

CONGRESS ON NUMERICAL METHODS IN ENGINEERING CMN2022



Conference Programme (Final v2)

12-14 September, 2022

<https://congress.cimne.com/cmn2022>

E-mail: CMN2022_sec@cimne.upc.edu



SEMNI

APMTAC



Las Palmas de Gran Canaria, 12-14 September
CONGRESS ON NUMERICAL METHODS IN ENGINEERING CMN-2022

Colaborate:



Congress Secretariat:



Location:





Las Palmas de Gran Canaria, 12-14 September
CONGRESS ON NUMERICAL METHODS IN ENGINEERING CMN-2022

WELCOME MESSAGE

On behalf of the CMN2022 organizing committee we are pleased to welcome you to Las Palmas de Gran Canaria for the Congress on Numerical Methods in Engineering (CMN 2022) held at Auditorio Alfredo Kraus / Palacio de Congresos de Canarias.

The Congress on Numerical Methods in Engineering takes place biennially and is jointly organized by the “Sociedad Española de Mecánica e Ingeniería Computacionales” (SEMNI, Spain), being the first Congress of the Society after its name change (despite its acronym remains the same), and the “Associação Portuguesa de Mecânica Teórica, Aplicada e Computacional” (APMTAC, Portugal). This conference follows the previous congress editions of Madrid (2002), Lisbon (2004), Granada (2005), Porto (2007), Barcelona (2009), Coimbra (2011), Bilbao (2013), Lisbon (2015), Valencia (2017) and Guimaraes (2019).

This edition is being held one year late compared to the initially scheduled date (2021) due to the incidence of the Covid-19 pandemic. We want to express our appreciation to all members of the committees, to all thematic session organizers, to all the staff who are managing the different aspects of the Congress and to all the contributing authors and participants.

We hope you will have a warm welcome to Las Palmas de Gran Canaria and all of you feel rewarded for your participation and contribution.

David Greiner Sánchez
Irene Arias
Manuel Tur Valiente

Gil Andrade-Campos
Nuno Lopes
J. Alexandre Pinho-da-Cruz

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SEMNI

APMTAC

CONGRESS ORGANIZATION

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Las Palmas de Gran Canaria, 12-14 September CONGRESS ON NUMERICAL METHODS IN ENGINEERING CMN-2022

Location (taken from Google Maps):





Access Detail (taken from Google Maps):

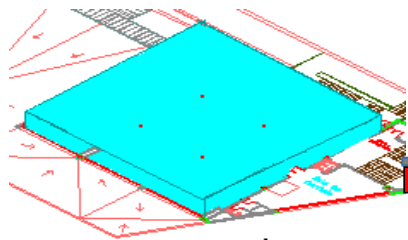


**WiFi network will be available at
the Secretary of CMN2022 and
in Sala de Cámara Room
(details in situ will be offered)**

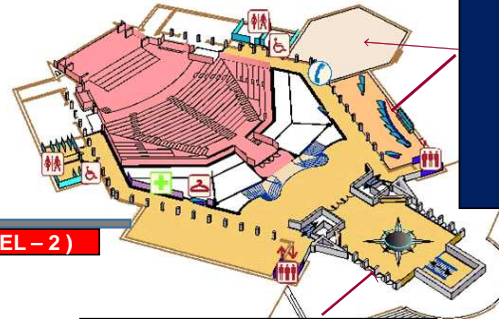
CONGRESO DE MÉTODOS NUMÉRICOS DE INGENIERIA. CMN . 12- 14 SEPTIEMBRE 2022

PLANO GENERAL DE DISTRIBUCIÓN DE SALAS Y ACTIVIDADES

NIVEL 0



ACCESO ALEGRANZA POR NIVEL - 2)



ENTRADA PRINCIPAL

CAFETERIA PRINCIPAL Y TERRAZA CANTERAS

LUNES 12 SEPT. 16:20 H. COFFEE BREAK
LUNES 12 SEPT. 19:50 H. COCKTAIL BIENVENIDA

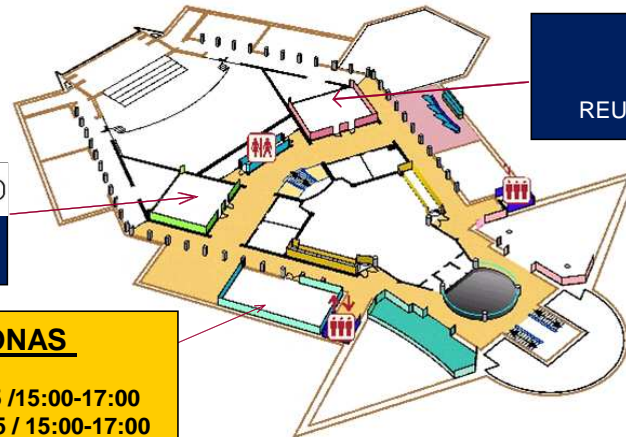


MARTES 13 SEPT. 10:30 H / 17:00 H. COFFEE BREAK
MIÉRCOLES 14 SEPT. 10:30 H / 17:00 H. COFFEE BREAK

ALEGRANZA

MARTES 13 SEPT. 13:45-15:00 H. LUNCH
MIÉRCOLES 14 SEPT. 13:45-15:00 H. LUNCH

NIVEL -1



GOMERA

MARTES 13 SEPT. 13:45-15:00 H
REUNION Y ALMUERZO EJECUTIVA SEMNI



HIERRO

MARTES 13 SEPT. 13:45-15:00 H
REUNION Y ALMUERZO EJECUTIVA APTMAC



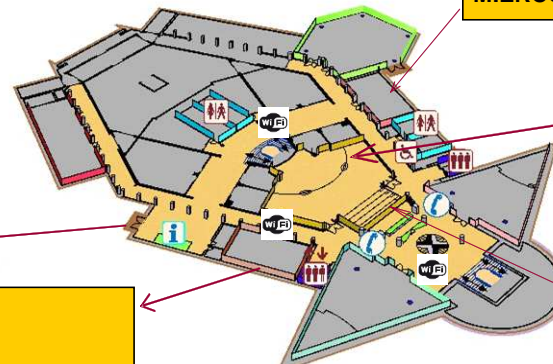
FUERTEVENTURA. 60 PERSONAS

SALA PARALELA 4
MARTES 13 SEPT. 8:30-10:30 / 11:45-13:45 / 15:00-17:00
MIÉRCOLES 14 SEPT. 8:30-10:30 / 11:45-13:45 / 15:00-17:00

LANZAROTE. 60 PERSONAS

SALA PARALELA 2
MARTES 13 SEPT. 8:30-10:30 / 11:45-13:45 / 15:00-17:00
MIÉRCOLES 14 SEPT. 8:30-10:30 / 11:45-13:45 / 15:00-17:00

NIVEL -2



ACCESO SALA ALEGRANZA)

CÁMARA. 326 PERSONAS

SALA PLENARIA + SALA PARALELA 1
LUNES 12 SEPT. 14:30-19:50 H
MARTES 13 SEPT. 8:30- 18:30 H
MIÉRCOLES 14 SEPT. 8:30-18:30 H



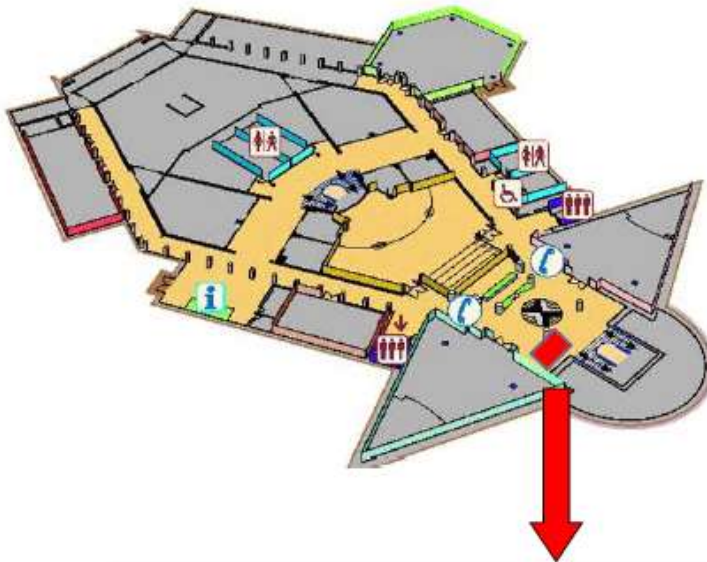
LA PALMA. 50 PERSONAS

SALA PARALELA 3
MARTES 13 SEPT. 8:30-10:30 / 11:45-13:45 / 15:00-17:00
MIÉRCOLES 14 SEPT. 8:30-10:30 / 11:45-13:45 / 15:00-17:00

MOSTRADOR ROSA DE LOS VIENTOS
L- X . 12-14 SEPT
SECRETARIA
ENTREGA ACREDITACIONES
MOSTRADOR INFORMACION TURISTICA



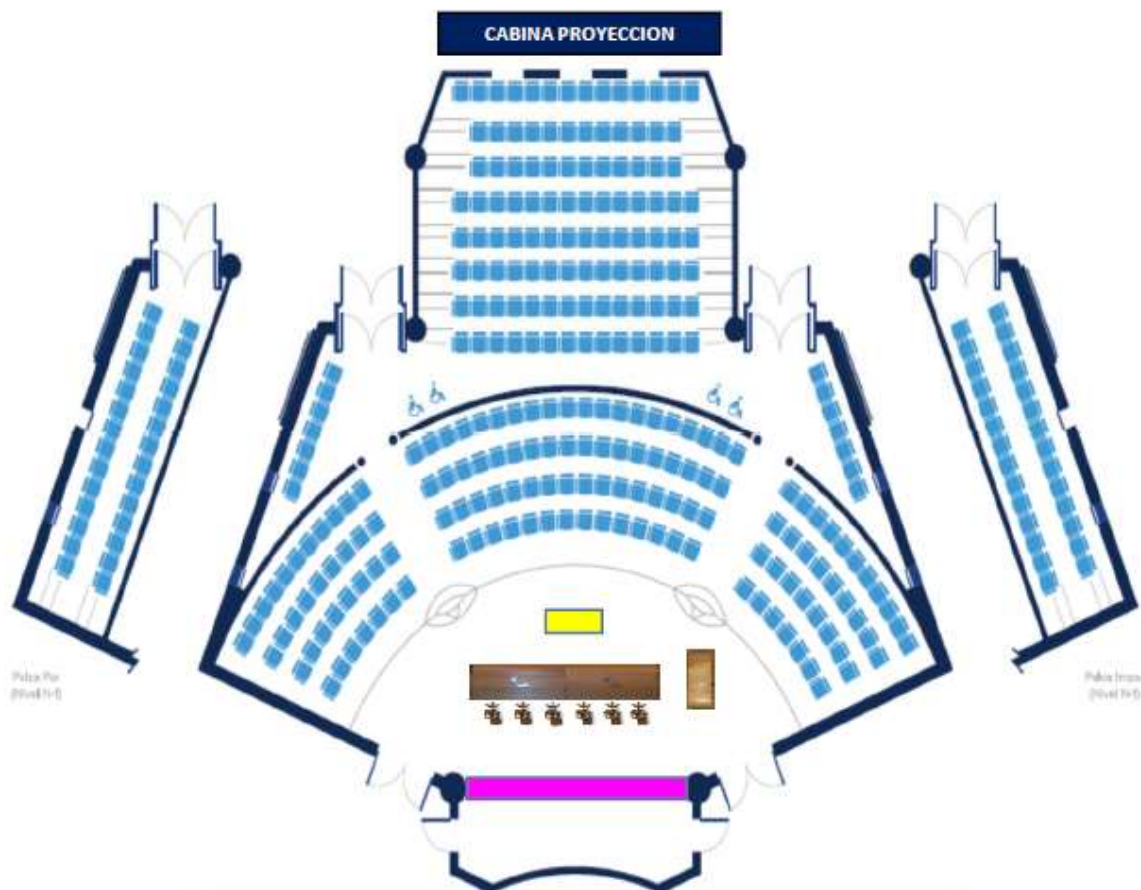
**CONGRESO DE MÉTODOS NUMÉRICOS DE INGENIERIA. CMN . 12- 14 SEPTIEMBRE 2022
HALL ROSA VIENTOS (ACCESO A SALA CÁMARA) . SECRETARÍA TÉCNICA Y ACREDITACIONES**



VITRINA + ROLL UP INFORMACIÓN TURÍSTICA

HALL ROSA VIENTOS. MOSTRADOR CAFETERIA CAMARA

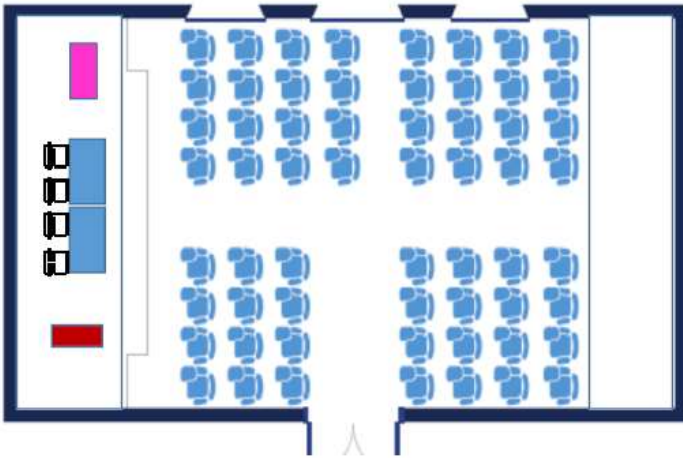
CONGRESO DE MÉTODOS NUMÉRICOS DE INGENIERIA. CMN . 12- 14 SEPTIEMBRE 2022
SALA CÁMARA . SESIONES PLENARIAS + SALA PARALELA 1. 12 A 14 DE SEPTIEMBRE



SALA CÁMARA. SALA PLENARIA + PARALELA 1

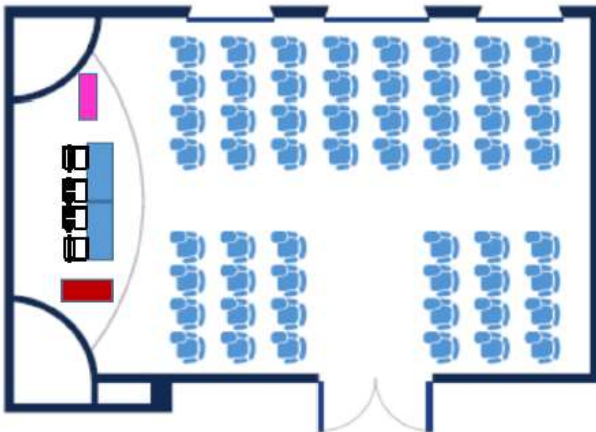


CONGRESO DE MÉTODOS NUMÉRICOS DE INGENIERIA. CMN . 12- 14 SEPTIEMBRE 2022
SALA LANZAROTE SALA PARALELA 2. 13- 14 DE SEPTIEMBRE



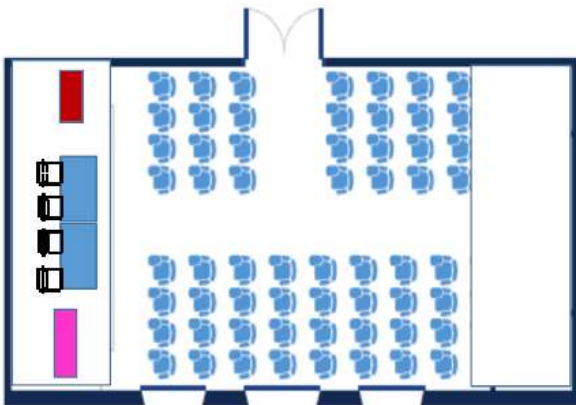
SALA LANZAROTE . SALA PARALELA 2

CONGRESO DE MÉTODOS NUMÉRICOS DE INGENIERIA. CMN . 12- 14 SEPTIEMBRE 2022
SALA LA PALMA SALA PARALELA 3. 13- 14 DE SEPTIEMBRE



SALA LA PALMA . SALA PARALELA 3

CONGRESO DE MÉTODOS NUMÉRICOS DE INGENIERIA. CMN . 12- 14 SEPTIEMBRE 2022
SALA FUERTEVENTURA. SALA PARALELA 4. 13- 14 DE SEPTIEMBRE



SALA FUERTEVENTURA. SALA PARALELA 4



Las Palmas de Gran Canaria, 12-14 September
CONGRESS ON NUMERICAL METHODS IN ENGINEERING CMN-2022

Monday, 12th: Main Program (Sala de Cámara)

14:30-14:50: Opening.

Lluís Serra Majem, Rector of ULPGC
José César de Sá, President of APMTAC
Elías Cueto, President of SEMNI
Gil Andrade Santos, APMTAC Local Organization Chair
David Greiner, SEMNI Local Organization Chair

14:50-15:35: Opening Invited Lecture

"Beyond forward simulations: From reduced-order models to digital twins with computational science"

Karen E. Willcox

Oden Institute Director, University of Texas at Austin, USA
Session Chairman: Antonio Huerta

15:35-16:20: Invited Lecture 2

"Hybridized methods for compressible and incompressible flows within computational engineering-based digital twins strategies"

Antonio Huerta Cerezuela

Universitat Politècnica de Catalunya, BarcelonaTech, Spain
Session Chairman: Elías Cueto

16:20-16:55: Coffee Break

16:55-17:40: Invited Lecture 3

"Non-linear numerical modeling of concrete dams affected by severe swelling reactions"

Carlos Pina

Director of Laboratorio Nacional de Engenharia Civil LNEC, Portugal presenter & Ivo Dias, LNEC, Portugal
Session Chairman: José César de Sá

17:40-19:50: Sesión Especial en Honor del Prof. Manuel Casteleiro: Una mirada hacia el futuro de la Mecánica Computacional

Moderadores de la sesión: Fermín Navarrina (UDC) y José París (UDC)

Memoria sobre el Prof. Manuel Casteleiro: Eugenio Oñate (CIMNE-UPC) y Antonio Huerta (UPC)

Intervenciones de los ponentes invitados:

Javier Bonet (CIMNE-UPC)

José César de Sá (FEUP)

Irene Arias (UPC)

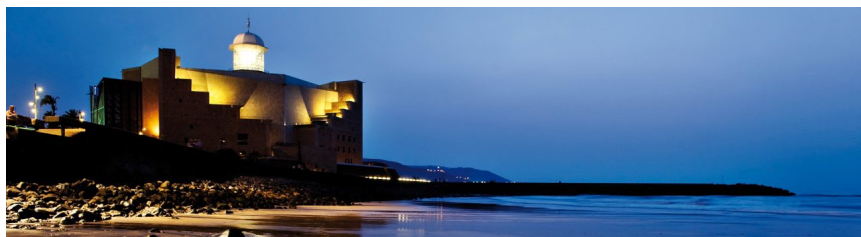
Alberto Figueroa (Univ. Michigan)

Coloquio: Intervenciones de los asistentes

Cierre de la sesión: Elías Cueto (UZ, presidente de SEMNI)

19:50-21.20: Wellcome Cocktail:

Auditorio Alfredo Kraus- Palacio Congresos Canarias





Las Palmas de Gran Canaria, 12-14 September
CONGRESS ON NUMERICAL METHODS IN ENGINEERING CMN-2022

Tuesday, 13th: Main Program

08:30-10:30: Parallel Sesions P1:

Sala de Cámara	Sala Lanzarote	Sala La Palma	Sala Fuerteventura
ST11-1: Computational engineering empowered by model order reduction and machine learning	ST07: Optimization, metaheuristics and evolutionary algorithms in civil engineering	ST06: Numerical modelling of biological cell systems	ST08: Steel and composite structures & Mechanical behaviour of materials

10:30-11:00: Coffee Break

11:00-11:45: Invited Lecture 4 (Sala de Cámara)

"Biomechanics of childbirth"
 Renato Natal, University of Porto, Portugal
 Session Chairman: Carlos Pina

11:50-13:50: Parallel Sesions P2:

Sala de Cámara	Sala Lanzarote	Sala La Palma	Sala Fuerteventura
ST11-2: Computational engineering empowered by model order reduction and machine learning	Optimization & ST05: Modeling of metal additive manufacturing processes	Computational Biology and Biomechanics & ST02: Computational methods in acoustics and vibration	ST10: Plasticity, Wrinkling and Fracture of Thin-Walled Structures at Finite Strains & Solid Mechanics

13:50-15:00: Lunch Break

15:00-17:00: Parallel Sesions P3:

Sala de Cámara	Sala Lanzarote	Sala La Palma	Sala Fuerteventura
ST11-3: Computational engineering empowered by model order reduction and machine learning	ST09: Celebrating 80th Anniversary of Jacques Periaux & <i>Kenote Lecture: Jacques Periaux</i>	Industrial applications	ST13: Advanced Methods for Structures under Earthquake Loading

17:00-17:30: Coffee Break

17:30-18:30:	Sala de Cámara SEMNI General Assembly	Sala Lanzarote APMTAC General Assembly
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 19:00-19:45: Science Chat - on the *Upper Terrace of Centro Comercial Las Arenas* (located just in front of Auditorio).



Tuesday, 13th: Parallel Sessions (Sala de Cámara)

Tuesday - Sala de Cámara - Parallel Sesion P1: Chair: Elías Cueto.

08:30-10:30: ST11-1: Computational engineering empowered by model order reduction and machine learning;

	Presenter	Title	ID
8:30	Olivier Allix	Towards know-how based design optimization	84
8:45	Iciar Alfaro Ruiz	Thermodynamics-informed learning of interpretable models	123
9:00	Alberto Badias Herbera	Towards real-time learned solvers	142
9:15	Ismael Ben-Yelun Insenser	Bounded updating generative design algorithm for optimized structures with variable stiffness	55
9:30	Carlos Bermejo Barbanoj	Aerodynamic analysis: A first approach using Thermodynamics-informed Deep Learning	77
9:45	Elías Cueto	Thermodynamics of the machine learning of physical phenomena	170
10:00	Ana Fernández Navamiel del Olmo	Bridge damage detection using Deep Autoencoder Networks	71
10:15	Antonio Gaspar-Cunha	Application of Artificial Intelligence Techniques in the Optimization of Single Screw Polymer Extrusion	97

Tuesday - Sala de Cámara - Parallel Sesion P2: Chair: David González.

11:50-13:50: ST11-2: Computational engineering empowered by model order reduction and machine learning;

	Presenter	Title	ID
11:50	David González	Physics-informed Learning of Inelasticity Problems	66
12:05	Quercus Hernández	Learning mechanics with geometry and thermodynamics	78
12:20	Joaquin Irazábal González	An automatic methodology based on Machine Learning for the calibration of parameters in numerical models	93
12:35	Beatriz Moya	Reinforcement learning for physically sound fluid dynamics correction	61
12:50	David Muñoz Pellicer	Sobre el uso de descriptores de forma y topología para la interpolación de objetos	119
13:05	Angel Javier Omella	r-adaptive meshes using Deep Neural Networks for solving Partial Differential Equations	166
13:20	David Pardo Zubiatur	Geosteering using Deep Learning	30
13:35	Román Quevedo-Reina	Characterization of pile stiffness using Artificial Neural Networks	108



Tuesday - Sala de Cámara - Parallel Sesion P3: Chair: Juan José Ródenas.

15:00-16:45: ST11-3: Computational engineering empowered by model order reduction and machine learning;

	Presenter	Title	ID
15:00	Juan José Ródenas García	Caracterización estructural de vértebras con metástasis mediante Machine Learning y el Cartesian Grid FEM	124
15:15	Román Quevedo-Reina	Structural evaluation of offshore wind turbines supported on a jacket using Artificial Neural Networks	109
15:30	Joaquin Hernández	A local basis approach for dimensional hyperreduction	127
15:45	Nathalia Silva Cancino	Metodología para la identificación de zonas de riesgo debido a la rotura de balsas usando técnicas de Machine Learning	72
16:00	Alberto García-González	Dimensionality reduction and kernel training applied to the prediction of finite element patient-specific thrombectomy simulation outcomes	231
16:15	Carlos Uriarte Baranda	Solving Partial Differential Equations using Adversarial Neural Networks	29
16:30	Julen Álvarez-Aramberri	A Goal-Oriented hp-Strategy for the Generation of Massive Databases for Deep Learning Inversion	205



Las Palmas de Gran Canaria, 12-14 September
CONGRESS ON NUMERICAL METHODS IN ENGINEERING CMN-2022

Tuesday, 13th: Parallel Sessions (Sala Lanzarote)

Tuesday - Sala Lanzarote - Parallel Sesion P1: *Chair: Víctor Yepes, David Greiner.*

08:30-10:30: ST07: Optimization, metaheuristics and evolutionary algorithms in civil engineering;

	Presenter	Title	ID
8:30	Victor Yepes Piqueras	Sustainable optimization of post-tensioned cast-in-place concrete slab road bridges using metamodels	26
8:45	Gustavo Montero García	Local wind forecasting for Dynamic Line Rating applications	148
9:00	Diogo Filipe Pereira da Cunha Nunes	Model Updating of Railway Bridges Combining Genetic Algorithms with Advanced Features Based on Train-induced Responses	35
9:15	Andrés Cacereño	Systems Design and reconditioning their Maintenance Plan using Multi-objective Optimisation based on Evolutionary Algorithms	36
9:30	Alex Ferrer	Stress minimization for lattice structures	198
9:45	Diego Villalba Rama	3D topology optimization of structures by using the overweight approach	34
10:00	Waldemar Hugo Llamosas Mayca	Analysis of elliptic curves in the multi-objective optimal design of submerged arches using shape parameterization	99
10:15	Daniel Yago Llamas	Comparative assessment of a variational approach to structural topology optimization	70

Tuesday - Sala Lanzarote - Parallel Sesion P2: *Chair: Jose Cesar de Sa.*

11:50-12:50: Optimization;

12:50-13:20: ST05: Modeling of metal additive manufacturing processes;

	Presenter	Title	ID
11:50	Marc Bosch Galera	Recuperación de tracciones equilibradas en elementos hexaédricos conformes en cgFEM para optimización topológica multinivel	138
12:05	Marlene Brás	Towards energy sustainability and cost reduction of water supply systems through operational optimization methodologies: a comparative study of problem formulations	88
12:20	Martí Coma Company	Métodos de optimización híbrida aplicados al diseño preliminar de un ala con función mono-objetivo.	104
12:35	Ivan Couceiro	Numerically efficient treatment of time-dependent constraints for optimization in structural dynamics	62
12:50	Roya Darabi	Implementation of a Phase-Field Thermal Numerical Simulation by Abaqus User-Subroutines Associated With AM Plug-in For Selective Laser Melting Additive Manufacturing	107
13:05	Jean-Philippe Ponthot	Particle Finite Element Method for simulations of Laser Powder Bed Fusion including vaporization	63



Tuesday - Sala Lanzarote - Parallel Sesión P3: Chair: Eugenio Oñate, Gabriel Winter.

15:00-17:00: ST09: Technological Session Celebrating 80th Anniversary of Jacques Periaux: A Research Life - Joining Industry and Academia Solving Complex Problems in Engineering;

	Presenter	Title	ID
15:10	Gabriel Bugada Castelltort	A durable and friendly scientific and technological cooperation between China and Europe – the creation, development and operation in aeronautics (2005 – 2020)	83
15:25	Tadeusz Burczynski	Computational Intelligence in Design of New Nanostructures	80
15:40	Rafael Montenegro Armas	Automatic topology detection and adaptive triangulation of 2D regions without boundary intersections using the Meccano method	57
15:55	Pedro Díez	Reduced-order modelling with kernel Principal Component Analysis, a kernel Proper Orthogonal Decomposition	160
16:10	David Greiner Sánchez	Una aproximación multi-objetivo mediante algoritmos evolutivos para la mejora de modelos subrogados en estructuras metálicas	157

16:25-17:00: Keynote Lecture

“Some Comments on 30 years of progress in Design Optimization Methods with Evolutionary Algorithms, Game Strategies and Finite Elements. Related applications in Aeronautics and Civil Engineering”

Jacques Periaux, UNESCO Chair on Numerical Methods in Engineering, CIMNE - UPC, Barcelona, Spain

Tuesday, 13th: Parallel Sessions (Sala La Palma)

Tuesday - Sala La Palma - Parallel Sesion P1: Chair: José Sarrate.

08:30-10:15: ST06: Numerical modelling of biological cell systems;

10:15-10:30: Computational Biology & Biomechanics;

	Presenter	Title	ID
8:30	Marcos Latorre	Efficient Fluid-Solid-Growth Modeling of In Vivo TEVG development	117
8:45	Pablo Blázquez Carmona	Mathematical modeling of the unmineralized callus stiffening under distraction	208
9:00	Ana Carrasco Mantis	Análisis in silico de la influencia mecánica de la matriz extracelular en la vasculogénesis	85
9:15	Josep Sarrate Ramos	3D modeling of glioblastoma multiforme growth in microfluidic devices	33
9:30	Jose Muñoz	Cell remodelling in 3D vertex models	174
9:45	Marina Pérez-Aliacar	Mathematical modelling and simulation of cell adaptation in glioblastoma evolution	137
10:00	Jacobo Ayensa-Jiménez	Understanding and simulating glioblastoma progression using Physically-Guided Neural Networks with Internal Variables	143
10:15	Marcos Hernández Gil	Numerical Simulation for predicting the Effect of Electrode Array Position in Cochlear Implants	92

Tuesday - Sala La Palma - Parallel Sesion P2: Chair: Francisco Denia.

11:50-12:50: Computational Biology & Biomechanics;

12:50-13:50: ST02: Computational methods in acoustics and vibration;

	Presenter	Title	ID
11:50	Javier Bayod López	Evaluación biomecánica de la osteotomía medializante de calcáneo en tejidos duros y blandos relacionados con la deformidad del pie plano adquirido en adultos: Un estudio computacional	48
12:05	Andrés Fernández San Miguel	A New Approach for Vibrational Analysis of Molecular Structures	49
12:20	Ana González Rodríguez	Numerical Simulation of the Neural Response in Cochlear Implants	91
12:35	Luis Gerardo Padrón Cabrera	Desplazamiento volar de la cabeza del astrágalo en los momentos de máximo apoyo en destrezas con cuerpos apoyados	182
12:50	Francisco David Denia Guzmán	Optimización acústica integral de sistemas de escape con múltiples dispositivos postratamiento y silenciadores	168
13:05	Asunción González Rodríguez	Validación experimental de un modelo numérico "street canyon" para propagación de ruido en áreas urbanas	135
13:20	David Roca Cazorla	Computational design of multiresonant layered acoustic metamaterials (MLAM) for broadband noise insulation	186
13:35	Jaime Gil Romero	Modelo periódico de catenaria ferroviaria para ensayos HIL de pantógrafos	53



Tuesday - Sala La Palma - Parallel Sesion P3: Chair: Pilar Ariza

15:00-16:15: Industrial applications;

	Presenter	Title	ID
15:00	José París López	Advanced computer methods for grounding analysis in underground electrical substations	181
15:15	Sergio Zlotnik	Combining Reduced Order Modeling with Bayesian updating: application to geophysical inversion	195
15:30	Pilar Ariza	Hydrogen storage in Mg nanowires	183
15:45	Ana Luisa Reis	On the benefits of demand side management in Water Supply System	76
16:00	Jose L. Pérez Aparicio	Finite element simulation of quantum confined thermoelectrics	58

Tuesday, 13th: Parallel Sessions (Sala Fuerteventura)

Tuesday - Sala Fuerteventura - Parallel Sesión P1: *Chair: Ana Espinós.*

08:30-09:30: ST08: Steel and composite structures;

09:30-10:15: Mechanical behaviour of materials;

	Presenter	Title	ID
8:30	Manuel Buitrago	Fusibles estructurales para evitar la propagación de fallos en cimbras de edificación	46
8:45	Joaquim Cruz	Modelação Numérica e Estudos de Benchmark da Resistência ao Fogo de Elementos Estruturais em Alumínio	147
9:00	Ruth Gutierrez Fernandez	Diseño de uniones de casquillo para correas de acero conformado en frío	141
9:15	David Medall Martos	Modelo numérico bidimensional para la evaluación del comportamiento térmico de columnas tubulares de acero rellenas de hormigón con perfiles embebidos en situación de incendio	37
9:30	Laura Moreno Corrales	Caracterización de daño en metamateriales de impresión 3D mediante técnicas numéricas	75
9:45	Gustavo Cámara	A DEM generalized Kelvin contact model for predicting damage in asphalt mixtures	134
10:00	Luis Antonio Gonçalves Junior	On the numerical investigation of the fatigue behavior of a Mn-TWIP steel	101

Tuesday - Sala Fuerteventura - Parallel Sesión P2: *Chair: Pedro Areias, X. Oliver.*

11:50-12:20: ST10: Plasticity, Wrinkling and Fracture of Thin-Walled Structures at Finite Strains;

12:20-13:50: Solid Mechanics;

	Presenter	Title	ID
11:50	Pedro Areias	Wrinkling of finite-strain membranes with mixed solid shell elements	223
12:05	Juan Antonio Cabrera González	Effect of geometrical imperfections on the instability behaviour of cylindrical steel shells for application in the design of wind turbine towers	145
12:20	Xavier Oliver	Towards multi-scale analysis and design of hyperelastic shock-absorbing metamaterials	190
12:35	Irina Tezaur	The Schwarz alternating method for multiscale contact mechanics	24
12:50	Emilio Martínez-Pañeda	Phase field predictions of hydrogen assisted fractures	31
13:05	Jacob David Rodríguez Bordón	Vertical dynamic interaction between suction caissons in tetrapod arrangements for offshore wind turbines	129
13:20	Alvaro González Ortega	Validation of bilinear damage models for aluminium alloys	52
13:35	Jacob David Rodríguez Bordón	MultiFEBE: an open-source multi-domain integrated Finite Element and Boundary Element software	132



Tuesday - Sala Fuerteventura - Parallel Sesion P3: Chair: Luis Romera.

15:00-17:00: ST13: Advanced Methods for Structures under Earthquake Loading

	Presenter	Title	ID
15:00	Nicoletta Bianchini	Effects of earthquakes with different nature on the seismic performance of masonry vaults	9
15:15	Arturo Norberto Fontán Pérez	Evaluación de la respuesta sísmica de estructuras de edificación con pilares mixtos y vigas de sección variable	153
15:30	Cristina Medina López	Respuesta sísmica de aerogeneradores marinos monopilotados de gran tamaño considerando la interacción dinámica suelo-estructura	100
15:45	Luis Romera Rodríguez	Diseño y verificación experimental de vigas con sección reducida conectadas a pilares mixtos	152
16:00	Carlos Romero Sánchez	Implementation of ground input motion and dynamic soil-structure interaction into OpenFAST for the seismic analysis of Offshore Wind Turbines	114
16:15	Georgios Vlachakis	Dynamic Simulation of One-Sided Rocking Masonry Facades using an Energy-Consistent Viscous Damping Model	39
16:30	Laura Moreno Martínez	A VMS-stabilized mixed formulation for non-linear incompressible solid mechanics problems using the implicit Material Point Method	213
16:45	Manuel Buitrago	Robustez de estructuras prefabricadas de hormigón: simulación computacional mediante Applied Element Method	45



Las Palmas de Gran Canaria, 12-14 September
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Wednesday, 14th: Main Program

08:30-10:30: Parallel Sesions P4:

Sala de Cámara	Sala Lanzarote	Sala La Palma	Sala Fuerteventura
Fluid Mechanics-1	ST01: Composites modelling: characterization, behaviour and structures	Meshless Methods & Finite Difference and Finite Volume & General Session	ST03: Image processing and visualization & General Session

10:30-11:00: Coffee Break

11:00-11:45: Invited Lecture 5 (Sala de Cámara)

“Art of Modeling Contact Problems in Multibody Dynamics”
 Paulo Flores, University of Minho, Portugal
 Session Chairman: Carlos Mota Soares

11:50-13:50: Parallel Sesions P5:

Sala de Cámara	Sala Lanzarote	Sala La Palma
Finite Elements-1	ST04: Metal forming – formability characterization, damage and ductile fracture	Course: "Introduction to Artificial Intelligence and its application to Computational Fluid Dynamics". Speaker: Ricardo Vinuesa

13:50-15:00: Lunch Break / Career Forum (in parallel); Mentors: Juan José Ródenas (UPV), David Pardo (UPV/EHU, BCAM, Ikerbasque), Emilio Martínez-Pañeda (Imperial College London), Matteo Giacomini (UPC, CIMNE)

15:00-17:00: Parallel Sesions P6:

Sala de Cámara	Sala Lanzarote	Sala La Palma
Finite Elements-2 & Fluid Mechanics-2	ST12: Computational Modeling in Mechanobiology and Tissue Engineering	Round Table: European and National Funding: Projects and Human Resources (with Success Cases)

17:00-17:30: Coffee Break

17:30-18:15: Invited Lecture 6 (Sala de Cámara):

“Modeling and controlling turbulent flows through deep learning”
 Ricardo Vinuesa Molina, KTH Royal Institute of Technology, Sweden
 Session Chairman: Elías Cueto

18:15-18:35: Closing Ceremony (Sala de Cámara)

18:45: Scheduled Bus at Auditorio: Visit to Plaza Santa Ana – Museum “Casa de Colón”, continuing Gala Dinner (estimated finishing at 24.00).



Wednesday, 14th: Parallel Sessions (Sala de Cámara)

Wednesday - Sala de Cámara - Parallel Sesion P1: *Chair: Sergio Idelsohn.*

08:30-10:30: Fluid mechanics I;

	Presenter	Title	ID
8:30	Sergio Idelsohn Barg	A multi-scale approach for the study of particle-laden turbulent flows using a continuous model	47
8:45	Miguel Masó	Un procedimiento Lagrangiano-Euleriano para la solución acoplada de las ecuaciones de Navier-Stokes y aguas poco profundas para olas generadas por deslizamientos de laderas	189
9:00	Xesús Nogueira	Métodos de disipación adaptativa para el cálculo de flujos turbulentos utilizando modelos de submalla implícitos	27
9:15	Dariusz Asendrych	Modelling gas-liquid flow over corrugated plates	184
9:30	Marcela Cruchaga	Modelling vortex induced vibration in a configuration of two-aligned cylinders using an embedded technique for fixed meshes	51
9:45	Francisco Javier Fernández Fidalgo	Simulación de flujos de transición y cambios de fase en medios porosos mediante ecuaciones de estado modificadas para obtener la tensión superficial correcta	28
10:00	Matteo Giacomini	A mesh-insensitive face-centred finite volume solver: from compressible to incompressible flows	167
10:15	Inés Hernández García	Hybridisable Discontinuous Galerkin applications for oceanographical Shallow Water Equations	207

Wednesday - Sala de Cámara - Parallel Sesion P2: *Chair: Eugenio Oñate.*

11:50-13:50: Finite Elements I;

	Presenter	Title	ID
11:50	Eugenio Oñate	Explicit time integration scheme with large time steps for first order transient problems using finite increment calculus	227
12:05	Alejandro Aguirre Ruz	Stabilized finite element formulations for Reissner-Mindlin plates and Timoshenko beams based in the VMS framework	211
12:20	André Alegre	Numerical models for seismic analysis of arch dams	125
12:35	Pablo Antolin Sánchez	Robust Numerical Integration on Curved Polyhedra Based on Folded Decompositions	216
12:50	Konstantin Ashkinadze	A finite grid method for analysis of structural slabs with weak planes	50
13:05	Miguel Ángel Padrón	Similarity classes generated by the Octasection method applied to the triangulation of the 3D unit cube into six tetrahedra	59
13:20	Ahmad Towaiq	Estimation of fatigue life of offshore steel structures using numerical simulations and artificial neural networks	194
13:35	Abdolhamid Attaran	A contribution to the modeling and simulation of stimuli-responsive polymer gels	204



Wednesday - Sala de Cámara - Parallel Sesion P3: Chair: Ignacio Romero, Ramón Codina

15:00-16:15: Finite Elements II;
16:15-17:00: Fluid Mechanics II;

	Presenter	Title	ID
15:00	Ramon Codina	Approximation of eigenproblems of incompressible materials using a stabilised finite element formulation. Application to modal analysis	60
15:15	Ignacio Romero	Theory and numerical methods for the simulation of nonlinear mechanics of dragged slender solids: the case of fat rods and shells	122
15:30	Inocencio Castañar Pérez	A stabilized mixed three-field formulation for stress accurate analysis including the incompressible limit in Finite Strain Solid Dynamics	209
15:45	Arnau Fabra Ruiz	Stabilized finite element method for the elastodynamics equation in vector-tensor mixed form for time and frequency domain	121
16:00	Albert Oliver	A hypergraph-grammar for the longest-edge refinement of triangular and tetrahedral meshes	110
16:15	Mohammad Reza Pendar	Numerical Analysis of Automotive Electrostatic Coating Process: Applying Nitrothermspray Technique	197
16:30	Rafel Perelló i Ribas	A RANS-based strategy for the accurate computation of aerodynamic forces under lateral wind	206
16:45	Javier Ruiz Ramírez	Numerical optimization of the design of an evaporative pre-cooling system by ultrasonic spray atomizers for air conditioning applications	133

Wednesday, 14th: Parallel Sessions (Sala Lanzarote)

Wednesday - Sala Lanzarote - Parallel Sesion P1: Chair: Rena Yu.

08:30-10:30: ST01: Composites modelling: characterization, behaviour and structures;

	Presenter	Title	ID
8:30	Bárbara Alcayde Romo	Fatigue behaviour of Glass-Fiber-Reinforced Polymers: numerical versus experimental	65
8:45	Albertino Arteiro	Numerical study of the damage induced by simulated lightning strikes in composite plates	215
9:00	José Luis Guzmán López	Practical introduction to snap-back control algorithms in a commercial FEM software	56
9:15	María de los Ángeles Herrera Garrido	Computation of stress singularity problem solutions of a sharp tool sliding with friction over a composite material	173
9:30	Mar Muñoz-Reja Moreno	New crack-tip elements for logarithmic stress-singularity of cracks propagating in spring-like interfaces under mode III	159
9:45	Rena Yu	A multi-scale model for the failure of fiber-reinforced cement-based composites	169
10:00	Igor A. Rodrigues Lopes	Modelling the inelastic response and progressive failure of fibre-reinforced composites at finite strains	192
10:15	Taherzadeh Fard	Numerical investigation of delamination damage in laminated composites, a fast simulation scheme	69

Wednesday - Sala Lanzarote - Parallel Sesion P2: Chair: Marta Oliveira, J. Mendiguren.

11:50-12:05: ST01: Composites modelling: characterization, behaviour and structures;

12:05-13:50: ST04: Metal forming – formability characterization, damage and ductile fracture;

	Presenter	Title	ID
11:50	Johannes Reiner	Calibration of Progressive Damage Models: Trial-and-Error, Machine Learning and Genetic Algorithms	199
12:05	António Andrade-Campos	Comparison of full-field inverse identification methods for metal plasticity	68
12:20	Ana Costa	Analysis of influence of chemical components in the mechanical properties in the Steel databases using Machine Learning	111
12:35	Daniel Cruz	Artificial Neural Networks and Three-Point Bending on the Identification of Hardening Parameters of Sheet Metals	171
12:50	Borja Erice	Necking predictions with Neural Networks in metal forming operations	96
13:05	Joseba Mendiguren	Anisotropic rate-dependent plasticity and fracture of AA5754	95
13:20	Marta C. Oliveira	Influence of the thickness variability on the assessed hardening behaviour using a meso-scale tensile/compression specimen	163
13:35	Javier Vichez Romero	Análisis de las tensiones residuales de springback elastoplástico según endurecimiento mediante simulación numérica de elementos finitos	196



Wednesday - Sala Lanzarote - Parallel Sesion P3: Chair: P. Fernandes, A. Castro, C. Borau, J. Melchor

15:00-17:00: ST12: Computational Modeling in Mechanobiology and Tissue Engineering;

	Presenter	Title	ID
15:00	Paulo Fernandes	Simulated Annealing Optimization Method for the design of TPMS scaffolds	94
15:15	André Castro	Mechanobiological Analysis of Bone Tissue Engineering TPMS Scaffolds	116
15:30	Carlos Borau Zamora	Multiscale modelling of neuroblastoma tumour growth.	193
15:45	Juan Melchor Rodríguez	Magnetic nanoparticle multiphysics computational design to propagate mechanical waves	118
16:00	Antolín Martínez Martínez	Simulación numérica basada en imagen médica del proceso de curación de fractura ósea con el Cartesian Grid FEM	103
16:15	Alba Muixí	A parametric model for molecular transport in osteoinductive scaffolds with a PCA-based hyper-reduction formulation	212
16:30	José Manuel Navarro Jiménez	Modelado de la osteointegración hueso-implante dental mediante el Cartesian grid Finite Element Method - cgFEM	126
16:45	Jacob Abdelfatah Ndioubnane	An overview on degradation of biopolymeric scaffolds and the effect on their mechanical properties	144



Wednesday, 14th: Parallel Sessions (Sala La Palma)

Wednesday - Sala La Palma - Parallel Sesion P1: Chair: Ignacio Colominas.

08:30-9:00: Meshless methods;

09:00-09:30: Finite difference and finite volume;

09:30-10:00: General Session;

	Presenter	Title	ID
8:30	Ignacio Colominas	A high accurate meshless approach based on SPH method for CFD	217
8:45	Félix Raymundo Saucedo Zendejo	Una formulación libre de malla para problemas de termoelasticidad lineal	162
9:00	Laura Edreira Marzoa	An Arbitrary Very High-Order Finite Volume Method based on Mean Preserving Moving Least Squares	82
9:15	Ricardo Costa	High-order accurate conjugate heat transfer solutions with a finite volume method in anisotropic meshes with application in polymer processing	219
09:30	José Javier Padilla Abellán	A higher order variant of Newton's method for solving the constitutive model of the steel reinforcement in tension as stiffened by the concrete	73
9:45	Igor Fernández de Bustos	COrientaciones3d: Una biblioteca de funciones para el uso intercambiable de distintos sistemas de representación de la orientación	136

Wednesday - Sala La Palma - Parallel Sesion P2: Chair: David Greiner

11:50-13:50: Introductory Course: "Introduction to Artificial Intelligence and its application to Computational Fluid Dynamics". Speaker: Ricardo Vinuesa.

Wednesday - Sala La Palma - Parallel Sesion P3: Chair: Irene Arias

15:00-17:00: Round Table: European and National Funding: Projects and Human Resources. *Chair: Irene Arias.*

- Juan Alberto Corbera, Director de Recursos Humanos de Investigación – Vicerrectorado de Investigación y Transferencia - ULPGC: "Posibilidades de financiación. Contratos Predoctorales y Postdoctorales de ámbito nacional."
- Aridane González, Director de Investigación y Desarrollo Tecnológico - Vicerrectorado de Investigación y Transferencia – ULPGC: "Posibilidades de financiación. Proyectos de Investigación - Convocatorias Nacionales."
- Caso de éxito ERC Starting Grant: Marcos Latorre (Universidad Politécnica Valencia)
- Caso de éxito ERC Starting Grant: Irene Arias (Universidad Politécnica Catalunya)



Wednesday, 14th: Parallel Sessions (Sala Fuerteventura)

Wednesday - Sala Fuerteventura - Parallel Sesion P1: *Chair: Enrique Nadal.*

08:30-09:00: ST03: Image processing and visualization;

09:00-10:00: General Session;

	Presenter	Title	ID
8:30	Emilia Fregoso Becerra	Inversión conjunta de datos geofísicos inicializada con un modelo de estimación Bayesiana	79
8:45	Ruben Rui	Automatic Hexahedral Mesh Generation of a Trachea with a Stent	87
9:00	Enrique Nadal Soriano	Adaptación personalizada de modelos computacionales para la predicción de remodelación ósea a partir de imágenes médicas	112
9:15	Francesco Marotti de Sciarra	Finite Element Analysis for Small-Scale Beams	200
9:30	Christian Beleña Postigo	El método de Ostrowski aplicado a la resolución de ecuaciones y sistemas no lineales	42
9:45	Héctor Navarro García	Extensión del método cgDG para la resolución del problema electromagnético en 3D	113



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