

2nd Spanish Fluid Mechanics Conference

SFMC 2023

Barcelona, Spain | 02 - 05 July 2023

PROGRAMME



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**Barcelona, Spain
02 - 05 July 2023**

A publication of:

**International Centre for Numerical
Methods in Engineering (CIMNE)**
Barcelona, Spain



Printed by: Artes Gráficas Torres S.L., Huelva 9, 08940 Cornellà de Llobregat,
Spain

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FOREWORD

Dear colleague,

It is our great pleasure to welcome you to the second edition of the Spanish Fluid Mechanics Conference (SFMC23) in Barcelona from July 2nd to July 5th, 2023. Hosted by Universitat Politècnica de Catalunya, this conference follows the success of its first edition in Cádiz last year. Our primary goal remains the same as when these conferences were originally conceived: to bring together the Spanish Fluid Mechanics community, along with collaborators all over the world, in order to foster valuable scientific discussion and favour future interaction among the attendees.

We appreciate and are delighted by the great support and response received for this second edition. Around 170 researchers will be participating in the conference, delivering over 150 oral presentations. The sessions cover a wide range of topics, including Computational Fluid Dynamics, Turbulence, Flow Instabilities, Combustion, Bubbles and Drops, Thin Films or Microscale and Nanoscale flows, among others. All these subjects combined address most of the fundamental aspects of fluid mechanics, and explore them from all three perspectives: theoretical, computational, and experimental. Additionally, we have included sessions dedicated to Active Matter, Biological Fluid Dynamics, Aerodynamics, Industrial Applications, and Machine Learning, which highlights the diverse application of fluid mechanics across many fields and acknowledges the emerging integration of new Artificial Intelligence techniques into the field of fluid dynamics.

Finally, we extend our gratitude to the conference's invited speakers Marc Ávila, Henar Herrero, José Miguel Rubí, and Javier Jiménez, for their participation and support. The organizing committee heartfully acknowledges the financial support provided by the Generalitat de Catalunya (SGR-AGAUR), Ajuntament de Barcelona and UPC.

We wish you a productive conference and a delightful time in Barcelona!

Arantxa Alonso, Jezabel Curbelo, Francisco Marqués, Fernando Mellibovsky, and Álvaro Meseguer.

ACKNOWLEDGEMENTS

The Conference organizers acknowledge the Support towards the organization of the 2nd SFMC 2023 Conference to the following organizations:



Universitat Poltècnica de Catalunya
(Department of Physics)



Universitat Poltècnica de Catalunya
(Department of Mathematics)



MicroVec



Ajuntament de Barcelona



B5tec



Fundación BBVA - Conference
partially supported by a 2022 Leonardo
Grant for Researchers and Cultural
Creators, BBVA Foundation

ORGANIZING COMMITTEE

Scientific Committee:

- Alfredo Bermúdez (Universidad de Santiago de Compostela)
- Luis Bonilla (Universidad Carlos III, Madrid)
- Javier Burguete (Universidad de Navarra)
- Ramon Codina (Universitat Politècnica de Catalunya)
- Antonio Crespo (Universidad Politécnica de Madrid)
- César Dopazo (Universidad de Zaragoza)
- Oscar Flores (Universidad Carlos III)
- Miguel Fosas (Universidad de Cádiz)
- Henar Herrero (Universidad de Castilla-La Mancha)
- Francisco J. Huera-Huarte (Universitat Rovira i Virgili)
- Javier Jimenez (Universidad Politécnica de Madrid)
- Soledad Le Clainche (Universidad Politécnica de Madrid)
- Oriol Lehmkuhl (Barcelona Supercomputing Center)
- Jose Manuel López Alonso (Universidad de Málaga)
- Álvaro Marín (University of Twente, The Netherlands)
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- Elena Martín Ortega (Universidade de Vigo)
- Jordi Ortín (Universitat de Barcelona)

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- Arantxa Alonso (Universitat Politècnica de Catalunya)
- Jezabel Curbelo (Universitat Politècnica de Catalunya)
- Francisco Marqués (Universitat Politècnica de Catalunya)
- Álvaro Meseguer (Universitat Politècnica de Catalunya)
- Fernando Mellibovsky (Universitat Politècnica de Catalunya)

INVITED SPEAKERS

Marc Ávila

ZARM, University of Bremen, Germany

Transition to Turbulence in Pipe Flow



Henar Herrero

Universidad de Castilla-La Mancha, Spain

**Schwarz Legendre collocation methods
for a Rayleigh-Bénard problem**



Miguel Rubí

Universitat de Barcelona, Spain

**Transport and Self-assembly of Active
Particles with Optimal Fuel Consumption**



GENERAL SESSIONS

General Session 1:

- S1.1** Machine Learning I
- S1.2** Aerodynamics I
- S1.3** Active Matter

General Session 2:

- S2.1** Aerosols and Suspensions
- S2.2** Industrial Applications I
- S2.3** Fluid-structure interaction I

General Session 3:

- S3.1** Bubbles and Drop impact
- S3.2** Computational Fluid Dynamics
- S3.3** Vortex Dynamics and Vortex Flows I

General Session 4:

- S4.1** Machine Learning II
- S4.2** Flow Instabilities I
- S4.3** Thin Films and Coating Flows

General Session 5:

- S5.1** Industrial Applications II
- S5.2** Fluid-structure interaction II
- S5.3** Convection and Bouyancy-Driven Flows

General Session 6:

- S6.1** Turbulence I
- S6.2** Learning III
- S6.3** Drops: formation and evaporation

General Session 7:

- S7.1** Aerodynamics II
- S7.2** Turbulence II
- S7.3** Multiphase and Free Surface Flows

General Session 8:

- S8.1** Combustion I
- S8.2** Industrial Applications III
- S8.3** Flow Instabilities II

General Session 9:

- S9.1** Microscale and Nanoscale Flows
- S9.2** Combustion II
- S9.3** Vortex Dynamics and Vortex Flows II

General Session 10:

- S10.1** Turbulence III
- S10.2** Biological Fluid Dynamics
- S10.3** Compressible Flows

PRACTICAL INFORMATION

Presentations

The Conference will provide computers for presentations.

The presenters should bring the presentation in a USB and upload it in the room's computer before the session starts.

Also, personal computers can be used for the presentation.

Registration and Check in

All attendees are required to check in at the registration desk of the Conference Venue.

During the conference, participants are responsible to wear name badges at all times while in the conference area. Access will not be allowed to the coffee breaks and technical session areas if a name badge is not visible.

Conference Venue

The **SFMC23** will take place in the facilities of the Campus Nord at Universitat Politècnica de Catalunya in Barcelona, Spain.

The Conference Venue is located at:

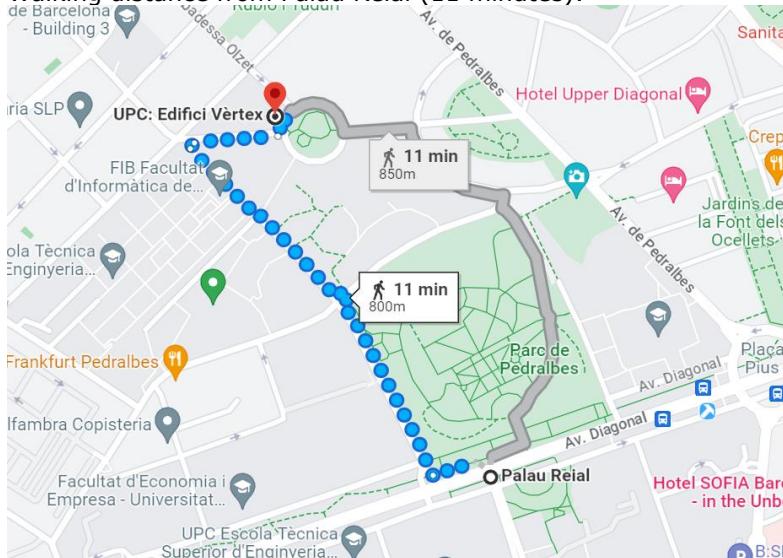
Vèrtex Building at Universitat Politècnica de Catalunya
Plaça d'Eusebi Güell, 6, Barcelona



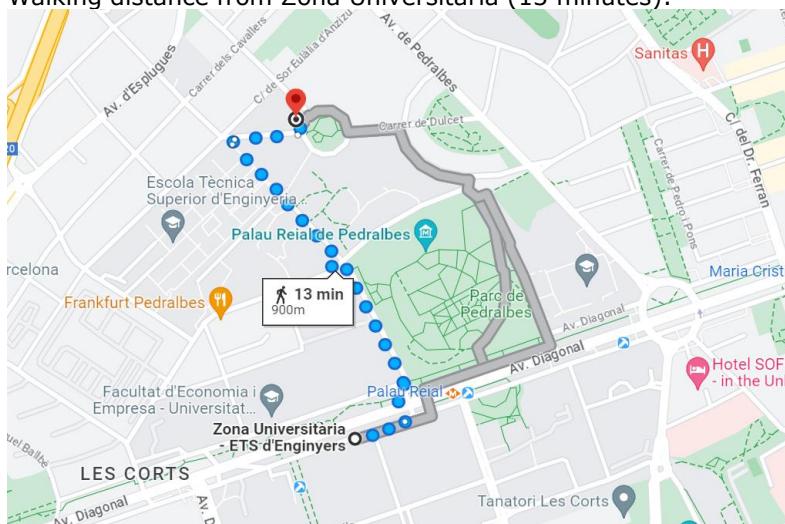
From Barcelona downtown:

The nearest metro stations to get to the conference venue are “Palau Reial” or “Zona Universitaria”, both in Line 3 (green line).

Walking distance from Palau Reial (11 minutes):



Walking distance from Zona Universitaria (13 minutes):



From the Barcelona El Prat Airport:

By Metro:

The fastest way to get to the Conference Venue from the airport by public transportation is to take Line 9 from T1 or T2 in Barcelona El Prat Aiport.

Last stop of Line 9 is "Zona Universitaria".

By train:

Renfe Line 2 suburban train

From Airport to Estació de Sants.

<http://www.renfe.com/viajeros/cercanias/barcelona/>

In Estació de Sants you can take Line 3 to get to "Zona Universitaria".

By bus:

Airport stops:

Bus stops at Terminal T1 and T2 (A, B, C)

Downtown stops:

This line ends at Plaça Catalunya (city center). Once there, you may take L3 of the underground to "Palau Reial" or "Zona Universitaria" stations.

Timetable:

From Plaça Catalunya 05:00 to 00:30 every 10 minutes. From the Airport 06:05 to 01:05 every 10 minutes

<https://aerobusbarcelona.es/>

By Taxi:

Free Now APP

<https://www.free-now.com/es/>

Telephones Barcelona Taxis:

+34 932 250 000

+34 933 033 033

Secretariat Desk Timetable:

Sunday July 02nd: 17h00 to 21h00
Monday July 03rd: 8h00 to 17h30
Tuesday 04th: 8h00 to 17h30
Wednesday 05th: 8h00 to 13h30

Internet Access

Free Wireless Internet access will be available.

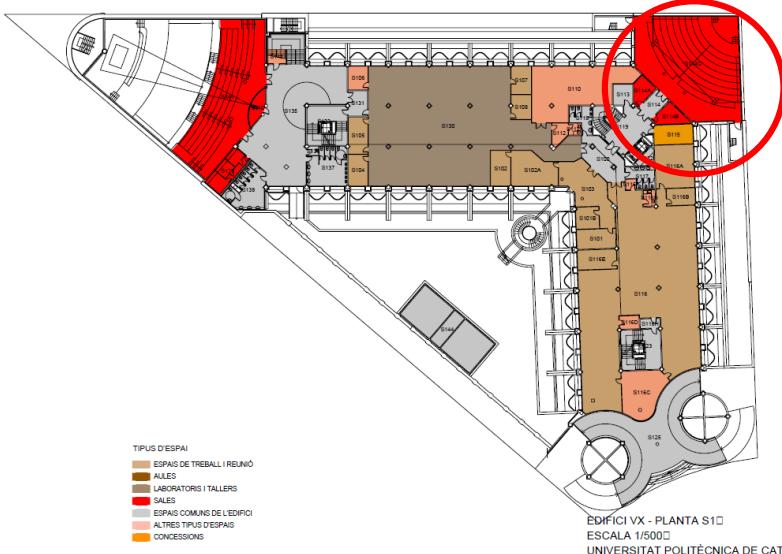
User: SFMC2023

Password: SFMC23bcn*

Rooms location at the Conference Venue

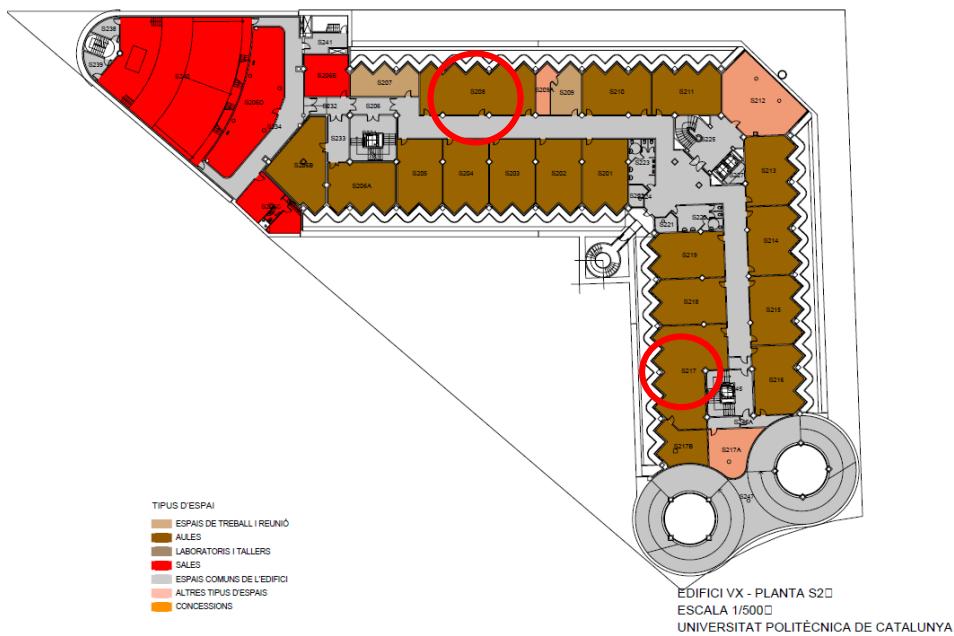
VÈRTEX VX BUILDING - LEVEL -1

Sala d'Actes



EDIFICI VÈRTEX VX –LEVEL -2

ROOMS VS208 (Sala 3), VS217 (Sala 2)



SOCIAL PROGRAMME

The Conference Social Programme includes the Welcome Cocktail and the Gala Dinner.

The **Welcome Cocktail** will be held on **Sunday July 02nd 2023, 20h00**, at **Institut d'Estudis Catalans**, Carrer del Carme, 47, 08001 Barcelona.

A registration desk will be open at IEC's entrance from 17h00.

Nearest metro station to Institut d'Estudis Catalans is "**Liceu**" (**Line 3**).

Please note that, if you are unable to attend the Welcome Cocktail on Sunday, you will also be able to register directly on **Monday July 03rd, 2023** at the conference venue located at: Edifici Vèrtex (UPC), Plaça d'Eusebi Güell, 6, 08034 Barcelona BarcelonTech (UPC).



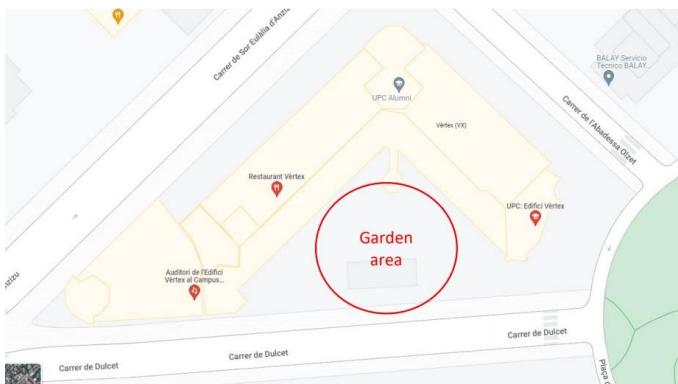
The **Gala Dinner** will be held on **Tuesday July 04th, 20h00**, in **Casa Fuster Hotel** located in Barcelona, Passeig de Gràcia, 132, 08008.

The Casa Fuster Hotel has several spaces with personality where food, culture and Entertainment merge to create a unique experience. Its excellent and unique architecture creates a unique atmosphere ideal for all kinds of events and celebrations.

You can go to Hotel Casa Fuster by taxi or public transportations.



Coffee breaks during Barcelona SFMC 2023 will take place at the Conference Venue, in the **garden of the Vèrtex Building** at Universitat Politècnica de Catalunya, located at Plaça d'Eusebi Güell, 6.



Monday July 03rd – morning and afternoon coffee break
Tuesday July 04th – morning and afternoon coffee break
Wednesday July 05th – morning coffee break

Lunches from **Monday July 03rd to Wednesday July 05th** will be served in the **garden of the Vèrtex Building** at Universitat Politècnica de Catalunya, located here (Plaça d'Eusebi Güell, 6, 08034 Barcelona).



Emergency Calls:

Emergency: 112

Ambulance: 061

Fire Emergency: 080

Police: 092

CONFERENCE SECRETARIAT CONGRESS BUREAU

Phone: (+34) 93 405 46 94

Email: secretaria@cimne.upc.edu

Campus Nord UPC

Building C1 - Office C4

C/ Gran Capità, S/N

08034 Barcelona, Spain



TECHNICAL PROGRAMME OVERVIEW

Time slot	Sunday	Monday	Tuesday	Wednesday
08:00 - 09:00			Registration	
9:00 - 10:00			Invited Lectures	
	M. Ávila	H. Herrero	J.M. Rubí	
10:00 - 10:15			Migration	
	S1.1 Machine Learning I	S5.1 Industrial Applications II	S9.1 Microscale and Nanoscale Flows	
10:15 - 11:15	S1.2 Aerodynamics I	S5.2 Fluid-structure interaction II	S9.2 Combustion II	
	S1.3 Active Matter	S5.3 Convection and Bouyancy-Driven Flows	S9.3 Vortex Dynamics and Vortex Flows II	
11:15 - 12:00		Coffee Break		
	S2.1 Aerosols and Suspensions	S6.1 Turbulence I	S10.1 Turbulence III	
12:00 - 13:30	S2.2 Industrial Applications I	S6.2 Learning III	S10.2 Biological Fluid Dynamics	
	S2.3 Fluid-structure interaction I	S6.3 Drops: formation and evaporation	S10.3 Compressible Flows	
13:30 - 15:00	Lunch Break			Closing & Lunch
	S3.1 Bubbles and Drop impact	S7.1 Aerodynamics II		
15:00 - 16:30	S3.2 Computational Fluid Dynamics	S7.2 Turbulence II		
	S3.3 Vortex Dynamics and Vortex Flows I	S7.3 Multiphase and Free Surface Flows		

Time slot	Sunday	Monday	Tuesday	Wednesday
16:30 - 17:00			Coffee Break	
		S4.1 Machine Learning II	S8.1 Combustion I	
17:00 - 18:00	Registration (from 17h to 21h)	S4.2 Flow Instabilities I	S8.2 Industrial Applications III	
		S4.3 Thin Films and Coating Flows	S8.3 Flow Instabilities II	
18:00 - 19:30				
19:30 - 20:00	Opening			
20:00 - 22:00	Welcome Reception		Gala Dinner	

SFMC23 Technical Programme

Sunday, 02/07/2023

Sun, 02/07/2023 17:00 - 21:00
REG - Registration

Claustre IEC

Sun, 02/07/2023 19:30 - 20:30
OP - Congress Opening Session - Javier Jimenez
Chaired by: Prof. Francisco Marques

Sala Enric Prat de la Riba IEC (Institut d'Estudis Catalans)

Sun, 02/07/2023 20:00 - 22:00
WL - Congress Welcome Reception

Claustre IEC

Monday, 03/07/2023

Mon, 03/07/2023 08:00 - 09:00

MON R - Registration

Mon, 03/07/2023 09:00 - 10:00

MON PL1 - Invited lecture: Transition to turbulence in pipe flow

Chaired by: Dr. Alvaro Meseguer (Universitat Politècnica de Catalunya)

Sala d'Actes - Vèrtex

Transition to turbulence in pipe flow
M. Avila*

Mon, 03/07/2023 10:15 - 11:15

MON 1.1 - Machine Learning I

Chaired by: Prof. Xavier Ruiz (Universitat Rovira i Virgili)

Sala d'Actes - Vèrtex

A Data-driven non-equilibrium wall model for LES of transitional flows
S. Radhakrishnan*, O. Lehmkul

Turbulent wake flow prediction of marine hydrokinetic turbine arrays in large-scale meandering river using physics-informed convolutional neural network
Z. Zhang, A. Khosronejad*

Study of the dispersion of pollutant over fence a using DALES and High Order Dynamic Mode Descomposition (HODMD) analysis
J. Sanchez Martinez*, P. Costa, J. Tomas, S. Le Clainche, M. Pourquie

Turbulent Closure for Sediment Transport Using Symbolic Regression Based on DNS Data
Y. Stöcker*, C. Golla, R. Jain, J. Fröhlich, P. Cinnella

Mon, 03/07/2023 10:15 - 11:15

MON 1.2 - Aerodynamics I

Chaired by: Prof. Luis Parras (Universidad de Málaga)

Room 217

Drag reduction in simplified geometries of blunt vehicles by means of different base blowing strategies
J. Camacho-Sánchez, C. García-Baena*, M. Lorite-Díez, C. Gutiérrez-Montes, J. Jiménez-González, C. Martínez-Bazán

Aerodynamic forces and wake structure on a 2D model of a vehicle in ground effect
P. Solís-García*, K. Zerzeri, M. Nouailhi, L. Parras, E. Durán-Venegas

Drag Reduction of a Squareback Ahmed Body Using Rear Flexible Devices

J. Muñoz Hervás*, J. Camacho Sánchez, M. Lorite Díez, J. Jiménez González, C. Martínez Bazán, O. Cadot

Automatic Parameter Selection for Model Predictive Control for Fluid Flows
L. Marra*, A. Melián-Vila, S. Discetti

Mon, 03/07/2023 10:15 - 11:15

MON 1.3 - Active Matter

Chaired by: Prof. Jordi Ortín (Universitat de Barcelona)

Room 208

Photocatalytic Janus Microswimmers as Micro-stirrers?

M. Bailey*, F. Grillo, F. Paratore, L. Isa

Brownian dynamics and spontaneous rotation of a Janus particle in a polymer solution
N. D'Auria, P. Martínez Lera*, M. De Corato

Simulating Microswimmers under Confinement with Dissipative Particle (hydro)Dynamics
C. Barruso Gutiérrez*, J. Martín Roca, V. Vianco, I. Pagonabarraga, C. Valeriani

Dynamic of a Microsphere inside an Spherical Cavity with Newtonian Fluid Subjected to Periodical Contractions
R. Castilla*

Mon, 03/07/2023 11:15 - 12:00

CB - Coffee Break

Mon, 03/07/2023 12:00 - 13:30

MON 2.1 - Aerosols and Suspensions

Chaired by: Prof. José Manuel Gordillo Arias de Saavedra (Universidad de Sevilla)

Sala d'Actes - Vèrtex

Capture of airborne microparticles by an ultra fine electrospray
I. González Loscertales*, A. Hijano Reyes, F. Higuera, J. Rivero Rodríguez

Short and long term dispersion of airborne pathogen-laden aerosols expelled in a violent expiratory event
J. Pallares*, A. Lavrinenco, S. Cito, A. Vernet, A. Fabregat

Modeling Wildland Fire Spot Ignition by Metal Sparks: Fluid Mechanics Aspects
C. Fernandez-Pello*, J. Urban

The Fluid Mechanics of Splat Painting
D. Ávila García, L. Lacambra Asensio, J. Rodríguez Rodríguez, R. Zenit, L. Champougny*

Influence of "fresh" fluid encounter on the settling of particles in the dilute regime
M. Moriche*, M. García-Villalba, M. Uhlmann

When Slower is Faster: Understanding the Striking Clogging of Suspensions Through Constrictions
A. Marin*, M. Souzy, E. Ortega-Roano, T. Weinhart, S. Luding, D. van der Meer

Mon, 03/07/2023 12:00 - 13:30

Room 217

MON 2.2 - Industrial Applications I

Chaired by: Phd. Robert Castilla (Universitat Politècnica de Catalunya)

Using CFD simulation to evaluate the passive odour emission from open-roof tanks

A. Macias*, F. Tagliari, M. Invernizzi, S. Vicent

Numerical and Experimental Evaluation of the Transmittance of an AHU

P. Torres*, R. Castilla, G. Raush, M. Morte, D. Moreno

Implementing Multi-Factor Design for Vacuum Ejector Improvement through Comprehensive Analysis of Construction Parameters

L. Macia*, R. Castilla, P. Gamez-Montero, G. Raush

Flow effects of the radial gap on a centrifugal pump using deterministic analysis and cavitation measurements

J. Fernández*, M. Galdo, R. Barrio, A. Vega, Á. Pardo, J. González

Design and optimization of an InFlow Radial (IFR) turbine for Oscillating Water Column (OWC) devices

A. Vega-Valladares*, B. Pereiras

On the Role of Electrolyte Mixing in Vanadium Redox Flow Battery Tanks: CFD and Experimental Approaches

P. Prieto-Díaz*, A. Trovó, M. Vera

Mon, 03/07/2023 12:00 - 13:30

Room 208

MON 2.3 - Fluid-structure interaction I

Chaired by: Prof. Carlos Martínez Bazán (Universidad de Granada)

Aerodynamic enhancement of spanwise-flexible flapping wings via fluid-structure resonance
C. Martínez-Muriel, M. García-Villalba, O. Flores*Numerical simulation of flow around spanwise-flexible tandem flapping wings
C. Martínez-Muriel, M. García-Villalba*, O. Flores

Two-way fluid-structure interaction for the study of advanced turbine control systems

C. Santoni, X. Yang, P. Seiler, F. Sotropoulos, A. Khosronejad*

Cavity flow induced by a flexible membrane in an oscillatory channel flow: case study of syringomyelia

E. Duran-Venegas*, C. Gutiérrez-Montes, W. Coenen, A. Sánchez, C. Martínez-Bazán

An asymptotic analysis of cavity flow induced by a flexible membrane in an oscillatory channel flow: case study of syringomyelia

G. López-Nozaleda*, J. Alaminos-Quesada, W. Coenen, A. Sanchez

CFD simulations of various heave plates using a lagrangian approach

J. Armahanzas*, J. Fuentes, A. Torres, J. León, M. Gil

Mon, 03/07/2023 13:30 - 15:00

LB - Lunch Break

Mon, 03/07/2023 15:00 - 16:30

Sala d'Actes - Vèrtex

MON 3.1 - Bubbles and Drop impact

Chaired by: Prof. Alvaro Marín (University of Twente)

On the purely inertial collapse of gas cavities: Bubble bursting jets

J. Gordillo Arias de Saavedra*, F. Blanco Rodríguez

Effect of a wall boundary on the dynamics of high-Bond bubbles rising in a still liquid at different regimes

C. Estepa-Cantero*, R. Bolaños-Jiménez, C. Martínez-Bazán

Merging theory-based cavitation model adaptable with non-condensable gas effects

E. Hasani Malekshah*, W. Wróblewski

Bubble velocities induced by interactions in polydisperse confined inertial swarms

J. Ruiz-Rus*, V. Roig, P. Ern, C. Martínez-Bazán

The skating of impacting drops over gas or vapor layers

G. Riboux*, P. García-Geijo, J. Gordillo

Absence of diffusion in pilot-wave hydrodynamics

P. Saenz*, A. Abraham, S. Malkov, F. Sazunov, M. Durey

Mon, 03/07/2023 15:00 - 16:30

Room 217

MON 3.2 - Computational Fluid Dynamics

Chaired by: Prof. Henar Herrero (Universidad de Castilla-La Mancha)

Lagrangian Approach for Studying Stratospheric Flows during Sudden Stratospheric Warming Events

A. Alcalde*, J. Curbelo

On the entropy-viscosity method for flux reconstruction

B. Font*, A. Miró, O. Lehmkuhl

GPU-Accelerated Direct Numerical Simulations with an Immersed Boundary Method

J. Catalán Gómez*, M. Guerrero Hurtado, M. García-Villalba, O. Flores Arias

Tree-based Adaptive Mesh Refinement strategy for High-Order Immersed Boundary Methods

H. Kessasra*, M. Cordero-Gracia, M. Gomez Lopez, E. Valero

Mon, 03/07/2023 15:00 - 16:30

Room 208

MON 3.3 - Vortex Dynamics and Vortex Flows I

Chaired by: Dr. Elena Martín (University of Vigo)

Frequency response of Batchelor vortex

C. del Pino*, F. Blanco-Rodríguez, M. Garrido-Martín, L. Parras

Numerical Investigation on the Effect of Active Injection Location on the Frequency Response of a Batchelor Vortex

M. Garrido-Martín*, F. Blanco-Rodríguez, P. Gutierrez-Castillo, C. del Pino

Experimental investigation of turbulent swirling jets

A. CUELLAR MARTÍN *, L. FRANCESCHELLI, C. MÁRQUEZ GARCÍA, S. DISCETTI, A. IANIRO

Exact coherent structures in a fully developed round jet

K. Deguchi*

Unraveling the Generation and Destruction Mechanisms of Arch Vortices in Urban Fluid Flows: A Comprehensive Analysis

E. Lazpita*, A. Martínez-Sánchez, S. Hoyas, R. Vinuesa, S. Le Clainche

Mon, 03/07/2023 16:30 - 17:00

CB - Coffee Break

Mon, 03/07/2023 17:00 - 18:00

Sala d'Actes - Vèrtex

MON 4.1 - Machine Learning II

Chaired by: Dr. Oriol Lehmkuhl (Barcelona Supercomputing Center (BSC))

Fast urban flow predictions through Convolutional Neural Networks

J. Calafell*, J. Bustillo, S. Gómez, F. Ramírez, S. Radhakrishnan, O. Lehmkuhl

Machine learning adaptation for laminar and turbulent flows: applications to high order discontinuous Galerkin solvers

K. Tales*, K. Otmani, G. Ntoukas, G. Rubio, E. Ferrer

Learning extrapolation in the reconstruction and forecasting of a turbulent velocity flow field using Autoencoders and Singular Value

Decomposition

R. Abadía-Heredia*, M. Criales-Esposito, M. Lopez-Martin, L. Brandt, S. Le Clainche

Machine learning based Viscous-Inviscid coupling for high order solvers

K. Otmani*, G. Ntoukas, E. Ferrer

Mon, 03/07/2023 17:00 - 18:00

Room 217

MON 4.2 - Flow Instabilities I

Chaired by: Prof. Sebastian Altmeier (Universitat Politècnica de Catalunya)

Regularized four-sided Cavity Flows: A spectral Bifurcation Benchmark implemented in Julia

M. Waldeben*, Á. Mesequer, O. Batiste, A. Alonso

Self-sustainment, Period Doubling and Boundary Crisis of Subcritical Rotating Waves in Taylor-Couette Flow

B. Wang*, R. Ayats, K. Deguchi, F. Melibovsky, A. Mesequer

Edge states alternation and period doubling cascades in subcritical Taylor-Couette flow

R. Ayats*, B. Wang, K. Deguchi, F. Melibovsky, A. Mesequer

Linear Rayleigh-Taylor instability of rotating viscous fluids

A. de Andrea*, J. Gandarias, L. González Gutiérrez

Mon, 03/07/2023 17:00 - 18:00

Room 208

MON 4.3 - Thin Films and Coating Flows

Chaired by: Prof. Sergio Chiva (Universitat Jaume I)

Thin films coating a solid cylindrical fibre: wetting and nonwetting scenarios

D. Moreno*, A. Sevilla

Dynamics of Dewetting Fronts: to Pinch or not to Pinch

M. Zürcher Guinea*, D. Moreno Boza, A. Sevilla Santiago

Evaluation and improvement of light transmittance for an optimal design of UV-C systems

D. Triffi*, Ó. Prades-Mateu, S. Chiva, R. Martínez-Cuenca

Capillary and non-linear damping mechanisms on 3D wavy thin liquid films

D. Barreiro-Villaverde*, A. Gosset, M. Lema, M. Méndez

Tuesday, 04/07/2023

Tue, 04/07/2023 08:00 - 09:00
TUE R - Registration

Tue, 04/07/2023 09:00 - 10:00
TUE PL2 - Invited lecture: Schwarz Legendre collocation methods for a Rayleigh-Bénard problem
Chaired by: Phd. Jezabel Curbelo (Universitat Politècnica de Catalunya)

Sala d'Actes - Vèrtex

Schwarz Legendre collocation methods for a Rayleigh-Bénard problem - Prof. Henar Herrero
H. Herrero*

Tue, 04/07/2023 10:15 - 11:15
TUE 5.1 - Industrial Applications II
Chaired by: Dr. Raul Martínez Cuenca (Universitat Jaume I)

Sala d'Actes - Vèrtex

Development of Local Capacitance Sensor for Two-Phase Measurements
O. Prades Mateu*, G. Monrós Andreu, R. Martínez Cuenca, S. Torro Cueco, S. Chiva Vicent
Shear stress measurements by Preston tubes
A. Vega*, C. Miguel, A. Rodriguez, B. Pereiras
Design and experimentation of a hydrokinetic turbine for electricity generation in closed pipes
J. Armañanzas*, M. Alcalá, J. Fuentes, J. León, A. Torres
Modelling the Catalytic Layer of a PEM Fuel Cell with Adsorption-Desorption Kinetics
S. MARTIN, L. GONZALEZ RODRIGUEZ, J. CASTILLO, P. GARCIA-YBARRA*

Tue, 04/07/2023 10:15 - 11:15
TUE 5.2 - Fluid-structure interaction II
Chaired by: Prof. Oscar Flores (Universidad Carlos III de Madrid)

Room 217

Wall shear stress on an elastic boundary or structure
S. Oh*, H. Reese, C. Oh
Suspended mooring line static analysis using internal XFlow capabilities
M. Gil*, A. Torres, J. Fuentes, J. Armañanzas, J. Leon
Calibration of a porous surface model for fishing nets
S. Roget, M. Lema*, A. Gosset
Experimental Evidence of the Effect of Permeability on Falling Porous Plates
J. Sánchez Rodríguez*, F. Gallaire

Tue, 04/07/2023 10:15 - 11:15
TUE 5.3 - Convection and Bouyancy-Driven Flows
Chaired by: Dr. Paloma Gutierrez-Castillo (Universidad de Málaga)

Room 208

Parametrically forced stably stratified flow
J. Lopez*
Bounding dissipation in Rayleigh-Benard convection
T. Alboussiere*
Temperature optimization in a gas reactor for the synthesis of carbon nanofibers: a numerical approach
M. Navarro*, J. Valverde, E. Castellanos

Tue, 04/07/2023 11:15 - 12:00
CB - Coffee Break

Tue, 04/07/2023 12:00 - 13:30
TUE 6.1 - Turbulence I
Chaired by: Prof. Marc Avila Cafellnas (ZARM, University of Bremen)

Sala d'Actes - Vèrtex

Fluidic Oscillators performance with shape modification and under incompressible and compressible flow
J. Bergadà Granyó*, M. Baghæi
Spectral analysis of the spatial evolution of energy-containing eddies
E. Kannadasan, C. Atkinson, J. Soria*
Turbulent Statistics and Coherent Structures in an Asymmetrically Heated Channel Flow
M. Garcia-Berenguer*, L. Gasparino, O. Lehmkühl, I. Rodriguez
Convergence of numerical simulations for pipe flow
S. Hoyas*, M. Piedrabuena, E. Kannadasan, H. NAqib, R. Vinuesa
Interventional Causality Analysis of Fully Developed Turbulent Channel Flow
K. Osawa*, J. Jiménez
Smallest Box Sizes Sustaining Short-Streak Channels
C. Martinez-Lopez*, O. Flores, J. Jiménez

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Tue, 04/07/2023 12:00 - 13:30

Room 217

TUE 6.2 - Machine Learning III

Chaired by: Prof. Stefano Discetti (Universidad Carlos III de Madrid)

Inclusion of a biochemical model for leveraging data-driven real-time CFD simulations in reactors
P. Barberá*, S. Iserete Agut, R. Martínez-Cuenca, S. Chiva Vicent

Fluid Dynamic Tool for Cardiac Diseases Analysis

N. Groun*, M. Villalba-Orero, E. Lara-Pezzi, E. Valero, J. Garicano-Mena, S. Le Clainche

Control of Facility's Humidity Using a Digital Twin Based on Deep Learning and CFD Simulations

J. Luis-Gómez*, R. Martínez-Cuenca, F. Martínez, J. Mascarós, O. Prades-Mateu, E. Borras, S. Chiva

Optimisation of open-loop control of convective heat transfer with genetic algorithms

R. Castellanos*, J. Alfaro, I. Robledo, A. Ianiro, S. Discetti

Comparison of predictive models for influent parameters in the inflow of Water Resource Recovery Facilities
A. González Barberá*, S. Iserete Agut, L. García García, F. Piñuela García, S. Chiva Vicent

Tue, 04/07/2023 12:00 - 13:30

Room 208

TUE 6.3 - Drops: formation and evaporation

Chaired by: Dr. Francisco José Blanco-Rodríguez (Universidad de Sevilla)

Stable production of liquid jets with vanishing diameters via tip streaming
J. Montanero*, M. Rubio, J. Eggers, M. Herrada

Response of a Drop of Eutectic Indium-Gallium to an Electric Current

J. Otero Martínez*, A. García Armada, J. Rodríguez Rodríguez

Challenges in Modeling Inkjet Printing: Physical and Numerical Aspects

A. Hashemi*, P. Ryzhakov, M. Hashemi, R. Rossi, N. Dlalam, R. Zorrilla

Evaluation of Experimental Artifacts in the Evaporation of Droplets on Fibers

M. Asrardel, T. Poonawala, Á. Muelas*, J. Ballester

Analysis of evaporating droplet dynamics using computational singular perturbation

L. Angelilli*, P. Ciottoli, F. Hernandez Pérez, M. Valorani, H. Im

Tue, 04/07/2023 13:30 - 15:00

LB - Lunch Break

Sala d'Actes - Vèrtex

Tue, 04/07/2023 15:00 - 16:30

TUE 7.1 - Aerodynamics II

Chaired by: Prof. Carlos del Pino (Universidad de Málaga)

Numerical Study of the Flow Past a Three-Element High-Lift Airfoil at Different Angles of Attack
R. Montalà*, O. Lehmkuhl, I. Rodríguez

On the effect of deformation in a wing model on the correlation of the lift slope

P. Gutiérrez-Castillo*, E. Durán-Venegas, N. Konovalov-Shishov, C. del Pino

Aerodynamic forces in deformed wings

L. Parras*, C. del Pino, P. Gutiérrez-Castillo, F. Blanco-Rodríguez

Generation of Free-stream Perturbations in Direct Numerical Simulation for Low-Reynolds Aerodynamics

S. Olivieri*, J. Catalán, O. Flores, M. García-Villalba

Towards data driven reduced order models for the automotive industry

B. Eiximeni*, A. Miró, I. Rodríguez, O. Lehmkuhl

Experimental Measurements of Particle Dispersion and Concentrations in the Turbulent Wake of Ahmed Body and Effects of Rear Slant angle

M. Kumar*, S. Veeravalli, M. Cholemarli

Tue, 04/07/2023 15:00 - 16:30

Room 217

TUE 7.2 - Turbulence II

Chaired by: Prof. Julio Soria (Monash University)

Cardiac-cycle inspired turbulent drag reduction
J. López*, D. Scarselli, A. Varshney, B. Hof

The effect of modulated driving on turbulent plane Couette flows

R. Ostilla-Mónico, W. Akhtar*

On the Aerodynamic Sound Generated by a Subsonic Flow Past a Circular Cylinder

C. Tur-Monge*, B. Eiximeni, O. Lehmkuhl, I. Rodríguez

Turbulent puffs and slugs in pulsatile pipe flow

D. Morón Montesdeoca*, M. Avila

Spectral analysis of the spatial evolution of energy-containing eddies in turbulent boundary layers

A. Matas*, E. Kannadasan, C. Atkinson, J. Soria

Tue, 04/07/2023 15:00 - 16:30

Room 208

TUE 7.3 - Multiphase and Free Surface Flows

Chaired by: Dr. Javier Ruiz-Rus (Universidad de Jaén)

On the Numerical Simulation of Interfacial Rheology
A. Esteban*, J. Tajuelo, P. Sánchez-Puga, M. Rubio, J. Hernández

On the Limitations of the Level Set Method in the Simulation of Interfacial Flows Involving Contact Lines
P. Gómez*, A. Esteban, F. Berlanga, C. Zanzi, J. López, J. Hernández

The impact of the convection on the melting process for different g levels
D. Dubert, M. Simon, J. Massons, F. Gavaldà, X. Ruiz*

Multicomponent Transport in OpenFoam (laminarSMOKE)
B. Naud*, Á. Cuoci, M. Arias-Zugasti

Shear-Induced Phase Separation of Chemically-Responsive Polymer Solutions
M. De Corato*, M. Arroyo

Pattern selection during thermocapillary-driven melting in microgravity
P. Salgado Sánchez*, J. Porter, I. Tinao, A. Laveron Simavilla

Tue, 04/07/2023 16:30 - 17:00

CB - Coffee Break

Tue, 04/07/2023 17:00 - 18:00

Sala d'Actes - Vèrtex

TUE 8.1 - Combustion I

Chaired by: Dr. Daniel Fernández Galisteo (CIEMAT)

Experimental evidence of the multiplicity of stationary solutions in ultra-lean hydrogen flames
R. Palomeque Santiago*, A. Domínguez, M. Rubio Rubio, D. Martínez-Ruiz, E. Fernández-Tarrazo, M. Sánchez-Sanz

Premixed flames in narrow heated circular channels: steady-state solutions, and linear stability analysis
V. Kurdyumov*, D. Fernández-Galisteo, C. Jiménez

Tue, 04/07/2023 17:00 - 18:00

Room 217

TUE 8.2 - Industrial Applications III

Chaired by: Dr. Josep M Bergadà (Universitat Politècnica de Catalunya)

A Joule-Thomson Process of a Vapor with Condensation and Evaporation Through Anodic Alumina Membranes
T. Loimer*, J. Sodagar-Abardeh, D. Petukhov, S. Podgolin

Design of a Non-invasive Cardiovascular Assist Device based on Asymmetric Valveless Pump Technology
J. Anatol*, M. García-Díaz, C. Barrios-Colado, J. Moneo-Fernández, F. Castro-Ruiz, J. Sierra-Pallares

Numerical Modeling and Experimental Validation of a Liebau Effect-based Valveless Pump
C. Barrios-Collado*, J. Anatol, M. García-Díaz, J. Moneo-Fernández, F. Castro-Ruiz, J. Sierra-Pallares

Production of long micrometer jets of weakly viscoelastic liquids.
M. Cabezas*, A. Rubio, E. Vega, F. Galindo-Rosales, A. Gañán-Calvo, J. Montanero

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Room 208

TUE 8.3 - Flow Instabilities II

Chaired by: Dr. Kengo Deguchi (Monash University)

Ferrofluidic wavy Taylor vortices under alternating magnetic field
S. Altmyer*

Stability of Magnetohydrodynamic Shock Waves
A. Calvo-Rivera*, C. Huete, F. García Rubio, A. Velikovich

Linear Stability Analysis of a Two-Layer Channel Flow with a Train of Solid Particles Flowing Parallel to the Interface
D. Ruiz-Martin*, J. Rivero-Rodríguez, M. Sánchez-Sanz

Floquet Stability Analysis of a Two-Layer Oscillatory Flow near a Flexible Wall
A. Barcenas-Luque*, C. Martínez-Bazán, C. Gutiérrez-Montes, W. Coenen

Tue, 04/07/2023 20:00 - 22:00

Hotel Casa Fuster

GD - Congress Gala Dinner

Wednesday, 05/07/2023

Wed, 05/07/2023 08:00 - 09:00

WED R - Registration

Wed, 05/07/2023 09:00 - 10:00

WED PL3 - Invited lecture: Transport and self-assembly of active particles with optimal fuel consumption

Chaired by: Dr. Arantxa Alonso (UPC)

Sala d'Actes - Vèrtex

Transport and self-assembly of active particles with optimal fuel consumption
Rubi*

Wed, 05/07/2023 10:15 - 11:15

WED 9.1 - Microscale and Nanoscale Flows

Chaired by: Mr. Miguel Rubí (Universitat de Barcelona)

Sala d'Actes - Vèrtex

Beads, bubbles and drops in microchannels: stability of centred position and equilibrium velocity
J. Rivero-Rodríguez*, J. Capello, Y. Vilry, A. Dewandre, B. Sobac, B. Scheid

Analytical solutions for vanadium membraneless micro redox flow batteries operating under different current regimes
M. de las Heras*, S. Ibáñez, M. Vera, A. Quintero

Drainage–Imbibition Cycles in a Model Open Fracture: Capillary Jumps, Hysteresis, Memory, and Dissipation
J. Ortín*, R. Holtzman, R. Planet, M. Dentz

Use of nanofluids in energy applications
R. Mondragón Cazorla, L. Hernández López*

Wed, 05/07/2023 10:15 - 11:15

Room 217

WED 9.2 - Combustion II

Chaired by: Dr. Vadim Kurdyumov (CIEMAT)

Influence of Preferential Diffusion on the Dynamics of Laminar Bidimensional Premixed Hydrogen Flames
P. Koumides, E. Pérez-Sánchez*, D. Mira

Numerical study of propagation patterns of lean hydrogen-air flames under confinement
A. Dejoan, D. Fernández-Galisteo*, V. Kurdyumov

A Hybrid Predictive Reduced Order Model for Laminar Flames
A. Corrochano*, R. Freitas, A. Parente, S. Le Clainche

Single-step chemistry validation in turbulent flame cases
A. Millán Merino*, S. Taileb, M. Tayyab, S. Zhao, P. Bolvin

Wed, 05/07/2023 10:15 - 11:15

Room 208

WED 9.3 - Vortex Dynamics and Vortex Flows II

Chaired by: Prof. Juan Lopez (ASU)

Numerical Investigation of Cavitation Effects on the Vortex Shedding Behind a Wedge
J. CHEN*, X. ESCALÉR

Vortex-induced vibrations of a rigidly linked pair of circular cylinders
F. Huera-Huarte*

Experimental and numerical study of vortex induced vibrations on bluff bodies immersed in a water open-channel
E. Martín*, F. Sastre, A. Velazquez

Parametric instability analysis of the flow past a square cylinder in the interface of two different-velocity streams
R. Elmansy*, J. Bergadá Granyó, F. Mellibovsky

Wed, 05/07/2023 11:15 - 12:00

CB - Coffee Break

Wed, 05/07/2023 12:00 - 13:30

Sala d'Actes - Vèrtex

WED 10.1 - Turbulence III

Chaired by: Prof. Sergio Hoyas (Universitat Politècnica de València)

On the stability of wall-bounded flows at high-pressure transcritical fluid conditions
M. Bernades*, F. Capuano, L. Jofre

Heat transfer control in a turbulent boundary layer with Large-Eddy Breakup devices
Q. Li Hu*, F. Foroozan, S. Discetti, A. Ianiro

A dual-grid approach for dispersed-flow simulations in turbulence
M. Schenck*, G. Giannagias, F. Zonta, A. Soldati

Hydrogen Injection and Turbulent Mixing Processes Using a Porous Plate Injector
D. Rodríguez Gutiérrez*, A. Gruber, R. Gómez Miguel, M. Sánchez Sanz, E. Fernández Tarrazo

Prediction and modelling coherent structures and noise radiation of supersonic twin jets
D. Rodríguez*, I. Padilla-Montero

Coherent Structures in Twin Supersonic Jets Obtained From High-Speed Schlieren Measurements
I. Padilla-Montero*, D. Rodríguez, V. Jaunet, S. Girard, D. Eysseric, P. Jordan

Wed, 05/07/2023 12:00 - 13:30

Room 217

WED 10.2 - Biological Fluid Dynamics

Chaired by: Mr. Manuel Garcia-Villalba (TU Wien)

In-vitro Experimental Characterization of the Transmantle Pressure in the Cerebral Aqueduct
F. Moral-Pulido*, S. Sincomb, O. Campos, C. Martínez-Bazán, V. Haughton, A. Sánchez

Fluid Mechanics of saliva transport during human respiratory events: Insights gained using DNS
W. Oaks, H. Seyyedzadeh, M. Sanchez Sanz, **A. Khosronejad***

On the effect of trabeculae on steady streaming in the subarachnoid space
G. Lopez Nozaleda, J. Alaminos Quesada, **W. Coenen***, A. Sanchez Perez

A noninvasive method to determine intracranial pressure fluctuations from MR measurements of cerebrospinal fluid flow in the spinal canal
W. Coenen*, S. Sincomb, V. Haughton, A. Sánchez

Multi-Fidelity Models for Thrombosis Risk Evaluation in the Left Heart Using Patient-Specific Data
G. Manuel*, M. Garcia-Villalba, E. Duran, A. Gonzalo, P. Martinez-Legazpiz, A. Kahn, J. Bermejo, J. del Alamo, F. Oscar

Wed, 05/07/2023 12:00 - 13:30

Room 208

WED 10.3 - Compressible Flows

Chaired by: Dr. Fernando Mellibovsky (Universitat Politècnica de Catalunya)

Exploring the Artificial Compressibility Method in High-Pressure Transcritical Fluids
A. Abdellatif*, J. Ventosa-Molina, J. Grau, R. Torres, L. Jofre

Assessing the Accuracy of Immersed Boundary Methods for High-Fidelity Computational Aeroacoustics
A. Lazaro*, S. Madriñan, O. Carrasco, J. Grau, R. Torres, L. Jofre, F. Capuano

Scramjet oblique shock waves reflection via 2D and 3D CFD analysis
J. Gracia i Sanz*, D. Zurita Sánchez, J. Bergadà Granyó

A High-Order Lagrange-Galerkin Method for Compressible Flows
M. Colera*

On the wake dynamics of the flow past a subsonic and transonic circular cylinder
I. Rodríguez*, B. Eiximeno, L. Gasparino, C. Tur-Mongé, J. Muela, O. Lehmkuhl

Taylor-Maccoll Equations Modification Implemented to Double-Cone Configuration
D. Zurita Sanchez*, J. Gracia i Sanz, J. Bergada Granyó

Wed, 05/07/2023 13:30 - 15:00

LB - Lunch Break and Closing Session

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