23rd IACM Computational Fluids Conference

PROGRAMME

Santiago de Chile, Chile
March 17 – 20, 2025

PREFACE

Greetings from the CFC2025 Conference Chairpersons

We are honored to host the 23rd edition of the Computational Fluids Conference, which has a long-standing and well-recognized history within the computational mechanics community. This will be the first time that the CFC is held in Latin America, supported by the Chilean, Brazilian, Argentinean, and Uruguayan communities. We are excited to welcome all participants to Santiago de Chile from March 17-20, 2025, and we hope you have a great time enriching your knowledge and enjoying the local attractions.

The CFC conferences are organized by the International Association for Computational Mechanics (IACM), bringing together associations worldwide with interests in the development and application of numerical and computational methods in Engineering and Applied Sciences. The conference promotes collaborative efforts among universities from different regions, research institutes, and industries active in these fields. We appreciate the trust placed in the local organization to host this edition of the conference, whose origins date back to Swansea (Wales, UK) in 1974, when it was known as the Finite Element in Fluids Conference, and which has since become a key event in the computational mechanics community.

CFC2025 has the support of the Chilean Society for Computational Mechanics, founded in 1995, and all the associated academics, researchers, and universities. We extend special thanks to all the active members of the national and international scientific committees, particularly the organizers of the minisymposia, and to all the authors whose contributions enrich and make this congress possible.

This conference is also patronized by the Chilean Ministry of Science, Technology, Knowledge, and Innovation. The Emeral group, through the International Journal of Numerical Methods for Heat & Fluid Flow, will award a prize for the best work presented by a young researcher, and the University of Santiago de Chile is sponsoring the event.

CFC2025 is an excellent opportunity to disseminate the latest scientific and technical developments and exchange new ideas. It provides a platform to meet people working on various aspects of computational fluid mechanics, including diverse numerical techniques (such as finite element, finite volume, finite differences, spectral, and particle methods), mathematical formulation, modeling, simulation, and applications. Topics also include statistical analysis, dimensional analysis, verification and validation techniques, uncertainties, emerging topics, and many other related areas.

The conference covers a wide range of topics: laminar and turbulent flows, compressible and incompressible flows, free surfaces, moving interfaces, Newtonian and non-Newtonian fluids, thermo-fluid coupled problems, and fluid-structure interactions, with applications to classical and emerging fields such as health studies, environmental flows, aerodynamics, energy generation, and hydrology, among others.

CFC biennial congresses provide a unique opportunity for scientists and engineers from all around the world. The Technical Programme for CFC2025 includes nearly 200 oral presentations, comprising 4 Plenary Lectures, 7 Semi-Plenary Lectures, 20 Minisymposia and 14 keynote lectures.

The high quality of the proposed work and the active participation of young researchers is remarkable. We are confident that participants, coming from 29 different countries worldwide, will benefit from the presentations and discussions during the scientific and technical sessions, as well as from the social program and the networking opportunities it provides to foster new collaborations.

We would like to express our gratitude to the CIMNE Secretariat for their outstanding support in organizing this event; without their help, this event would not have been possible.

Finally, we extend our thanks to everyone who contributed to this event, particularly those presenting their work. Your participation helps strengthen the local computational mechanics community and fosters collaboration with the international community. We thank all attendees and wish you an enriching experience during the conference and a wonderful time in Santiago de Chile.

Santiago de Chile, 17 March 2025

Marcela Cruchaga

Universidad de Chile, Chile

Franco Perazzo

Universidad Técnica Federico Santa María, Chile

Nelson Moraga

Universidad de La Serena, Chile

Diego Celentano

Pontificia Universidad Católica de Chile, Chile

SUPPORTING ORGANIZATIONS

Besides the support from IACM, the Universidad de Santiago de Chile and other Chilean and South American institutions will support the organization of CFC 2025:

ORGANIZERS AND COMMITTEES

Chairs of the conference:

Marcela Cruchaga, Universidad de Santiago de Chile, Chile
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Nelson Moraga, Universidad de La Serena, Chile
Diego Celentano, Pontificia Universidad Católica de Chile, Chile

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Scuola Internazionale Superiore di Studi Avanzati (SISSA), Italy

Esteban Samaniego
Universidad de Cuenca, Ecuador

Guglielmo Scovazzi
Duke University, USA

Rubén Sevilla
Swansea University,UK

Mario Storti
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Kenji Takizawa
Waseda University, Japan

Eleuterio Toro
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Barcelona Supercomputing Center (BSC-CNS),
ELEM Biotech, Spain

Maria Vittoria Salvetti
Universita di Pisa, Italy

Harald Van Brummelen
Eindhoven University of Technology, The Netherlands

Wolfgang Wall
Technical University of Munich, Germany

William R. Wolf
Universidade Estadual de Campinas UNICAMP, Brazil

Shinobu Yoshimura
The University of Tokyo, Japan

PLENARY SPEAKERS

PHILIPPE DEVLOO
UNICAMP/Civil Engineering, Brazil
On the use of HDiv Spaces in Computational Fluid Mechanics

RAINALD LOHNER
George Mason University, USA
Timestepping Techniques For Barely Coupled Multiphysics

BEATRICE RIVIERE
RICE University, USA
Computational Methods for Two-Phase Flows at the Pore Scale

ELEUTERIO TORO
University of Trento, Italy
Hyperbolic systems: fluxes, fluctuations and computational algorithms.

SEMI - PLENARY SPEAKERS

SANTIAGO BADIA
Monash University, Australia
Recent Advances in Unfitted Finite Element Methods

GABRIEL BARRENECHEA
University of Strathclyde, United Kingdom
Positivity-preserving Discretisations Without Mesh Restrictions

LAURA BATTAGLIA
CIMEC, Universidad Nacional del Litoral, Argentina
Computational Modeling and Experimental Validation of Free Surface Flows and Related Problems

MARÍA FERNANDINO
Norwegian University of Science and Technology, Norway
Phase-Field Methods for Interfacial Flows with Phase Change

RAJESH RANSING
Swansea University, United Kingdom
Physics-Corrected Graph Network Simulators (GNS) for Modelling Fluid Flow

WILLIAM ROBERTO WOLF
University of Campinas, Brazil
Shock-boundary layer interactions in supersonic turbine cascades

HARALD VAN BRUMMELEN
Eindhoven University of Technology, Netherlands
Phase-Field Models of Binary Fluids in (Soft-)Wetting

LIST OF MINISYMPOSIA

MS001 Advanced Computational Modelling of Free Surface Flows And Applications
Organized by: *A. Engsig-Karup (Technical University of Denmark, Denmark) and O. Bokhove (University of Leeds, United Kingdom)*

MS002 Advances in Numerical Methods for Coupled Flows in Civil and Environmental Engineering
Organized by: *J. Molina (University of Granada, Spain), P. Ortiz (University of Granada, Spain) and R. Bravo (University of Granada, Spain)*

MS003 Heat transfer, combustion and fire dynamics
Organized by: *M. Toledo (14.325.645-6, Chile)*

MS004 Complex Fluid Flows in Engineering: Modeling, Simulation and Optimization
Organized by: *S. Elgeti (TU Wien/RWTH Aachen, Austria), F. Key (TU Wien, Austria), F. Gonzalez (RWTH Aachen, Germany) and M. Behr (RWTH Aachen, Germany)*

MS005 High-Fidelity Simulations, Machine-Learning Techniques and Active Control
Organized by: *V. Golubev (Embry Riddle Aeronautical University, United States) and W. MacKunis (Embry Riddle Aeronautical University, United States)*

MS006 Computational Fluid Mechanics with Free and Moving Boundaries: Methods and Applications
Organized by: *R. Rao (Sandia National Laboratories, United States), D. Noble (Sandia National Laboratories, United States) and A. Kucala (Sandia National Laboratories, United States)*

MS007 Computational Methods in Fundamental and Applied Aerodynamics
Organized by: *C. Muñoz (Universidad Tecnológica Metropolitana, Chile) and M. Avila (Barcelona Supercomputing Center, Spain)*

MS009 Finite Element Methods in Fluid Mechanics
Organized by: *F. Fuentes (Pontificia Universidad Catolica de Chile, Chile) and M. Sanchez (Pontificia Universidad Catolica de Chile, Chile)*

MS010 Fluid-structure interaction: Methods and applications
Organized by: *L. Battaglia (CIMEC - Ctro. de Inv. en Mét. Computacionales, Argentina), J. D›Elía (CIMEC - Ctro. de Inv. en Mét. Computacionales, Argentina), L. Garelli (CIMEC - Ctro. de Inv. en Mét. Computacionales, Argentina), G. Ríos Rodríguez (CIMEC - Ctro. de Inv. en Mét. Computacionales, Argentina), M. Storti (CIMEC - Ctro. de Inv. en Mét. Computacionales, Argentina) and M. Cruchaga (Universidad de Santiago de Chile, Chile)*

MS011 Forward and inverse problems in biofluids and biomechanics
Organized by: *F. Galarce (School of Civil Engineering, PUCV, Chile), A. Ranno (RWTH Aachen University, Germany), J. Garay (Mechanical and Metallurgical Engineering, UC, Chile) and A. Caiazzo (WIAS im Forschungsverbund Berlin e.V., Germany)*

MS013 Hyperbolic Equations: Novel Methods and Applications
Organized by: *E. Gaburro (University of Verona, Italy), E. Toro (University of Trento, Italy) and G. Montecinos (Universidad de la Frontera, Chile)*

MS015 Innovative numerical methods for non-Newtonian or non-homogeneous flows
Organized by: *D. Pacheco (RWTH Aachen University, Germany), E. Castillo (USACH, Chile) and G. Barrenechea (University of Strathclyde, United Kingdom)*

MS016 Joint Brazil-Chile-Inria MS on Innovative Numerical Methods for Fluids
Organized by: *R. Araya (UDEC, Chile), M. Fernandez (Inria, France) and F. Valentin (LNCC, Brazil)*

MS017 Mathematics, Algorithms, and Software for Predictive Digital Twins in CFD
Organized by: *I. Tezaur (Sandia National Laboratories, United States), O. Ghattas (University of Texas at Austin, United States), P. Bochev (Sandia National Laboratories, United States) and P. Kuberry (Sandia National Laboratories, United States)*

MS019 Modern numerical methods and simulation techniques for complex flow problems
Organized by: *S. Frei (University of Konstanz, Germany), T. Richter (University of Magdeburg, Germany), H. von Wahl (University of Jena, Germany) and T. Wick (Leibniz University Hannover, Germany)*

MS020 Multiphase flow and transport at microscale and in porous media
Organized by: *P. Kler (CIMEC, UNL/CONICET y FRSF-UTN,, Argentina), P. Gamazo (Departamento del Agua, CENUR Litoral Norte, U, Uruguay), G. Buscaglia (Instituto de Ciências Matemáticas e de Comput, Brazil) and S. Marquez Damian (CIMEC, UNL/CONICET y FRSF-UTN, Argentina)*

MS023 Particle Methods in Computational Fluid Dynamics and Fluid-Structure Interactions
Organized by: *E. Fernandez (Liege University, Belgium) and J. Ponthot (Liege University, Belgium)*

MS024 Physics-based and Data-driven Low-order Modeling for Turbulent Flows
Organized by: *E. Kracht (University of Chile, Chile) and B. Herrmann (University of Chile, Chile)*

MS025 Polytopal Methods for PDES in Fluid Mechanics
Organized by: *L. Beirao da Veiga (Università di Milano-Bicocca, Italy), D. Mora (Universidad del Bío-Bío, Chile) and G. Vacca (Università degli Studi di Bari, Italy)*

MS027 The human circulation and associated diseases: models, methods and simulations.
Organized by: *L. Müller (University of Trento, Italy), E. Toro (University of Trento, Italy), G. Bertaglia (University of Ferrara, Italy) and C. Contarino (Computational Life Inc., United States)*

PRACTICAL INFORMATION

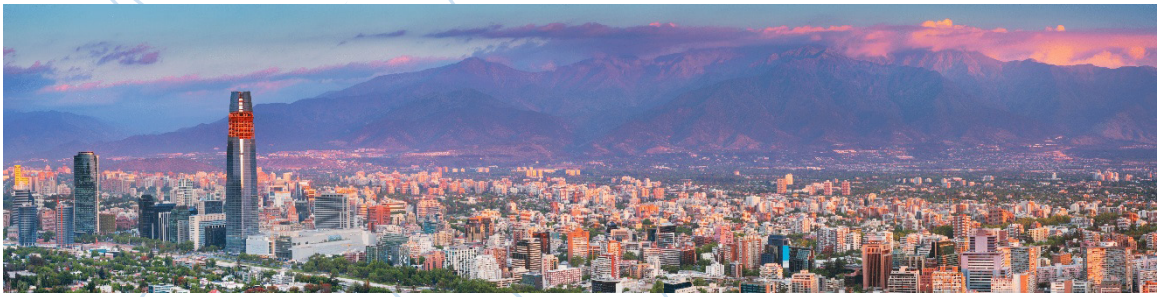
PRESENTATION

Santiago is a city where the breathtaking beauty of the Andes meets a bustling metropolitan capital. Its mountainous terrain and its proximity to Chile's central coastline are ideal for experiencing the nature and culture of the most southern country in the world.

CFC 2025 Conference will be held at the InterContinental Santiago Hotel convention centre in **Santiago, Chile**, located in the El Golf sector – known as the new financial, commercial, and gastronomic center of the capital of Chile – in the Las Condes district. Its location allows you to reach downtown Santiago in 20 minutes and the airport in 15 minutes.

The Conference Venue is located at:

InterContinental Santiago Hotel
Av Vitacura 2885
7550023 Las Condes
Metropolitan Region, Chile



ACCESS TO THE CONFERENCE VENUE & LECTURE ROOMS

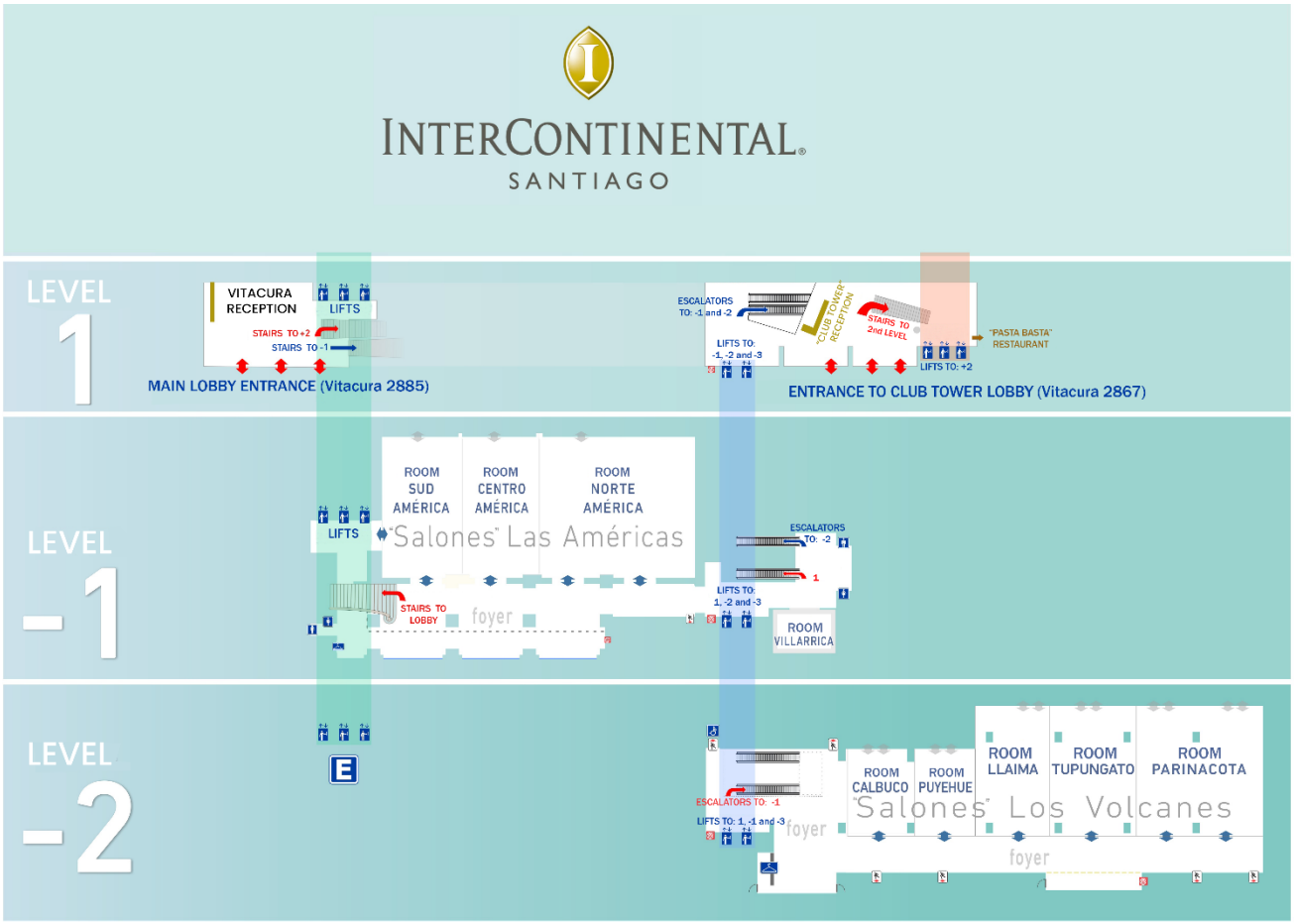
All sessions will take place at the **InterContinental Santiago Hotel** located at: Av Vitacura 2885**,** 7550023 Las Condes**,** Santiago de Chile, Chile.

We will be using the following lecture rooms: Las Américas (Norteamérica, Centroamérica, and Sudamérica) on Level -1, and Las Volcanes (Topungato, Llaima, and Calbuco-Puyehue) on Level -2.

- **Plenary and Semi Plenary Lectures** will be addressed at the Las Américas.
- **Regular talks**: Los Volcanes and Las Américas.

Once arrived at the Hotel, we recommend using the **Lobby Access at Torre Club** (Avenida Vitacura 2867) to reach the lecture rooms. Upon arrival at this lobby, which is not the main hotel entrance, you will find escalators that will take you to Floor -1, Las Américas. If you go down one more level, you will reach Floor -2, Los Volcanes.

Alternatively, if you enter through the **Main Lobby** (Avenida Vitacura 2885), you can also access both event floors. There is a staircase leading to Floor -1, Las Américas. To reach Floor -2, Los Volcanes, you will need to cross the entire Las Américas area to find the escalator at the end (in front of the Villarrica Room)



REGISTRATION

Pre-registration will start on March 17, 2025, from 16:30 to 19:30 and will take place in the premisses of the hotel's Convention Center. Signs will direct you to the exact location.

Registration will continue on March 18, 2025, from 08:00 to 08:30. This schedule will apply for the rest of the days. You can come to the **registration desk** with your confirmation email, and you will be able to collect your badge.

If you are unable to pre-register on March 17 or 18, you can register on any of the following days.

The confirmation email with your **Registration Code** (sent a few days before the conference) will be required at the Registration Desk. Kindly ensure you have it with you, either in printed form or on your mobile device.

Your badge can be collected at the Conference Secretariat desk. Please remember to wear your badge at all times during the conference.

Secretariat Desk Timetable:

Monday, March 17: 16:00 to 19:30
Tuesday, March 18: 07:30 to 12:30 / 13:30 to 17:00
Wednesday, March 19: 07:30 to 12:30 /13:30 to 17:30
Thursday, March 20: 08:00 to 12:30 / 13:30 17:00

WIRELESS CONNECTION

Internet Connection will be available at the **InterContinental Santiago Hotel**.

Delegates will be able to login to the network below. Please follow the steps to connect:

1. Please, go to Wifi Parameters in your mobile phone, tablet or laptop.
2. Select the Wifi network: Events & Banquets
3. Introduce the password: 30092025

PRESENTATIONS

Time & Equipment:

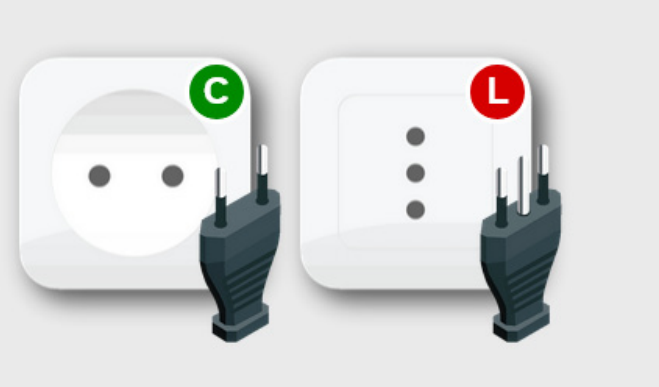
The Technical program of CFC 2025 consists of 4 Plenary Lectures, 7 Semi-Plenary Lectures, 20 Minisymposia, and 185 oral presentations, including 14 keynote lectures.

The duration of each contributed talk is **20 minutes**, while keynote lectures are allocated **40 minutes**, and Plenary and Semi-Plenary lectures **60 minutes**. The above times include the Q&A sessions.

Each room is equipped with a laptop and an LCD projector with an HDMI connection. Please make sure to bring your own adapter plug if needed. We highly recommend bringing a copy of your presentation on a USB storage device to upload to the system and reaching the session's room at least 10 minutes before the session starts in order to do a quick test.

Power sockets and plug converters for electricity in Chile:

In Chile, power plugs and sockets (outlets) of type C and type L are used. The standard voltage is 220 V at a frequency of 50 Hz. You may need a power plug travel adapter for sockets type L in Chile.



COFFEE BREAKS

Coffees will be served at the conference venue, in the Foyer of Las Américas rooms.

LUNCHES: EATING OUTSIDE THE VENUE

Lunches are not included in the registration fees; however, the hotel is located at the beginning of a street lined with a variety of restaurants. The street, Isidora Goyenechea, stretches for about five blocks, offering many options. For more specific recommendations, please contact the hotel concierge for further suggestions at concierge@interconti.cl.

- La Mesa
- La Calma by Fredes
- La Cabrera
- Yum Cha
- Boragó
- Aligot
- Ambrosia
- Don Carlos
- Confitería Torres
- Tip y Tap
- Pinpilinpausha
- Café Cassis Isidora Goyenechea

WATER FOUNTAINS

At the InterContinental Santiago Hotel, there are several water fountains located throughout the spaces where the conference will take place. A glass water bottle will be provided to all delegates, allowing you to refill your bottle using these water fountains during the conference.

SOCIAL PROGRAMME

The social programme of CFC 2025 includes a **Welcome Reception** for all attendees and a **Conference Banquet** for those whose fees include it. Both events will take place at the conference venue.

- **Welcome Reception:** Monday 17 March 2025 (19:30 to 21:30), Foyer of Los Volcanes meeting rooms.
- **Conference Banquet:** Wednesday 19 March 2025 at 20:00, the Restaurant Pasta e Basta, Located at the Club Tower, level 1.

** Kindly remember that it is mandatory to wear your badge to access the Conference Banquet.*

EMERGENCY CALLS

The following numbers are the **safety and emergency numbers** which are important to know, when you need help of information in Santiago:

"131" Emergency Medical Service (SAMU)
"103" General Information
"133" Police of Santiago (Carabineros)
"134" Chilean Investigative Police (PDI)
"132" Fire Brigade

All are available 24hrs. and their use is free.

HOW TO GET FROM THE AIRPORT TO THE CENTRE

The International Airport of Chile is located in the north west of Santiago. **Arturo Merino Benítez International Airport**, which is located about 20 kilometers from the city's most central neighborhoods and to travel from the airport to the center of Santiago you have many alternatives. It is recommended to use the authorities of the airport, which feature identification.

The new international arrivals exit includes a transportation center in a safe area, separate from the public zone, where you can acquire your official airport ground transportation. Upon leaving the SAG and CUSTOMS inspection area, follow the blue arrow on the floor. Head to the designated counters, where you can choose between regular and tourist taxis, transfers, or buses. Hire your chosen transportation at the corresponding booth and head to the public area.

If you are going to use a taxi, for your safety, it is recommended to only use the **official taxis** recommended by the Santiago airport. You can find more information about the taxis in the following link from Taxi Oficial and Taxi Vip.

PUBLIC TRANSPORT IN SANTIAGO DE CHILE

The public transport system in Santiago is designed for a dynamically and smoothly traffic flow. With its convenient access and modern transportation, you can travel throughout the city of Santiago.

In Santiago's the most common transports are: transantiago (buses), metro, collective taxis (black colour and have space for more passengers on a predetermined route), which run through almost all communes of Santiago.

If you want to travel in Chile, there are three options: planes, trains and intercity buses. Each of them has different characteristics depending on the destination and you can choose according to your needs.

URBAN BUSES:

The public transport system in Santiago is called Transantiago. The city buses in Santiago de Chile are known among Chileans as Micros, which run through the city of Santiago. There are two types of buses: The Troncales, which are circulating through the large avenues such as Av. Providencia and Alameda and there are the alimentadores, which are small buses which are connecting the smaller streets.

You can only pay with a Bip prepaid card, which can be purchased at Metro Stations or Bip Centers, which are located throughout Santiago.

The Bip card is not personalized and therefore can be used by more than one person.

The buses run in the night and day in Santiago. The schedule is from 5:30am to 1:00am, in which they travel with a normal frequency. During the night from 1:00am till 5:30am they run less frequently.

For those who want to explore the city as tourists there is a Circuito Cultural Transantiago, which exists of 15 stops at historical and cultural points of Santiago. This service is available every Sunday from 10:00am to 6:30pm. The payment will be just one charge from your Bip card.

METRO:

The Metro in Santiago de Chile is one of the most modern transportation in Latin America. It has 5 lines covering most of the city and is currently expanding into new sectors. It is fast, secure and its lines are easily identified by colour:

- Línea 1 (Red)
- Línea 2 (Yellow)
- Línea 4 (Blue)
- Línea 4A (Navy Blue)
- Línea 5 (Green)

You can pay this transportation either with your Bip card or through a ticket, which can be purchased at the counters in the Metro stations. The prices will depend on the time during the day:

- Horario Punta (Rush Hour) (07.00am a 08.59am y 18.00pm a 19.59pm)
- Horario Valle (06.30am a 06.59am; 09.00am a 17.59pm; 20.00pm a 20.44pm)
- Horario Low (06.00am a 06.29am; 20.45pm a 23.00pm)

For more information you can visit the website of Metro of Santiago.

TAXIS

In Santiago, you can recognize taxis by their black color with yellow roofs and orange license plates. This transportation is relatively inexpensive and can be found all over the city at any time. There is no fixed rate for destinations, but the meter measures the distance traveled and accordingly displays the amount to be paid. You will see the rates on the passenger's side of the windshield.

In case you want to book a taxi in advance you can use radio taxis, which are safer and only slightly higher in prices, but they will pick up the passengers at the requested location. You can identify them by their orange-coloured patent.

- Taxi Oficial, website www.taxioficial.cl
- Taxi Vip, website www.transvip.cl

More information about Santiago de Chile, please visit the tourist official website:

https://www.chile.travel/en/

Operating schedule of their phone line and WhatsApp chat is from Monday to Friday, between 9:00 am and 6:00 pm and Saturdays from 10:00 am to 3:00 pm. If you prefer, you can send them an email which is active 24 hours and we will reply during the same schedule of the telephone service.

Contact:

- +562 2731 8337
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CONFERENCE SECRETARIAT

CIMNE

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Building C1 - Office C4
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Tel. +34 93 405 4696

Conference Secretariat & Invitation Letter: cfc25_sec@cimne.upc.edu
Payments & Invoices: financialsupport@cimne.upc.edu

CFC 2025

Overview Programme

TIME	Monday March 17, 2025	Tuesday March 18, 2025	Wednesday March 19, 2025	Thursday March 20, 2025
8:00-8:30		Registration	Registration	Registration
8:30-9:00		Opening Ceremony		
9:00-9:30		Plenary Lecture	Plenary Lecture	Technical Sessions
9:30-10:00				
10:00-10:30		Coffee Break		
10:30-11:00		Technical Sessions	Technical Sessions	
11:00-11:30				
11:30-12:00				Coffee Break
12:00-12:30				Plenary Lecture
12:30-13:00		Lunch Break	Lunch Break	
13:00-13:30				Lunch Break
13:30-14:00			Semi-Plenary Lecture	
14:00-14:30		Semi-Plenary Lecture		Semi-Plenary Lecture
14:45-15:00			Technical Sessions	
15:00-15:30		Coffee Break		
15:30-16:00		Technical Sessions		Technical Sessions (15:15h - 17:15h)
16:00-16:30				
16:30-16:45	Registration			
16:45-17:15			Coffee Break	
17:00-17:15				
17:15-17:30			Plenary Lecture	Closing Ceremony & Farewell Coffee
17:30-18:00				
18:00-18:30				
18:30-19:00				
19:00-19:30				
19:30-20:00	Welcome Cocktail			
20:00-20:30			Banquet Dinner	
20:30-21:00				
21:00-21:30				
21:30-23:00				

For the latest updates, please visit the [conference website](#).

CFC 2025
Technical Programme

Last updated: 2025-03-19 16:16

Monday, 17/03/2025

Mon, 17/03/2025 16:30 - 19:30
Registration

Mon, 17/03/2025 19:30 - 21:30
Welcome Cocktail

Tuesday, 18/03/2025

Tue, 18/03/2025 08:00 - 08:45
Registration

Tue, 18/03/2025 08:30 - 09:00 Norteamérica
Opening Ceremony

Tue, 18/03/2025 09:00 - 10:00 Norteamérica
PL1 - Plenary Lecture I
Prof. Philippe Devloo (UNICAMP/Civil Engineering, Brazil)
Chaired by: Prof. Diego Celentano (Pontificia Universidad Católica de Chile)

On the use of HDiv Spaces in Computational Fluid Mechanics
***P. Devloo**

Tue, 18/03/2025 10:00 - 10:30
Coffee Break

Tue, 18/03/2025 10:30 - 12:30 Norteamérica
MS004A - Complex Fluid Flows in Engineering: Modeling, Simulation and Optimization I
Main Organizer: Prof. Stefanie Elgeti (RWTH Aachen)
Chaired by: Prof. Stefanie Elgeti (RWTH Aachen), Dr. Felipe Gonzalez (RWTH Aachen)

Weakly Imposed Kinematic Condition on Free Surface Coupled with Fluid Flow in Finite Element Framework
***Y. Yang,** J. Nam

Thermofluid Simulation of Single-Strand Deposition in the Context of FDM 4D Printing
***F. González,** S. Elgeti, M. Behr

Dip Coating of Discrete Object
D. Yu, J. Song, ***J. Nam**

Numerical Simulation of a Fume Treatment Filter System
F. Bacchi, M. Valenzuela Pino, ***A. Scarabino**

Unstructured Space-Time Meshes for Accurate and Automated Handling of Moving Boundaries in Fluid Flow Simulation
***M. Behr**

Density Based Topology Optimization of Fluid Flow Problems
***B. Lazarov**

Tue, 18/03/2025 10:30 - 12:30 Parinacota
MS013A - Hyperbolic Equations: Novel Methods and Applications I
Main Organizer: Prof. Elena Gaburro (University of Verona)
Chaired by: Prof. Elena Gaburro (University of Verona), Prof. Eleuterio F. Toro (University of Trento)

A High-Order Matrix-Free Finite Element Method for Hyperbolic Problems
***S. Tokareva**

Finite Element ALE Hydrodynamics with Sharp Curved Material Interfaces and Complex Domains
N. Atallah, G. Scovazzi, ***V. Tomov**

Implicit Shock Tracking for Flows with Shocks Attached to Surfaces Using Mesh-Based Parametrization
***A. Perez-Reyes,** M. Zahr

High-Order Implicit Shock Tracking for time-dependent flows
***C. Naudet,** M. Zahr

Monolithic Convex Limiting for Implicit Finite Element Discretizations of the Compressible Euler Equations
***D. Kuzmin,** P. Moujaes

A New Locally Divergence-Free Path-Conservative Central-Upwind Scheme for Ideal and Shallow Water Magnetohydrodynamics
***A. Chertock**

Tue, 18/03/2025 10:30 - 12:30 Tupungato

MS017A - Mathematics, Algorithms, and Software for Predictive Digital Twins in CFD I

Main Organizer: Dr. Irina Tezaur (Sandia National Laboratories)
Chaired by: Prof. Omar Ghattas (The University of Texas at Austin), Dr. Irina Tezaur (Sandia National Laboratories)

Enhancing CFD simulations for Digital Twins by combining model order reduction and scientific machine learning Keynote
***G. Rozza**

Domain decomposition-based coupling of subdomain-local reduced order models (ROMs) in fluid mechanics using the Schwarz alternating method
C. Wentland, F. Rizzi, J. Barnett, ***I. Tezaur**

Interpretable data-driven reduced-order models using kernel methods
***A. Diaz,** P. Blonigan, S. McQuarrie

Tue, 18/03/2025 10:30 - 12:30 Sudamérica

MS001A - Advanced Computational Modelling of Free Surface Flows And Applications I

Main Organizer: Prof. Allan Peter Engsig-Karup (Technical University of Denmark)
Chaired by: Prof. Allan Peter Engsig-Karup (Technical University of Denmark), Prof. Onno Bokhove (University of Leeds)

Comparative Study on Wave Reflection Coefficients for V-Shaped and Flat-Front Wave Absorbers
R. Muñoz, M. Rosas, ***F. Pierart**

Analysis of Coupling Methods of Phase-Resolving Coastal Wave Models
***J. Galaz Mora,** M. Kazolea, A. Rousseau

Numerical Analysis of a Spatially Developing Capillary Jet
A. Mostafavi, M. Ranjbar, V. Yurkiv, A. Yarin, ***F. Mashayek**

A Comparative Evaluation of The Interface Capturing Schemes in A Bundle Bubbly Flow
***T. Fukuda,** S. Uesawa, S. Yamashita, T. Suzuki

Simulation of Drainage in a Tank Using the Level Set Method
***N. Mena,** R. Arrau, J. Ramos, M. Marian

Tue, 18/03/2025 10:30 - 12:30 Centroamérica

MS023A - Particle Methods in Computational Fluid Dynamics and Fluid-Structure Interactions I

Main Organizer: Prof. Jean Philippe Ponthot (University of Liège)
Chaired by: Prof. Jean Philippe Ponthot (University of Liège), Dr. Alessio Alexiadis (University of Birmingham)

An MPI-Parallel Meshfree Generalization of the Finite Volume Method Keynote
***F. Breiden,** M. Schweitzer

Numerical Modeling of Water Tank Sloshing Using the Material Point Method
***G. Sanchez,** F. Zabala, R. Rodari

Surface Tension Simulation: A pairwise force approach
***E. Santacruz-Yunga,** E. Plaza, C. Trejo-Soto

A fluid-particle interaction method for the simulation of 3D fluids laden with particles
A. Müller, ***E. Campello,** H. Gomes

Recent Advances in the Particle Finite Element Method for Fluid-Structure Interactions and Multi-Physics Problems
M. Lacroix, E. Fernandez, S. Février, L. Papeleux, R. Boman, ***J. Ponthot**

Tue, 18/03/2025 10:30 - 12:30 Llaima

MS009A - Finite Element Methods in Fluid Mechanics I

Main Organizer: Dr. Federico Fuentes (Pontificia Universidad Catolica de Chile)
Chaired by: Dr. Federico Fuentes (Pontificia Universidad Catolica de Chile)

Reliable Simulations of Industrial Fluid Flow Applications Keynote
***R. Scott**

Computing Energy Stability Limits in Ducts of Arbitrary Cross-Section
***V. Iligaray,** D. Aballay, F. Fuentes

Energy Stability of Pressure-Driven Flows Between Concentric Cylinders
***D. Aballay,** V. Iligaray, F. Fuentes

Finite Element Solution of the Reynolds-Orr Energy Eigenvalue Problem
***W. Imbachi Quinchua,** F. Fuentes Caycedo

A Property-Preserving Stabilized Continuous Galerkin Method for Convection-Dominated Flows
***A. Blanco-Casares,** O. Lehmkuhl, D. Mira

Tue, 18/03/2025 10:30 - 12:30 Calbuco - Puyehue

MS005A - High-Fidelity Simulations, Machine-Learning Techniques and Active Control I

Main Organizer: Prof. Vladimir Golubev (ERAU)
Chaired by: Prof. Vladimir Golubev (ERAU), Prof. Ivette Rodriguez (Universitat Politècnica de Catalunya)

Synthetic Jet Actuators in Active Flow Control Simulations
***V. Golubev**

Lift Enhancement of a Rotating and Translating NACA 0015 Airfoil Using Dual Synthetic Jets
***F. Aguirre,** L. Silva

Mesh-Free Pressure Field Reconstruction from Image Velocimetry Data Using SIREN
***R. Miotto,** W. Wolf, F. Zigunov

On a probabilistic closure for Algebraic Surrogate Models of Turbulent Flows
B. Eiximeno, M. Sanchis-Agudo, A. Miró, ***I. Rodriguez,** R. Vinuesa, O. Lehmkuhl

Rank reduction autoencoder for the generative design of power transformer
***S. Rodriguez,** L. Achour, C. Ghnatios, A. Ammar, F. Chinesta

Remaining Useful Life of Oil-Immersed Transformers: A Combined CFD and Surrogate Model
***L. Achour ,** S. Rodriguez, C. Ghnatios, A. Ammar, F. Chinesta

Tue, 18/03/2025 12:30 - 14:00

Lunch Break

Tue, 18/03/2025 14:00 - 15:00 Norteamérica

SPL01 - Semi-Plenary I

Prof. María Fernandino (NTNU)
Chaired by: Prof. Marek Behr (RWTH Aachen University)

Phase-Field Methods for Interfacial Flows with Phase Change
***M. Fernandino**

Tue, 18/03/2025 14:00 - 15:00 Sudamérica

SPL02 - Semi-Plenary II

Prof. Santiago Badia (Monash University)
Chaired by: Dr. Roberto Cabrales (Universidad de Tarapacá)

Recent Advances in Unfitted Finite Element Methods
***S. Badia**

Tue, 18/03/2025 15:00 - 15:30

Coffee Break

Tue, 18/03/2025 15:30 - 17:30 Norteamérica

MS004B - Complex Fluid Flows in Engineering: Modeling, Simulation and Optimization II

Main Organizer: Prof. Stefanie Elgeti (RWTH Aachen)
Chaired by: Prof. Marek Behr (RWTH Aachen University), Dr. Felipe Gonzalez (RWTH Aachen)

Automatic generation of adjoint lattice Boltzmann methods through reverse mode alogorithmic differentiation in OpenLB
***S. Ito,** A. Kummerländer, F. Bukreev, M. Krause

Shape Optimization of Printing Nozzles for Extrusion-Based Additive Manufacturing
***S. Tillmann,** F. Gonzalez, S. Elgeti

Thixotropy on Fluid Dynamics in Battery Electrode Slot Coating
***S. Oh,** J. Nam

An open-source framework for the capture of turbulent non-isothermal CO2 flows captured by an axial fan
***A. BENCHIKH LE HOCINE,** S. PONCET

Combined influence of surface texturing and electro-rheological lubricant behaviour on hybrid spherical journal bearing
***M. Marian,** A. Tomar

Optimization of a centrifugal blower using a gradient-based approach
R. Lavimi, A. Benchikh Lehocine, ***S. Poncet,** B. Marcos, R. Panneton

Tue, 18/03/2025 15:30 - 17:30 Parinacota

MS013B - Hyperbolic Equations: Novel Methods and Applications II

Main Organizer: Prof. Elena Gaburro (University of Verona)
Chaired by: Dr. Gino Montecinos (Universidad de La Frontera), Prof. Elena Gaburro (University of Verona)

High Order Accurate ADER Finite Volume Schemes Based on Novel Genuinely Multidimensional Riemann Solvers
***E. Gaburro,** M. Dumbser, M. Ricchiuto

On the Riemann Problem and Solution Nonuniqueness in Nonconservative Hyperbolic Systems
***A. Aleksyuk**

A Flux-Vector Splitting Scheme for the Shallow Water Equations: Assessment of an Approximate Riemann Solver
***C. Castro,** E. Toro, A. Siviglia

Adaptive Water Wave Simulations in GeoClaw with Hyperbolic-Dispersive Models
***C. Muñoz-Moncayo,** D. Ketcheson

A Multilayer Shallow Water Model for Tsunamis and Coastal Forest Interaction
***R. Bürger, *E. Fernández-Nieto,** J. Moya

An Improved Approach to the Predictability & Reliability of the Onset of Turbulence with Shocks
***H. Yee**

Tue, 18/03/2025 15:30 - 17:30 Tupungato

MS017B - Mathematics, Algorithms, and Software for Predictive Digital Twins in CFD II

Main Organizer: Dr. Irina Tezaur (Sandia National Laboratories)
Chaired by: Dr. Irina Tezaur (Sandia National Laboratories), Prof. Omar Ghattas (The University of Texas at Austin)

Large Eddy Simulation Reduced Order Models (LES-ROMs) for Turbulent Flows Keynote
***T. Iliescu**

A graph neural network surrogate for microstructure evolution in metal additive manufacturing
Y. Qin, A. Hikmet, ***G. Biros**

A Digital Twin for Real Time Bayesian Inference and Prediction of Tsunamis
***O. Ghattas,** S. Venkat, S. Henneking, M. Fernando

Optimal Experimental Design with Digital Twins
N. Aretz, ***S. Leyffer**

Tue, 18/03/2025 15:30 - 17:30 Sudamérica

MS001B - Advanced Computational Modelling of Free Surface Flows And Applications II

Main Organizer: Prof. Allan Peter Engsig-Karup (Technical University of Denmark)
Chaired by: Prof. Onno Bokhove (University of Leeds), Prof. Allan Peter Engsig-Karup (Technical University of Denmark)

Interfacial energy exchange in free-surface turbulence
A. Calado, ***E. Balaras**

Subspace Acceleration for Efficient Nonlinear Water Wave Simulation
***R. Sørensen,** A. Engsig-Karup, M. Guido, D. Kressner

A High-Order Steady-State Solver to the Incompressible Navier-Stokes Equations with a Free Surface
***S. Minniti,** J. Visbech, A. Engsig-Karup

Electromagnetic damping of liquid metal free surface instability
***A. Brekis**

Data Driven Multi-Fidelity Modeling for Advanced Free Surface Simulations
***A. Melander,** A. Engsig-Karup

Tue, 18/03/2025 15:30 - 17:30 Centroamérica

MS023B - Particle Methods in Computational Fluid Dynamics and Fluid-Structure Interactions II

Main Organizer: Prof. Jean Philippe Ponthot (University of Liège)
Chaired by: Prof. Jean Philippe Ponthot (University of Liège), Ms. Farah Breiden (University of Bonn)

Coupling Particle Methods with Discrete Multiphysics Keynote
***A. Alexiadis**

Effect of Interfacial Charge Inversion on the Transport of Nanoconfined electrolyte solutions.
***H. Zambrano,** J. Walther, A. Rojano

Analysis of the Scouring Phenomenon Caused by Tsunami Effects Using the Smoothed Particle Hydrodynamics (SPH) Method
***P. Rivera,** R. Aránguiz

Fully Lagrangian Vortex Particle Methods for 2D and 3D Flows Simulation and their Efficient Implementations
***I. Marchevsky,** G. Shcheglov

Tue, 18/03/2025 15:30 - 17:30 Llaima

MS009B - Finite Element Methods in Fluid Mechanics II

Main Organizer: Dr. Federico Fuentes (Pontificia Universidad Catolica de Chile)
Chaired by: Mr. Manuel Sanchez (Pontificia Universidad Catolica de Chile)

On the analysis and approximation of some models of fluids over weighted spaces on convex polyhedra
***E. Otarola,** A. Salgado

Symplectic Hamiltonian hybridizable discontinuous Galerkin methods for linearized shallows-water equations
***C. Núñez,** M. Sánchez

A DPG method for the streamfunction formulation of Stokes equations
***T. Fuehrer,** P. Herrera, N. Heuer

Space-time least-squares finite elements for evolution equations
T. Führer, R. González, ***M. Karkulik**

hp-DG Time Stepping Method with Continuous/Discontinuous Galerkin Methods for Nonlinear Parabolic Delay Problems
***R. Devi,** D. Pandey

Tue, 18/03/2025 15:30 - 17:30 Calbuco - Puyehue

MS025A - Polytopal Methods for PDES in Fluid Mechanics I

Main Organizer: Prof. David Mora (Universidad del Bío-Bío)
Chaired by: Prof. David Mora (Universidad del Bío-Bío), Dr. Gonzalo Rivera (Universidad de Los Lagos)

An HHO-DDR polytopal method for the Brinkman problem that is robust in pure Stokes and Darcy regimes Keynote
***J. Droniou,** D. Di Pietro

A Reynolds-semi-robust and pressure-robust Hybrid High-Order method for the time dependent incompressible Navier–Stokes equations on general meshes
***D. Castanon Quiroz,** D. Di Pietro

Nonconforming Virtual Element Methods for the Oseen Eigenvalue Problem
A. Dibyendu, F. Lepe, ***G. Rivera**

A Reynolds-Semi-Robust Hybrid High-Order Scheme for the Unsteady Navier-Stokes Problem
L. Beirão da Veiga, D. Di Pietro, J. Droniou, K. Haile, ***T. Radley**

Stream virtual elements for the Navier-Stokes system
***D. Mora,** A. Silgado

Wednesday, 19/03/2025

Wed, 19/03/2025 08:00 - 09:00
Registration

Wed, 19/03/2025 09:00 - 10:00 — Norteamérica
PL02 - Plenary Lecture II
Prof. Beatrice Riviere (Rice University)
Chaired by: Dr. Marcela Cruchaga (Universidad de Santiago de Chile)

Computational Methods for Two-Phase Flows at the Pore Scale
***B. Riviere**

Wed, 19/03/2025 10:00 - 10:30
Coffee Break

Wed, 19/03/2025 10:30 - 12:30 — Norteamérica
MS004C - Complex Fluid Flows in Engineering: Modeling, Simulation and Optimization III
Main Organizer: Prof. Stefanie Elgeti (RWTH Aachen)
Chaired by: Dr. Felipe Gonzalez (RWTH Aachen), Prof. Marek Behr (RWTH Aachen University)

Topology Optimization of Hydrogen Heat Exchangers Considering Two Fluids
***J. Rothkegel Ide,** P. Duysinx

Approximate Critical Damping Factor for Vibration of Intelligent Completion Control Lines
T. Eduardo, A. Braga, ***A. Nieckele**

Modeling, Simulation, and Optimization in Manufacturing: Selected Applications in Lubricated Orthogonal Cutting and Extrusion
***S. Elgeti,** J. Lee, F. Zwicke, M. Riegler, J. Saelzer, G. Polus, A. Zabel

Numerical simulation of pressure-drop in large tube U-bends of air cooled supercritical CO2 gas coolers
***S. Hosseinnia,** L. Amiri, S. Poncet

Advances in Vortical Structure Analysis for Superior Heat Transfer in Pin-Fin Microchannels
***J. Jaseli?nait?,** M. Šeporaitis

Wed, 19/03/2025 10:30 - 12:30 — Parinacota
MS013C - Hyperbolic Equations: Novel Methods and Applications III
Main Organizer: Prof. Elena Gaburro (University of Verona)
Chaired by: Prof. Dmitri Kuzmin (TU Dortmund University), Dr. Gino Montecinos (Universidad de La Frontera)

Low-Dissipation Central-Upwind Schemes
***A. Kurganov**

Positivity Preserving Central WENO Schemes for Polydisperse Sedimentation Models
***J. Barajas-Calonge,** R. Bürger, P. Mulet, L. Villada

High-order finite difference scheme for Nonlocal macroscopic models of multi-population pedestrian flows
***L. Villada osorio,** P. Goatin, D. Inzunza

Finite volume scheme for time-dependent bottom detection via optimal control problem on Boussinesq-Peregrine equations
***G. Montecinos**

Variational Derivation and Compatible Discretizations of the Maxwell-GLM System Keynote
***M. Dumbser**

Wed, 19/03/2025 10:30 - 12:30 Tupungato

MS010A - Fluid-structure interaction: Methods and applications I

Main Organizer: Dr. Laura Battaglia (CIMEC)
Chaired by: Dr. Laura Battaglia (CIMEC), Dr. Luciano Garelli (CIMEC-CONICET)

Reduced Order Modelling (ROM) of Fluid-Structure Interaction (FSI) for Turbulent Flow Problems Keynote
***T. Kvamsdal,** V. Tsiolakis, H. van Brummelen, E. Fonn, A. Rasheed

Evaluating the impact of topographic features on wake recovery in a single turbine located on a hill
***A. Torrejón,** L. Silva-Llanca, S. Montecinos, C. Meneveau

CFD and experimental study of a model-scale two-body hinged raft wave energy converter
***J. walther,** G. KOVACS, Y. shao, R. BLOOM

Modeling of Simplified Water Alkaline Electrolyzers using Code Saturne
***L. Garelli,** G. Rios Rodriguez, M. Storti

Experimental and Computational Assessment of an Energy-Saving Innovation in a Customised Testing Cabin
G. Henshaw, A. Deyranlou, K. Rimmer, R. Fitton, ***A. Keshmiri**

Wed, 19/03/2025 10:30 - 12:30 Sudamérica

MS019A - Modern numerical methods and simulation techniques for complex flow problems I

Main Organizer: Prof. Thomas Wick (Leibniz Universität Hannover (LUH))
Chaired by: Prof. Thomas Wick (Leibniz Universität Hannover (LUH)), Dr. Henry von Wahl (Friedrich Schiller University Jena)

Obtaining Reliable Simulations in Incompressible Flows
L. Rebholz, R. Scott, ***H. von Wahl**

On an Improved Global Linelet Preconditioner for Large-Scale Incompressible Flow Simulations
***R. de Olazábal,** R. Borrell, O. Lehmkuhl

Leveraging Truncated Hierarchical B-splines for Efficient Stokes Solutions
***D. Velasco Vega,** K. Shepherd, C. Goats

On AI friendly, high order mass weighted upwind schemes
***T. Berres**

Three-dimensional fluid–structure interaction numerical solver with Navier's slip interface condition
***K. T?ma**

Space-time modeling, Galerkin finite element discretizations, and numerical solution of non-Newtonian fluids using internal variables
P. Junker, ***T. Wick**

Wed, 19/03/2025 10:30 - 12:30 Centroamérica

MS027A - The human circulation and associated diseases: models, methods and simulations. I

Main Organizer: Prof. Lucas Omar Müller (University of Trento)
Chaired by: Prof. Eleuterio F. Toro (University of Trento), Dr. Christian Contarino (Computational Life)

Exploring Graph Neural Networks for Simulating Cerebral Microcirculatory Blood Flow
P. Botta, P. Vitullo, T. Ventimiglia, ***A. Linninger,** P. Zunino

Estimating Fluid Exchange between Brain and Subarachnoid Space using Poroelasticity and Finite Elements
***F. Costanzo,** B. Ghitti, M. Jannesari, P. Drew

A 0-D Computational Model of Aspiration Thrombectomy with Collapsible Vessels
***A. Pradhan,** F. Mut, J. Cebral

A multiscale framework for modeling blood flow in the cardiovascular system
***G. Bertaglia,** L. Pareschi

Subject-specific modeling of infant aortic haemodynamics: Assessment of aortic conduit and reservoir functions under hypoplastic left heart syndrome condition
***J. Orera,** J. Ramirez, P. Lamata, J. Murillo†

Wed, 19/03/2025 10:30 - 12:30 Llaima

MS007A - Computational Methods in Fundamental and Applied Aerodynamics I

Main Organizer: Prof. Christian Muñoz (Universidad Tecnológica Metropolitana)
Chaired by: Prof. Christian Muñoz (Universidad Tecnológica Metropolitana), Dr. Matias Oscar Avila Salinas (Barcelona SuperComputing Center)

Analysis and Control of Dynamic Stall in a Simplified Vertical Axis Wind Turbine Setup: Large Eddy Simulation and Linear Stability Theory Keynote
L. Souza, R. Miotto, ***W. Wolf**

Impact of 2.5D Domain Thickness on the Accuracy of VAWT CFD
***J. Isla,** G. Cornejo, I. Cornejo

A large eddy simulation environment for offshore wind farm flows, using the new open source code SOD2D
***M. Avila,** O. Lehmkuhl, H. Owen, R. Chavez

A numerical study on the performance of hydrogen-lubricated journal bearings with surface micro-textures
***A. TOMAR,** M. Marian

An exploration of the Glowinski-Le Tallec splitting strategy for approximating the solution of singular nonlinear PDEs
***Q. SHENG**

Wed, 19/03/2025 12:30 - 13:30

Lunch Break

Wed, 19/03/2025 13:30 - 14:30 Norteamérica

SPL03 - Semi-Plenary III

Prof. Harald van Brummelen (Eindhoven University of Technology)
Chaired by: Dr. Rekha Rao (Sandia National Laboratories)

Phase-Field Models of Binary Fluids in (Soft-)Wetting
***H. van Brummelen**

Wed, 19/03/2025 13:30 - 14:30 Centroamérica

SPL04 - Semi-Plenary IV

Dr. Rajesh Ransing (Swansea University)
Chaired by: Prof. Alvaro Coutinho (COPPE/Federal University of Rio de Janeiro)

Physics-Corrected Graph Network Simulators (GNS) for Modelling Fluid Flow
P. Pe, ***R. Ransing**

Wed, 19/03/2025 13:30 - 14:30 Sudamérica

SPL05 - Semi-Plenary V

Prof. William Wolf (University of Campinas)
Chaired by: Dr. Luciano Garelli (CIMEC-CONICET)

Shock-boundary layer interactions in supersonic turbine cascades
***W. Wolf**

Wed, 19/03/2025 14:45 - 16:45 Norteamérica

MS016A - Joint Brazil-Chile-Inria MS on Innovative Numerical Methods for Fluids I

Main Organizer: Dr. Frederic Valentin (LNCC)
Chaired by: Dr. Miguel A. Fernández (Inria)

Solving flow in large-scale heterogeneous fractured porous media with the robust and efficient domain decomposition preconditioner PETSc-HPDDM Keynote
P. Jolivet, M. Kern, F. Nataf, ***G. Pichot,** R. Zanella, D. Zegarra Vasquez

Non-overlapping domain-decomposition multiscale preconditioners for flows in porous media
***F. Sousa,** P. Carvalho, P. Carvalho, F. Rocha, R. Ausas, G. Buscaglia, R. Guiraldello, F. Pereira

Robust polygonal element method for urban flow modeling
M. Boutilier, ***K. Brenner,** V. Dolean, W. Fkaier

A finite element approximation for an optimal control problem on Navier-Stokes-Brinkman equations
***J. Aguayo**

Numerical simulation of incompressible fluid flow in a volume-changing domain using a capacitance function
***M. Correa,** L. Abdala, C. Mady

Wed, 19/03/2025 14:45 - 16:45 Parinacota

MS006A - Computational Fluid Mechanics with Free and Moving Boundaries: Methods and Applications I

Main Organizer: Dr. Rekha Rao (Sandia National Laboratories)
Chaired by: Phd. Alec Kucala (Sandia National Labs), Dr. Rekha Rao (Sandia National Laboratories)

Approximation and Coalescence of Multiples Bubbles in Two-Phase Flows Keynote
***G. R. Anjos,** D. B.V. Santos, G. R.G. Sousa, A. E. M. Santos

Towards a Coupled Semi-Lagrangian, Conforming Transient h-r Unstructured Adaptive Mesh Refinement (cThruAMR) Method for Multiphase Flow Problems
***D. Noble**

Stabilized Simulation of Deformable Capsules Flowing Through a Pipe
***J. Bagge,** Z. Du, G. Biros

Free vibrations of a flexible cylinder immersed in a confined viscous fluid
***M. Puscas,** R. Lagrange

Wed, 19/03/2025 14:45 - 16:45 Tupungato

MS010B - Fluid-structure interaction: Methods and applications II

Main Organizer: Dr. Laura Battaglia (CIMEC)
Chaired by: Dr. Luciano Garelli (CIMEC-CONICET), Dr. Laura Battaglia (CIMEC)

Stabilized Hyper-Elastic Solid-Shell formulation for Embedded Fluid-structure interaction problems Keynote
***A. Aguirre,** R. Zorrilla, J. Baiges, R. Codina

Study of Immersed Solids in Vortex Induced Vibrations
***P. Moreno Oliva,** M. Cruchaga

A novel approach for the mechanical characterization of single-cells through microfluidic devices
***A. Abarca-Ortega,** C. Velasquez, B. González-Bermúdez, G. Plaza

Embedded Finite Volume Technique for Fluid/Rigid-Body Interaction Problems
***E. Zamora,** L. Battaglia, M. Cruchaga, M. Storti

Wed, 19/03/2025 14:45 - 16:45 Sudamérica

MS024A - Physics-based and Data-driven Low-order Modeling for Turbulent Flows I

Main Organizer: Dr. Benjamin Herrmann (Pontificia Universidad Católica de Chile)
Chaired by: Dr. Benjamin Herrmann (Pontificia Universidad Católica de Chile), Eng. Erick Kracht (University of Chile)

Data-driven approaches for simulation, modeling and control of complex fluid flows Keynote
***A. Nair**

Connecting modal decompositions with instantaneously present flow structures via explainable AI
***B. Reyes,** A. Cremades, R. Vinuesa, B. Herrmann

Cause-and-effect approach to reduced-order modeling of turbulence
***Á. Martínez-Sánchez,** A. Lozano-Durán

Data-Driven Reduced Order Modeling of Extreme Events in Turbulent Flows
***N. Zolman,** S. Mokbel, S. Otto, N. Kutz, S. Brunton

A High Reynolds Number Data-Driven Modification to the Spalart-Allmaras Turbulence Model
***C. Jordan,** M. Barone, E. Parish

Wed, 19/03/2025 14:45 - 16:45 Centroamérica

MS027B - The human circulation and associated diseases: models, methods and simulations. II

Main Organizer: Prof. Lucas Omar Müller (University of Trento)
Chaired by: Phd. Giulia Bertaglia (University of Ferrara), Prof. Eleuterio F. Toro (University of Trento)

Multiscale Computational Modeling for Cardiogenic Shock: Integration of Circulatory Support and Pharmacological Strategies
***C. Contarino,** F. Chifari

Optimizing the Outcome of veno-venous Extracorporeal Membrane Oxygenation via Patient-Specific CFD
B. Ondrusova, M. Leoni, J. Szasz, J. Meier, ***L. Gerardo-Giorda**

Computational Model of Stented Coronary Arteries: Influence of Hemodynamics and Pharmacokinetics on Restenosis
***A. Ranno,** F. Vogt, K. Linka, M. Behr

AI-Informed Physics-Based Models for Pulmonary Perfusion and Ventilation Estimates from Non-Contrast Imaging
***J. Cisneros,** C. Herrera, Y. Liu, E. Castillo

Wed, 19/03/2025 16:45 - 17:15

Coffee Break

Wed, 19/03/2025 17:30 - 18:30 Norteamérica

PL03 - Plenary Lecture III

Prof. Rainald Lohner (George Mason University)
Chaired by: Dr. Franco Perazzo (Universidad Técnica Federico Santa María)

Timestepping for Barely Coupled Multiphysics
***R. Lohne**

Wed, 19/03/2025 20:00 - 23:00

Banquet Dinner

Thursday, 20/03/2025

Thu, 20/03/2025 08:00 - 09:30
Registration

Thu, 20/03/2025 09:30 - 11:30 Norteamérica
MS016B - Joint Brazil-Chile-Inria MS on Innovative Numerical Methods for Fluids II
Main Organizer: Dr. Frederic Valentin (LNCC)
Chaired by: Dr. Rodolfo Araya (Universidad de Concepcion)

Recent Advances in Scientific Machine Learning for Coupled Fluid Flow and Transport
***A. Coutinho**

Multiscale Five-field Composite Mixed Finite Elements for Biot Problems Based on General Polyhedral Partitions
M. Correa, O. Durán, A. Farias, ***S. Gomes,** J. Lee

Post-processing for the Dual Variables From a Primal Hybrid Solution of the Biot System
***G. Taraschi,** M. Correa

A Multiscale Hybrid Method
G. Barrenechea, A. Gomes, ***D. Paredes**

Recent results on the multiscale hybrid-mixed method for Stokes and Brinkman equations
R. Araya, C. Harder, A. Poza, ***F. Valentin**

Thu, 20/03/2025 09:30 - 11:30 Parinacota
MS006B - Computational Fluid Mechanics with Free and Moving Boundaries: Methods and Applications II
Main Organizer: Dr. Rekha Rao (Sandia National Laboratories)
Chaired by: Dr. David Noble (Sandia National Laboratories), Dr. Rekha Rao (Sandia National Laboratories)

Modeling Direct Ink Write of sinusoidal patterns using the conformal decomposition finite element method
***A. Kucala,** R. Rao, M. Golobic, T. Weisgraber

Extrusion Models for Viscoelastic Fluids
***R. Rao,** W. Ortiz, S. Lindberg, M. Hamersky

Simulation of open channel flow and rotating sliding mesh with open source CFD code CAFFA3D
***R. Pienika,** J. Cataldo, H. Ramos

Moving Boundaries with Reactions
***V. Voller,** E. Detournay

Numerical and Experimental Analysis of Sloshing in Rectangular Tanks Subjected to Vertical Imposed Motion
***O. González Cofré,** M. Cruchaga, M. Lacroix, E. Fernández Sanchez, J. Ponthot, D. Celentano

Thu, 20/03/2025 09:30 - 11:30 Tupungato
MS010C - Fluid-structure interaction: Methods and applications III
Main Organizer: Dr. Laura Battaglia (CIMEC)
Chaired by: Dr. Luciano Garelli (CIMEC-CONICET), Dr. Laura Battaglia (CIMEC)

Efficient Fluid-Structure Interaction Simulations Using Homogenized Lattice Boltzmann Methods in OpenLB
***A. Kummerländer,** F. Bukreev, S. Ito, M. Krause

Wall Modelled Large Eddy Simulation Approach with Incompressible Homogenized Lattice Boltzmann Method Using OpenLB
***F. Bukreev,** A. Kummerländer, S. Ito, M. Krause

A Highly Parallelizable Robin-Robin Loosely Coupled Method for Practical Applications in Fluid-Poroelastic Structure Interaction
***Y. Wang**

Thu, 20/03/2025 09:30 - 11:30 Sudamérica

MS024B - Physics-based and Data-driven Low-order Modeling for Turbulent Flows II

Main Organizer: Dr. Benjamin Herrmann (Pontificia Universidad Católica de Chile)
Chaired by: Dr. Aditya Nair (University of Nevada Reno), Eng. Erick Kracht (University of Chile)

Sparse sensor placement for turbulent flow field reconstruction based on mean-flow-linearized dynamics
***E. Kracht,** S. Brunton, B. McKeon, B. Herrmann

Nonlinear Reduced-Order Models of Turbulent Channel Flow Using Mean-Flow-Based Balanced Modes
***I. Addison-Smith,** B. Herrmann

Reduced Order Modeling of Roughness Sublayer Turbulence Using Resolvent Analysis
***M. Chan,** U. Piomelli, B. McKeon

Resolvent analysis for the study of intermittent bursting in channel flow
***E. Ballouz,** S. Dawson, J. Bae

Resolvent Analysis of the Atmospheric Boundary Layer
***L. Freire,** M. Ribeiro, M. Araújo, L. Souza

Thu, 20/03/2025 09:30 - 11:30 Centroamérica

MS015A - Innovative numerical methods for non-Newtonian or non-homogeneous flows I

Main Organizer: Dr. Douglas Ramalho Queiroz Pacheco (RWTH Aachen University)
Chaired by: Dr. Douglas Ramalho Queiroz Pacheco (RWTH Aachen University), Dr. Ernesto Castillo (University of Santiago de Chile)

An adaptive superconvergent variational multiscale finite element method based on local residual minimization for generalized Newtonian fluids
N. Barnafi, E. Castillo, ***P. Vega**

A VMS Finite Element Formulation for the Numerical Simulation of Phase Change Problems with Variable Density
***R. Cabrales,** E. Castillo, J. Gutierrez-Santacreu

Unconditionally stable, linearized IMEX schemes for incompressible flows with variable density
***N. Espinoza-Contreras,** D. Pacheco

A fully decoupled and unconditionally stable IMEX method for dispersed multi-phase flows
***D. Pacheco**

A temperature reconstruction framework for food freezing process in mixed turbulent flows by FV-URANS forward simulations and data assimilation techniques with optimal sensor placements
***D. Rivera,** E. Castillo, F. Galarce

Thu, 20/03/2025 09:30 - 11:30 Llaima

MS011A - Forward and inverse problems in biofluids and biomechanics I

Main Organizer: Ms. Anna Ranno (RWTH Aachen University)
Chaired by: Ms. Anna Ranno (RWTH Aachen University), Dr. Felipe Galarce (Pontificia Universidad Católica de Valparaíso)

A Novel SPH Model for Thrombus Formation
S. Laha, G. Fourtakas, P. Das`, ***A. Keshmiri**

Multifidelity approaches for computational fluid dynamics in cardiovascular applications
***P. Africa,** S. Rathore, G. D'Inverno, S. Salavatidezfouli, G. Rozza

A comprehensive study of blood flows reconstruction from 4D-flow data in large arteries using variational data assimilation tools
***F. Galarce**

Non-invasive Estimation of Pressure Curves in Arteries Using Physics-Informed Neural Networks
***S. Jara,** F. Galarce, H. Mella, R. Ñanculef, F. Sahli, I. Valverde, S. Uribe, J. Sotelo

Eulerian Description of Flow-Induced Red Blood Cell Deformation for Computational Hemolysis Prediction
***N. Dirkes,** M. Behr

Thu, 20/03/2025 11:30 - 12:00

Coffee Break

Thu, 20/03/2025 12:00 - 13:00 Norteamérica

PL04 - Plenary Lecture IV

Prof. Eleuterio F. Toro (University of Trento)
Chaired by: Prof. Nelson Orlando Moraga Benavides (Universidad de La Serena)

Hyperbolic systems: fluxes, fluctuations and computational algorithms
***E. Toro**

Thu, 20/03/2025 13:00 - 14:00

Lunch Break

Thu, 20/03/2025 14:00 - 15:00 Norteamérica

SPL06 - Semi-Plenary VI

Dr. Laura Battaglia (CIMEC)
Chaired by: Dr. Miguel A. Fernández (Inria)

Computational Modeling and Experimental Validation of Free Surface Flows and Related Problems
***L. Battaglia**

Thu, 20/03/2025 14:00 - 15:00 Sudamérica

SPL07 - Semi-Plenary VII

Dr. Gabriel R. Barrenechea (University of Strathclyde)
Chaired by: Dr. Felipe Galarce (Pontificia Universidad Católica de Valparaíso)

Positivity-preserving Discretisations Without Mesh Restrictions
***G. Barrenechea**

Thu, 20/03/2025 15:15 - 17:15 Norteamérica

MS016C - Joint Brazil-Chile-Inria MS on Innovative Numerical Methods for Fluids III

Main Organizer: Dr. Frederic Valentin (LNCC)
Chaired by: Dr. Frederic Valentin (LNCC)

An adaptive stabilized finite element method for Darcy's equations with pressure-dependent viscosities
***R. Araya,** A. Poza, C. Carcamo

Enhanced mass conservation in low-order fictitious domain methods
***M. Fernández**

Numerical approximation for a coupled fluid flow problem arising from reverse osmosis modeling
***M. Solano**

Weakly imposed slip conditions in Navier-Stokes, analysis and turbulence modeling
A. Bansal, ***N. Barnafi,** D. Pandey

Thu, 20/03/2025 15:15 - 17:15 Parinacota

MS003A - Heat Transfer, Combustion and Fire Dynamics I

Main Organizer: Dr. Mario Toledo (UTFSM)

Score-Based Diffusion Models with Autocorrelation Regularization for Fluid Flow Prediction
***W. Genuist,** É. Savin, F. Gatti, D. Clouteau

A study on ignition criteria of wood boards when exposed to firebrands-like and flames-like incident heat fluxes in numerical simulations using FDS
W. Oliveira, R. Helfenstein, M. Beshir, P. Reszka, ***F. Centeno**

Effect of Hydrogen use on the Characteristics of a Natural Gas and Hydrogen Combustion Process
***M. Otero Iregui,** O. López Mejía, C. Sedano Quiroz

Sparse Sensor Placement and Physics Informed Neural Networks for Temperature and Velocity Fields Reconstruction in Axisymmetric Flames
***C. López,** B. Herrmann, R. Demarco, F. Escudero

Slip-Flow and Axial Diffusion Effects in Conjugate Heat Transfer: An Integral Transform and FEM Analysis
M. Brito, ***D. Chalhub**

Thu, 20/03/2025 15:15 - 17:15 Tupungato

MS020A - Multiphase flow and transport at microscale and in porous media I

Main Organizer: Dr. Pablo Gamazo (Universidad de la República)
Chaired by: Dr. Pablo Gamazo (Universidad de la República), Prof. Pablo A. Kler (CIMEC (UNL-CONICET))

Preliminaries Results on the Use of Non-Uniform Algebraic Dynamic Multilevel and Multiscale Method as a Preconditioner for the Numerical Simulation of Two-Phase Flows in Porous Media
J. Araujo dos Santos, D. Elisiáario de Carvalho, R. Willmersdorf, A. Echevarria Antunes, J. Pereira Rodrigues, ***P. Maciel Lyra**

3D Numerical prototyping of universal droplet generators
D. Harispe, ***P. Kler**

Efficient GPU-Based Eulerian TVD Methods for Macrodispersion Analysis in 2D and 3D Heterogeneous Porous Media
***L. Bessone,** P. Gamazo, J. Ramos, E. Alvareda

GPU resolution of reactive transport problems with variable porosity for porous media with high heterogeneity
***P. Gamazo,** L. Bessone, J. Ramos, A. Saracho, E. Alvareda

Thu, 20/03/2025 15:15 - 17:15 Sudamérica

MS002A - Advances in Numerical Methods for Coupled Flows in Civil and Environmental Engineering I

Main Organizer: Dr. Jorge Molina (University of Granada)
Chaired by: Dr. Jorge Molina (University of Granada), Dr. Rafael Bravo Pareja (University of Granada)

A Coupled Model for Cohesionless Sediment Transport in Non-Saturated Conditions
***J. Molina,** P. Ortiz, R. Bravo

Effects of varying sea breeze profiles on the coastal Stratocumulus dissipation
***F. Rojas,** M. Zamora Zapata

Enhancing Surrogate Modeling for Turbidity Currents via Super-Resolution with Diffusion Models
R. Sousa, A. Cortes, ***R. Velho,** G. Barros, F. Rochinha, A. Coutinho

Reduced Order Modelling for Water Waves using Incompressible Navier-Stokes Simulation
***A. Engsig-Karup,** A. Melander

Numerical Analysis of the Onset and Development of Sandy Bed Erosion Due to Pipeline Leaks
***S. Avendaño,** Y. Niño

A Coupled Non-Oscillatory Model for Geysering-Induced Flow Propagation in Reduced-Depths
***R. Bravo Pareja,** J. Molina Moya, P. Ortiz

Thu, 20/03/2025 15:15 - 17:15 Centroamérica

MS015B - Innovative numerical methods for non-Newtonian or non-homogeneous flows II

Main Organizer: Dr. Douglas Ramalho Queiroz Pacheco (RWTH Aachen University)
Chaired by: Dr. Ernesto Castillo (University of Santiago de Chile), Dr. Douglas Ramalho Queiroz Pacheco (RWTH Aachen University)

Non-residual-based stabilization formulation for liquid-solid phase-change flows including macrosegregation scenarios
***E. Castillo,** R. Cabrales, D. Pacheco

Fully decoupled fractional-step method for non-linear viscoelastic flows in phase change
***I. Aguirre,** E. Castillo, D. Pacheco

Non-Newtonian convective solid-liquid phase changes at low and high temperatures described by fast-accurate finite volume method
J. Jaime Rojas, L. Poblete Rojas, ***N. Moraga Benavides**

Anderson Acceleration Method in FVM for Non-Newtonian Convective Problems: Thermal Coupling and Phase Change
***F. Díaz,** E. Castillo, R. Cabrales, N. Moraga

Thu, 20/03/2025 15:15 - 17:15 Llaima

MS011B - Forward and inverse problems in biofluids and biomechanics II

Main Organizer: Ms. Anna Ranno (RWTH Aachen University)
Chaired by: Dr. Felipe Galarce (Pontificia Universidad Católica de Valparaíso), Ms. Anna Ranno (RWTH Aachen University)

Computational analysis of turbulent flow structures in the left ventricle using a fluid-structure interaction model of the mitral valve **Keynote**
***J. Hoffman,** J. Kronborg

Resistive valves in electro-fluid-structure interaction models of the heart
***M. Bucelli,** L. Dede'

Identification of the Unloaded Configuration Considering Surrounding Tissue Interactions in Cardiovascular Mechanics
***J. Jilberto,** W. Zhang, D. Nordsletten

A Diffusion-Inertia Model for Respiratory Aerosol Deposition
***M. Giordano,** J. Miranda?Fuentes, J. Jacob

Thu, 20/03/2025 17:15 - 18:00 Norteamérica

Closing Ceremony & Farewell Coffee