

SciCADE 2013

Timetable



SciCADE 2013 – Short Timetable

	<b>September, Monday 16</b>
9:00	REGISTRATION AND OPENING
9:30	Plenary Talk: Robert D. Skeel
10:30	Coffee break
11:00	<p>MS08 - Splitting Methods Lecture room: Paraninfo Speakers: Ariadna Farres, Mechthild Thalhammer, Philipp Bader, Fernando Casas.</p> <p>MS16A - DAEs and PDAEs: Analytical aspects, numerics and applications Lecture room: Real Chancilleria Speakers: Roswitha März, Lennart Jansen, Ignacio García de la Vega, Ewa B. Weinmueller.</p> <p>MS19A - Recent advances on parareal algorithms Lecture room: Claudio Moyano Speakers: Yvon Maday, Debasmita Samaddar, Feng Chen, Frédéric Legoll.</p> <p>MS20A - Variational Techniques in Structure-Preserving Methods for Partial Differential Equations Lecture room: Rey Felipe II Speakers: Daisuke Furihata, Takayasu Matsuo, Klas Modin, Yajuan Sun.</p> <p>MS21A - Modelling and numerical methods in financial mathematics Lecture room: Cardenal Mendoza Speakers: Michèle Breton, Matthias Ehrhardt, Antonio Falco, Cornelis Oosterlee.</p> <p>CS01 - Stochastic partial differential equations Lecture room: Dr. Luis de Mercado Speakers: Chuchu Chen, Amar Debbouche, Hugo de la Cruz, Liying Zhang.</p> <p>CS02 - Time integration of partial differential equations Lecture room: Rector Calixto Valverde Speakers: Isaias Alonso-Mallo, José Augusto Ferreira, Chengming Huang, Ana Portillo.</p>
13:00	Lunch
15:00	<p>MS04A - Time integration of partial differential equations Lecture room: Paraninfo Speakers: Christian Lubich, Dhia Mansour, Tomislav Pazur, Ivonne Sgura.</p> <p>MS07A - Multiphase Flows: Analysis, Numerics and Optimization Lecture room: Rector Calixto Valverde Speakers: Francisco Guillen-Gonzalez, Lubomir Banas, Ayse Sariaydin, Malte Braack.</p> <p>MS10A - Numerics for Stochastic Differential Systems Lecture room: Rey Felipe II Speakers: David Cohen, Andreas Rößler, Erika Hausenblas, Conall Kelly.</p> <p>MS15A - Multiscale modelling: numerical methods and applications Lecture room: Real Chancilleria Speakers: Keith Daly, Aleksandar Donev, Konstantinos Zygalakis.</p> <p>MS21B - Modelling and numerical methods in financial mathematics Lecture room: Cardenal Mendoza Speakers: Luis Ortiz-Gracia, Oleg Reichmann, Christoph Reisinger, Carlos Vázquez.</p> <p>CS03 - DAEs and PDAEs Lecture room: Claudio Moyano Speakers: Robert Altmann, Christoph Huck, Ljubov Solovarova, Hongjiong Tian.</p> <p>CS10 - Variational methods and structure preserving schemes Lecture room: Dr. Luis de Mercado Speakers: Jitse Niesen, Sina Ober-Blöbaum, Pranav Singh, Takaharu Yaguchi.</p>
17:00	Coffee break
17:30	DAHLQUIST PRIZE LECTURE

SciCADE 2013 – Short Timetable

	<b>September, Tuesday 17</b>
9:30	Plenary Talk: Andrew Stuart
10:30	Coffee break
11:00	MS02A - Recent Trends in Lattice Boltzmann Methods: Boundary Conditions and Applications Lecture room: Rector Calixto Valverde Speakers: Andreas Bartel, Salvador Izquierdo, Mohamed Mahdi Tekitek, Daniel Heubes.
	MS03A - Computational and stochastic methods in inverse problems Lecture room: Paraninfo Speakers: Uri Ascher, Tijana Janjic Pfander, Volker Schulz.
	MS10B - Numerics for Stochastic Differential Systems Lecture room: Rey Felipe II Speakers: Raphael Kruse, Anne Kværnø, Sonja Cox, Tony Shardlow.
	MS15B - Multiscale modelling: numerical methods and applications Lecture room: Real Chancilleria Speakers: Frédéric Legoll, Gilles Vilmart, Carsten Hartmann.
	MS17A - Numerical approximation of nonlinear waves Lecture room: Claudio Moyano Speakers: Jerry Bona, Denys Dutykh, Vassilios Dougalis, Nuria Reguera.
	CS04 - Delay differential equations Lecture room: Dr. Luis de Mercado Speakers: Phi Ha, El Karkri Jaafar, Rossana Vermiglio, Vyacheslav Tsybulin.
	CS05 - Molecular Dynamics Lecture room: Cardenal Mendoza Speakers: Jason Frank, Vasily Govorukhin, Bei Li, Daniel Tameling.
13:00	Lunch
15:00	MS05 - Oscillatory Hamiltonian systems Lecture room: Paraninfo Speakers: Philippe Chartier, Ernst Hairer, Arieh Iserles, Richard Tsai, Daniel Weiss.
	MS19B - Recent advances on parareal algorithms Lecture room: Claudio Moyano Speakers: Julien Salomon, Jose Miguel Reynolds-Barredo, Franz Chouly, Giovanni Samaey.
	MS24 - Fast direct linear solvers for elliptic partial differential equations Lecture room: Real Chancilleria Speakers: Mario Bebendorf, Benoit Lize, Per Gunnar Martinsson, Artem Napov.
	MS25 - Numerical solution of integral and integral-algebraic equations of Volterra type Lecture room: Dr. Luis de Mercado Speakers: Mikhail Bulatov, Viktor Chistyakov, Alexey Eremin, Pedro Lima, Tomoaki Okayama.
	CS06 - Implementation issues Lecture room: Cardenal Mendoza Speakers: Philipp Birken, Shinsuke Nakamura, Terence Norton, Noorhelyna Razali, Adrian Sandu.
	CS07 - Stochastic differential equations Lecture room: Rey Felipe II Speakers: Tomasz Badowski, Qian Guo, Jialin Hong, Marie Kopec.
	CS08 - Modelization and Simulation Lecture room: Rector Calixto Valverde Speakers: Michael Hanke, Andre Leier, Gonçalo Pena.
17:15	Coffee break
17:45	Plenary Talk: Ander Murua

# SciCADE 2013 – Short Timetable

	<b>September, Wednesday 18</b>
9:30	Plenary Talk: Marlis Hochbruck
10:30	Coffee break
11:00	<p>MS01A - Molecular Dynamics Lecture room: Claudio Moyano Speakers: Manuel Athènes, Ralf Banisch, Sigrid Leyendecker, Charles Matthews.</p> <p>MS02B - Recent Trends in Lattice Boltzmann Methods: Boundary Conditions and Applications Lecture room: Rector Calixto Valverde Speakers: Alfonso Caiazzo, Ynte Vanderhoydonc, Jens Harting, Martin Geier.</p> <p>MS04B - Time integration of partial differential equations Lecture room: Paraninfo Speakers: Tobias Jahnke, Lukas Einkemmer, Katharina Schratz, Alexander Zlotnik.</p> <p>MS16B - DAEs and PDAEs: Analytical aspects, numerics and applications Lecture room: Real Chancilleria Speakers: Martin Arnold, Diana Estevez-Schwarz, Bernd Simeon, Pablo Pedregal.</p> <p>MS20B - Variational Techniques in Structure-Preserving Methods for Partial Differential Equations Lecture room: Rey Felipe II Speakers: Fernando Jimenez, Melvin Leok, Yuto Miyatake, Hiroaki Yoshimura.</p> <p>MS22A - Numerical solution of stochastic differential equations Lecture room: Cardenal Mendoza Speakers: Kevin Burrage, Evelyn Buckwar, Yoshio Komori, Pamela Burrage.</p> <p>CS09 - General linear methods Lecture room: Dr. Luis de Mercado Speakers: John Butcher, Gholamreza Hojjati, Gulshad Imran, Beatrice Paternoster.</p>
13:00	Plenary Talk: Ludwig Gauckler
14:00	Lunch
16:00	SOCIAL ACTIVITIES

SciCADE 2013 – Short Timetable

	<b>September, Thursday 19</b>
9:30	Plenary Talk: Folkmar Bornemann
10:30	Coffee break
11:00	MS01B - Molecular Dynamics Lecture room: Claudio Moyano Speakers: Tony Lelièvre, Han Wang, Jonathan Weare.
	MS03B - Computational and stochastic methods in inverse problems Lecture room: Paraninfo Speakers: Sebastian Reich, Sebastian Krumscheid, Antonella Zanna .
	MS13A - Discontinuous dynamical systems: theory and numerical methods Lecture room: Rey Felipe II Speakers: Marino Zennaro, Marino Zennaro, Paweł Przybyłowicz, Cinzia Elia.
	MS14 - Efficient computation of matrix functions for exponential and trigonometric integrators Lecture room: Real Chancilleria Speakers: Ioannis Famelis, Tanja Göckler, Peter Kandolf, Antti Koskela.
	MS22B - Numerical solution of stochastic differential equations Lecture room: Cardenal Mendoza Speakers: Adrian Blumenthal, María Jesús Senosiain, Kristian Debrabant, Larisa Yaroslavsteva.
	CS11 - Software issues Lecture room: Rector Calixto Valverde Speakers: Basem Attili, Hiroshi Hirayama, Tomonori Kouya, Andreas Steinbrecher.
	CS12 - Spatial discretization of partial differential equations Lecture room: Dr. Luis de Mercado Speakers: Adérito Araújo, Chris Budd, Wenjun Cai, Helge Dietert.
13:00	Lunch
15:00	MS06 - Markov Chain Monte Carlo and related dynamic sampling methods Lecture room: Real Chancilleria Speakers: Gersende Fort, Benjamin Jourdain, Tony Shardlow, Andrew Stuart.
	MS12A - Geometric and Algebraic Methods for Differential Equations Lecture room: Cardenal Mendoza Speakers: Robert McLachlan, Olivier Verdier, Kurusch Ebrahimi-Fard, Sergio Amat.
	MS13B - Discontinuous dynamical systems: theory and numerical methods Lecture room: Rey Felipe II Speakers: Juan Ignacio Montijano, Roberto Garrappa, Luciano Lopez.
	MS17B - Numerical approximation of nonlinear waves Lecture room: Claudio Moyano Speakers: Taras Lakoba, Yuto Miyatake, Henrik Kalisch, Angel Durán.
	MS23 - Geometric Numerical Integration for PDEs Lecture room: Paraninfo Speakers: Erwan Faou, Arie Iserles, Alexander Ostermann, Lorenzo Pareschi.
	CS13 - Stability properties of numerical methods for ODEs Lecture room: Rector Calixto Valverde Speakers: Raffaele D'Ambrosio, Michael Guenther, Inmaculada Higuera, Lajos Lóczy.
	CS14 - Boundary value problems Lecture room: Dr. Luis de Mercado Speakers: Ioannis Famelis, Yuki Takeuchi, Alberto Gil C. P. Ramos.
17:00	Coffee break
17:30	SANZ-SERNA'S BIRTHDAY
20:30	CONFERENCE BANQUET

SciCADE 2013 – Short Timetable

	<b>September, Friday 20</b>
9:30	Plenary Talk: Jianxian Qiu
10:30	Coffee break
11:00	<p>MS04C - Time integration of partial differential equations Lecture room: Paraninfo Speakers: Mayya Tokman, Vu Thai Luan, Begoña Cano, Cesáreo González.</p> <p>MS07B - Multiphase Flows: Analysis, Numerics and Optimization Lecture room: Rector Calixto Valverde Speakers: Georgy Kitavtsev, Dietmar Kroener, Noel Walkington.</p> <p>MS09A - Software issues Lecture room: Real Chancilleria Speakers: Severiano Gonzalez Pinto, David Ketcheson, René Lamour, Francesca Mazzia.</p> <p>MS11 - Structure preserving numerical methods Lecture room: Cardenal Mendoza Speakers: Onno Bokhove, Jerome Bonelle, Andrew McRae, Dmitry Pavlov.</p> <p>MS18A - Mathematical Models and Numerical Methods for Image Processing Lecture room: Claudio Moyano Speakers: Volker Grimm, Marcelo Bertalmío, Bartomeu Coll, Patrick Guidotti.</p> <p>CS15 - Optimal control Lecture room: Rey Felipe II Speakers: Lena Scholz, Valery Glizer, Hermann Mena.</p> <p>CS16 - Inverse problems and Kalman filtering Lecture room: Dr. Luis de Mercado Speakers: Gennady Kulikov, Maria Kulikova, Joaquin Mura, Wensheng Zhang.</p>
13:00	Lunch
15:00	<p>MS09B - Software issues Lecture room: Real Chancilleria Speakers: Luis Randez, Caren Tischendorf, Marnix Van Daele, Jan Van lent.</p> <p>MS12B - Geometric and Algebraic Methods for Differential Equations Lecture room: Cardenal Mendoza Speakers: Antonella Zanna , Elena Celledoni, Brynjulf Owren, Reinout Quispel.</p> <p>MS18B - Mathematical Models and Numerical Methods for Image Processing Lecture room: Claudio Moyano Speakers: Guillermo Gallego, Javier Finat, Eduardo Cuesta.</p> <p>CS17 - Implicit-explicit methods for ODEs Lecture room: Rey Felipe II Speakers: Michal Bras, Adrian Hill, Teo Roldan, Adrian Sandu.</p> <p>CS18 - Dynamical systems Lecture room: Rector Calixto Valverde Speakers: Barnabas M. Garay, Ruili Zhang.</p>
17:00	Coffee break
17:30	Plenary Talk: Sergio Blanes

# CONFERENCE PROGRAM

September, Monday 16

**9:00** REGISTRATION AND OPENING

## Plenary Talk

**9:30** Robert D. Skeel

*Off-Label Uses for ODE Methods: Randomization*

**10:30** Coffee break

## MS08 - Splitting Methods

(Lecture room: Paraninfo)

**11:00** Ariadna Farres

*Splitting Methods for High-Precision Integration in Dynamical Astronomy*

**11:30** Mechthild Thalhammer

*Multi-revolution composition methods for time-dependent Schrödinger equations*

**12:00** Philipp Bader

*Splitting methods for Schrödinger equations in imaginary time*

**12:30** Fernando Casas

*On some splitting methods involving high order derivatives*

## MS16A - DAEs and PDAEs: Analytical aspects, numerics and applications

(Lecture room: Real Chancilleria)

**11:00** Roswitha März

*Functional-analytic aspects of DAEs*

**11:30** Lennart Jansen

*Convergence issues of DAEs with non-constant constraints*

**12:00** Ignacio García de la Vega

*Characterizing DAE circuit models via mixed determinantal expansions*

**12:30** Ewa B. Weinmueller

*Collocation for Singular BVPs in ODEs with Unsmooth Data*

## MS19A - Recent advances on parareal algorithms

(Lecture room: Claudio Moyano)

**11:00** Yvon Maday

*Introduction to the minisymposium and to the parallelisation in time algorithms*

**11:30** Debasmita Samaddar

*A study of parareal applications to advanced operation scenario simulations of fusion plasma*

**12:00** Feng Chen

*An adjoint approach for stabilizing the parareal method for hyperbolic problems*

**12:30** Frédéric Legoll

*Parallel-in-time integrators for Hamiltonian systems*

**MS20A - Variational Techniques in Structure-Preserving Methods for Partial Differential Equations**

(Lecture room: Rey Felipe II)

**11:00** Daisuke Furihata

*Predictor corrector algorithm with the discrete variational derivative method*

**11:30** Takayasu Matsuo

*Energy-preserving compact difference schemes for nonlinear wave equations*

**12:00** Klas Modin

*Collective integrators for point vortex dynamics on the sphere*

**12:30** Yajuan Sun

*Local discontinuous Galerkin methods for Hamiltonian PDEs*

**MS21A - Modelling and numerical methods in financial mathematics**

(Lecture room: Cardenal Mendoza)

**11:00** Michèle Breton

*Numerical approaches for the evaluation of derivative securities*

**11:30** Matthias Ehrhardt

*A General Approach for Stochastic Correlation using Hyperbolic Functions*

**12:00** Antonio Falco

*Algorithms and Numerical Methods for High Dimensional Financial Market Models*

**12:30** Cornelis Oosterlee

*Accurate and Efficient Techniques for Pricing Derivatives and for Computing Risk Measures*

**CS01 - Stochastic partial differential equations**

(Lecture room: Dr. Luis de Mercado)

**11:00** Chuchu Chen

*Mean-square convergence order of a stochastic symplectic semi-discrete scheme for the stochastic Schrödinger equation*

**11:30** Amar Debbouche

*Sobolev Type Nonlocal Fractional Stochastic Control Systems in Hilbert Spaces*

**12:00** Hugo de la Cruz

*Effective computer simulation of the stochastic transport equation*

**12:30** Liying Zhang

*Stochastic Multi-symplectic Preissman Scheme for Stochastic Maxwell Equations*

**CS02 - Time integration of partial differential equations**

(Lecture room: Rector Calixto Valverde)

**11:00** Isaias Alonso-Mallo

*Geometric Time Integration and absorbing boundary conditions. A case study*

**11:30** José Augusto Ferreira

*Laplace-finite element methods for integro-differential equations of Volterra type*

**12:00** Chengming Huang

*Delay-dependent stability of high order time discretizations for delay partial differential equations*

**12:30** Ana Portillo

*Geometric integration of two coupled wave equations with absorbing boundary conditions*

**13:00** Lunch

**MS04A - Time integration of partial differential equations**  
(Lecture room: Paraninfo)

**15:00** Christian Lubich

*Variational discretization of wave equations on evolving surfaces*

**15:30** Dhia Mansour

*A numerical analysis of parabolic differential equations on evolving surfaces*

**16:00** Tomislav Pazur

*Implicit Runge-Kutta schemes and discontinuous Galerkin methods for Maxwell's equations*

**16:30** Ivonne Sgura

*Numerical approximation of Turing patterns in a reaction-diffusion model for electrodeposition*

**MS07A - Multiphase Flows: Analysis, Numerics and Optimization**  
(Lecture room: Rector Calixto Valverde)

**15:00** Francisco Guillen-Gonzalez

*On energy-stable schemes for a Vesicle Membrane phase-field model*

**15:30** Lubomir Banas

*Finite element discretization of a phase field model for incompressible fluid flow with variable density and viscosity*

**16:00** Ayse Saryaydin

*Structure Preserving Discontinuous Galerkin methods in space and time for Allen-Cahn equation*

**16:30** Malte Braack

*Optimal control of incompressible two-phase flows*

**MS10A - Numerics for Stochastic Differential Systems**  
(Lecture room: Rey Felipe II)

**15:00** David Cohen

*Energy-preserving integrators for stochastic Poisson systems*

**15:30** Andreas Rößler

*Stability analysis for stiffly accurate SRK methods*

**16:00** Erika Hausenblas

*The Numerical Approximation of Stochastic Evolution Equations in Banach spaces*

**16:30** Conall Kelly

*On the use of discrete forms of the Itô formula*

**MS15A - Multiscale modelling: numerical methods and applications**  
(Lecture room: Real Chancilleria)

**15:00** Keith Daly

*Multiscale image based modelling of two phase flow in soil*

**15:30** Aleksandar Donev

*Multiscale Problems in Fluctuating Hydrodynamics*

**16:00** Konstantinos Zygalakis

*Numerical studies of homogenization under a fast cellular flow*

**MS21B - Modelling and numerical methods in financial mathematics**  
(Lecture room: Cardenal Mendoza)

**15:00** Luis Ortiz-Gracia

*Robust pricing of European options with wavelets*

**15:30** Oleg Reichmann  
*Efficient numerical methods for option pricing in time-inhomogeneous models*

**16:00** Christoph Reisinger  
*Pricing Derivatives in High-Dimensional Settings via PDE Expansions*

**16:30** Carlos Vázquez  
*Numerical methods for pricing companies with PDE models and GPUs*

**CS03 - DAEs and PDAEs**  
(Lecture room: Claudio Moyano)

**15:00** Robert Altmann  
*Index Reduction for Semi-explicit Operator DAE's*

**15:30** Christoph Huck  
*Stable and efficient simulation of PDAEs describing flow networks*

**16:00** Ljubov Solovarova  
*On solution of differential-algebraic equations by collocation-variation splines*

**16:30** Hongjiong Tian  
*Numerical stability of Runge-Kutta methods for neutral delay differential-algebraic equations*

**CS10 - Variational methods and structure preserving schemes**  
(Lecture room: Dr. Luis de Mercado)

**15:00** Jitse Niesen  
*Preserving Taylor's constraint in magnetohydrodynamics*

**15:30** Sina Ober-Blöbaum  
*On higher order variational schemes for numerical optimal control*

**16:00** Pranav Singh  
*Effective approximation for the linear time-dependent Schrödinger equation*

**16:30** Takaharu Yaguchi  
*Lagrangian approach of the discrete gradient method based on finite element methods*

**17:00** Coffee break

**17:30** DAHLQUIST PRIZE LECTURE

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**September, Tuesday 17**

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**Plenary Talk**

**9:30** Andrew Stuart  
*Computational Methods for Bayesian Inverse Problems*

**10:30** Coffee break

**MS02A - Recent Trends in Lattice Boltzmann Methods: Boundary Conditions and Applications**

(Lecture room: Rector Calixto Valverde)

**11:00** Andreas Bartel  
*Introduction to Lattice Boltzmann Method and Recent Trends*

**11:30** Salvador Izquierdo  
*Challenges in boundary conditions for CFD simulations using lattice Boltzmann methods*

**12:00** Mohamed Mahdi Tekitek  
*High order boundary conditions for Lattice Boltzmann Schemes*

**12:30** Daniel Heubes  
*Non-Reflecting Boundary Conditions for the Lattice Boltzmann Method*

**MS03A - Computational and stochastic methods in inverse problems**  
(Lecture room: Paraninfo)

**11:00** Uri Ascher  
*Stochastic algorithms for inverse problems involving PDEs and many measurements*

**11:30** Tijana Janjic Pfander  
*Mass Conservation and Positivity Preservation with Ensemble-type Kalman Filter Algorithms*

**12:00** Volker Schulz  
*Exploiting Shape Hessians in PDE constrained Shape Optimization*

**MS10B - Numerics for Stochastic Differential Systems**  
(Lecture room: Rey Felipe II)

**11:00** Raphael Kruse  
*Weak convergence in second moments for linear SPDEs*

**11:30** Anne Kværnø  
*Integrating factor methods for stochastic differential equations*

**12:00** Sonja Cox  
*Regularity and convergence rates for SDEs with non-globally Lipschitz coefficients*

**12:30** Tony Shardlow  
*An adaptive time stepping method for SDEs*

**MS15B - Multiscale modelling: numerical methods and applications**  
(Lecture room: Real Chancilleria)

**11:00** Frédéric Legoll  
*A MsFEM approach à la Crouzeix-Raviart for problems on perforated domains*

**11:30** Gilles Vilmart  
*Weak second order mean-square stable integrators for stiff stochastic differential equations*

**12:00** Carsten Hartmann  
*Optimal control of multiscale systems: an approach using logarithmic transformations*

**MS17A - Numerical approximation of nonlinear waves**  
(Lecture room: Claudio Moyano)

**11:00** Jerry Bona  
*Theory and numerical analysis of systems of KdV-equations*

**11:30** Denys Dutykh  
*Fast and accurate computation of solitary waves to the free surface Euler equations*

**12:00** Vassilios Dougalis  
*Error estimates for Galerkin-Finite element methods for the shallow water equations*

**12:30** Nuria Reguera  
*Numerical dynamic detection, generation and simulation of solitary waves for nonlinear wave equations*

### **CS04 - Delay differential equations**

(Lecture room: Dr. Luis de Mercado)

**11:00** Phi Ha

*Solvability analysis and reformulation of general Linear Delay Differential-Algebraic Equations*

**11:30** El Karkri Jaafar

*A delay differential equation describing the evolution of a Herpes virus*

**12:00** Rossana Vermiglio

*Polynomial chaos expansion and stability analysis of uncertain DDEs*

**12:30** Vyacheslav Tsybulin

*Multiple convective flows in porous annular domains*

### **CS05 - Molecular Dynamics**

(Lecture room: Cardenal Mendoza)

**11:00** Jason Frank

*Stochastic correction of kinetic energy spectra in fluids*

**11:30** Vasily Govorukhin

*A Lagrangian method for numerical analysis of distributed vortical dynamics*

**12:00** Bei Li

*Molecular dynamics simulation of lubricant adsorption and depletion under heat treatment*

**12:30** Daniel Tameling

*Multilevel Summation for Dispersion: A Linear-Time Algorithm for  $r^{-6}$  Potentials*

**13:00** Lunch

### **MS05 - Oscillatory Hamiltonian systems**

(Lecture room: Paraninfo)

**15:00** Philippe Chartier

*Multi-revolution composition methods for highly oscillatory differential equations*

**15:30** Ernst Hairer

*Control of parasitic oscillations in linear multistep methods*

**16:00** Arie Iserles

*Highly oscillatory ODEs with irregular oscillators*

**16:30** Richard Tsai

*A Multiscale Method for Highly Oscillatory Dynamical Systems Using a Poincaré Map Type Technique*

**17:00** Daniel Weiss

*Integrating Highly-Oscillatory Mechanical Systems with Solution-Dependent Frequencies*

### **MS19B - Recent advances on parareal algorithms**

(Lecture room: Claudio Moyano)

**15:00** Julien Salomon

*An intermediate state method for the time-parallelized solving of optimal control problems*

**15:30** Jose Miguel Reynolds-Barredo

*A novel, semilagrangian, coarse solver for the parareal technique and its application to 2D drift-wave (BETA) and 5D gyrokinetic (GENE), turbulence simulations*

**16:00** Franz Chouly

*A parareal multiscale coupling of finite element and Lattice Boltzmann methods*

**16:30** Giovanni Samaey  
*A micro-macro parareal algorithm: application to singularly perturbed ordinary differential equations*

**MS24 - Fast direct linear solvers for elliptic partial differential equations**  
(Lecture room: Real Chancilleria)

**15:00** Mario Bebendorf  
*Robust LU factorization with logarithmic-linear complexity*

**15:30** Benoit Lize  
*A task-based H-matrix solver for acoustic and electromagnetic problems on multicore architectures*

**16:00** Per Gunnar Martinsson  
*A direct solver with  $O(N)$  complexity for a spectral multidomain method*

**16:30** Artem Napov  
*Conditioning of incomplete Cholesky factorizations with orthogonal approximations*

**MS25 - Numerical solution of integral and integral-algebraic equations of Volterra type**  
(Lecture room: Dr. Luis de Mercado)

**15:00** Mikhail Bulatov  
*Numerical solution of integro-algebraic equations by multistep methods*

**15:30** Viktor Chistyakov  
*On Properties of Integral Algebraic Equations with Rectangular Coefficient Matrices*

**16:00** Alexey Eremin  
*Solving delay differential equations with diagonally implicit Runge–Kutta methods*

**16:30** Pedro Lima  
*Analysis and Numerical Approximation of the Generalized Density Profile Equation*

**17:00** Tomoaki Okayama  
*Sinc-collocation methods for Volterra integro-differential equations*

**CS06 - Implementation issues**  
(Lecture room: Cardenal Mendoza)

**15:00** Philipp Birken  
*Inexact Fixed Point Schemes and Applications in Scientific Computing*

**15:30** Shinsuke Nakamura  
*A pre-fetched BiCGSTAB method in the solution of the trapezoidal rule of large ODEs*

**16:00** Terence Norton  
*An iterative starting method for multistep methods and its impact on Hamiltonian systems*

**16:30** Noorhelyna Razali  
*Two-Step Symmetrization with Extrapolation*

**17:00** Adrian Sandu  
*Rosenbrock-Krylov time stepping methods*

**CS07 - Stochastic differential equations**  
(Lecture room: Rey Felipe II)

**15:00** Tomasz Badowski  
*New adaptive method for variance reduction using approximating martingales*

**15:30** Qian Guo  
*Convergence and stability analysis of stochastic delay differential equations*

**16:00** Jialin Hong  
*Fundamental Convergence Theorems of Numerical Methods for SDEs*

**16:30** Marie Kopec  
*Weak backward error analysis for Langevin process*

**CS08 - Modelization and Simulation**  
(Lecture room: Rector Calixto Valverde)

**15:00** Michael Hanke  
*Towards multiscale modelling in neuroscience: Experiences with coupling cellular and subcellular levels of neuronal organisation*

**15:30** Andre Leier  
*Reduction of chemical reaction networks through delay distributions*

**16:00** Gonalo Pena  
*A nonFickian coupled model for diffusion in porous media*

**17:15** Coffee break

**Plenary Talk**

**17:45** Ander Murua  
*On solving highly oscillatory ODE problems*

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**September, Wednesday 18**

**Plenary Talk**

**9:30** Marlis Hochbruck  
*Convergence of an ADI splitting for Maxwell's equations*

**10:30** Coffee break

**MS01A - Molecular Dynamics**  
(Lecture room: Claudio Moyano)

**11:00** Manuel Athènes  
*On the use of Bayes theorem for estimating free energies from adaptively biased simulations*

**11:30** Ralf Banisch  
*A meshfree discretization of optimal control problems with applications in Molecular Dynamics*

**12:00** Sigrid Leyendecker  
*Structure preserving integration of constrained multirate systems*

**12:30** Charles Matthews  
*Robust and efficient configurational molecular sampling via Langevin Dynamics*

**MS02B - Recent Trends in Lattice Boltzmann Methods: Boundary Conditions and Applications**  
(Lecture room: Rector Calixto Valverde)

**11:00** Alfonso Caiazzo  
*Asymptotic analysis of LB for fluid-structure interaction: boundaries, forces and coupling schemes*

**11:30** Ynte Vanderhoydonc  
*Numerical lifting for Lattice Boltzmann models*

**12:00** Jens Harting  
*Lattice Boltzmann Simulations of Soft Matter Interfaces*

**12:30** Martin Geier

*Real world CFD applications on GPGPU based LBM with local grid-refinement*

**MS04B - Time integration of partial differential equations**

(Lecture room: Paraninfo)

**11:00** Tobias Jahnke

*On Schrödinger, Strang and Strichartz*

**11:30** Lukas Einkemmer

*An investigation of Strang and high order splitting schemes for Vlasov-type equations*

**12:00** Katharina Schratz

*Efficient time integration of the Klein-Gordon equation in the non-relativistic limit regime*

**12:30** Alexander Zlotnik

*Finite-difference schemes with splitting and discrete TBCs for the 2D Schrödinger equation in a strip*

**MS16B - DAEs and PDAEs: Analytical aspects, numerics and applications**

(Lecture room: Real Chancilleria)

**11:00** Martin Arnold

*Projection techniques for higher index DAEs revisited*

**11:30** Diana Estevez-Schwarz

*Diagnosis of Singular Points of DAEs*

**12:00** Bernd Simeon

*Transient Saddle Point Problems and Domain Decomposition Methods*

**12:30** Pablo Pedregal

*A different look at DAEs*

**MS20B - Variational Techniques in Structure-Preserving Methods for Partial Differential Equations**

(Lecture room: Rey Felipe II)

**11:00** Fernando Jimenez

*Discretization of Nonholonomic Dynamics*

**11:30** Melvin Leok

*The Construction and Analysis of Variational Integrators*

**12:00** Yuto Miyatake

*An energy-preserving exponentially-fitted continuous stage Runge–Kutta method for Hamiltonian systems*

**12:30** Hiroaki Yoshimura

*Variational Integrators and Discrete Lagrangian Mechanics for Interconnected Systems*

**MS22A - Numerical solution of stochastic differential equations**

(Lecture room: Cardenal Mendoza)

**11:00** Kevin Burrage

*Post-transcriptional regulation in the nucleus and cytoplasm: a study of mean time to threshold and the narrow escape problem*

**11:30** Evelyn Buckwar

*Mean-Square Stability of Stochastic Linear Two-step methods for SDEs*

**12:00** Yoshio Komori

*Weak order exponential Runge-Kutta methods for stiff stochastic differential equations*

**12:30** Pamela Burrage

*Structure-preserving Runge-Kutta methods for stochastic Hamiltonian equations with additive noise*

**CS09 - General linear methods**  
(Lecture room: Dr. Luis de Mercado)

**11:00** John Butcher

*The order of G-symplectic methods*

**11:30** Gholamreza Hojjati

*On the construction of sequential second derivative general linear methods*

**12:00** Gulshad Imran

*Runge-Kutta methods satisfying conjugate order conditions*

**12:30** Beatrice Paternoster

*Numerical solution of Hamiltonian problems by G-symplectic integrators*

**Plenary Talk**

**13:00** Ludwig Gauckler

*Plane wave stability of the split-step Fourier method for the nonlinear Schrödinger equation*

**14:00** Lunch

**16:00** SOCIAL ACTIVITIES

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**September, Thursday 19**

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**Plenary Talk**

**9:30** Folkmar Bornemann

*Computing Operator Determinants and Preconditioning Riemann-Hilbert Problems – A Numerical Analyst's Encounter with Mathematical Physics*

**10:30** Coffee break

**MS01B - Molecular Dynamics**  
(Lecture room: Claudio Moyano)

**11:00** Tony Lelièvre

*Mathematical analysis of accelerated dynamics*

**11:30** Han Wang

*Linear response theory and optimal control for a molecular system under nonequilibrium conditions*

**12:00** Jonathan Weare

*Using Coarse Grained Models to Speed Convergence to the Minimum Energy Pathway*

**MS03B - Computational and stochastic methods in inverse problems**  
(Lecture room: Paraninfo)

**11:00** Sebastian Reich

*Can Localization Lift the Curse of Dimensionality for Particle Filters?*

**11:30** Sebastian Krumscheid

*Consistent inference for coarse-grained models from multiscale data*

**12:00** Antonella Zanna

*A combined registration-segmentation model for filtration estimation in the kidney*

**MS13A - Discontinuous dynamical systems: theory and numerical methods**  
(Lecture room: Rey Felipe II)

**11:00** Marino Zennaro

*A novel method to compute Lyapunov exponents of switched linear systems (I)*

**11:30** Marino Zennaro

*A novel method to compute Lyapunov exponents of switched linear systems (II)*

**12:00** Paweł Przybyłowicz

*Optimal adaptive approximation of a class of non-autonomous IVPs with unknown singularities*

**12:30** Cinzia Elia

*A Filippov sliding vector field on a codimension 2 surface. Theoretical justifications*

**MS14 - Efficient computation of matrix functions for exponential and trigonometric integrators**  
(Lecture room: Real Chancilleria)

**11:00** Ioannis Famelis

*Rational  $L_\infty$  approximations to the matrix cosine*

**11:30** Tanja Gückler

*A Parallel Rational Krylov Subspace Method for the Approximation of  $\varphi$ -Functions in Exponential Integrators*

**12:00** Peter Kandolf

*Recent advances of Leja interpolation*

**12:30** Antti Koskela

*A moment-matching Arnoldi method for phi-functions*

**MS22B - Numerical solution of stochastic differential equations**  
(Lecture room: Cardenal Mendoza)

**11:00** Adrian Blumenthal

*Solving Stiff Stochastic Differential Equations with a Stabilized Multilevel Monte Carlo Method*

**11:30** María Jesús Senosiain

*A review on numerical schemes for solving a linear stochastic oscillator*

**12:00** Kristian Debrabant

*Monotone approximation schemes for linear parabolic PDEs by weak SDE approximation methods*

**12:30** Larisa Yaroslavsteva

*Computing deterministic quadrature rules for marginals of SDEs.*

**CS11 - Software issues**  
(Lecture room: Rector Calixto Valverde)

**11:00** Basem Attili

*Numerical Treatment of Two-Point Boundary Value Problems of Fractional Differential Equations*

**11:30** Hiroshi Hirayama

*C++ Template Programs for ODE and DAE by Taylor Series*

**12:00** Tomonori Kouya

*On Numerical Properties of Accelerated Multiple Precision Fully Implicit Runge-Kutta Methods*

**12:30** Andreas Steinbrecher

*Overdetermined Regularization of Modelica based Model Equations for Dynamical Systems and its Efficient Numerical Simulation*

**CS12 - Spatial discretization of partial differential equations**  
(Lecture room: Dr. Luis de Mercado)

**11:00** Adérito Araújo  
*Stability of finite difference schemes for complex reaction-diffusion processes*

**11:30** Chris Budd  
*Alignment of optimally transported meshes*

**12:00** Wenjun Cai  
*Two new schemes for the Degasperis-Procesi equation*

**12:30** Helge Dietert  
*Spectral Method for the Transport Equation – Fast Expansion into a Suitable Basis*

**13:00** Lunch

**MS06 - Markov Chain Monte Carlo and related dynamic sampling methods**  
(Lecture room: Real Chancilleria)

**15:00** Gersende Fort  
*Convergence of the Wang-Landau algorithm*

**15:30** Benjamin Jourdain  
*Optimal scaling of the transient phase of Metropolis Hastings algorithms*

**16:00** Tony Shardlow  
*Numerical Analysis of Gaussian Random Field Generators*

**16:30** Andrew Stuart  
*Gibbs Sampling for Hierarchical Bayesian Inverse Problems*

**MS12A - Geometric and Algebraic Methods for Differential Equations**  
(Lecture room: Cardenal Mendoza)

**15:00** Robert McLachlan  
*Modified Trigonometric Integrators*

**15:30** Olivier Verdier  
*Which methods have a B-Series expansion?*

**16:00** Kurusch Ebrahimi-Fard  
*Algebraic structures related to stochastic differential equations*

**16:30** Sergio Amat  
*Approximation of Hamiltonian systems using a variational approach*

**MS13B - Discontinuous dynamical systems: theory and numerical methods**  
(Lecture room: Rey Felipe II)

**15:00** Juan Ignacio Montijano  
*Runge-Kutta methods for the numerical solution of discontinuous systems of Filipov's type*

**15:30** Roberto Garrappa  
*Numerical solution of fractional differential equations with discontinuous right-hand side*

**16:00** Luciano Lopez  
*One-sided numerical methods to locate event points in discontinuous ODEs*

**MS17B - Numerical approximation of nonlinear waves**  
(Lecture room: Claudio Moyano)

**15:00** Taras Lakoba  
*Instability of the split-step and related methods near localized solutions of nonlinear Schrödinger equations*

**15:30** Yuto Miyatake

*On the derivation of energy-preserving  $H^1$ -Galerkin schemes for Hamiltonian partial differential equations*

**16:00** Henrik Kalisch

*Long wave models and pressure evaluation for surface waves on shear flows*

**16:30** Angel Durán

*On some systems for internal wave propagation*

### **MS23 - Geometric Numerical Integration for PDEs**

(Lecture room: Paraninfo)

**15:00** Erwan Faou

*Hamiltonian splitting methods for Vlasov equations and Landau damping*

**15:30** Arie Iserles

*Stability in the presence of transport terms*

**16:00** Alexander Ostermann

*Composition methods based on an almost symmetric Strang splitting*

**16:30** Lorenzo Pareschi

*Implicit-Explicit Runge-Kutta schemes for optimal control problems and applications to PDEs*

### **CS13 - Stability properties of numerical methods for ODEs**

(Lecture room: Rector Calixto Valverde)

**15:00** Raffaele D'Ambrosio

*Long-term stability of multi-value methods for ordinary differential equations*

**15:30** Michael Guenther

*Nonlinear stability of generalized additive and partitioned implicit multirate Runge-Kutta schemes*

**16:00** Inmaculada Higuera

*Strong stability properties for some classes of nonlinear problems*

**16:30** Lajos Lóczy

*Rational functions with maximal radius of absolute monotonicity*

### **CS14 - Boundary value problems**

(Lecture room: Dr. Luis de Mercado)

**15:00** Ioannis Famelis

*The numerical solution of a BVP which arises in the prediction of meteorological parameters.*

**15:30** Yuki Takeuchi

*Approximate solutions of fractional differential equations with Riesz fractional derivatives in a finite domain*

**16:00** Alberto Gil C. P. Ramos

*Numerical Solution of Sturm–Liouville Problems via Fer Streamers*

**17:00** Coffee break

**17:30** SANZ-SERNA'S BIRTHDAY

**20:30** CONFERENCE BANQUET

## Plenary Talk

**9:30** Jianxian Qiu

*Weighted Essentially Non-Oscillatory limiters for Runge-Kutta Discontinuous Galerkin Methods*

**10:30** Coffee break

### MS04C - Time integration of partial differential equations

(Lecture room: Paraninfo)

**11:00** Mayya Tokman

*On construction of customized efficient exponential integrators for large stiff systems of ODEs*

**11:30** Vu Thai Luan

*Exponential B-series: The stiff case*

**12:00** Begoña Cano

*Projected explicit Lawson methods for the integration of Schrödinger equation*

**12:30** Cesáreo González

*Exponential type integrators for abstract quasilinear parabolic equations with variable domains*

### MS07B - Multiphase Flows: Analysis, Numerics and Optimization

(Lecture room: Rector Calixto Valverde)

**11:00** Georgy Kitavtsev

*On solvability of lubrication systems modelling evolution of two immiscible viscous thin liquid films*

**11:30** Dietmar Kroener

*Phase field models for two phase flows with phase transition*

**12:00** Noel Walkington

*Numerical Schemes for Equations Modeling Fluid Mixtures*

### MS09A - Software issues

(Lecture room: Real Chancilleria)

**11:00** Severiano Gonzalez Pinto

*Refinements in the Approximate Matrix Factorization for the time integration of advection-diffusion-reaction PDEs*

**11:30** David Ketcheson

*Automated design and analysis of ODE solvers*

**12:00** René Lamour

*daePAD – a DAE solver based on Projectors and AD*

**12:30** Francesca Mazzia

*Numerical Solution of Initial and Boundary Value Problems in the open source software R: Packages de-TestSet and bvpSolve*

### MS11 - Structure preserving numerical methods

(Lecture room: Cardenal Mendoza)

**11:00** Onno Bokhove

*Compatible Space-Time Finite Element Discretizations for Wave Tanks*

**11:30** Jerome Bonelle

*Analysis of Compatible Discrete Operator Schemes for Stokes problem on Polyhedral Meshes*

**12:00** Andrew McRae  
*Mimetic Finite Element methods applied to the Shallow Water Equations*

**12:30** Dmitry Pavlov  
*Structure-preserving discretization of continuum theories*

**MS18A - Mathematical Models and Numerical Methods for Image Processing**  
(Lecture room: Claudio Moyano)

**11:00** Volker Grimm  
*Discrete gradient methods in image processing*

**11:30** Marcelo Bertalmío  
*Denoising an image by denoising its curvature image*

**12:00** Bartomeu Coll  
*A nonconvex model for image segmentation*

**12:30** Patrick Guidotti  
*Some Nonlinear Diffusions inspired by the Perona-Malik equation*

**CS15 - Optimal control**  
(Lecture room: Rey Felipe II)

**11:00** Lena Scholz  
*Self-conjugate differential and difference operators arising in the optimal control of descriptor systems*

**11:30** Valery Glizer  
*One Approach to Numerical Solution of a Finite-Horizon Linear-Quadratic Optimal Control Problem for Time Delay Systems*

**12:00** Hermann Mena  
*Numerical Solution of Large-Scale Differential Riccati Equations*

**CS16 - Inverse problems and Kalman filtering**  
(Lecture room: Dr. Luis de Mercado)

**11:00** Gennady Kulikov  
*Adaptive ODE Solvers in the Continuous-Discrete Extended Kalman Filtering Method I: Numerical Tests and Comparison*

**11:30** Maria Kulikova  
*Adaptive ODE Solvers in the Continuous-Discrete Extended Kalman Filtering Method II: Square-Root Implementation and Application to Target Tracking*

**12:00** Joaquin Mura  
*Detection of weak inclusions in poroelastic soils using Small Amplitude Homogenization*

**12:30** Wensheng Zhang  
*Wavefield simulation and velocity inversion based on the acoustic wave equation*

**13:00** Lunch

**MS09B - Software issues**  
(Lecture room: Real Chancilleria)

**15:00** Luis Randez  
*Numerical methods with L<sup>A</sup>T<sub>E</sub>X*

**15:30** Caren Tischendorf  
*Solving Network DAEs with Python*

**16:00** Marnix Van Daele

*Deferred correction based on exponentially fitted mono-implicit Runge-Kutta methods*

**16:30** Jan Van lent

*Solving Optimal Transport Problems Using Python*

### **MS12B - Geometric and Algebraic Methods for Differential Equations**

(Lecture room: Cardenal Mendoza)

**15:00** Antonella Zanna

*Volume preserving numerical methods and generating forms*

**15:30** Elena Celledoni

*Preserving first integrals with symmetric Lie group methods*

**16:00** Brynjulf Owren

*Integral preserving methods on moving grids*

**16:30** Reinout Quispel

*Recent results on Kahan's method*

### **MS18B - Mathematical Models and Numerical Methods for Image Processing**

(Lecture room: Claudio Moyano)

**15:00** Guillermo Gallego

*Second-order Riemannian Active Contours for Image Segmentation*

**15:30** Javier Finat

*A basic diffusion model on Grassmannians for simultaneous Detection, Segmentation and Restoration in Video mini-sequences*

**16:00** Eduardo Cuesta

*Image processing and non-local continuous models*

### **CS17 - Implicit-explicit methods for ODEs**

(Lecture room: Rey Felipe II)

**15:00** Michal Bras

*Nordsieck methods with inherent quadratic stability*

**15:30** Adrian Hill

*An a priori analysis of parasitism for G-symplectic multivalued methods*

**16:00** Teo Roldan

*Efficient Implicit-Explicit Runge-Kutta methods with low storage requirements*

**16:30** Adrian Sandu

*A class of implicit-explicit general linear methods*

### **CS18 - Dynamical systems**

(Lecture room: Rector Calixto Valverde)

**15:00** Barnabas M. Garay

*Exponentially long transient oscillations in a class of cooperative cellular networks*

**15:30** Ruili Zhang

*Symplectic simulation of guiding-center motion*

**17:00** Coffee break

## **Plenary Talk**

**17:30** Sergio Blanes

*Splitting methods for autonomous and non-autonomous perturbed systems*