

# PROGRAM

*updated June 9, 2010*

# ROOM PLAN

**Legenda**  
Aule e strutture di appartenenza

Magna I = Aula Magna, Ingegneria  
Magna A = Aula Magna, Architettura  
A = Aula A, Architettura  
B = Aula B, Architettura  
C = Aula C, Architettura  
Scherma = Aula della Scherma, Architettura  
Crociere = Aula delle Crociere, Architettura  
Officina = Aula Officina, Architettura  
Mura = Sala delle Mura, Ghetto

## Monday, June 21

h v	Magna I	Magna A	A	B	C	Scherma	Crociere	Officina	Mura
9:00-10:00	Opening Ceremony								
10:30-12:30	Plenary Session								
14:30-16:30		MSP03	MSP41	MSP19	MSP10	MSP38	MSP23	MSP09	MSP36
17:00-19:00		MSP03	MSP12/Y	MSP19	MSP10	MSP47-I	MSP23	MSP09	MSP36

## Tuesday, June 22

h v	Magna I	Magna A	A	B	C	Scherma	Crociere	Officina	Mura
9:00-11:00		Plenary Session							
11:30-13:30		MSP02	MSP47 - II	MSP08 - I	MSP18	MSP13-I	MSP26 - I	MSP28	MSP25 -
15:00-17:00		MSP21	MSP01 - I	MSP14	MSP39	MSP24	MSP33	MSP37	MSP05
17:30-19:30		MSP21	MSP01 - I	MSP14	MSP39	MSP24	MSP33	MSP37	MSP05

## Wednesday, June 23

<b>h</b> <b>v</b>	<i>Magna I</i>	<i>Magna A</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>Sberma</i>	<i>Crociere</i>	<i>Officina</i>	<i>Mura</i>
9:00-11:00		MSP48	MSP20	MSP08 - II	MSP17	MSP13 - II	MSP26 - II	MSP31/Y	
11:30-12:30		Round Table							
12:30-13:00		Premio Sileri 2008 Lecture							

## Thursday, June 24

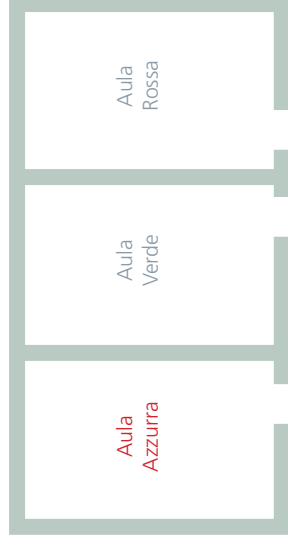
<b>h</b> <b>v</b>	<i>Magna I</i>	<i>Magna A</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>Sberma</i>	<i>Crociere</i>	<i>Officina</i>	<i>Mura</i>
9:00-11:00		Plenary Session							
11:30-13:30		MSP29	MSP06	MSP42	MSP46	MSP43 - I	MSP16	MSP22	
15:00-17:00		MSP30	MSP27	MSP40	MSP11	MSP43 - II	MSP15	MSP34	
17:30-19:30		MSP30	MSP27	MSP40	MSP11	MSP43 - II	MSP15	MSP04 - I	

## Friday, June 25

<b>h</b> <b>v</b>	<i>Magna I</i>	<i>Magna A</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>Sberma</i>	<i>Crociere</i>	<i>Officina</i>	<i>Mura</i>
9:00-11:00		Plenary Session							
11:30-13:30		MSP35	MSP01-II	MSP04 - II	MSP07	MSP44	MSP45	MSP32	
13:30-14:00		Closing Ceremony							

# MAP

## Facoltà di Architettura

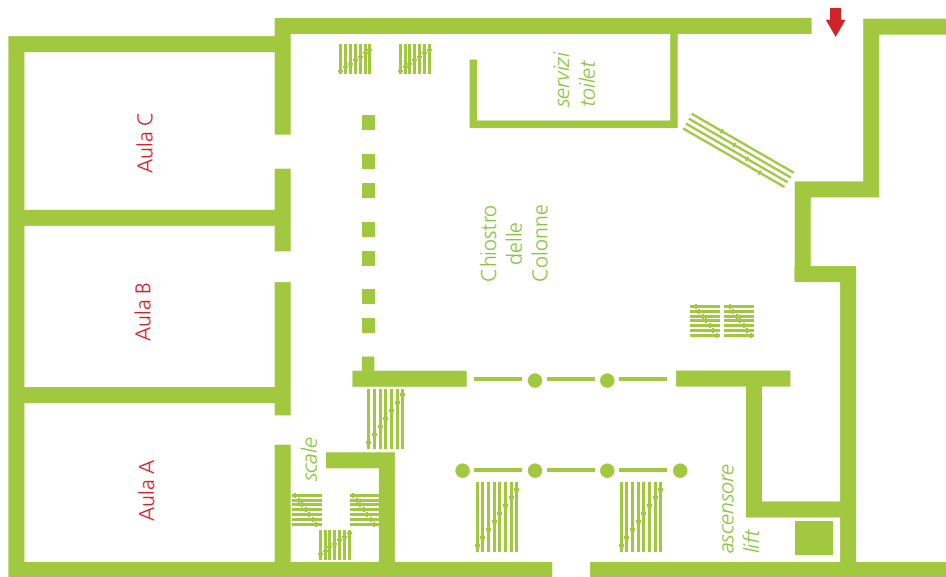


Sala  
delle  
Mura  
(al Ghetto)

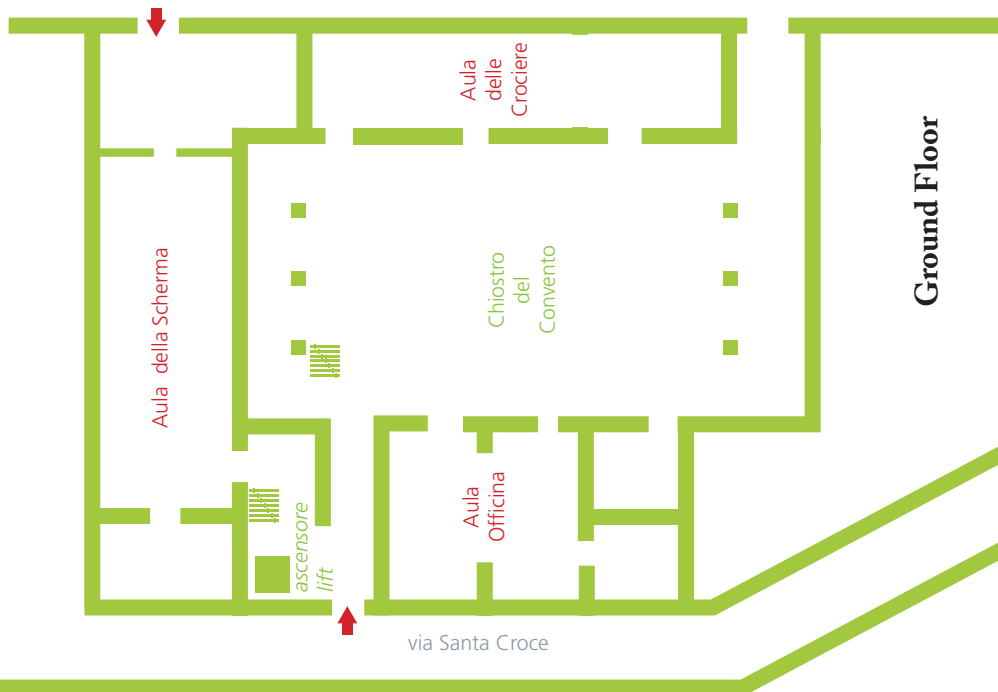


**First Floor**

via Stretta



via Corte d'Appello



**Ground Floor**

via Santa Croce

# TIME TABLE

Time Table		Room
	<b>Monday, June 21</b>	
08.30-9.30	<i>Registration</i>	Magna I
09.30-10.00	<i>Opening Ceremony</i>	Magna I
10.00-10.30	<i>Coffè Break</i>	
10.30-11.30	<i>Plenary Session: J.L. Vazquez - Porous medium flow with fractional diffusion</i>	Magna I
10.30-11.30	<i>Plenary Session: A Tramontano - No protein is an island</i>	Magna I
	<i>Lunch Break</i>	
12.30-14.30	<i>Registration</i>	Magna A
	<b>Minisymposia: Parallel Sessions 14.30-16.30 and 17.00-19.00</b>	
MSP03	Analytical and Geometrical Problems in Continuum Mechanics (Mariano, Focardi)	Magna A
MSP41	Numerical Solution of Large Linear System in Numerical Optimization (Bellavia, Bertaccini)	A
MSP12/Y	Crowd and Swarm Dynamics: Interactions, Self-organization Mathematics, Applications (Frasca, Tosin)	A
MSP19	Image and Video Forensics (Battiato, Gallo, Stanco)	B
MSP10	Control and Stabilization of Nonlinear Evolutionary Systems (González Burgos, Naso)	C
MSP47 - I	Topics in Fluid Dynamics - I (Iafra)	Scherma
MSP38	Numerical Approximation and Applications: from Cagd to Wavelets (Carnicer, Peña, Rossini)	Scherma
MSP23	Mathematical Models and Numerical Methods for Charge Transport in Semiconductors (Ali, Mascali, Majorana, Muscato, Romano)	
MSP09	Control and Optimization with Partial Differential Equations (Annunziato, Borzi, Verani)	Crociera
MSP36	Nonlinear Evolution Equations and Applications (Seatzu, Aktosun, van der Mee)	Officina
16.30-17.00	<i>Coffè Break</i>	Mura
19.30-21.00	<i>Welcome Party, Terrazza del Ghetto</i>	

## Tuesday, June 22

09.00-10.00	<i>Plenary Session: L. Formaggia - Numerical models for geological evolution</i>	Magna A
10.00-11.00	<i>Plenary Session: C. Parrés - Numerical approximation of nonconservative hyperbolic systems: applications and difficulties</i>	Magna A
11.00-11.30	<i>Coffè Break</i>	
	<b><i>Minisymposia: Parallel Sessions 11.30-13.30</i></b>	
MSP02	Algebraic Geometry for Data Analysis and Statistical Modeling (Riccomagno)	Magna A
MSP47 - II	Topics in Fluid Dynamics - II (Iafrafi)	A
MSP08 - I	Computational electromagnetics and industrial applications - I (Alonso Rodriguez, Gómez, Salgado)	B
MSP18	Image Analysis Methods for Cultural Heritage (Stanco, Battiato, Gallo)	C
MSP13 - I	Domain Decomposition Methods, Iterative Solvers and Adaptive Method - I (Verani, Ayuso de Dios, Perotto, Scacchi)	Scherma
MSP 26 - I	Mathematics in Decisions, Economics, Finance and Games - I (Carfi, Moreno, Scolozzi, Ricciardello)	Crociere
MSP28	Methods for Derivative Free Optimization: Theory and Applications (Peri, Fasano)	Officina
MSP25	Mathematical Models for the Evolution of Biological Tissues (Fasano, Herrero)	Mura
13.30-15.00	<i>Lunch Break</i>	
	<b><i>Minisymposia: Parallel Sessions 15.00-17.00 and 17.30-19.30</i></b>	
MSP21	Mathematical modelling for environmental problems (Bonaventura Fernandez Nieto)	Magna A
MSP01 - I	Advances and challenges in biomathematics and bioinformatics - I (Pontrelli, Bersani)	A
MSP14	Energy, Water and Environment (Rosso)	B
MSP39	Numerical Methods and Advanced Technologies for Applied Scientific Computing (Spitaleri)	C
MSP24	Mathematical models for smart materials and other applications (Carillo)	Scherma
MSP33	New trends in Algebraic Geometry and its Applications (Failla, Lahyane, Cerda Rodríguez)	Crociere
MSP37	Nonlinear Transport PDEs in biology and physics: Asymptotics and Entropies (Di Francesco)	Officina
MSP05	Blending together atomistic and continuum models (Colombo, Di Carlo, Podio Guidugli)	Mura
17.00-17.30	<i>Coffè Break</i>	

Wednesday, June 23

*Minisymposia: Parallel Sessions 09.00-11.00*

MSP48	New Trends in Scientific Computing: Computational Biology (Naldi)	Magna A
MSP20	Interplay Between Inversion Methods and Mathematical Models in the Applied Sciences (Piana)	A
MSP08 - II	Computational Electromagnetics and Industrial Applications - II (Alonso Rodriguez, Gómez, Salgado)	B
MSP17	Homogenization and Free Boundary Problems (Novaga, Orlandi )	C
MSP13 - II	Domain Decomposition Methods, Iterative Solvers and Adaptive Method - II (Verani, Ayuso de Dios, Perotto, Scacchi)	Scherma
MSP26 - II	Mathematics in Decisions, Economics, Finance and Games - II (Carfi, Martínez Moreno, Scolozzi, Ricciardello)	Crociere
MSP31/Y	Models of Cellular Motion and Aggregation (Scianna, Morale)	Officina
11.00-11.30	<i>Coffè Break</i>	
11.30-12.30	<i>Tavola Rotonda: L'Ingegneria matematica in Italia: passato, presente e futuro,</i> <i>L. Formaggia, P. Podio-Guidugli, L. Preziosi, B. Rubino</i>	Magna A
12.30-13.00	<i>Fausto Saleri 2008 Prize Recipient Lecture P. Antonietti, Modelling and numerical simulation of the polymer extrusion process in textile products</i>	Magna A
15.00-19.30:	<i>Conference Break: work, or beach &amp; sport fun, city sightseeing</i>	
20.30-21.30	<i>Assemblea soci SIMAI, Convento di San Giuseppe (Cagliari)</i>	
21.30	<i>Banquet, Convento di San Giuseppe (Cagliari)</i>	

## Thursday, June 24

09.00-10.00	<i>Plenary Session: B. Piccoli – From vehicular traffic to pedestrian motions and animal groups</i>	Magna A
10.00-11.00	<i>Plenary Session: E. Zuazua – Waves and Numerics</i>	Magna A
11.00-11.30	<i>Coffe Break</i>	
	<b><i>Minisymposia: Parallel Sessions 11.30-13.30</i></b>	
MSP29	Models and Numerical Methods in Quantative Finance (Vazquez, Pascucci)	Magna A
MSP06	Computational Aspects in Biological Tissue Mathematical Modeling (Cavallini)	A
MSP42	Phase transitions and growth phenomena (Cirillo)	B
MSP46	Variational methods in image processing (Lazzaro, Amat)	C
MSP43 - I	Recent Idea in Non-Equilibrium Thermodynamics an Applications - I (Mongiovi, Jou, Muschik, Restuccia)	Scherma
MSP16	Groebner bases and combinatorics: techniques and applications to concrete models (Utano, Rinaldo)	Crociere
MSP22	Mathematical Models and Methods for Volcano Physics (Del Negro, Russo)	Officina
13.30-15.00	<i>Lunch Break</i>	
	<b><i>Minisymposia: Parallel Sessions 15.00-17.00 and 17.30-19.30</i></b>	
MSP30	Models and simulations of engineering materials (Cuomo, Cinquini, Romano, Torrissi)	Magna A
MSP27	Mechanics in Biology (Ambrosi)	A
MSP40	Numerical methods for hyperb. systems in non-conservative form and environmental appl. (Russo, Parés)	B
MSP11	Coupled problems in fluid mechanics and fluid-structure interaction (Vergara, Badia, Principe, Nobile)	C
MSP43 - II	Recent Idea in Non-Equilibrium Thermodynamics an Applications - II (Mongiovi, Jou, Muschik, Restuccia)	Scherma
MSP15	Geometric Probability, Stochastic Processes and Applications to Sciences (Caristi, Bonanzinga)	Crociere
MSP34	New trends in kinetic theory (Bisi, Carrillo)	Officina
MSP04 - I	Analytical and Numerical Methods for Applied Inverse Problems - I (Estatico, Rodriguez)	Officina
17.00-17.30	<i>Coffe Break</i>	

## Friday, June 25

09.00-10.00	<i>Plenary Session: L. Preziosi, Multiphase and multiscale aspects of cancer modelling</i>	Magna A
10.00-11.00	<i>Plenary Session: P. Quintela, Numerical simulation of nonsmooth mathematical models</i>	Magna A
11.00-11.30	<i>Coffe Break</i>	
	<b><i>Minisymposia: Parallel Sessions 11.30-13.30</i></b>	
MSP35	Non Linear Elliptic PDE's (Arcoya, Boccardo, Casado Diaz)	Magna A
MSP01 - II	Advances and challenges in biomathematics and bioinformatics - II (Pontrelli, Bersani)	A
MSP04 - II	Analytical and Numerical Methods for Applied Inverse Problems - II (Estatico, Rodriguez)	B
MSP07	Computational Continuum Mechanics (Cazzani)	C
MSP44	Simulation and optimization of complex systems modeled by macroscopic approach (D'Apice, Piccoli)	Scherma
MSP45	Variational Inequalities and Applications to Dynamic Network Equilibrium Problems (Barbagallo, Maugeri)	Crocitere
MSP32	Multi-Objective Optimization and Decision Making in Engineering Design (Poles)	Officina
13.30-14.00	<i>Closing Ceremony</i>	Magna A

**MSP01 - I**  
**Advances and Challenges in Biomathematics**  
**and Bioinformatics**

Giuseppe Pontrelli, Alberto Bersani

***Tuesday, June 22 - 15:00-17:00 - Aula A Architettura***

*Lagrangian Coherent Structures in the intraventricular flow*

Giorgio Querzoli, Stefania Fortini, Maria Grazia Badas, Stefania Espa,  
Antonio Cenedese

*Cardiac vortex flows, combining theoretical studies and clinical imaging*

Gianni Pedrizzetti, Federico Domenichini, Giovanni Tonti

*Dynamical model of non stationary heart rate series*

Camillo Cammarota

*Drug delivery of an eluting coronary stent in a multi-layered wall*

Giuseppe Pontrelli, Filippo de Monte

*Blocking of aura during migraine*

Cristina Pocci

*Asymptotic expansions in enzyme reactions with high enzyme concentrations*

Alberto Maria Bersani, Guido Dell'Acqua

***Tuesday, June 22 - 17:30 - 19:30 - Aula A Architettura***

*Cell membranes with alternating channels*

Daniele Andreucci, Dario Bellaveglia

*Multistability in Double Phosphorylation –Dephosphorylation Cycles*

Alberto Maria Bersani, Guido Dell'Acqua

*Modeling electrical conduction in biological tissues through homogenization:  
asymptotic stability*

Micol Amar, Daniele Andreucci, Paolo Bisegna, Roberto Gianni

*Numerical approximation of some conditioned heat flow problems across fractal  
layers*

Massimo Cefalo, Guido Dell'Acqua, Maria Rosaria Lancia

*Asymptotics for irregular scale fractals*

Raffaella Capitanelli, Maria Agostina Vivaldi

## MSP01 - II

### Advances and Challenges in Biomathematics and Bioinformatics

Giuseppe Pontrelli, Alberto Bersani

*Friday, June 25 - 11:30- 13:30 - Aula A Architettura*

*A stochastic model for simulation and forecasting of emergencies of the 118-ambulance service in the area of Milano*

Alessandra Micheletti, Daniela Morale

*Propagation of twist solitons in fully inhomogeneous DNA chains*

Mariano Cadoni, Roberto De Leo, Sergio Demelio, Giuseppe Gaeta

*A hyperbolic wound healing model in a network*

Irene Guaraldo

*Dynamic Modularization Assessment in Affine Protein Interaction Networks*

Antonella Travaglione, Elisabetta Marras, Enrico Capobianco

*Simulated models for an axiomatic theory of evolution*

Cristiano Bocci, Paolo Freguglia, Enrico Rogora

*Inferring Gene Networks*

Alberto de la Fuente

## MSP02

### Algebraic Geometry for Data Analysis and Statistical Modeling

Eva Riccomagno

*Tuesday, June 22 - 11:30 - 13:30 - Aula Magna Architettura*

*Tree-cumulants and identifiability of phylogenetic tree model*

Piotr Zwiernik

*Replicated measurements, ideals and derivations*

Roberto Notari

*Approximate algebraic varieties for empirical data*

Claudia Fassino, Maria Laura Torrente

*Combinatorial Commutative Algebra for the Reliability Analysis of Coherent Systems*

Eduardo Sáenz-de-Cabezón

*Aberration and Connectivity of Algebraic Models*

Hugo Maruri-Aguilar

*Hermite polynomial aliasing*

Eva Riccomagno

## MSP03

### Analytical and Geometrical Problems in Continuum Mechanics

Paolo Maria Mariano, Matteo Focardi

#### *Monday, June 21-14:30-16:30 - Aula Magna Architettura*

*Optimal design of materials under constraints on the gradient of the state*

José Carlos Bellido Guerrero, Alberto Donoso, Paolo Pedregal

*Asymptotic analysis of a second-order singular perturbation model for phase transitions*

Emanuele Spadaro

*Effects of microstructure on antiplane crack growth in couple stress elastic materials*

Enrico Radi

*Around (non-)existence of solutions to Prandtl equation*

Tomasz Cieslak

*Stability of the solutions of minimization problems on domains approaching a fractal*

Uta Renata Freiberg, Davide La Torre

*On uniformly  $\Gamma$ -equivalent theories for nonconvex discrete systems*

Lucia Scardia, Anja Schloemerkerper, Chiara Zanini

#### *Monday, June 21 - 17:00-19:00 - Aula Magna Architettura*

*Approximating Effective Properties of Random Particle Reinforced Composites*

Daniel Peterseim

*Evolution of Interfaces in Polarizable Matter*

Paolo Paoletti

*Mimetic finite differences for eigenvalue problems*

Andrea Cangiani, Francesca Gardini, Gianmarco Manzini

*On the displacement problem of elastostatics*

Antonio Russo, Alfonsina Tartaglione

## **MSP04 - I**

### **Analytical and Numerical Methods for Applied Inverse Problems**

Claudio Estatico, Giuseppe Rodriguez

*Thursday, June 24 - 17:30-19:30 - Aula Officina Architettura*

*High-order iterative methods for the approximation of inverse problems*

Sergio Amat, J. Antonio Ezquerro, M. Angel Hernández

*An SVD based Wavefront Reconstruction for Adaptive Optics*

Ronny Ramlau

*Remote Sensing Problems*

Maurizio Migliaccio

*Exact multiplicity of nematic states for an Onsager model*

Marcello Lucia, Jesenko Vukadinovic

*The magnetoencephalography inverse problem*

Michele Piana

## **MSP04 - II**

### **Analytical and Numerical Methods for Applied Inverse Problems**

Claudio Estatico, Giuseppe Rodriguez

*Friday, June 25 - 11:30-13:30 - Aula B Architettura*

*A paradigm for updating preconditioners in nonlinear image denoising and deblurring*

Fiorella Sgallari, Daniele Bertaccini

*Microwave imaging of dielectric targets: numerical and experimental results*

Matteo Pastorino

*Subspace correction methods for  $l_1$ -norm and total variation minimization*

Andreas Langer

*A Deterministic Algorithm for Optical Flow Estimation*

Ivan Gerace, Francesca Martinelli

*Efficient inversion of Markov moment problem and applications to multiphase computations in geometric optics*

Laurent Gosse

## MSP05

### Blending Together Atomistic and Continuum Models

Luciano Colombo, Antonio Di Carlo, Paolo Podio-Guidugli

***Tuesday, June 22 - 15:00-17:00 - Sala delle Mura Ghetto***

*Understanding graphene elasticity by combining continuum and atomistic modeling*

Luciano Colombo

*Order-disorder phase transition in confined materials: the case of nanoSilicon embedded in SiO<sub>2</sub>*

Simone Meloni, Sergio Orlandini, Luciano Colombo

*Running faster, running together: hydrodynamic coupling of molecular motors*

Paolo Margaretti, Ignacio Pagonabarraga

*Nonlinear features and scale-effects in the Esbelby configuration*

Stefano Giordano, Pier Luca Palla, Emiliano Cadelano, Luciano Colombo

*New perspective on the classical mechanics of particle systems*

Eliot Fried

*Consistent continuum-mechanics stored energies and molecular-dynamics potentials*

Paolo Podio Guidugli

***Tuesday, June 22 - 17:30-19:30 - Sala delle Mura Ghetto***

*Small perturbations around the Parrinello Rahman Lagrangian*

Marco Ribezzi Crivellari

*Non-constant pressure in the Parrinello-Rahman equation*

Manuela Minozzi

*On-the-fly coupling between MD and continuum mechanics*

Antonio DiCarlo

## MSP06

### Computational Aspects in Biological Tissue Mathematical Modeling

Nicola Cavallini

*Thursday, June 24 - 11:30-13:30 - Aula A Architettura*

*Multiscale Modeling in Blood Flow Simulation*

Nicola Cavallini

*Stability estimates for the finite element immersed boundary method*

Lucia Gastaldi

*Numerical Simulation of Arterial Blood Flow Under Physiological Conditions*

Martina Bukac

*Mathematical Challenges in Fluid-Structure Interactions*

Giovanna Guidoboni

*Software for individualizing drug tumour therapy to tumours and patients*

Andrey Koptuyug, Eugen Mamontov, Tobias Myrberg

*Magnetic Resonance Imaging Segmentation using Parallel Computation*

Lilla Bonanno, Alessandro Celona, Luigia Puccio, Silvia Marino, Placido Bramanti, Pietro Lanzafame

## MSP07

### Computational Continuum Mechanics

Antonio Cazzani

*Friday, June 25 - 11:30-13:30 - Aula C Architettura*

*Second Gradient Poroelasticity and Applications*

Francesco dell'Isola, Angela Madeo

*Filtering and focussing effects of Structural Interfaces in Elastodynamics*

Michele Brun, Sebastien Guenneau, Alexander B. Movchan, Davide Bigoni

*Generalization of Garvin problem in 3D*

Angela Ricciardello, Arrigo Caserta

*Natural Boundary Conditions in Porous Media: an Application to Reflection and Transmission of Acoustic Waves*

Angela Madeo

*Multi-domain BEM for two dimensional problems of wave propagation*  
Alessandra Aimi, Mauro Diligenti, Chiara Guardasoni, Silvia Gazzola  
*Domain decomposition for 3D seismic problem: a parallel approach*  
Santa Agreste, Angela Ricciardello  
*Numerical computation on a controllability problem for the wave equation*  
Ernesto Aranda, Pablo Pedregal

## **MSP08 I**

### **Computational Electromagnetics and Industrial Applications**

Ana Alonso Rodriguez, Dolores Gómez, Pilar Salgado

*Tuesday, June 22 - 11:30-13:30 - Aula B Architettura*

*Mathematical and numerical modeling of piezoelectric sensors*

Patrick Joly, Sebastien Imperiale

*Finite element solution of an eddy current time-dependent problem on moving domains arising from electromagnetic forming*

Alfredo Bermudez, Carlos Reales, Rodolfo Rodriguez, Pilar Salgado

*Impact of innovative materials on our capability to manage time-harmonic electromagnetic boundary value problems*

Paolo Fernandes, Marina Ottonello, Mirco Raffetto

*Numerical Methods for Computing the Band Spectrum of 2D Photonic Crystals*

Pietro Contu, Sebastiano Seatzu, Cornelis van der Mee

*Numerical solution of an axisymmetric transient non-linear eddy current problem*

Alfredo Bermúdez, Dolores Gómez, Pilar Salgado

## **MSP08 - II**

### **Computational Electromagnetics and Industrial Applications**

Ana Alonso Rodriguez, Dolores Gómez, Pilar Salgado

*Wednesday, June 23 - 9:00-11:00 - Aula B Architettura*

*The Interior Transmission Problem in Acoustics and Electromagnetics*

Peter Monk

*Exterior calculus and the  $p$ -version of edge finite elements*

Daniele Boffi

*Qualitative inverse scattering: computational issues and applications*

Michele Piana

*Reduced basis method for the harmonic Maxwell's equations: application to radar cross section computations*

Yanlai Chen, Jan S. Hesthaven, Yvon Maday, Jerónimo Rodríguez

*Voltage and current excitation for eddy current problems*

Ana Alonso Rodríguez, Alberto Valli

## **MSP09**

### **Control and Optimization with Partial Differential Equations**

Mario Annunziato, Alfio Borzi, Marco Verani

#### ***Monday, June 21 - 14:30-16:30 - Aula Officina Architettura***

*Robust and fast numerical methods for Fredholm optimal control problems*

Mario Annunziato

*A fast Newton solution of dipole quantum control problems*

Alfio Borzi

*Optimal control problems for scalar conservation laws in higher dimensions*

Carlos Castro

*Some Recent Dynamic Programming Techniques for Infinite-Dimensional Problems*

Roberto Ferretti

*Newton-Kantorovich's theory under center-Lipschitz conditions*

J. M. Guiterrez, Ángel Alberto Magreñán Ruiz, Natalia Romero

*On a class of Hamilton-Jacobi equations and related logarithmic Sobolev inequality*

Cristina Pucci

#### ***Monday, June 21 - 17:00-19:00 - Aula Officina Architettura***

*Adaptive Finite Elements for Shape Optimization problems*

Marco Verani

## MSP10

### Control and Stabilization of Nonlinear Evolutionary Systems

Manuel González Burgos, Maria Grazia Naso

#### *Monday, June 21 - 14:30-16:30 - Aula C Architettura*

*Theoretical and numerical controllability of some parabolic systems*

Enrique Fernandez-Cara

*Controllability of Coupled Parabolic Equations*

Assia Benabdallah

*Controllability of a linear retarded heat equation*

Farid Ammar Khodja

*Some controllability results for linear Maxwell viscoelastic fluids*

Jose Luiz Boldrini, Anna Doubova, Enrique Fernandez-Cara, Manuel Gonzalez-Burgos

*Virtual control approach for heterogeneous couplings*

Paola Gervasio

*On the energy decay in a contact problem between two thermoelastic beams*

Giovanna Bonfanti

#### *Monday, June 21 - 17:00-19:00 - Aula C Architettura*

*Controllability of a string submitted to unilateral constraint*

Arnaud Munch

*Genetic mutations and immune system competition*

Carlo Bianca, Marcello Delitala

*An optimal control approach of cancer chemotherapy*

Mercedes Marín

*Tomography and inverse problems*

Faustino Maestre

**MSP11**  
**Coupled Problems in Fluid Mechanics and Fluid-Structure  
Interaction**

Christian Vergara, Santiago Badia, Javier Principe, Fabio Nobile

***Thursday, June 24 - 15:00-17:00 - Aula C Architettura***

*Recent advances in rowing boat modeling*

Nicola Parolini, Andrea Mola

*A numerical overview for a nematic Ericksen-Leslie liquid crystal model*

Santiago Badia, Francisco Guillén-González, Juan Vicente Gutiérrez-Santacreu

*A Method for Shock Hydrodynamics on Tetrahedral Finite Elements*

Guglielmo Scovazzi

*Finite element approximation of magnetohydrodynamic flows for fusion reactor design*

Santiago Badia, Ramon Planas

*Direct Solvers in Added Mass Effect Treatment*

Nicola Cavallini

*Approximation of transmission conditions in domain interaction problems introducing boundary subgrid scales*

Joan Baiges, Ramon Codina

***Thursday, June 24 - 17:30-19:30 - Aula C Architettura***

*Parallel algorithms in FSI with applications to haemodynamics*

Paolo Crosetto

*Dynamic subgrid modelling in a finite element approximation of thermally coupled flows*

Javier Principe, Ramon Codina, Matias Avila

*Recent theoretical results in fluid-structure interaction problems*

Christian Vergara

## MSP12/Y

### Crowd and Swarm Dynamics: Interactions, Self-Organization, Mathematics, Applications

Paolo Frasca, Andrea Tosin

*Monday, June 21 - 17:00-19:00 - Aula A Architettura*

*Overlapping Generations Social Network*

Andrea Blasco, Daniel Remondini

*A Multiscale Approach for Granular Pedestrian Flows*

Emiliano Cristiani, Benedetto Piccoli, Andrea Tosin

*Mean-field limit for collective behavior models with noise*

Francois Bolley, José Alfredo Cañizo, José A. Carrillo de la Plata

*Trail geometry encodes heuristic information in the Argentine ant*

Simon Garnier, Vincent Fourcassie, Guy Theraulaz

*A refined result of flocking for the Cucker-Smale model*

José A. Carrillo, Massimo Fornasier, Jesu Rosado, Giuseppe Toscani

## MSP13 - I

### Domain Decomposition Methods, Iterative Solvers and Adaptive Method

Marco Verani, Blanca Ayuso de Dios, Simona Perotto, Simone Scacchi

*Tuesday, June 22 - 11:30-13:30 - Aula della Scherma Architettura*

*Multilevel Preconditioners for Discontinuous Galerkin discretizations of problems with jump coefficients*

Blanca Ayuso de Dios

*BDDC Preconditioners for Spectral Element Discretizations of Almost Incompressible Elasticity in Three Dimensions*

Luca F. Pavarino, Olof Widlund, Stefano Zampini

*A Posteriori Error Estimates for Augmented Mixed Methods in Elasticity*

Tomas P. Barrios, E. Marcelo Behrens, Maria Gonzalez Taboada

*Certified bounds for the error in linear outputs using flux-free error estimators*

Núria Parés Mariné, Pedro Díez, Antonio Huerta

*Domain Decomposition approaches to solve Electrophysiology problems*

Luca Gerardo-Giorda, Mauro Perego, Alessandro Veneziani

*A multilevel Newton-Krylov-Schwarz method for the Bidomain system and applications to electrocardiology*

Piero Colli Franzone, Leopold Grinberg, Marilena Munteanu, Luca F. Pavarino, Simone Scacchi

## **MSP13 - II**

### **Domain Decomposition Methods, Iterative Solvers and Adaptive Method**

Marco Verani, Blanca Ayuso de Dios, Simona Perotto, Simone Scacchi

*Wednesday, June 23 - 9:00-11:00 - Aula della Scherma Architettura*

*Optimized Schwarz Methods for Maxwell System*

Luca Gerardo Giorda

*A Mortar Method using Riesz representation for Lagrange Multipliers*

Eliseo Chacon Vera

*Adaptive spectral element discretization of optimal control problems*

Loredana Gaudio

*Numerical approximation of null controls for the heat equation through transmutation*

Enrique Zuazua

*An adaptive numerical method for the 1-d Laplace equation with quadratic singular potential*

Cristian Mihai Cazacu, Enrique Zuaza

*A posteriori control of the boundary for FEM approximation of elliptic eigenvalue problems*

Marco Verani

## **MSP14**

### **Energy, Water and Environment**

Fabio Rosso

*Tuesday, June 22 - 15:00-17:00 - Aula B Architettura*

*Optimal control in wastewater management: a multi-objective study*

Miguel Ernesto Vazquez-Mendez, Lino Jose Alvarez-Vazquez, Nestor Garcia-Chan, Aurea Martinez

*A Stefan problem for a deterministic polymer crystallization model*

Ramón Escobedo, Luis Alberto Fernández

*Application of mathematical modelling and numerical techniques in geothermal exploration*

Fausto Batini

*Modelling waste water filtration using multibore and hollow-fiber filters*

Iacopo Borsi

*An analytical study on the dynamics of a geothermal reservoir rain supplied*

Matteo Cerminara

*Computing the Permeability of a Hollow Fibre Filtration Module*

Angiolo Farina

**Tuesday, June 22 - 17:30-19:30 - Aula B Architettura**

*Simplified modelling of geothermal clusters: a focus on some important details*

Alessandro Speranza

*A multiscale approach to bioremediation*

Angiolo Farina, Antonio Fasano, Massimiliano Muratori

*Qualitative sensitivity analysis on the parameters influencing the sizing of vertical heat exchangers*

Enrica Salvatici, Alessandro Baietto

*A nonlinear mathematical model for multi-phase flow in geothermal reservoirs*

Iacopo Borsi, Lorenzo Fusi, Fabio Rosso, Alessandro Speranza

*Modelling of geothermal reservoirs*

Maurizio Ceseri

**MSP15**

**Geometric Probability, Stochastic Processes and Applications to Sciences**

Giuseppe Caristi, Vittoria Bonanzinga

**Thursday, June 24 - 15:00-17:00 - Aula delle Crociere Architettura**

*Applications of computational algebra to stochastic problems*

Gaetana Restuccia

*Integration in a dynamical stochastic geometric framework. Application to birth-and-growth process. Statistical aspects.*

Giacomo Aletti, Enea Giuseppe Bongiorno, Vincenzo Capasso

*Simulations about Penrose's CLT for Random Measures*

Enea Giuseppe Bongiorno, Vincenzo Capasso, Irene Matuonto

*Geometric probability for Hazmat Transport Problems*

David Barilla, Paola Bartolomeo, Alfio Puglisi

*Some extensions of the Cauchy Distribution*

Giuseppe Caristi

*Problems of Stochastic Geometry*

Vittoria Bonanziga, Loredana Sorrenti

***Thursday, June 24 - 17:30-19:30 - Aula delle Crociere Architettura***

*Certain Anti-holomorphic Submanifolds in a Locally Conformal Kaehler Manifold*

Koji Matsumoto, Zerrin Senturk

*On a problem of Buffon type for regular lattices with obstacles*

Gioia Failla

*On the distribution of a chord on a non regular polygon*

Loredana Sorrenti

*Conditioned random walks and Gibbs principle*

Michele Broniatowski

*Planar graphs with loops and applications to territorial problems*

MariaFortuna Paratore

## **MSP16**

### **Groebner Bases and Combinatorics: Techniques and Applications to Concrete Models**

Rosanna Utano, Giancarlo Rinaldo

***Thursday, June 24 - 11:30-14:00 - Aula delle Crociere Architettura***

*Binomial edge ideals and applications*

Giancarlo Rinaldo

*Families of connected graphs coming from Groebner Bases generated by binomials*

Gioia Failla

*Groebner basis and triangulations*

Paola Lea Staglianò

*Graphs and groebner bases*

Maurizio Imbesi, Monica La Barbiera

*Applications of Groebner bases theory to problems of Model Theory in first order logic*

MariaFortuna Paratore, Gaetana Restuccia

*Simplicial complexes, duality and applications*

Loredana Sorrenti, Vittoria Bonanzinga

*Concrete problems in Computational Geometry*

Adelina Fabiano

*Groebner bases of binomial ideals*

Rosanna Utano, Gaetana Restuccia

## **MSP17**

### **Homogenization and Free Boundary Problems**

Matteo Novaga, Giandomenico Orlandi

***Wednesday, June 23 - 9:00-11:00 - Aula C Architettura***

*Droplet phases in non-local Ginzburg-Landau models with Coulomb repulsion in two dimensions*

Cyrill Muratov

*Vortex density models for 3-D superconductivity and bose-Einstein condensates*

Giandomenico Orlandi

*A mathematical model of neural axons based on metric induced by Hamilton-Jacobi equation*

Antonio Marigonda, Alessandro Daducci, Giandomenico Orlandi, Roberto Posenato

*Bump solutions for semilinear equations in periodic media*

Matteo Novaga

*Curvature flow with a forcing term*

Annalisa Cesaroni, Matteo Novaga, Enrico Valdinoci

*G-convergence and homogenization for evolution equations in divergence form*

Fabio Paronetto

## MSP18

### Image Analysis Methods for Cultural Heritage

Filippo Stanco, Sebastiano Battiato, Giovanni Gallo

*Tuesday, June 22 - 11:30-13:30 - Aula C Architettura*

*Pattern recognition techniques for multispectral images*

Giuseppe A Maino, Silvia Massari, Lorenza Roversi

*Morphological operators and perception laws for the automatic detection of cracks in digitized paintings*

Vittoria Bruni, Domenico Vitulano, Giuliana Ramella

*Digital Reconstruction of Fragmented Glass Plate Photographs: the Case of Archaeological Photography*

Filippo Stanco, Davide Tanasi, Giovanni Gallo, Enzo Gabriele Leanza

*Smart Photo Sticking for Intangible Cultural Heritage*

S. Battiato, S. Bianco, G. Ciocca, F. Gasparini, Giovanni Puglisi, R. Schettini

*Fine Scale 3D Reconstruction of Small Artifacts from Digital Scanning Electron Microscopy*

Ruggero Pintus, Simona Podda, Massimo Vanzi, Enrico Gobbetti

*"The Red Giant". High-end computer graphic interactive technologies applied to archaeological research: reconstruction hypothesis of nuraghe Arrubiu (Orroli, Sardinia)*

Giorgio Todde, Lucia Mura

## MSP19

### Image and Video Forensics

Sebastiano Battiato, Giovanni Gallo, Filippo Stanco

*Monday, June 21 - 14:30-16:30 - Aula B Architettura*

*Detection of resampling evidence in digital images: where are we?*

Francesca Uccheddu, Alessia De Rosa, Alessandro Piva, Mauro Barni

*An overview of forensic image processing issues and results, based on a large dataset coming from real cases*

Martino Jerian, Sergio Carrata, Federico Cervelli, Francesca Dardi

*A comparison of denoising techniques for forgery detection based on sensor noise*

Ignazio Finizio, Francesco Gargiulo, Sara Parrilli, Giovanni Poggi, Carlo Sansone, Luisa Verdoliva

*Advanced analysis of image collections for digital investigation: status and perspectives*  
Sebastiano Battiato, Giovanni Maria Farinella, Giuseppe Claudio Guarnera,  
Giovanni Puglisi

*A survey on automatic shoemarks recognition methods for crime scene experts*  
Francesca Dardi, Federico Cervelli, Sergio Carrato

*An Improved Benchmarking Dataset for Forgery Detection Strategies*  
Sebastiano Battiato, Giuseppe Messina, Lucia Trupia

***Monday, June 21 - 17:00-19:00 - Aula B Architettura***

*An advanced image processing tool for latent fingerprint analysis and liveness assessment*  
Fabio Roli, Gian Luca Marcialis, Pietro Coli

*Static features for detecting fake fingerprints*  
Emanuela Marasco, Carlo Sansone

*A new method for real-time video quality measurement in IPTV (Internet Protocol Television) service*

Salvatore Cuomo, Giuseppe Magnete, Vincenzo Orabona

*Optimized joint bandwidth and playout control for streaming-traffic over wireless-channels*

Nicola Cordeschi, Tatiana Patriarca, Enzo Baccarelli

**MSP20**

**Interplay Between Inversion Methods and Mathematical Models in  
the Applied Sciences**

Michele Piana

***Wednesday, June 23 - 9:00-11:00 - Aula A Architettura***

*The linear sampling method as a consequence of a power constraint on the scattered field*  
Riccardo Aramini

*Tracking the time course of visual recognition with dynamical MEG source modeling*  
Thomas Serre

*From electron maps to acceleration mechanisms of energetic particles in the flaring Sun*  
Anna Maria Massone

*Unsupervised Statistical Learning as Applied to Inverse Scattering Problems*  
Federico Viani, Leonardo Lizzi, Andrea Massa

## MSP21

### Mathematical Modelling for Environmental Problems

Luca Bonaventura, Enrique Fernandez Nieto

#### *Tuesday, June 22 - 15:00-17:00 - Aula Magna Architettura*

*Non-normal stability analysis of a shear current under surface gravity waves*

Davide Ambrosi

*A 1D physical-NPZ model for the study of the biogeochemical processes induced by tides in the Strait of Gibraltar*

Jorge Macías, M. J. Castro, E. D. Fernandez-Nieto

*Use of the positive streamwise invariant (PSI) method for convection dominated problems in geophysical applications*

Marco Restelli, Tomas Chacon Rebollo, Macarena Gomez Marmol

*A multilayer Shallow Water model*

Amelie Rambaud

*Modelling of some Non-Newtonian fluids through a Shallow Water system*

Didier Bresch, Gladys Narbona-Reina

*A multi-layer network model for the zebra mussel invasion of the Mississippi-Missouri river system*

Lorenzo Mari, Enrico Bertuzzo, Renato Casagrandi, Marino Gatto, Andrea Rinaldo

#### *Tuesday, June 22 - 17:30-19:30 - Aula Magna Architettura*

*Numerical solution of nonlinear heat-mass transfer models in soils under forest fires*

José Durany, Brunho Fraga, Fernando Varas

*Some Recent Results on the Stability of Semi-Lagrangian Schemes*

Roberto Ferretti

*Numerical verification of shallow ice profile models through effective tools with analytical solutions*

Natividad Calvo, José Durany, Carlos Vázquez

*Mathematical and numerical modelling of free surface flows over mobile bed with high sediment concentration*

Giorgio Rosatti, Giulia Garegnani, Luca Bonaventura

## MSP22

### Mathematical Models and Methods for Volcano Physics

Ciro Del Negro, Giovanni Russo

*Thursday, June 24 - 11:30-13:30 - Aula Officina Architettura*

*An approach to mitigate lava flow invasion by optimized barrier configuration and numerical simulation applied to 1981 and 2001 Etna eruption*

Silvia Scifoni, Annalisa Cappello, Mauro Coltelli, Ciro Del Negro, Maria Marsella, Cristina Proietti, Annamaria Vicari

*Lava flow hazard zonation of large areas: an example of application to Mt Etna*

Gino Mirocle Crisci, Maria Vittoria Avolio, Donato D'Ambrosio, Salvatore Di Gregorio, Valeria Lupiano, Rocco Rongo, William Spataro, Boris Behncke, Marco Neri

*Experimental Measurements of Spectral Emissivity of Basaltic Melts*

Valerio Lombardo, Claudia Spinetti, Jacopo Taddeucci

*An original satellite data analysis strategy for volcanic activity monitoring and investigation in the space-time domain*

Nicola Pergola, Francesco Marchese, Valerio Tramutoli

## MSP23

### Mathematical Models and Numerical Methods for Charge Transport in Semiconductors

Giuseppe Ali, Giovanni Mascali, Armando Majorana,

Orazio Muscato, Vittorio Romano

*Monday, June 21 - 14:30-16:30 - Aula delle Crociere Architettura*

*Diffusive limit of the two-band  $kp$  model for semiconductors*

Luigi Barletti, Giovanni Frosali

*Realistic simulation of a Double Gate MOSFET through a hybrid quantum-classical model*

Maria Jose Caceres Granados, Jose Miguel Mantas Ruiz, Francesco Vecil

*Hydrodynamic subband model for semiconductors based on the Maximum entropy principle*

Vittorio Romano, Giovanni Mascali

*Applications of the discontinuous Galerkin method to kinetic models for semiconductor devices*

Armando Majorana

*Multi-Physics Computational Models in Neuroelectronics*

Riccardo Sacco

*Guidelines for the development of multigrid optimization schemes*

Alfio Borzi

***Monday, June 21 - 17:00-19:00 - Aula delle Crociere Architettura***

*Thermal and electrical modeling of sub-micron silicon devices*

Vincenza Di Stefano, Orazio Muscato

*Diffusive limit of MEP hydrodynamical models for semiconductors and linear irreversible thermodynamics*

Giuseppe Ali, Vittorio Romano, Nella Rotundo

*A full band hydrodynamic model for Si semiconductors based on the Maximum entropy principle*

Giovanni Mascali, Vittorio Romano

## **MSP24**

### **Mathematical Models for Smart Materials and Other Applications**

Sandra Carillo

***Tuesday, June 22 - 15:00-17:00 - Aula della Scherma Architettura***

*The Cahn-Hilliard equation with dynamic boundary conditions and singular potentials*

Gianni Gilardi

*Temperature and flux controllability for heat equations with memory*

Sergei Avdonin, Luciano Pandolfi

*Abstract elliptic and parabolic problems with applications in cylindrical domains*

Davide Guidetti

*Energy decay for a class of weakly dissipative second-order systems with memory*

Maria Grazia Naso

*Non linear wave propagation in n-type extrinsic semiconductors with defects of dislocation*

Maria Paola Mazzeo, Liliana Restuccia

*Modelling heat transport in nanosystems*

Vito Antonio Cimmelli, David Jou, Antonio Sellitto

*Vanishing Viscosity Solutions to Rate-independent Systems*

Riccarda Rossi

***Tuesday, June 22 - 17:30-19:30 - Aula della Scherma Architettura***

*Wave propagation in a continuously-stratified anisotropic elastic layer*

Angelo Morro

*A unilateral contact problem coupling friction and adhesion*

Giovanna Bonfanti

*A geometric perspective on Irreversible Thermodynamics with Internal Variables and applications to continuum models*

Marina Dolfin, Mauro Francaviglia

*Evolution Equation for Flame Ball Radius*

Gianni Pagnini, Francesco Mainardi

*Integro-differential systems in magneto-viscoelasticity*

Sandra Carillo

*Hysteresis Loop in paramagnetic-ferromagnetic phase transition*

Mauro Fabrizio, Giovanni Matarazzo, Massimo Pecoraro

*Long-term Dynamics of a coupled system for the suspension bridge model*

Ivana Bochicchio, Claudio Giorgi, Elena Vuk

## **MSP25**

### **Mathematical Models for the Evolution of Biological Tissues**

Antonio Fasano, Miguel Angel Herrero

***Tuesday, June 22 - 11:30-13:30 - Sala delle Mura Ghetto***

*A Mathematical Model for the Growth of Elongated Bones*

Antonio Fasano, Miguel Ángel Herrero, José Manuel López, Elena Medina

*A fluid-dynamic model for the growth of phototrophic biofilms*

Cristiana Di Russo, Fabrizio Clarelli, Roberto Natalini, Magali Ribot

*Modelling the Interaction of Infused Factor VIII and a Generic Inhibitor in Hemophilia A Patients*

Alvaro Köhn, Miguel Angel Herrero

*Initial/boundary-value problems of tumor growth with the theory of mixtures*

Andrea Tosin

*A simplification of the two-fluid approach for modelling tumour spheroids*

Antonio Fasano, Marco Gabrielli, Alberto Gandolfi

## MSP26 - I

### Mathematics in Decisions, Economics, Finance and Games

David Carfi, Juan Martínez Moreno, Donato Scolozzi, Angela Ricciardello

*Tuesday, June 22 - 11:30-13:30 - Aula delle Crociere Architettura*

*Coopetitive Games*

David Carfi

*An algorithm for payoff space in  $C1$  parametric game*

Santa Agreste, Angela Ricciardello

*Balancing interfering elements*

David Carfi, Gianfranco Gambarelli, Angelo Uristani

*Urban traffic management via environmental options: an evolutionary game model*

Angelo Antoci, Marcello Galeotti, Davide Radi

*Oligopoly on a Circle*

Ahmad Kabir Naimzada, Mauro Sodini

*Solvency index for pay-as-you-go pension funds*

Roberta Melis, Alessandro Trudda

## MSP26 - II

### Mathematics in Decisions, Economics, Finance and Games

David Carfi, Juan Martínez Moreno, Donato Scolozzi, Angela Ricciardello

*Wednesday, June 23 - 9:00-11:00 - Aula delle Crociere Architettura*

*Cristoffell bilinear forms for financial evolutions*

David Carfi

*A bilinear form approach to pricing perpetual American put options*

Luca Anzilli, Lucianna Cananà, Donato Scolozzi

*Financial immunization for perpetual cash flow*

Luigi Romano

*Transform Methods for Cash Flow Modeling*

Juan Martinez-Moreno, A Roldan, C Roldan

*A three parameter chaotic model to reproduce the distribution of prices in Financial Markets*

Leon Zingales, Francesco Scaramuzzino, Carmen Vitanza

*Price formation and free boundary problems: qualitative analysis*

Maria Pia Guldani

**MSP27**  
**Mechanics in Biology**

Davide Ambrosi

***Thursday, June 24 - 15:00-17:00 - Aula A Architettura***

*Force Transmission during Cell Migration and Polarization*

Maxime Fournier

*Cellular Traction as an Optimal Control Problem*

Guido Vitale

*On the dynamics of skeletal muscle at different scales*

Antonio Di Carlo, Lena Rebecca Zastrow

*Modeling the Left Ventricular Torsion and Function*

Paola Nardinocchi, Paolo Emilio Puddu, Luciano Teresi, Valerio Varano

*Selective enzymatic digestion as a key to understand soft tissue microstructure*

Maurizio Ventre, Francesco Mollica, Paolo A. Netti

*Unfolding Osteons: Poroelasticity, Microstructure and beyond*

Vittorio Sansalone, Joanna Kaiser, Salah Naili, Thibault Lemaire, Antonio Di Carlo

***Tuesday, June 22 - 17:30-19:30 - Aula A Architettura***

*Numerical analysis of a piezoelectric strain-adaptive bone remodeling problem*

Jose R. Fernandez, José M. Garcia-Aznar, Rebeca Martinez

*Growth, Mass Transfer, and Remodelling in Multiphase Biological Materials*

Alfio Salvatore Grillo, Gabriel Wittum

**MSP28**

**Methods for Derivative Free Optimization: Theory and Applications**

Daniele Peri, Giovanni Fasano

***Tuesday, June 22 - 11:30-13:30 - Aula Officina Architettura***

*Globally convergent modifications of Particle Swarm Optimization for Unconstrained Optimization*

Emilio Fortunato Campana, Matteo Diez, Giovanni Fasano, Daniele Peri

*A Coupled PSO-ACM Derivative Free Global Optimization Method*

Daniele Peri, Matteo Diez

*Coupling local and global models into a derivative-free global optimization algorithm*

Daniele Peri, Federica Tinti, Matteo Diez

*A stochastic programming approach to robust ship design using a derivative-free particle swarm optimization algorithm*

Matteo Diez, Daniele Peri

## **MSP29**

### **Models and Numerical Methods in Quantitative Finance**

Carlos Vazquez, Andrea Pascucci

***Thursday, June 24 - 11:30 - 13:30 - Aula Magna Architettura***

*Fast binomial procedures for pricing Parisian/ParAsian options*

Marcellino Gaudenzi, Antonino Zanette

*Numerical methods for pricing spread options*

Ignacio Arbues, Carlos Moreno González

*Numerical methods for PDE problems modelling Amerasian options prices*

Alfredo Bermúdez, María R. Nogueiras, Carlos Vázquez

*Numerical solution of PDE models for retirement plans based on average salary*

María del Carmen Calvo, Carlos Vázquez

*Modeling, mathematical analysis and numerical methods for a ratchet cap pricing problem*

Andrea Pascucci, María Suárez, Carlos Vázquez

*Free boundary problem for arithmetic Amerasian options*

Andrea Pascucci

## MSP30

### Models and Simulations of Engineering Materials

Massimo Cuomo, Carlo Cinquini, Vittorio Romano, Mariano Torrisi

#### *Thursday, June 24 - 15:00-17:00 - Aula Magna Architettura*

*Numerical Methods and Adaptivity for Stiff ODEs*

Alessandra Jannelli, Riccardo Fazio

*Modeling and simulation of 3rd generation solar cells*

Carlo de Falco, Riccardo Sacco, Maurizio Verri

*Discontinuity waves for a two fluid model*

Carmen Mineo, Mariano Torrisi

*Exact integration of an Element with Embedded Discontinuities formulation*

Massimo Cuomo, Loredana Contrafatto

*A Finite Element Multifield Model for Stability Analysis of Composite Laminated Plates*

Antonio Cazzani, Riccardo Battaglia, Antonio Tralli

*Mechanical behaviour of deposited waste materials*

Francesco Castelli, Valentina Lentini

#### *Thursday, June 24 - 17:30-19:30 - Aula Magna Architettura*

*Simulation of the performance of organic electronic devices based on a two-dimensional drift-diffusion approach*

Manfred Gruber, Benjamin Stickler, Alexander Meierhofer, Karin Zojer, Ferdinand Schürer

*Mathematical Models and Micromagnetic Simulations of Spintronic Oscillators*

Giancarlo Consolo

*2d numerical simulations of an electron-phonon hydrodynamical model based on the maximum entropy principle*

Vittorio Romano, Alexander Rusakov

*On the use of local and global stress constraints in topology optimization*

Carlo Cinquini, Matteo Bruggi

*Coupled diffusion-damage modeling of historical masonry walls*

Giovanni Castellazzi, Stefano de Miranda, Giovanni Formica, Francesco Ubertini

**MSP31/Y**  
**Models of Cellular Motion and Aggregation**

Marco Scianna, Daniela Morale

*Wednesday, June 23 - 9:00-11:00 - Aula Officina Architettura*

*Cellular Potts Model for cell migration across mesothelial linings*

Chiara Giverso

*Extended Cellular Potts Models for Cell Migration*

Marco Scianna

*Progression and Heterogeneity in Cancer Dynamics. A Model of Colorectal Cancer Based on The Kinetic Theory for Active Particles*

Marcello Delitala, Tommaso Lorenzi

*Modeling Epidemics and Virus Mutations by Methods of the Mathematical Kinetic Theory for Active Particles*

Maria Cesarina Salvatori

*Multiscales and Stochastic Modelling for Angiogenesis*

Daniela Morale, Vincenzo Capasso

*Computational models of mechanotransduction phenomena of in vitro cultures of cartilage cells*

Paola Causin

**MSP32**  
**Multi-Objective Optimization and Decision Making in  
Engineering Design**

Silvia Poles

*Friday, June 25 - 11:30-13:30 - Aula Officina Architettura*

*Multi-Objective Optimization*

Silvia Poles

*Bootstrap analysis in metamodel-based simulation-optimization under uncertainty*

Gabriella Dellino, Jack P.C. Kleijnen, Carlo Meloni

*Numerical algorithms for an inverse problem of corrosion detection*

Giulia Deolmi, Fabio Marcuzzi, Sergio Marinetti, Silvia Poles

*Lipschitz Sampling and Adaptive Strategies for Improving Metamodel Accuracy*

Alberto Lovison, Enrico Rigoni

## MSP33

### New Trends in Algebraic Geometry and its Applications

Gioia Failla, Mustapha Lahyane, Jesús Adrian Cerda Rodríguez

*Tuesday, June 22 - 15:00-17:00 - Aula delle Crociere Architettura*

*Geometry of Rational Surfaces*

Mustapha Lahyane

*Linear Systems on Projective Rational Surfaces*

Jesus Adrian Cerda Rodríguez

*Rational Varieties with monoid  $S(n,m)$  and Groebner basis of defining ideal of  $K[S(n,m)]$*

Gioia Failla, Mustapha Lahyane

*New Construction of Algebraic Geometry Codes*

Brenda Leticia De La Rosa Navarro

*Rees Algebras of a Class of Monomial Ideals*

Rosanna Utano

*Unique expansions for ternary alphabets*

Anna Chiara Lai

*Tuesday, June 22 - 17:30-19:30 - Aula delle Crociere Architettura*

*Essential perturbations of polynomial vector fields with a period annulus*

Adriana Buica, Maite Grau, Jaume Gine

*Rational Surfaces whose Cox Ring is Finitely Generated*

Brenda Leticia De La Rosa Navarro, Mustapha Lahyane, Israel Moreno Mejia

*Prime numbers and cryptography*

Paola Lea Staglianò

*Anticanonical Linear Systems of Rational Surfaces*

Jesus Adrian Cerda Rodríguez, Gioia Failla, Mustapha Lahyane,  
Osvaldo Osuna Castro

*Projective Cubic Curves with some Applications*

Juan Bosco Frias Medina

*Controlling the number of limit cycles of an interstellar 2-d model*

Maria Jesus Alvarez, Armengol Gasull, Rafel Prohens

## MSP34

### New Trends in Kinetic Theory

Marzia Bisi, José Antonio Carrillo

*Thursday, June 24 - 14:15-17:00 - Aula Officina Architettura*

*Discontinuous Galerkin Solver for the Semiconductor Boltzmann-Poisson Model*

Armando Majorana

*Strong convergence towards self-similarity for one-dimensional dissipative Maxwell models*

Giulia Maria Furioli, Ada Pulvirenti, Elide Terraneo, Giuseppe Toscani

*Localized Kinetic Upscaling Techniques for Rarefied Gas Dynamics Simulations*

Giacomo Dimarco

*Relaxation problems for reacting gas mixtures*

Marzia Bisi, Maria Groppi, Giampiero Spiga

*Gas rarefaction effects in Micro-Electro-Mechanical-Systems applications*

Silvia Lorenzani

*A kinetic model for the keloid genesis: Malignant effects and immune system response*

Carlo Bianca

*Simulation of a Double Gate MOSFET through a hybrid quantum-classical model*

Naoufel Ben Abdallah, Maria Jose Caceres Granados,

Jose Antonio Carrillo de la Plata, Francesco Vecil

*Some kinetic models in swarming*

Jose A. Carrillo

## MSP35

### Non Linear Elliptic PDE's

David Arcoya, Lucio Boccardo, Juan Casado Diaz

*Friday, June 25 - 11:30-13:30 - Aula Magna Architettura*

*Degenerate Elliptic Equations with Nonlinear Boundary Conditions and Measures Data*

Jose M. Mazon

*On optimal control problem in the coefficients for Elliptic Problems*

Faustino Maestre

*Elliptic equations with singularity at the boundary arising from state constraint problems*

Alessio Porretta

*Continua of solutions for quasilinear elliptic singular problems*

José Carmona Tapia

*Quasilinear and Semilinear Singular Problems*

Luigi Orsina

## **MSP36**

### **Nonlinear Evolution Equations and Applications**

Sebastiano Seatzu, Tuncay Aktosun, Cornelis van der Mee

***Monday, June 21 - 14:30-16:30 - Sala delle Mura Ghetto***

*Novel reformulation of water and interfacial waves, asymptotic reductions and solitary waves*

Mark Jay Ablowitz

*Nonlinear Evolution Equations and Applications*

Tuncay Aktosun

*Nonlinear Propagation in Fiber-optic Systems*

Marco Secondini, Enrico Forestieri

***Monday, June 21 - 17:00-19:00 - Sala delle Mura Ghetto***

*Inverse Scattering Transform (IST) for the Multicomponent Nonlinear Schrödinger (NLS) Equation Under Non-Vanishing Boundary Conditions*

Barbara Prinari

*Numerical solution of the small dispersion limit of the Camassa-Holm equation and multiscale expansions*

Simonetta Abenda, Tamara Grava, Christian Klein

*Nonlinear Evolution Equations of Diffusive Type on Moving Boundaries*

Silvana De Lillo

*Nonlinear envelope equation for broadband optical pulses in quadratic media*

Matteo Conforti, Fabio Baronio, Costantino De Angelis

*Numerical solution of the nonlinear Schrödinger equation*

Antonio Aricò, Giuseppe Rodriguez, Sebastiano Seatzu

*Exact Solutions to the Sine-Gordon Equation*

Francesco Demontis

## MSP37

# Nonlinear Transport PDEs in Biology and Physics: Asymptotics and Entropies

Marco Di Francesco

***Tuesday, June 22 - 15:00-17:00 - Aula Officina Architettura***

*Some polymeric fluid flow models: steady states & large-time convergence*

Anton Arnold

*Coupled chemotaxis-fluid models*

Alexander Lorz, Marco Di Francesco, Renjun Duan, Jian-Guo Liu,  
Peter Markowich

*Finite mass self-similar blowing-up solutions of a chemotaxis system with non-linear diffusion*

Adrien Blanchet

*$L^p$  Theory for the Multidimensional Aggregation Equation*

Andrea L. Bertozzi, Tomas Laurent, Jesus Rosado

*Entropy-entropy dissipation inequalities and convergence to equilibrium for fragmentation equations with a drift term*

Maria J. Caceres Granados, José Alfredo Cañizo, Stephane Mischler

*Existence theory for nonlinear Cross Diffusion models*

Baerbel Schlake

***Tuesday, June 22 - 17:30-19:30 - Aula Officina Architettura***

*On mathematical models for crowd motion - two examples*

Jan-Frederik Pietschmann

*Models of Morphogen Transport*

Dariusz Wrzosek

*Local stability in a price formation model: a mean field approximation*

Maria Pia Gualdani

## MSP38

### Numerical Approximation and Applications: from Cagd to Wavelets

Jesus Carnicer, Juan Manuel Peña, Milvia Rossini

*Monday, June 21 - 14:30-17:00 - Aula della Scherma Architettura*

*Nonstationary Multiresolution Analysis and Biorthogonal Bases*

Francesca Pitolli

*Efficient algorithms for evaluation of trigonometric and hyperbolic curves*

Esmeralda Mainar, Juan Manuel Peña

*Interactive wavelet simplification of 2D sketches for CAD curve styling*

Loredana Chieppa, Michele Fiorentino, Antonio Emmanuele Uva,  
Giuseppe Monno

*A method to fill holes in a 3D-surface by minimal energy spline surfaces*

Miguel Ángel Fortes, Pedro González, Miguel Pasadas

*Path Design and Approximation with Pythagorean Hodograph Curves*

Carla Manni, Alessandra Sestini

*On the optimality of B-bases*

Jorge Delgado

*Survey of Parametric Curved Patches for  $C^0$  Interpolation of Triangular Meshes*

Maria Boschioli, Christoph Fünfzig, Lucia Romani, Gudrun Albrecht

## MSP39

### Numerical Methods and Advanced Technologies for Applied Scientific Computing

Rosa Maria Spitaleri

*Tuesday, June 22 - 15:00-17:00 - Aula C Architettura*

*Computational Simulations & nD Visualization: Research & Development, Education & Training*

Bharat Soni

*Regions detection in SAR images by level set method*

Maria Mercede Cerimele, Rossella Cossu

*Text line segmentation in ancient documents by fast marching method*

Rossella Cossu, Maria Mercede Cerimele, Marco Veneziani

*Assessing the impact of orbital debris on a spatial system*

Romain Kervac, Sylvain Bertrand, Thibault Lang, Catherine Jolly, Therese Donath, Jean Bourrely

*Numerical solution of electrons' and phonons' coupled dynamics in Carbon Nanotubes*

Maria Morandi Cecchi, Vittorio Rispoli

***Tuesday, June 22 - 17:30-19:30 - Aula C Architettura***

*Advanced image processing methods and visualization facilities for accurate motion tracking of the heart wall*

Bernhard Quatember, Wolfgang Recheis, Martin Mayr, Stefanos Demertzis, Ezio Venturino, Alessandra Derossi, Roberto Cavoretto, Giampietro Allasia

*Metamodels for fast multi-objective optimization: trading off global exploration and local exploitation*

Enrico Rigoni, Alessandro Turco

*New algorithms and online knowledge in numerical grid generation*

Rosa Maria Spitaleri

*Grid Generation: State-of-the-art, State-of-the-practice & Future Directions*

Bharat Soni

**MSP40**

**Numerical Methods for Hyperbolic Systems in non-Conservative Form and Environmental Applications**

Giovanni Russo, Carlos Parés

***Thursday, June 24 - 15:00-17:00 - Aula B Architettura***

*Well balanced HWENO scheme for Shallow Water Equations*

Valerio Caleffi, Alessandro Valiani

*Head Reconstruction Method to Balance Flux and Source Terms in Shallow Water Equations*

Enrico Creaco, Alberto Campisano, Alexander Khe, Carlo Modica, Giovanni Russo

*High Order Well Balanced Schemes for Systems of Balance Laws*

Giovanni Russo, Alexander Khe

*Path-conservative methods for systems of balance laws*

Maria Luz Muñoz-Ruiz, Carlos Pares

*On WAF type methods for nonconservative problems*

Manuel J. Castro Díaz, Enrique D. Fernández-Nieto, Gladys Narbona Reina

*A Simple Extension of the Osher Riemann Solver to General Conservative and Non-Conservative Hyperbolic Systems*

Michael Dumbser

**Thursday, June 24 - 17:30-19:30 - Aula B Architettura**

*On the derivation of fast finite volume solvers for non-conservative hyperbolic systems: PVM methods*

Manuel J. Castro Díaz, Enrique D. Fernández-Nieto

*High-order polynomial reconstructions. Solving nonconservative hyperbolic systems using GPUs*

Jose M. Gallardo, S. Ortega, M. Asuncion, J. M. Mantas

*HLLC solver for non-conservative systems*

Manuel Castro Díaz, Enrique Fernández Nieto, Tomás Morales de Luna, Gladys Narbona Reina

## **MSP41**

### **Numerical Solution of Large Linear Systems in Numerical Optimization**

Stefania Bellavia, Daniele Bertaccini

**Monday, June 21 - 14:30-16:30 - Aula A Architettura**

*Improving a class of PCG-based interior-point methods by quadratic regularizations*

Jordi Castro, Jordi Cuesta

*Issues on preconditioning Conjugate Gradient methods for large scale unconstrained optimization*

Giovanni Fasano, Massimo Roma

*On Preconditioner Updates for Sequences of Linear Systems in Large-Scale Optimization*

Stefania Bellavia, Valentina De Simone, Daniela di Serafino, Benedetta Morini

*Subspace Minimization Methods for Solving Nonlinear Least-Squares Problems*

Nick I.M. Gould, Margherita Porcelli, Philippe Toint

*A reduced Newton method for large constrained linear least-squares problems*

Benedetta Morini, Raymond H.F. Chan, Margherita Porcelli

## MSP42

### Phase Transitions and Growth Phenomena

Emilio Nicola Maria Cirillo

*Thursday, June 24 - 11:30-13:30 - Aula B Architettura*

*Phase separation of binary mixtures with dynamic temperature*

Giuseppe Gonnella, Antonio Lamura, Adriano Tiribocchi

*Droplet growth for Isotropic and Anisotropic model with conservative Kawasaki dynamics*

Francesca Romana Nardi

*Dynamical scaling and its violations in phase-ordering phenomena*

Federico Corberi

*Looking for large cliques through spin glasses*

Alexandre Gaudilliere

*Mechanical unfolding of proteins and RNA: an Ising-like model*

Alessandro Pelizzola

*Fourier law, phase transitions and the stationary Stefan problem*

Anna De Masi, Errico Presutti, Dimitrios Tsagkarogiannis

*Phase transition in soil consolidation*

Emilio Nicola Maria Cirillo, Nicoletta Ianiro, Giulio Sciarra

## MSP43 - I

### Recent Ideas in Non-Equilibrium Thermodynamics and Applications

Maria Stella Mongiovi, David Jou, Wolfgang Muschik, Liliana Restuccia

*Thursday, June 24 - 11:30-13:30 - Aula della Scherma Architettura*

*Thermodynamic equilibrium and space-time geometry - a survey*

Horst-Heino von Borzeszkowski, Thoralf Chrobok, Wolfgang Muschik

*Objectivity and Kinematics of Continua*

Tamas Fulop, Peter Van

*Thermodynamical Concepts for Computational Methods*

Heiko Herrmann

*Systematic remarks on the entropy inequality and on the exploitation of the entropy principle in thermodynamics of rigid heat conductors*

Vito Antonio Cimmelli

*Exploiting entropy inequality in gradient material theories*

Vita Triani, Antonio Sellitto, Vito Antonio Cimmelli

*On a generalized kinetic approach to Relativistic Extended Thermodynamics*

Maria Cristina Carrisi, Sebastiano Pennisi

## **MSP43 - II**

### **Recent Ideas in Non-Equilibrium Thermodynamics and Applications**

Maria Stella Mongiovi, David Jou, Wolfgang Muschik, Liliana Restuccia

***Thursday, June 24 - 15:00-17:00 - Aula della Scherma Architettura***

*Propagation of magnetoelastic waves in a superconducting heterostructure*

Bogdan Maruszewski, Andrzej Drzewiecki, Roman Starosta

*On a thermodynamic theory for magnetic relaxation phenomena in anisotropic magnetizable media*

Liliana Restuccia

*A mechanical approach to fractional non-local thermoelasticity*

Mario Di Paola, Guido Borino, Massimiliano Zingales

*Thermodynamics of ferromagnetic crystals with a non-Euclidean structure as internal variable*

Marina Dolfin, Mauro Francaviglia, Liliana Restuccia

*Statistical mechanics and thermodynamics of turbulent quantum vortex tangles*

David Jou, Maria Stella Mongiovi, Michele Sciacca

*Thermodynamic and Hamiltonian Modeling of Quantum Turbulence*

Miroslav Grmela

***Thursday, June 24 - 17:30-19:30 - Aula della Scherma Architettura***

*Flow of turbulent superfluid helium inside a porous medium*

Lucia Ardigzone, Giuseppa Gaeta, Maria Stella Mongiovi

*Fractal dimension of superfluid turbulence at very low temperature*

Carlo Ferruccio Barenghi, David Jou, Maria Stella Mongiovi, Michele Sciacca

*Decay of quantum turbulence in heat flux experiments*

Michele Sciacca, Carlo Ferruccio Barenghi, Yuri Sergeev

*Determination of asymptotic waves in a fluid mixture of T cells by double scale method*

Marina Dolfin, Liliana Restuccia

*Phonon boundary effects and thermal conductivity in nanosystems*

Antonio Sellitto, David Jou, Francesc Xavier Alvarez

*Extended thermodynamics and heat fluctuations: application to nanowires*

José Casas-Vázquez, Manuel Criado-Sancho, David Jou

*Internal Variables thermodynamics description of thermodiffusion, suspensions and porous media*

Patrizia Rogolino, Mauro Francaviglia, Annunziata Palumbo

## **MSP44**

### **Simulation and Optimization of Complex Systems Modeled by Macroscopic Approach**

Ciro D'Apice, Benedetto Piccoli

*Friday, June 25 - 11:30-13:30 - Aula della Scherma Architettura*

*A multiscale approach to the modeling of crowd dynamics*

Emiliano Cristiani, Benedetto Piccoli, Luigi Sorrentino, Andrea Tosin

*Optimization techniques to improve supply chains productivity*

Ciro D'Apice, Carmine De Nicola, Rosanna Manzo, Benedetto Piccoli

*Optimal redistribution of traffic flows in emergency cases*

Rosanna Manzo, Benedetto Piccoli, Luigi Rarità

*Control of traffic flows on Barcelona networks*

Luigi Rarità, Ciro D'Apice, Benedetto Piccoli, Dirk Helbing

## **MSP45**

### **Variational Inequalities and Applications to Dynamic Network Equilibrium Problems**

Annamaria Barbagallo, Antonino Maugeri

*Friday, June 25 - 11:30-13:30 - Aula delle Crociere Architettura*

*On differentiability of the minima of nondifferentiable functionals*

Maria Alessandra Ragusa, Atsushi Tachikawa

*Weighted Traffic Equilibrium Problem in Non Pivot Hilbert Spaces*

Sofia Giuffrè, Stéphane Pia

*Regularity results of the solutions of a parametric economic general equilibrium model of pure exchange with a numerical application*

Francesco Scaramuzzino, Carmen Vitanza

*Evolutionary variational inequalities for competitive financial equilibrium problems*

Annamaria Barbagallo, Patrizia Daniele, Antonino Maugeri

## **MSP46**

### **Variational Methods in Image Processing**

Damiana Lazzaro, Sergio Amat

***Thursday, June 24 - 11:30-13:30 - Aula C Architettura***

*Compressed Sensing Image Reconstruction from undersampled frequency acquisitions*

Serena Papi

*On the strong convergence of a particular linearization of the total variation denoising model*

Sergio Amat, Pablo Pedregal

*Using a nonlinear multiresolution algorithm in the discretization of a variational problem for image denoising*

Sergio Amat, Juan Ruiz, Juan Carlos Trillo

*Variational image restoration-decomposition by means of nonlinear multiresolution schemes: First results*

Sergio Amat, Juan Ruiz, Juan Carlos Trillo

*Analysis of left ventricle echocardiographic movies by variational methods: a dedicated software for ECG and ECHO synchronizations during cardiac cycles*

Massimiliano Pedone

## **MSP47 - I**

### **Topics in Fluid Dynamics**

Alessandro Iafrazi

***Monday, June 21 - 17:00-19:00 - Aula della Scherma Architettura***

*A New Mortar Method to Stokes Problem*

Eliseo Chacón Vera, Daniel Franco Coronil, Anna Martínez Gavara

*Analytical solutions to Stokes' problems*

Giorgio Riccardi

*On the Navier problem for incompressible Navier—Stokes equations*

Antonio Russo, Alfonsina Tartaglione

*The Schwarz function approach to the two-dimensional vortex dynamics*

Giorgio Riccardi

*Solution of free boundary problems: water entry flows*

Alessandro Iafrazi

## **MSP47 - II**

### **Topics in fluid dynamics**

Alessandro Iafrazi

***Tuesday, June 22 - 11:30-13:30 - Aula A Architettura***

*A new more consistent model for piezoviscous hydrodynamic lubrication*

Guy Bayada, Begoña Cid, Guillermo García Lomba, Carlos Vázquez

*Optimal error estimates for a viscosity-splitting scheme for Navier–Stokes equations*

María Victoria Redondo Neble, Francisco Guillén González

*A Hybrid scheme for shallow water flows with wet/dry fronts*

Rosa Donat, Anna Martinez Gavara

*Finite Element methods in Primitive Equations of the ocean*

Rafael Rodríguez Galván, Francisco Guillén González

## **MSP48**

### **New Trends in Scientific Computing: Computational Biology**

Giovanni Naldi

***Wednesday, June 23 - 9:00-11:00 - Aula Magna Architettura***

*Data Driven Simulations of the Cardiovascular System*

Alessandro Veneziani

*Multi-Physics Computational Models in Tissue Engineering*

Riccardo Sacco

*Computational challenges in mechano-biological problems*

Dirk Hartmann

*Quantifying neurotransmission by taking into account the metrical properties of spike trains*

Romain Brasselet, Roland S. Johansson, Angelo Arleo