IMACS2023 Tuesday 09/12/2023 **PLENARY ROOM #38**

9:00 - KEYNOTE LECTURE
Chair: *Laura Gardini*

Mathematical Modeling of Oncological Data - A Multi-scale Perspective
Michele Piana

9:45 - GUEST LECTURE
Chair: *Rosa Maria Spitaleri*

Research Integrity & Publishing Ethics: A whistlestop tour of common ethical pitfalls by well-intentioned researchers
Darren Sugrue

10:20 – SS9
NONLINEAR DYNAMICS FOR ECONOMICS, FINANCE AND SOCIAL SCIENCES
Organizer: *Fabio Tramontana*

10:20 - On the Statistical Significance of Quantile Connectedness Indexes
Bonaccolto Giovanni, Massimiliano Caporin, Jawad Syed Shahzad

10:40 - A Discontinuous Model of Exchange Rate Dynamics with Sentiment Traders
Giovanni Campisi, Anastasiia Panchuk, Fabio Tramontana

11:00 – *COFFEE BREAK*

11:30 – MS9
RECENT PROBLEMS AND METHODS IN COMPUTATIONAL FINANCE
Organizers: *Karel in't Hout, Carlos Vázquez Cendón*

11:30 - Identifying the Number of Latent Factors of Stochastic Volatility Models
Erindi Allaj, Maria Elvira Mancino, Simona Sanfelici

11:50 - XVA Modelling and Computing in a Multicurrency Setting
Inigo Arregui, Roberta Simonella, Carlos Vazquez

12:10 - Efficient Likelihood Estimation with Wavelets
Augusto Blanc-Blocquel, Luis Ortiz-Gracia, Rodolfo Oviedo

12:30 - Impact of Correlation between Interest Rates and Mortality Rates on the Valuation of Various Life Insurance Products
Griselda Deelstra, Pierre Devolder, Benjamin Roelants du Vivier

12:50 - A Deep Solver for BSDEs with Jumps
Alessandro Gnoatto, Marco Patacca, Athena Picarelli

13:10 - Artificial Neural Networks with Chebyshev Polynomials
Beatriz Gomez Martin,Victor Gatón Bustillo

13:30 - *LUNCH TIME*

IMACS2023 Tuesday 09/12/2023 **PLENARY ROOM #38**

15:00 – KEYNOTE LECTURE

Chair: *Francesca Pitolli*

Modeling Traffic Jam and Growth Process of Neurons Using IGA and PGNN
Jessica Zhang

16:00 – MS9

16:00 - A New Deep Solution Algorithm for Fully Coupled FBSDEs
Zhipeng Huang

16:20 - Efficient Numerical Valuation of European Options under the Two-asset Kou Jump-diffusion Model
Karel in 't Hout, Pieter Lamotte

16:40 - Equilibrium Problems with Heterogeneous Agents under Jump-diffusion Models
Jonatan Ráfales, Carlos Vázquez

17:00 - *COFFEE BREAK*

17:30 – MS9

17:30 - Approximate Option Pricing under Jump-diffusion Stochastic Volatility Models Based on a Hull and White Type Tormula
Josep Vives

18:30 – APNUM & MATCOM Editors Meeting

10:20 – MS4

MMSEP: MODELLING, METHODS AND SIMULATIONS FOR ENVIRONMENTAL PROBLEMS
Organizers: *Carmela Marangi, Andrea Scagliarini, Luca Sgheri, Isabella Torcicollo*

10:20 - Pattern Formation Driven by Cross-diffusion in the Klausmeier-Gray-Scott Model
Giuseppe Alì, Carmelo Scuro, Isabella Torcicollo

10:40 - Numerical Rock-Glacier Flow via the Pressure Method
Elishan Christian Braun, Daniela Mansutti, Kumbakonam R. Rajagopal

11:00 – *COFFEE BREAK*

11:30 – MS4

11:30 - Investigating spatial patterns in a model describing three-species interactions
Maria Francesca Carfora, Isabella Torcicollo

11:50 - Retrieval of Surface and Atmospheric Parameters from High Resolution Infrared Sensors
Italia De Feis, Fabio Della Rocca, Guido Masiello, Carmine Serio

12:10 - The RothC Model: a Simple Tool for Simulating Soil Organic Carbon Dynamic
Fasma Diele, Carmela Marangi

12:30 - 2D model for seismic wave propagation in complex fractured domains
Federica Di Michele, Pierangelo Marcati, Donato Pera, Bruno Rubino, Andriy Styahar

12:50 - Multiscale modelling of soil bioremediation by multispecies biofilm
Luigi Frunzo, Maria Rosaria Mattei, Ahmed Fathi

13:10 - From Micro to Macro in the Physics and Ecology of Sea Ice
Kenneth Morgan Golden

13:30 – *LUNCH TIME*

16:00 – MS4

15:00 - Modelling Horizontal Gene Transfer of Plasmid-borne Resistance in Biofilms
Maria Rosaria Mattei, Julien Vincent, Alberto Tenore, Luigi Frunzo

16:20 - On-off Intermittency in the Beddington-Free-Lawton Model
Angela Monti

16:40 - Modelling sea ice and melt ponds evolution: sensitivity to microscale heat transfer mechanisms
Andrea Scagliarini, Enrico Calzavarini, Daniela Mansutti, Federico Toschi

17:00 *COFFEE BREAK*

17:30 – MS4

17:30 - FORUM Sensitivity to Surface Emissivity
Cristina Sgattoni, Marco Ridolfi, Luca Sgheri, Chiara Zugarini

17:50 - Building a Realistic Simulation of the Atmospheric State in Radiative Transfer
Luca Sgheri, Cristina Sgattoni, Chiara Zugarini

10:20 – MS3

MATHEMATICAL AND NUMERICAL MODELLING OF POROUS MEDIA IN SUBSURFACE ENVIRONMENTS
Organizers: *Marco Berardi, Fabio Di Fonzo, Matteo Icardi, Mario Putti*

10:20 - A Preliminary Model for Optimal Control of Moisture Content in Unsaturated Soils
Marco Berardi, Fabio Vito Difonzo, Roberto Guglielmi

10:40 - Stabilized Explicit Methods for the Solution of a Vegetation Model
Dajana Conte, Severiano González-Pinto, Domingo Hernández-Abreu, Beatrice Paternoster, María Soledad Pérez-Rodríguez

11:00 – *COFFEE BREAK*

11:30 – MS3

11:30 - FLOWS: A Physically-Based Model to Simulate Water Flow and Solute Transport in the soil
Antonio Coppola, Angelo Basile, Alessandro Comegna, Shawkat Basel Mostafa Hassan

11:50 - Understanding the Effects of Irrigation with Different Treatment Reused Waters: a Machine Learning Approach
Nicoletta Del Buono

12:10 - A Macroscopic Model for Unsaturated Flow in Deformable Evolving Porous Media
Matteo Icardi

12:30 - Analytical and Numerical Solutions of Fractional Models in Porous Media
Alessandra Jannelli, Maria Paola Speciale

12:50 - A novel reduced-order model for advection-dominated problems based on Radon-Cumulative-Distribution Transform
Tobias Long, Robert Barnett, Richard Jefferson-Loveday, Giovanni Stabile, Matteo Icardi

13:10 - Numerical Simulation of a Compressible Gas Flow in Porous Media and Bioremediation
Filippo Notarnicola

13:30 – *LUNCH TIME*

16:00 – MS11

MS11 - RECENT TRENDS ON NUMERICS OF SINGULARLY PERTURBED DIFFERENTIAL EQUATIONS
Organizer*: Natesan Srinivasan*

16:00 - Fractal Quintic Spline Solutions for Singularly Perturbed Boundary-value Problems
Balasubramani N, Guru Prem Prasad Mahalingam, Natesan Srinivasan

16:20 - An Efficient Uniformly Convergent Method for Two Dimensional Parabolic Convection-diffusion Singularly Perturbed Systems
Carmelo Clavero, Juan Carlos Jorge

16:40 - Low-degree Robust Finite Element Scheme for Inhomogeneous Fourth Order Perturbation Problem
Bin Dai, Huilan Zeng, Chen-song Zhang, Shuo Zhang

17:00 *COFFEE BREAK*

17:30 – MS11

17:30 - Efficient Finite Element Method for 2D Parabolic Convection Diffusion Problems with Discontinuous Source Term
Soundararajan Rajendran, Subburayan Veerassamy

17:50 - Parameter-robust Numerical Analysis of a Numerical Scheme for a Parabolic Reaction-diffusion Equation with Time Delay Having Interior and Boundary Layers in its Solution
S. Chandra Sekhara Rao, Abhay Kumar Chaturvedi

10:20 – MS7

NUMERICAL METHODS FOR FRACTIONAL-DERIVATIVE DIFFERENTIAL EQUATIONS
Organizers: *Roberto Garrappa, Martin Stynes*

10:20 - Numerical Approximation of a Differential Equation with a Riemann-Liouville-Caputo Fractional Derivative
Jose Luis Gracia, Martin Stynes

10:40 - Nonuniform Time-stepping Approximation Methods to Solve the Two-dimensional Time-fractional Diffusion-wave Equation
Sarita Kumari, Rajesh K. Pandey

11:00 – *COFFEE BREAK*

11:30 – General Session (2)

Chair: *Veronica Tora*

11:30 - Response Function for Linearized Saint-Venant Equations with Uniformly Distributed Lateral Inflow
Swaroop Nandan Bora, Shiva Kandpal

11:50 - Simulating how Climate Change Affects Cultural Heritage Deterioration
Gabriella Bretti, Maurizio Ceseri

12:10 - Numerical Solutions of the Velocity–Vorticity Formulation of the Navier–Stokes Equations by Using the Localized Ghost Point Method
Chung-Lin Chu, Chia-Ming Fan

12:30 - Steady-state Density Preserving Method for Second-order Stochastic Differential Equations
Hugo A. de la Cruz

12:50 – MS7

12:50 Fast Second-order Numerical Method for Variable-order Caputo Fractional Differential Equations
Junseo Lee, Bongsoo Jang

13:10 An Efficient Computational Technique for 2D Time-Fractional Diffusion Problem
Natesan Srinivasan, Sandip Maji

13:30 – *LUNCH TIME*

16:00 – MS7

16:00 - Optimal Long-time Decay Rate of Solutions of Complete Monotonicity-preserving Schemes for Nonlinear Time-fractional Evolutionary Equations
Martin Stynes, Dongling Wang

16:20 - A stabilizer-free weak Galerkin finite element method for the distributed order time-fractional diffusion equation
Suayip Toprakseven, Natesan Srinivasan

16:40 - A Method-of-lines Approach for Space-fractional Nonlinear PDEs
Paul Andries Zegeling

17:00 -*COFFEE BREAK*

17:30 – General Session (3)

Chair: *Hennie Husniah*

17:30 - Surface Effects on Propagation of Shear Horizontal Waves on Nonlocal PE-PM Bilayer Structure with an Imperfect interface
Sudarshan Dhua, Subrata Mondal

17:50 - Numerical Simulation of 3D Vorticity Dynamics with the Diffused Vortex Hydrodynamics Method
Danilo Durante, Salvatore Marrone, Dirk Brommel, Robert Speck, Andrea Colagrossi

18:10 - Radial Basis Function Interpolation for Child's Hand X-ray Image Processing
Jakub Krzysztof Grabski