

SEMNI Spanish Society of Computational

SEMNI

## Congress on Numerical Methods in Engineering

Gijón, Spain July 1-3, 2026

Mechanics and Computational Engineering

### TS011 Numerical Modeling Techniques for Complex Problems in Science and Engineering (In Honor of Rafael Montenegro)



## TS011A Numerical Modeling Techniques for Complex Problems in Science and Engineering (In Honor of Rafael Montenegro) I

Main Organizer: Prof. Gustavo Montero ( Universidad de Las Palmas de Gran Canaria , Spain )

📅 Wed, 01/07/2026

🕒 10:00 - 11:30

🏠 Room 1

This thematic session is dedicated to recent advances in numerical modeling applied to multiphysical and multiscale problems in different areas of science and engineering. It will address both the development of new methodologies—such as finite elements, finite volumes, boundary elements, and high-order HDG formulations—and their application to complex cases: incompressible flows, wave propagation, porous media simulation, atmospheric and marine pollution, solar and wind energy, and forest fire propagation, among others. In addition to applications, contributions addressing key computational aspects such as load balancing in parallel algorithms, geometric accuracy in meshes, and the fidelity of numerical models will also be included. The aim of the session is to provide a multidisciplinary space for sharing theoretical, computational, and applied approaches that push the boundaries of numerical simulation in real and demanding contexts.

### Scheduled presentations:

- **Keynote** Numerical Modelling of Coupled Wind, Wildfire Spread and Smoke Dispersion: From Mathematical Formulation to Operational Integration  
\***M. Asensio Sevilla**, J. Cascón Barbero, J. Iglesias Pérez, L. Ferragut Canals
- Towards the Prediction of the Underwater Acoustic Footprint of Offshore Wind Turbines  
\***E. ferrer**
- Data-Driven Prediction of Particulate Pollution Episodes from Low-Cost Sensor Networks in a Coastal Industrial City: Lessons from Gijón (Spain)  
A. Menéndez Rubiera, A. Fernández Aybar, M. Fernández Amor, I. Rodríguez Larrad, M. Domat,  
\***E. González Plaza**
- Coupling CFD-DPM simulation of electric vehicle fire suppression in tunnel  
\***J. Bielawski**, W. Węgrzyński

## TS011B Numerical Modeling Techniques for Complex Problems in Science and Engineering (In Honor of Rafael Montenegro) II

Main Organizer: Prof. Gustavo Montero ( Universidad de Las Palmas de Gran Canaria , Spain )

📅 Wed, 01/07/2026

🕒 12:45 - 13:45

📍 Room 2

This thematic session is dedicated to recent advances in numerical modeling applied to multiphysical and multiscale problems in different areas of science and engineering. It will address both the development of new methodologies—such as finite elements, finite volumes, boundary elements, and high-order HDG formulations—and their application to complex cases: incompressible flows, wave propagation, porous media simulation, atmospheric and marine pollution, solar and wind energy, and forest fire propagation, among others. In addition to applications, contributions addressing key computational aspects such as load balancing in parallel algorithms, geometric accuracy in meshes, and the fidelity of numerical models will also be included. The aim of the session is to provide a multidisciplinary space for sharing theoretical, computational, and applied approaches that push the boundaries of numerical simulation in real and demanding contexts.

### Scheduled presentations:

- [POD-Galerkin Reduction Models for transient, non-linear problems: application to Glioblastoma progression](#)  
**\*J. Sarrate**, M. Dingle, E. Sala-Lardies, N. Parés
- [Validación de un Modelo 3D Adaptativo de Radiación Solar a Escala Local Usando Medidas de Piranómetro y un MDE de Alta Resolución](#)  
E. Rodríguez, M. Hernández, J. García-Ferrero, M. Sánchez-Aparicio, J. Iglesias, A. Oliver-Serra, M. Santos, P. de Andrés-Anaya, J. Cascón, **\*G. Montero**, A. Medina, S. Lagüela, M. Asensio, R. Montenegro
- [Modelo Computacional para la Optimización de la Estimulación Multipolar en Implantes Cocleares](#)  
M. Hernández, Á. Ramos de Miguel, D. Greiner Sánchez, D. Benítez Sánchez, Á. Ramos Macías, **\*J. Escobar Sánchez**
- [Numerical Simulation of Structural Behavior under Blast Loading.](#)  
**\*A. Santos Yanguas**, R. Castedo Ruiz, M. Chiquito Nieto, L. López Sánchez

## TS011C Numerical Modeling Techniques for Complex Problems in Science and Engineering (In Honor of Rafael Montenegro) III

Main Organizer: Prof. Gustavo Montero ( Universidad de Las Palmas de Gran Canaria , Spain )

📅 Wed, 01/07/2026

🕒 15:45 - 17:15

📍 Room 1

Chaired by:

Prof. Gustavo Montero (Universidad de Las Palmas de Gran Canaria , Spain)

This thematic session is dedicated to recent advances in numerical modeling applied to multiphysical and multiscale problems in different areas of science and engineering. It will address both the development of new methodologies—such as finite elements, finite volumes, boundary elements, and high-order HDG formulations—and their application to complex cases: incompressible flows, wave propagation, porous media simulation, atmospheric and marine pollution, solar and wind energy, and forest fire propagation, among others. In addition to applications, contributions addressing key computational aspects such as load balancing in parallel algorithms, geometric accuracy in meshes, and the fidelity of numerical models will also be included. The aim of the session is to provide a multidisciplinary space for sharing theoretical, computational, and applied approaches that push the boundaries of numerical simulation in real and demanding contexts.

### Scheduled presentations:

- **Keynote** [A NURBS-Cut High-Order Hybridizable Discontinuous Galerkin Method for Incompressible Flows](#)  
A. Felipe, M. Giacomini, **\*A. Huerta**
- [A FEM-based formulation for nanostructures: from small molecules to proteins](#)  
**\*A. Fernández San Miguel**, I. Couceiro Aguiar, L. Ramírez Palacios, F. Navarrina Martínez
- [Un Marco Híbrido FEM-ANN para la Estimación de los Elementos Diagonales de la Matriz de Impedancia en Implantes Cocleares](#)  
**\*M. Hernández-Gil**, Á. Ramos, D. Greiner, D. Benitez, G. Montero, J. Escobar
- [BEM-FEM models for the coupled analysis of wave propagation and structural dynamics problems in engineering](#)  
J. Rodríguez Bordón, G. Álamo Meneses, R. Quevedo Reina, C. Medina López, R. Toledo Quintana, A. González Rodríguez, C. Romero Sánchez, E. Rodríguez Galván, B. Benítez Suárez, S. González Jiménez, Ó. Ramón Turner, F. García del Pino, L. Padrón Hernández, J. Aznárez González, **\*O. Maeso Fortuny**
- [Numerical and Experimental Assessment of CFRP-Timber Interface Debonding Using Cohesive Zone Modeling and Full-Field Strain Measurements](#)  
**\*R. Bravo Pareja**, C. Cruz Rodríguez, J. Lorenzana Fernández, F. Rescalvo Fernández, M. Portela Barral, M. Guaita, A. Gallego Molina

## TS011D Numerical Modeling Techniques for Complex Problems in Science and Engineering (In Honor of Rafael Montenegro) IV

Main Organizer: Prof. Gustavo Montero ( Universidad de Las Palmas de Gran Canaria , Spain )

📅 Thu, 02/07/2026

🕒 17:30 - 18:30

📍 Room 2

This thematic session is dedicated to recent advances in numerical modeling applied to multiphysical and multiscale problems in different areas of science and engineering. It will address both the development of new methodologies—such as finite elements, finite volumes, boundary elements, and high-order HDG formulations—and their application to complex cases: incompressible flows, wave propagation, porous media simulation, atmospheric and marine pollution, solar and wind energy, and forest fire propagation, among others. In addition to applications, contributions addressing key computational aspects such as load balancing in parallel algorithms, geometric accuracy in meshes, and the fidelity of numerical models will also be included. The aim of the session is to provide a multidisciplinary space for sharing theoretical, computational, and applied approaches that push the boundaries of numerical simulation in real and demanding contexts.

### Scheduled presentations:

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- [The Meccano Technique: Beyond Meshes and Methods](#)  
\***J. Cascón**, J. Escobar, G. Montero, A. Oliver, E. Rodríguez
- [Simulación de los efectos de la inyección de gases no convencionales en el transporte de gas natural](#)  
\***A. López-Benito**, F. Elorza, L. Gutiérrez-Pérez
- [The Meccano Method for Adaptive Triangulation of 2D Regions with Automatic Topology Identification](#)  
G. Socorro-Marrero, \***A. Oliver-Serra**, R. Montenegro
- [A degradative-erosive integrated framework for computing the evolution of porosity and mechanical properties under dynamic conditions in bioresorbable polymeric scaffolds.](#)  
\***J. Abdelfatah Ndioubnane**, R. Paz Hernández, M. Monzón Verona, G. Winter Althaus