyperelastic Electromechanical Models

***N. Ellmer,** R. Ortigosa, J. Martínez-Frutos, A. Gil

Rediscovering the Mullins Effect with Physics Augmented Neural Networks

***M. Zlati?,** M. ?ana?ija

Physics-augmented neural network material models for hyperelasticity with softening

***J. Fey,** D. Klein, O. Weeger

Nonlinear Electro-Elastic Finite Element Analysis with Neural Network Constitutive Models

***D. Klein,** R. Ortigosa, J. Martínez-Frutos, O. Weeger

Wed, 28/05/2025 16:30 - 18:30 Sala Gardenia

IS053C - Projection-Based and Data-Driven Reduced Order Modeling: Bridging Accuracy and Efficiency III

Main Organizer: Dr. Maria Strazzullo (Politecnico di Torino)
Chaired by: Dr. Federico Pichi (SISSA), Dr. Maria Strazzullo (Politecnico di Torino)

A Reduced Order Model of a multiphysics thermal flow

***E. Delgado Avila,** F. Ballarin, A. Mola, G. Rozza

A Hierarchical Model (HiMod) reduction for the simulation of turbulent flows in solar panels

***E. Temellini,** F. Ballarin, T. Chacon Rebollo, S. Perotto

Projection Based and Data-Driven Reduced Order Models for Annealing Furnace

***R. Halder,** G. Stabile, G. Reiss, W. Eßl, C. Mugrauer, E. Wimmer, G. Rozza

Hybrid and projection-based Reduced Order Models for biomedical applications

P. Siena, P. Africa, M. Girfoglio, A. Quaini, G. Rozza

Structured Gaussian Process Regression for Multiphysics Problems

***R. Koprinkov,** F. Bachoc, N. Bartoli, S. Dubreuil

Application of Reduced Quadrature-Based Hyper-Reduction to Fluid-Structure Interaction Problems

***S. Kaneko**

Wed, 28/05/2025 16:30 - 18:30 Sala Begonia

IS045A - Multiphysics Problems on Bodies that Undergo Large Deformations â?? Continuum Mechanics and Numerical Methods I

Main Organizer: Prof. Detlef Kuhl (University of Kassel)
Chaired by: Prof. Detlef Kuhl (University of Kassel), Prof. Stefan Hartmann (Clausthal University of Technology)

High-order Time-Integration Applied to Thermomechanically Coupled Problems Keynote

***S. Hartmann,** C. Steinweller

Biofilm growth modeled within the framework of the extended Hamiltonian principle

F. Klempt, M. Soleimani, P. Junker

Hydraulically-Actuated Asymmetric Flexible Hinge: A Bio-Inspired Design Principle

E. Starostin, ***G. Goss**

A Finite Swelling Beam Model with Axial and Radial Diffusion

J. Alzate Cobo, O. Weeger

Emergence of Natural Convection Beneath a Fluid-Supported Elastic Sheet

***S. Chowkampally,** O. Oshri

Continuum Thermomechanics of Shape Memory Alloy Phase Transformation for Bodies Undergoing Thermally Induced Large Deformations

***D. Kuhl,** S. Descher

Wed, 28/05/2025 16:30 - 18:30 Sala Azalea

IS062A - Uncertainty quantification and Data-driven approaches for Multi-Fidelity, Multi-physics, and Multi-Scale problems I

Main Organizer: Prof. Daniele Schiavazzi (University of Notre Dame)

Multifidelity Bayesian Optimization for Steady-State Predictions using Gyrokinetic Simulations of Plasma Turbulence

***P. Robbe,** P. Rodriguez-Fernandez, N. Howard, A. Ho, C. Holland, B. Debusschere

Stochastic Finite Element Analysis of a Multiphysics Model for Heated Concrete

***P. Apostolopoulos,** M. Guadagnini, S. Huang, S. Dal Pont, J. Baroth, G. Torelli

NeurAM: nonlinear dimensionality reduction for uncertainty quantification through neural active manifolds

***D. Schiavazzi,** A. Zanoni, G. Geraci, M. Salvador, A. Marsden

UQ and Data-Based Learning employing Multi-Fidelity and Multi Physics Approaches targeting complex Problems in Biomechanics

***W. Wall,** J. Nitzler, L. Häusel,, S. Hervas-Raluy, B. Wirthl

Wed, 28/05/2025 16:30 - 18:30 Sala Magnolia

IS028B - Efficient and Scalable Methods for Multiscale and Multiphysics Problems II

Main Organizer: Dr. Ngoc Mai Monica Huynh (University of Pavia)
Chaired by: Dr. Edoardo Centofanti (University of Pavia), Dr. Ngoc Mai Monica Huynh (University of Pavia)

Efficient parallel thermoelasticity and thermoplasticity finite element simulations originating from laser beam welding

T. Bevilacqua, A. Klawonn, M. Lanser, A. Wasiak

A parallel solver for fluid-structure interaction problems with Lagrange multiplier

***F. Credali,** D. Boffi, L. Gastaldi, S. Scacchi

A Deep Learning Algorithm to Accelerate Algebraic Multigrid Methods in Finite Element Solvers for Strongly Heterogeneous Problems

***M. Caldana,** P. Antonietti, L. Dede'

Acceleration of Extreme Scale Flow Simulations through Hierarchical Mesh Partitioning

***J. Fenske,** M. Cristofaro, A. Rempke

High-Order Multidisciplinary Time Integration Towards Adaptive Time Stepping

I. Shuvi, ***F. Roß,** A. Stück

Wed, 28/05/2025 16:30 - 18:30 Sala Ginestra

IS051A - Optimization Methods for Coupled Problems I

Main Organizer: Dr. Lars Radtke (University of Rostock)
Chaired by: Dr. Lars Radtke (University of Rostock), Dr. Jan Heners (MTU Aero Engines AG)

Shape Optimization of Axial Groove Heat Pipes

***A. Bjerregaard Petersen,** O. Sigmund, C. Schousboe Andreasen

Coupling of FEM and FVM Codes for Optimal Control

***S. Baldini,** G. Barbi, G. Bornia, A. Cervone, F. Giangolini, S. Manservisi, L. Sirotti

Adjoint shape optimization for cardiovascular fluid-structure interaction in bypass-graft anastomoses

***L. Radtke,** B. Georgios, J. Heners, A. Düster

Shape Optimization for Unsteady Fluid--Structure Interaction

***J. Haubner,** M. Ulbrich

Application of time-parallel methods on adjoint shape optimisation problems governed by URANS flows

***J. Heners,** J. Cosson, L. Radtke

Non-Direct Optimization of Coupled Thermo-Chemical Problem in Pultrusion of Thin-Walled Profiles

***E. Barkanov,** P. Akishin, J. Lazarev

Wed, 28/05/2025 16:30 - 18:30 Sala delle Ceramiche

IS008A - Advances in Multiphysics Modeling and Simulation of Electromagnetic Systems I

Main Organizer: Prof. Federico Moro (Università di Padova)

A Fully Coupled Modelling Strategy for Non-linear Induction Heating of Steel Sheets Undergoing Large Deformations

***V. Filkin,** Y. Vetyukov, F. Toth

Numerical simulation of Tokamak plasma equilibrium evolution

***G. Gros,** B. Faugeras, C. Boulbe, F. Rapetti, R. Nouailletas, J. Artaud

Electro-quasistatic and coupled problems in modelling and simulating electrically active implants

***U. van Rienen,** R. Appali

Shape and Parameter Optimization of Magnetocaloric Cooling Device with Isogeometric Analysis

***Y. Elbadry,** B. Balouchev, M. Wiesheu, S. Schoeps, O. Weeger

Self-Consistently Coupled Wake Field and Space Charge Simulations

***J. Christ,** E. Gjonaj

Hybrid Transmission Conditions for the Schwarz Domain Decomposition Method in Accelerator Components

***F. Quetscher,** E. Gjonaj, H. De Gersem

Wed, 28/05/2025 16:30 - 18:30 Samarcanda

IS024B - Data-Driven, Physics-Informed and Operator Learning Methods for Complex Dynamical Systems II

Main Organizer: Dr. Sourav Dutta (The University of Texas at Austin)
Chaired by: Dr. Mario Putti (University of Padua)

A Fractal RBF Approach for Enhanced Surrogate Modeling of a Debris Flow

***D. Kumar,** E. Spricigo, M. Putti, D. Pasetto, A. Larese

Well-conditioned snapshot data generation for operator inference

***H. Rosenberger,** B. Sanderse, G. Stabile

Learning Stable port-Hamiltonian Dynamics with Neural Networks

***F. Roth,** M. Kannapinn, D. Klein, O. Weeger

Combining U-Net and Neural Operator Models for Accelerating Phase-Field Simulations

***C. Bonneville,** N. Bieberdorf, H. Najm, M. Asta, L. Capolungo, C. Safta

Wed, 28/05/2025 18:40 - 19:00 Sala Ibisco

Closure Ceremony