

SciCADE 2024 Location: LT27 (LT27 is located at Blk S16)

Date: Monday, 15/July/2024

8:50am	Opening Session
-	Location: LT27
9:00am	
9:00am	Jie SHEN, A new class of higher-order stiffly stable schemes with application to the Navier-Stokes equations
-	Location: LT27
10:00am	Chair: Li-Lian Wang
2:00pm	Elena CELLEDONI, Deep learning of diffeomorphisms with application to shape analysis
-	Location: LT27
3:00pm	Chair: Benedict Leimkuhler
6:30pm	Yingda CHENG, Sparse grid discontinuous Galerkin (DG) methods for high dimensional PDEs
-	Location: LT27
7:30pm	Chair: Carol S. Woodward

Date: Tuesday, 16/July/2024

9:00am	Gilles VILMART, Explicit stabilized integrators for stiff problems: the interplay of geometric integration and stochastic integration
-	Location: LT27
10:00am	Chair: Alexander Ostermann
2:00pm	Lei ZHANG, Construction of solution landscape for complex systems
-	Location: LT27
3:00pm	Chair: Qiang Du

Date: Wednesday, 17/July/2024

9:00am	Gianluca CERUTI, Geometry-driven approach to low-rank dynamics
-	Location: LT27
10:00am	Chair: Weiqing Ren

Date: Thursday, 18/July/2024

9:00am	Jianfeng LU, Convergence analysis of classical and quantum dynamics via hypocoercivity
-	Location: LT27
10:00am	Chair: Zhenning Cai
2:00pm	Carola-Bibiane SCHÖNLIEB, Mathematical imaging: From geometric PDEs and variational modelling to deep learning for images
-	Location: LT27
3:00pm	Chair: Xin Tong

Date: Friday, 19/July/2024

9:00am	Qianxiao LI, Learning, approximation and control
-	Location: LT27
10:00am	Chair: Christian Lubich
11:30am	Ann ALMGREN, Adaptive Mesh Refinement: Algorithms and Applications
-	Location: LT27
12:30pm	Chair: Weizhu Bao

SciCADE 2024 Location: MSL-01-02 (Training room 1)

Date: Monday, 15/July/2024

8:00am - 8:50am
Registration
Location: MSL-01-01

10:30am - 12:30pm
Parallel Contributed Talks 01
Location: MSL-01-01

10:30am - 11:00am

Data-based adaptive mesh refinement of finite element thin plate spline
Lishan Fang

11:00am - 11:30am

Optimal Error Estimates of a Crank-Nicolson Finite Element Projection Method for Magnetohydrodynamic Equations
Zeyu Xia

11:30am - 12:00pm

Recovery-based a posteriori error estimate for the weak Galerkin finite element method
Ying Liu, Yufeng Nie

12:00pm - 12:30pm

Node-based adaptive local mesh generation method and its application
Weiwei Zhang, Yuqing Zhou

3:30pm - 5:30pm
Parallel Contributed Talks 03
Location: MSL-01-01

3:30pm - 4:00pm

Fast Algorithm for Quasi-2D Coulomb Systems
Xuanzhao Gao, Zecheng Gan, Jiuyang Liang, Zhenli Xu

4:00pm - 4:30pm

An L^2 -projection isogeometric analysis based on Strang splitting for nonlinear systems of convection-diffusion-reaction
Ilham Asmouh, Alexander Ostermann

4:30pm - 5:00pm

Bulk-surface splitting for parabolic problems with dynamic boundary conditions
Robert Altmann

5:00pm - 5:30pm

A THIRD-ORDER FINITE DIFFERENCE WENO SCHEME WITH SHALLOW NEURAL NETWORK
Kwanghyuk Park, Xinjuan Chen, Dongjin Lee, Jiayi Gu, Jae-Hun Jung

SciCADE 2024 Location: MSL-01-02 (Training room 1)

Date: Tuesday, 16/July/2024

8:30am

Check-in

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Location: MSL-01-01

9:00am

10:30am

Parallel Contributed Talks 05

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Location: MSL-01-01

12:30pm

10:30am - 11:00am

An Uncertainty-aware Mesh-free Numerical Method for Kolmogorov PDEs

Daisuke Inoue, Yuji Ito, Takahito Kashiwabara, Norikazu Saito, Hiroaki Yoshida

11:00am - 11:30am

Error estimates of the CIP scheme for one-dimensional advection equations

Haruki Takemura, Takahito Kashiwabara

11:30am - 12:00pm

Fast implicit hybrid solvers for stiff time-evolution equations

Tianyu Jin, Georg Maierhofer, Katharina Schratz

12:00pm - 12:30pm

Towards the calculation generalized target functional with multi-mesh approach

Jingfeng Wang, Guanghui Hu

3:30pm

Parallel Contributed Talks 07

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Location: MSL-01-01

6:00pm

3:30pm - 4:00pm

A multi-scale low-rank integrator for Marshak waves

Chinmay Patwardhan, Jonas Kusch, Martin Frank

4:00pm - 4:30pm

Two-Step iterative method for solving singular tensor equations

$\mathcal{A} * \mathcal{M} \mathcal{X} = \mathcal{B}$ under \mathcal{M} -product

Jajati Keshari Sahoo

4:30pm - 5:00pm

Exponential integrator for stochastic strongly damped wave equation based on the Wong-Zakai approximation

Yibo Wang

5:00pm - 5:30pm

Fractional variational integrators based on convolution quadrature

Khaled Hariz, Fernando Jimenez, Sina Ober-Blöbaum

5:30pm - 6:00pm

Runge-Kutta resonance-based methods and symplectic low-regularity integrators

Georg Maierhofer, Katharina Schratz

SciCADE 2024 Location: MSL-01-02 (Training room 1)

Date: Wednesday, 17/July/2024

8:30am - 9:00am
Check-in
Location: MSL-01-01

10:30am - 1:00pm
Parallel Contributed Talks 09
Location: MSL-01-01

10:30am - 11:00am

Acceleration of self-consistent field iteration for electronic structure calculations

Fei Xu

11:00am - 11:30am

Enhancing Modeling Accuracy via Discriminating Hamiltonian Systems

Yuhan Chen, Takaharu Yaguchi

11:30am - 12:00pm

Linear Relaxation Method with Regularized Energy Quadraticization for Phase Field Model

Maosheng Jiang

12:00pm - 12:30pm

Energy-preserving discretizations of anisotropic waves applied to plasma physics

Micol Bassanini, Simone Deparis, Paolo Ricci

12:30pm - 1:00pm

Weak Galerkin Mixed FEM for the Crank-Nicolson Scheme of Parabolic Interface Problems

Amit Kumar Pal, Jhuma Sen Gupta

SciCADE 2024 Location: MSL-01-02 (Training room 1)

Date: Thursday, 18/July/2024

8:30am - 9:00am
Check-in
Location: MSL-01-01

10:30am - 12:30pm
Parallel Contributed Talks 11
Location: MSL-01-01

10:30am - 11:00am

Efficient Multilevel Importance Sampling in Derivative Pricing
Devang Sinha, Siddhartha Pratim Chakrabarty

11:00am - 11:30am

On the weak Galerkin mixed FEM for parabolic interface problems
Jhuma Sen Gupta, Amit Kumar Pal, Rajen Kumar Sinha

11:30am - 12:00pm

Evolutionary bifurcation diagrams of a multiparameter generalized logistic problem
KUO-CHIH HUNG, SHIN-HWA WANG

12:00pm - 12:30pm

Impact of Liquidity Risk and Limited Liability in Loan Portfolio Management
DEB NARAYAN BARIK, S IDDHARTHA P. C HAKRABARTY

3:30pm - 5:30pm
Parallel Contributed Talks 13
Location: MSL-01-01

3:30pm - 4:00pm

Asymptotic convergence of heterogeneous first-order aggregation models: from the sphere to the unitary group
Dohyun Kim, Hansol Park

4:00pm - 4:30pm

Parameter Uniform Numerical Methods Based on OSCM for The Singularly Perturbed Differential Equations with Delay in Time
Jewel Howlader, pankaj Mishra, Kapil K. Sharma

4:30pm - 5:00pm

Study of Soret Effect in Magnetized Dissipative Chemically Reactive Sisko Nanofluid Flow: A Numerical Insight
Reema Jain, Yogesh Dadhich

5:00pm - 5:30pm

HIV Community Transmission under Treatment: A Two-strain Modelling Approach
Ashish Poonia, Siddhartha Pratim Chakrabarty

SciCADE 2024 Location: MSL-01-03 (Training Room 2)

Date: Monday, 15/July/2024

10:30am Parallel Contributed Talks 02

Location: MSL-01-02

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12:30pm

10:30am - 11:00am

Elastic full-waveform inversion as training a neural network

Wensheng Zhang

11:00am - 11:30am

WITS: Weakly-supervised individual tooth segmentation model trained on box-level labels

Ruicheng Xie, Yunyun Yang, Zhaoyang Chen

11:30am - 12:00pm

Self-Attention Network for Solving HJB Equation arising from Optimal Trade Execution

Andrew Na, Justin Wan

12:00pm - 12:30pm

Neural Option Pricing for Rough Bergomi Model

Changqing Teng, Guanglian Li

3:30pm

Parallel Contributed Talks 04

Location: MSL-01-02

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5:30pm

3:30pm - 4:00pm

Recent progress on the Schrödinger map equation

Sandeep Kumar

4:00pm - 4:30pm

On error bounds for approximations to high-frequency wave propagation in nonlinear dispersive media

Julian Baumstark, Tobias Jahnke

4:30pm - 5:00pm

Unique Solvability conditions for the absolute value equations and absolute value matrix equations

Shubham Kumar, Deepmala --

5:00pm - 5:30pm

Synchronous cycles in migrating population dynamics

Ram Surendra Singh, Yogesh Trivedi, Anushaya Mohapatra

SciCADE 2024 Location: MSL-01-03 (Training Room 2)

Date: Tuesday, 16/July/2024

10:30am
-
12:30pm

Parallel Contributed Talks 06
Location: **MSL-01-02**

10:30am - 11:00am

RBMD: Random Batch Molecular Dynamics on Heterogeneous Computing Architectures
Weihang Gao

11:00am - 11:30am

Mitigating distribution shift in machine learning-augmented hybrid simulation
Jiaxi Zhao, Qianxiao Li

11:30am - 12:00pm

Superconvergent Jacobi Spectral Methods for System of Nonlinear Volterra- Integro-Differential Equations
Rakesh Kumar, BV Rathish Kumar

12:00pm - 12:30pm

A Time Filtered Scheme for Non-linear Hyperbolic Equations Motivated by Modeling DNA Transcription Process
Faranak Pahlevani, Kevin Courtney, Lisa Davis

3:30pm
-
6:00pm

Parallel Contributed Talks 08
Location: **MSL-01-02**

3:30pm - 4:00pm

PDE-constrained optimization with flux-correction in mathematical biology
Karolina Benkova, John Pearson, Mariya Ptashnyk

4:00pm - 4:30pm

Mirror Descent-Ascent for mean-field min-max problems
Razvan-Andrei Lascu

4:30pm - 5:00pm

A Model Independent Approach for Empirically Identifying the Optimal Control Strategy of a Power Storage Facility
Fraser John Wilkinson O'Brien

5:00pm - 5:30pm

Implicit Peer Triplets in Gradient-Based Solution Algorithms for ODE Constrained Optimal Control
Jens Lang, Bernhard A. Schmitt

5:30pm - 6:00pm

Explicit Runge-Kutta methods for quadratic optimization with optimal rates
Tuo Liu, David Ketcheson

SciCADE 2024 Location: MSL-01-03 (Training Room 2)

Date: Wednesday, 17/July/2024

10:30am
-
1:00pm

Parallel Contributed Talks 10
Location: MSL-01-02

10:30am - 11:00am

Modeling and Fast Algorithms for the Dynamics of Auto-Chemotactic Chiral Active Droplets
Zecheng Gan

11:00am - 11:30am

Simulation Method of Microscale Fluid-Structure Interactions: Diffuse-Resistance-Domain Approach
Xinpeng Xu

11:30am - 12:00pm

Optimal-order convergence of the linearly extrapolated Crank–Nicolson method and the two-step BDF method for the Navier–Stokes equations with H^1 initial data
Na Wang

12:00pm - 12:30pm

Nonclassical Symmetry Analysis to Find out Analytical Solution of a Porous Media Flow Model
Sougata Mandal, Sukhendu Ghosh

12:30pm - 1:00pm

Study on dynamical behaviour of reaction-diffusion epidemic model
Hariharan Soundararajan, Shangerganesh Lingeshwaran

SciCADE 2024 Location: MSL-01-03 (Training Room 2)

Date: Thursday, 18/July/2024

10:30am Parallel Contributed Talks 12

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12:30pm

Location: **MSL-01-02**

Chair: Buyang Li

10:30am - 11:00am

Optimal convergence of the arbitrary Lagrangian–Eulerian interface tracking method for two-phase Navier–Stokes flow

Buyang Li, [Shu Ma](#), Weifeng Qiu

11:00am - 11:30am

Stable and efficient methods for 2D-3C clamped plate and shallow shell models

[Xiaoqin Shen](#)

11:30am - 12:00pm

Improved estimate of the number of input points of DeepONet

[Dehami Kiryu](#), Baige Xu, Takaharu Yaguchi

12:00pm - 12:30pm

Operator Learning of Hamiltonian Density for Modeling Nonlinear Waves

[Baige Xu](#), Yusuke Tanaka, Takashi Matsubara, Takaharu Yaguchi

3:30pm

-

5:30pm

Parallel Contributed Talks 14

Location: **MSL-01-02**

3:30pm - 4:00pm

Numerical method for the crack problem with a Signorini-type contact condition on a linear combination of displacement and velocity

[Guanyu Zhou](#)

4:00pm - 4:30pm

Generalized Convolution Quadrature for non smooth sectorial problems

Jing Guo, [Maria Lopez-Fernandez](#)

4:30pm - 5:00pm

Supersymmerties with Arbitrary Functions of a New Supersymmetric Dispersionless System and the classifications

[Ruoxia Yao](#)

5:00pm - 5:30pm

Nonlocal Yajima–Oikawa system: binary Darboux transformation, exact solutions and dynamic properties

[Caigin Song](#), Hai-qiong Zhao, Zuo-nong Zhu

SciCADE 2024 Location: S16-02-06 (Blk S16 Level 2 Room 6)

Date: Monday, 15/July/2024

10:30am
-
12:30pm

MS04-1 Communication of Structure-preserving Techniques for Computing Diffusion and Dispersion

Location: S16-02-01

10:30am - 11:00am

An energy stable and maximum bound principle preserving scheme for the dynamic Ginzburg Landau equations

Limin Ma

11:00am - 11:30am

Explicit K-symplectic methods for nonseparable non-canonical Hamiltonian systems

Beibei Zhu, Lun Ji, Aiqing Zhu, Yifa Tang

11:30am - 12:00pm

Space-time discontinuous Galerkin methods for Korteweg-de Vries type equations

Qian Zhang, Xia Yinhua

12:00pm - 12:30pm

Numerical methods for ground states of Bose-Einstein condensate with higher-order interactions

Xinran Ruan

3:30pm
-
5:30pm

MS14-1 Numerical Integration for Dispersive Problems

Location: S16-02-01

3:30pm - 4:00pm

Simulation of asymmetric interface transport in topological insulators

Guillaume Bal

4:00pm - 4:30pm

Numerical approximation of discontinuous solutions of the semilinear wave equation

Jiachuan Cao, Buyang Li, Yanping Lin, Fangyan Yao

4:30pm - 5:00pm

The non-relativistic limits of nonlinear quantum field equations

Yifei Wu

5:00pm - 5:30pm

Improved Uniform Error Bounds on Time-splitting Methods for Long-time Dynamics of Dispersive PDEs

Yue Feng

SciCADE 2024 Location: S16-02-06 (Blk S16 Level 2 Room 6)

Date: Tuesday, 16/July/2024

10:30am - 12:30pm MS14-2 Numerical Integration for Dispersive Problems

Location: S16-02-01

10:30am - 11:00am

Unitary rational approximations for the matrix exponential

Tobias Jawecki, [Pranav Singh](#)

11:00am - 11:30am

Bourgain techniques for low regularity error estimates

[Lun Ji](#), Alexander Ostermann, Frédéric Rousset, Katharina Schratz

11:30am - 12:00pm

An explicit and symmetric exponential wave integrator for the nonlinear Schrödinger equation with low regularity potential and nonlinearity

Weizhu Bao, [Chushan Wang](#)

12:00pm - 12:30pm

Filtered Lie-Trotter splitting for the “good” Boussinesq equation: low regularity estimates

Lun Ji, [Hang Li](#), Alexander Ostermann, Chunmei Su

3:30pm - 6:00pm MS04-2 Communication of Structure-preserving Techniques for Computing Diffusion and Dispersion

Location: S16-02-01

3:30pm - 4:00pm

A Novel Stochastic Interacting Particle-Field Algorithm for 3D Parabolic-Parabolic Keller-Segel Chemotaxis System

Zhongjian Wang, Jack Xin, [Zhiwen Zhang](#)

4:00pm - 4:30pm

An iterative algorithm for POD basis adaptation in solving parametric convection-diffusion equations

[Zhizhang Wu](#), Zhiwen Zhang

4:30pm - 5:00pm

Computation of two types of ground state solutions for nonlinear Schrödinger equations

[Wei Liu](#)

5:00pm - 5:30pm

A 3-D High-order Spectral Element Time-Domain Method for Quantum Device Simulations

[Na Liu](#), Kangshuai Du

5:30pm - 6:00pm

Optimal L^2 error estimates of unconditionally stable FE schemes for the Cahn-Hilliard-Navier-Stokes system

[Jilu Wang](#)

SciCADE 2024 Location: S16-02-06 (Blk S16 Level 2 Room 6)

Date: Wednesday, 17/July/2024

10:30am - 1:00pm MS46 Recent Advance on Numerical Methods and Analysis for Complex Problems

Location: **S16-02-01**

10:30am - 11:00am

An unconditionally stable IMEX scheme for Allen-Cahn/Cahn-Hilliard equation perturbed by multiplicative noise

Can Huang

11:00am - 11:30am

Analysis for a high accuracy nonlinear scheme for strong nonlinear diffusion problem

Xia Cui, Yu-Jie Gong, Guang-Wei Yuan

11:30am - 12:00pm

Spectral Methods for Partial Differential Equations on Complex Geometries

Sheng Chen

12:00pm - 12:30pm

Stability of the Minimal Energy Path

Huajie Chen

12:30pm - 1:00pm

The sticky particle system with alignment interactions

Changhui Tan

SciCADE 2024 Location: S16-02-06 (Blk S16 Level 2 Room 6)

Date: Thursday, 18/July/2024

10:30am - 12:30pm MS15-1 Efficient and High-order Numerical Methods for Problems in Quantum Physics

Location: S16-02-01

10:30am - 11:00am

An asymptotic preserving scheme for the defocusing Davey-Stewartson II equation in the semiclassical limit

Hanquan Wang

11:00am - 11:30am

A Spectrally Accurate Numerical Method For Computing The Bogoliubov-De Gennes Excitations Of Dipolar Bose-Einstein Condensates

Yong ZHANG

11:30am - 12:00pm

An accurate and efficient numerical method to compute the ground states of the rotating spin-orbit coupled spin-1 Bose-Einstein condensates

Yongjun Yuan

12:00pm - 12:30pm

A fourth-order compact time-splitting method for the Dirac equation

Jia Yin, Weizhu Bao, Xianzhe Chen

3:30pm - 5:30pm MS15-2 Efficient and High-order Numerical Methods for Problems in Quantum Physics

Location: S16-02-01

3:30pm - 4:00pm

Numerical methods for Bogoliubov-de Gennes excitations of Bose-Einstein condensates

Yali Gao

4:00pm - 4:30pm

Numerical methods for the logarithmic Dirac equation

Wenfán Yi

4:30pm - 5:00pm

Error estimates of numerical methods for the Dirac equation

Ying Ma

5:00pm - 5:30pm

Radiation fields for semilinear Dirac equations with spinor null forms

Jiong-Yue Li

Date: Friday, 19/July/2024

10:30am - 11:30am MS33-2 Challenges and Innovations for the Time-Stepping of PDEs

Location: S16-02-01

10:30am - 11:00am

On the order of Runge-Kutta methods applied to stiff, semilinear ODEs

Steven Byram Roberts, David George Shirokoff, Abhijit Biswas, David Isaac Ketcheson, Benjamin Seibold

11:00am - 11:30am

Accurate Solution of the NLS Equation via Conservative Multiple-Relaxation ImEx Methods

Abhijit Biswas, David I. Ketcheson

SciCADE 2024 Location: S16-02-07 (Blk S16 Level 2 Room 7)

Date: Monday, 15/July/2024

10:30am - 12:30pm **MS36-1 Geometric and Multiscale Methods for High-Dimensional Dynamics**

Location: **S16-02-02**

10:30am - 11:00am

Unbiased Kinetic Langevin Monte Carlo with Inexact Gradients

Neil Chada, Benedict Leimkuhler, Daniel Paulin, Peter Whalley

11:00am - 11:30am

Splitting methods with modified potentials for certain classes of nonlinear evolution equations

Fernando Casas

11:30am - 12:00pm

Overcoming the order barrier two in splitting methods when applied to semilinear parabolic problems with non-periodic boundary conditions

Ramona Häberli

12:00pm - 12:30pm

Advanced Time-Adaptive PIROCK Method with Error Control for Magnetic Reconnection Simulations in Chromospheric Environments

Q. M. Wagnier, G. Vilmart, J. Martinez-Sykora, V. H. Hansteen, B. De Pontieu

3:30pm - 5:30pm **MS36-2 Geometric and Multiscale Methods for High-Dimensional Dynamics**

Location: **S16-02-02**

3:30pm - 4:00pm

Numerical methods for stochastic collisional dynamics

Benedict Leimkuhler, Akash Sharma, Michael Tretyakov

4:00pm - 4:30pm

Exotic aromatic forests for high-order sampling of the invariant measure

Eugen Bronasco

4:30pm - 5:00pm

Uniform in time numerical approximations of (multiscale) SDEs

Michela Ottobre

5:00pm - 5:30pm

State-Space Systems as Dynamic Generative Models

Florian Rossmannek

SciCADE 2024 Location: S16-02-07 (Blk S16 Level 2 Room 7)

Date: Tuesday, 16/July/2024

10:30am - 12:30pm **MS06-1 Numerical Methods for Highly Oscillatory ODEs and PDEs**

Location: **S16-02-02**

10:30am - 11:00am

Uniform error bounds on numerical methods for long-time dynamics of dispersive PDEs

Weizhu Bao, Yongyong Cai, Yue Feng, Chunmei Su

11:00am - 11:30am

Solving long-time nonlinear Schrödinger equation by a class of oscillation-relaxation integrators

Kai Liu, Bin Wang, Xiaofei Zhao

11:30am - 12:00pm

Filtered finite difference methods for highly oscillatory semilinear hyperbolic systems

Christian Lubich, Yanyan Shi

12:00pm - 12:30pm

Time integration method for wave propagation with spatio-temporal oscillations

Tobias Jahnke, Johanna Mödl

3:30pm - 6:00pm **MS08-1 Recent Advances on Structure-preserving Algorithms with Applications**

Location: **S16-02-02**

Chair: Bin Wang

3:30pm - 4:00pm

Geometric numerical integration for the linear-gradient system

Yajuan Sun

4:00pm - 4:30pm

Error estimates for backward difference formulae for the transient Stokes problem

Alessandro Contri, André Massing, Balázs Kovács

4:30pm - 5:00pm

Structure-preserving algorithms and their error estimates for the relativistic dynamics of charged particle

Ruili Zhang

5:00pm - 5:30pm

Aggressive Splitting in Structure-Preserving Numerical Methods

Naoki Ishii, Toyohiro Aso, Shun Sato, Takayasu Matsuo

SciCADE 2024 Location: S16-02-07 (Blk S16 Level 2 Room 7)

Date: Wednesday, 17/July/2024

10:30am - 1:00pm **MS06-2 Numerical Methods for Highly Oscillatory ODEs and PDEs**

Location: **S16-02-02**

10:30am - 11:00am

Asymptotic expansions for the linear PDEs with oscillatory input terms: Analytical form and error analysis

Karolina Kropielnicka

11:00am - 11:30am

A uniformly accurate method for the Klein-Gordon-Dirac system in the nonrelativistic regime

Yongyong Cai, Wenfan Yi

11:30am - 12:00pm

Using non-resonant step sizes to improve efficiency of time integrators for oscillatory non-linear Dirac equations

Tobias Jahnke, Michael Kirn

12:00pm - 12:30pm

Numerical methods for disordered NLS

Xiaofei Zhao

SciCADE 2024 Location: S16-02-07 (Blk S16 Level 2 Room 7)

Date: Thursday, 18/July/2024

10:30am - 12:30pm MS08-2 Recent Advances on Structure-preserving Algorithms with Applications

Location: **S16-02-02**

Chair: Ruili Zhang

10:30am - 11:00am

Crossroads between Geometric Numerical Integration and Machine Learning

Michael Kraus

11:00am - 11:30am

Splitting algorithms for total variation imaging via SAV approach

Raymond H. Chan, Yuto Miyatake

11:30am - 12:00pm

Learning stochastic differential equations from data

Aiqing Zhu, Qianxiao Li

12:00pm - 12:30pm

Invariant-preserving difference schemes for the R2CH system

Qifeng Zhang

3:30pm - 5:30pm MS16 Recent Advances in Time Integration: Exponential Integrators and Algorithms

Location: **S16-02-02**

3:30pm - 4:00pm

Parallelism and Exponential Integration

Tommaso Buvoli

4:00pm - 4:30pm

Computation of phi functions for exponential integrators

Markus Neher

4:30pm - 5:00pm

A Krylov subspace exponential integrator based on the Adams-Bashforth method

Jitse Niesen

5:00pm - 5:30pm

Low Synchronization Arnoldi Methods with Application to Exponential Integrators

Tanya Vanessa Tafolla, Stephane Gaudreault, Mayya Tokman

Date: Friday, 19/July/2024

10:30am - 11:30am MS08-3 Recent Advances on Structure-preserving Algorithms with Applications

Location: **S16-02-02**

10:30am - 11:00am

Hamiltonian Particle-in-Cell methods for Vlasov-Poisson equations

Anjiao Gu, Yang He, Yajuan Sun

11:00am - 11:30am

Variational integrators for the Lagrangian quadratic in velocities

Yihan Shen

SciCADE 2024 Location: S16-02-08 (Blk S16 Level 2 Room 8)

Date: Monday, 15/July/2024

10:30am - 12:30pm MS01-1 Recent Advances in Fast Algorithms and Integral Equation Methods

Location: S16-02-03

10:30am - 11:00am

Rapid evaluation of Newtonian potentials on planar domains

Zewen Shen, Kirill Serkh

11:00am - 11:30am

High-order quadrature for the evaluation of layer potentials on surfaces in three dimensions via exterior extension and complete reduction

Hai Zhu, Shidong Jiang

11:30am - 12:00pm

The Approximation of Singular Functions by Series of Non-integer Powers

Mohan Zhao, Kirill Serkh

12:00pm - 12:30pm

A panel based trapezoidal quadrature for surface integral operators

Bowei Wu, Joar Bagge

3:30pm - 5:30pm MS01-2 Recent Advances in Fast Algorithms and Integral Equation Methods

Location: S16-02-03

3:30pm - 4:00pm

Fast and accurate simulation of close-to-touching discs in 2D Stokes flow

Dhairya Malhotra, Mariana Martinez Aguilar, Dan Fortunato

4:00pm - 4:30pm

A fast integral equation solver for surface PDEs.

Tristan Goodwill, Michael O'Neil, Jeremy Hoskins

4:30pm - 5:00pm

A Dual-space Multilevel Kernel-splitting Framework for Discrete and Continuous Convolution

Shidong Jiang, Leslie Greengard

5:00pm - 5:30pm

Fast algorithms for bulk-surface diffusion

Daniel Fortunato

SciCADE 2024 Location: S16-02-08 (Blk S16 Level 2 Room 8)

Date: Tuesday, 16/July/2024

10:30am - 12:30pm **MS37-1 High-Order Methods for Linear and Nonlinear Wave Propagation**
Location: **S16-02-03**
Chair: Li-Lian Wang

10:30am - 11:00am

Cavity scattering problems for the biharmonic wave equation

Peijun Li

11:00am - 11:30am

Low regularity estimates of the Lie-Trotter time-splitting Fourier spectral method for the logarithmic Schrödinger equation

Xiaolong Zhang, Li-Lian Wang

11:30am - 12:00pm

Structure-preserving spectral and spectral-element methods for Vlasov-Maxwell equations

Zhiguo Yang

12:00pm - 12:30pm

A perfectly matched layer method for signal-propagation problems in axon

Xue Jiang

3:30pm - 6:00pm **MS37-2 High-Order Methods for Linear and Nonlinear Wave Propagation**
Location: **S16-02-03**
Chair: Zhiguo Yang

3:30pm - 4:00pm

Structure-preserving particle-in-cell method for plasma simulations

Zhenli Xu

4:00pm - 4:30pm

Fast boundary element method for scattering problem in layered media

Bo Wang

4:30pm - 5:00pm

Numerical simulation of nonlocal effects in metallic nanostructures using generalized HD model

Maohui Lyu

5:00pm - 5:30pm

A general tetrahedral spectral element method and its implementation to Kohn-Sham equation

Hongfei Zhan, Guanghui Hu

5:30pm - 6:00pm

Numerical methods for the biharmonic nonlinear Schrödinger equation

Teng Zhang

SciCADE 2024 Location: S16-02-08 (Blk S16 Level 2 Room 8)

Date: Wednesday, 17/July/2024

10:30am MS33-1 Challenges and Innovations for the Time-Stepping of PDEs

Location: S16-02-03

-

1:00pm

10:30am - 11:00am

Explicit Runge-Kutta Methods that Avoid Order Reduction with an Optimal Number of Stages

David George Shirokoff, Abhijit Biswas, David Isaac Ketcheson, Steven Byram Roberts, Benjamin Seibold

11:00am - 11:30am

Adaptive methods for the two-time Kadanoff-Baym equations

David Gardner, Thomas Blommel, Emanuel Gull, Carol Woodward

11:30am - 12:00pm

Accelerating non-equilibrium Green's function computation through dynamic mode decomposition and recurrent neural networks

Jia Yin, Yang-hao Chan, Felipe Jornada, Diana Qiu, Steven Louie, Chao Yang

12:00pm - 12:30pm

On the rate of error growth in time for numerical solutions for chosen PDE problems

Sebastian Bleecke

12:30pm - 1:00pm

Leveraging Unconditional Stability Theory to Advance Index-1 Differential-Algebraic Equations Without Inverting Constraints

Kiera Eloise Harmatz-Kean, Benjamin Seibold, Rujeko Chinomona, David Shirokoff

SciCADE 2024 Location: S16-02-08 (Blk S16 Level 2 Room 8)

Date: Thursday, 18/July/2024

10:30am - 12:30pm MS48-1 Recent Advances on Spectral and High-Order Methods

Location: S16-02-03

10:30am - 11:00am

A framework for stable spectral methods in d-dimensional unit balls

Jing GAO

11:00am - 11:30am

Finite-difference method on the surface of the helical pipes

Yujian Jiao

11:30am - 12:00pm

A convolution quadrature using derivatives and its application

Junjie Ma

12:00pm - 12:30pm

A unified superconvergent postprocessing technique for Galerkin time-stepping methods

Lijun Yi

3:30pm - 5:30pm MS53-1 Surface Evolution and Harmonic Maps

Location: S16-02-03

3:30pm - 4:00pm

Error estimates for inextensible elastic curves

Soeren Bartels

4:00pm - 4:30pm

Numerical analysis for fourth order geometric curve evolutions based on the DeTurck trick

Robert Nürnberg, Klaus Deckelnick

4:30pm - 5:00pm

Accelerated gradient flows for large bending deformations of nonlinear plates

Guozhi Dong, Hailong Guo, Shuo Yang

5:00pm - 5:30pm

Convergence of an evolving finite element method for surface evolution with tangential motion by harmonic map heat flow

Guangwei Gao, Buyang Li, Rong Tang

Date: Friday, 19/July/2024

10:30am - 11:30am MS48-2 Recent Advances on Spectral and High-Order Methods

Location: S16-02-03

10:30am - 11:00am

Spectral collocation method for numerical solution to the fully nonlinear Monge-Ampère equation

Zhaoxiang LI

11:00am - 11:30am

Novel spectral methods for maxwell eigenvalue problem using divergence free curl-orthogonal polynomials

Jing Zhang

SciCADE 2024 Location: S16-03-04 (Blk S16 Level 3 Room 4)

Date: Monday, 15/July/2024

10:30am MS25-1 Analysis and Numerical Computations for Kinetic Models

Location: **S16-03-04**

-
12:30pm

10:30am - 11:00am

Discontinuous Galerkin Finite Element Methods for Port-Hamiltonian Dynamical Systems

Yan Xu

11:00am - 11:30am

Kinetic modeling of infectious viral dynamics based on mutual utility functions

Giulia Bertaglia, Lorenzo Pareschi, Giuseppe Toscani

11:30am - 12:00pm

Efficient asymptotic preserving SL-DG methods for multiscale kinetic transport equations

Tao Xiong

12:00pm - 12:30pm

Neural PDE Solvers toward Digital Twin: Theory and Applications

Hyung Ju Hwang, Hwi Jae Son, Jaeyong Lee, Hyuntae Jo

3:30pm

MS25-2 Analysis and Numerical Computations for Kinetic Models

Location: **S16-03-04**

-
5:30pm

3:30pm - 4:00pm

A fast iteration for the moment model of the Boltzmann-BGK equation in near-continuum regimes

Zhicheng Hu

4:00pm - 4:30pm

Reduced Variance Random Batch Methods for nonlocal meanfield equations

Mattia Zanella

4:30pm - 5:00pm

On a kinetic Elo rating model for players with dynamical strength

Bertram Düring

5:00pm - 5:30pm

Stochastic Galerkin Particle Methods for Kinetic Equations of Plasmas with Uncertainties

Andrea Medaglia

SciCADE 2024 Location: S16-03-04 (Blk S16 Level 3 Room 4)

Date: Tuesday, 16/July/2024

10:30am - 12:30pm **MS21 Recent Progress on Data Driven Reduced Order Models for Kinetic Transport Problems**
Location: **S16-03-04**

10:30am - 11:00am

A symplectic deep autoencoder for Hamiltonian systems

Wei Guo

11:00am - 11:30am

Hyperbolic machine learning moment closure models for the radiative transfer equation

Juntao Huang

11:30am - 12:00pm

Finite Expression Method: A Symbolic Approach for Scientific Machine Learning

Haizhao Yang

12:00pm - 12:30pm

A Reduced Order Model Enhanced Iterative Solver for Parametric Radiative Transfer Equation

Zhichao Peng

3:30pm - 6:00pm **MS18-1 Recent Advances in Structure-preserving Numerical Methods for Complex Nonlinear Systems**
Location: **S16-03-04**

3:30pm - 4:00pm

A Thermodynamically Consistent Nonisothermal Hydrodynamical Model for Binary Fluids with Cross-Coupling

Qi Wang

4:00pm - 4:30pm

APTT: An accuracy-preserved tensor-train method for the Boltzmann-BGK equation

Zhitao Zhu, Chuanfu Xiao, Kejun tang, Jizu Huang, Chao Yang

4:30pm - 5:00pm

A new flow dynamic approach for Wasserstein gradient flows

Qing Cheng

5:00pm - 5:30pm

Structure-preserving Oscillation-Eliminating Hermite WENO Method for Hyperbolic Systems

Chuan Fan

5:30pm - 6:00pm

A structure-preserving method to the Boltzmann equation

Bo Lin, Zhenning Cai

SciCADE 2024 Location: S16-03-04 (Blk S16 Level 3 Room 4)

Date: Wednesday, 17/July/2024

10:30am
-
1:00pm

MS18-2 Recent Advances in Structure-preserving Numerical Methods for Complex Nonlinear Systems
Location: **S16-03-04**

10:30am - 11:00am

A linearly implicit energy-preserving method for the logarithmic Klein-Gordon equation

Qingzhou Shu, Chunmei Su, [Qinglin Tang](#)

11:00am - 11:30am

New fully decoupled and high-order algorithms with optimal energy approximation for the Cahn-Hilliard-Navier-Stokes phase field model

[Xiaoli Li](#)

11:30am - 12:00pm

STRUCTURE PRESERVING IMPLICIT-EXPLICIT RUNGE-KUTTA METHODS FOR GRADIENT FLOWS

[Zhaohui Fu](#)

12:00pm - 12:30pm

Highly Efficient Numerical Methods for Energy Dissipative/Conservative Nonlinear Systems

[Yanrong Zhang](#)

12:30pm - 1:00pm

New unconditionally stable higher-order consistent splitting schemes for the Navier-Stokes equations

[Fukeng Huang](#), [Jie Shen](#)

SciCADE 2024 Location: S16-03-04 (Blk S16 Level 3 Room 4)

Date: Thursday, 18/July/2024

10:30am - 12:30pm **MS45 Numerical Methods for Quantum Many-Body Problems**

Location: **S16-03-04**

10:30am - 11:00am

Adaptive diagonal basis sets for electronic structure theory

Michael Lindsey

11:00am - 11:30am

Density Estimation via Sketching and its Applications in Solving Fokker-Planck Equation

Siyao Yang

11:30am - 12:00pm

Parallel Coordinate Descent Full Configuration Interaction

Weiguo Gao, Yingzhou Li, Yuejia Zhang

12:00pm - 12:30pm

Augmented Lagrangian method for coupled-cluster

Fabian Maximilian Faulstich

3:30pm - 5:30pm **MS31-1 Advances in Scientific Machine Learning with Applications to Uncertainty Quantification**

Location: **S16-03-04**

3:30pm - 4:00pm

Learning prediction function of prior measures for statistical inverse problems

Junxiong Jia

4:00pm - 4:30pm

On theoretical understanding of generative distribution learning through the lens of infinite-dimensional statistics

Lin Liu, Ling Guo, Lei Ma, Sihui Zhao

4:30pm - 5:00pm

Deep adaptive sampling for surrogate modeling without labeled data

Kejun Tang

5:00pm - 5:30pm

Deep adaptive density approximation for Fokker-Planck type equations

Li Zeng

Date: Friday, 19/July/2024

10:30am - 11:30am **MS31-2 Advances in Scientific Machine Learning with Applications to Uncertainty Quantification**

Location: **S16-03-04**

10:30am - 11:00am

Phase Field Smoothing-PINN: a neural network solver for partial differential equations with discontinuous coefficients

Zihao Yang, Rui He, Jizu Huang, Xiaofei Guan

11:00am - 11:30am

Resolution invariant deep operator network for PDEs with complex geometries

Yue Qiu

SciCADE 2024 Location: S16-03-05/06 (Blk S16 Level 3 Room 5/6)

Date: Monday, 15/July/2024

10:30am - 12:30pm **MS19 Recent Advances in Theories and Computations of Liquid Crystals**
Location: **S16-03-05/06**

10:30am - 11:00am

Classical density functional theory for colloidal liquid crystals: predicting phase behavior and topological defects from first principles

René Wittmann

11:00am - 11:30am

Quasi-entropy

Jie Xu

11:30am - 12:00pm

From Polyatomic Gas to Liquid Crystals: A Kinetic Approach

Umberto Zerbinati, Patrick E. Farrell, Giovanni Russo

12:00pm - 12:30pm

Recent progress on the hyperbolic Ericksen-Leslie system for liquid crystals

Ning Jiang

3:30pm - 5:30pm **MS05-1 Numerical Methods for Geometric PDEs and Interface Problems**
Location: **S16-03-05/06**

3:30pm - 4:00pm

A convergent evolving finite element method with artificial tangential motion for surface evolution under a prescribed velocity field.

Genming Bai

4:00pm - 4:30pm

An ALE meshfree method for surface PDEs coupling with forced mean curvature flow

Xinlong Feng

4:30pm - 5:00pm

Parametric finite element approximation of two-phase Navier–Stokes flow with viscoelasticity

Harald Garcke, Robert Nürnberg, Denni Trautweins

5:00pm - 5:30pm

Including low-dimensional features in 2D surface models

Elena Bachini, Antonia Larese, Mario Putti, Guglielmo Scovazzi

SciCADE 2024 Location: S16-03-05/06 (Blk S16 Level 3 Room 5/6)

Date: Tuesday, 16/July/2024

10:30am - 12:30pm	MS05-2 Numerical Methods for Geometric PDEs and Interface Problems Location: S16-03-05/06
	10:30am - 11:00am Multilevel Representations of Isotropic Gaussian Random Fields on the Sphere <u>Ana Djurdjevac</u>
	11:00am - 11:30am Numerical analysis of a spectral problem with Ventcel boundary conditions on curved meshes <u>Joyce Ghantous</u>
	11:30am - 12:00pm Space-time adaptivity for parabolic PDEs on stationary surfaces <u>Michael Lantelme, Balázs Kovács</u>
	12:00pm - 12:30pm Parametric polynomial preserving recovery on manifolds and its application <u>Hailong Guo</u>
3:30pm - 6:00pm	MS20-1 Mathematical Modeling, Analysis and Numerical Methods for Interface Problems and Related Geometric Flows Location: S16-03-05/06
	3:30pm - 4:00pm A Variational Approach to the Modelling of Evaporating Droplets <u>Tiezheng Qian</u>
	4:00pm - 4:30pm Mechanics at Nano-Bio interface: Cellular Packing of Flexible Nanomaterials and Membrane Targeting Antimicrobials <u>Guijin Zou, Xin Yi, Huajian Gao</u>
	4:30pm - 5:00pm Hydrodynamics of a thin film of active nematic fluid <u>Yakun LI</u>
	5:00pm - 5:30pm Capillary Folding of Thin Elastic Sheets <u>Zhixuan Li</u>
	5:30pm - 6:00pm Modeling inertial migration of particles in curved duct flow <u>Brendan Harding</u>

SciCADE 2024 Location: S16-03-05/06 (Blk S16 Level 3 Room 5/6)

Date: Wednesday, 17/July/2024

10:30am
-
1:00pm

MS20-2 Mathematical Modeling, Analysis and Numerical Methods for Interface Problems and Related Geometric Flows
Location: **S16-03-05/06**

10:30am - 11:00am

Transformed Model Reduction for Partial Differential Equations with Sharp Inner Layers

Tianyou Tang, Xianmin Xu

11:00am - 11:30am

Efficient methods for interface related optimization problems

Dong Wang

11:30am - 12:00pm

Parametric finite element methods for anisotropic axisymmetric flows

Meng Li

12:00pm - 12:30pm

Numerical investigations on solving surface interface problems

Xufeng Xiao

12:30pm - 1:00pm

Evolving finite element methods with an artificial tangential velocity for mean curvature flow and Willmore flow

Jiashun Hu, Buyang Li

SciCADE 2024 Location: S16-03-05/06 (Blk S16 Level 3 Room 5/6)

Date: Thursday, 18/July/2024

10:30am - 12:30pm **MS07 Recent Advances in Fractional-step Methods: Advances and Pitfalls**

Location: **S16-03-05/06**

10:30am - 11:00am

Solving the Real-Time Boltzmann Transport Equation with Adaptive and Multirate Time Integration Methods

Jia Yao, Ivan Maliyov, Carol S. Woodward, David Gardner, Marco Bernardi

11:00am - 11:30am

Splitting for low regularity problems

Alexander Ostermann

11:30am - 12:00pm

Numerical integration of the Schrödinger equation: Polynomial versus splitting methods

Sergio Blanes

12:00pm - 12:30pm

Wrong solutions for differential systems

Uri Michael Ascher

3:30pm - 5:30pm **MS20-3 Mathematical Modeling, Analysis and Numerical Methods for Interface Problems and Related Geometric Flows**

Location: **S16-03-05/06**

3:30pm - 4:00pm

Original Energy Dissipation Preserving Exponential Time Differencing Runge-Kutta methods for Phase-field Gradient Flows

Jiang Yang

4:00pm - 4:30pm

Structure-preserving parametric finite element method for some curvature flows with nonlocal terms

Lifang Pei

4:30pm - 5:00pm

A Structure-Preserving Parametric Finite Element Method of Anisotropic Geometric Flows

Yifei Li

5:00pm - 5:30pm

High order in time, BGN-based parametric finite element methods for solving geometric flows

Wei Jiang, Chunmei Su, Ganghui Zhang

Date: Friday, 19/July/2024

10:30am - 11:30am **MS53-2 Surface Evolution and Harmonic Maps**

Location: **S16-03-05/06**

10:30am - 11:00am

Numerics of the stochastic Landau-Lifshitz-Gilbert equation

Michael Feischl

11:00am - 11:30am

Stability and Volume Conservation in the Multi-Phase Mullins-Sekerka Problem: A Finite Element Perspective

Tokuhiro Eto

SciCADE 2024 Location: S16-03-07 (Blk S16 Level 3 Room 7)

Date: Monday, 15/July/2024

10:30am
-
12:30pm

MS55-1 Dynamical Systems, Structure Preservation and Deep Learning
Location: S16-03-07

10:30am - 11:00am

Nearest Neighbors GParareal: Improving Scalability of Gaussian Processes for Parallel-in-Time Solvers
Lyudmila Grigoryeva, Guglielmo Gattiglio, Massimiliano Tamborrino

11:00am - 11:30am

Neural network aided simulation of ordinary differential equations
Marta Betcke, Priscilla Canizares, Lisa Kreusser, Davide Murari, Ferdia Sherry, Zak Shumaylov

11:30am - 12:00pm

Greedy algorithm with randomized dictionaries in application to ReLU^k shallow neural network approximation
Jongho Park, Xiaofeng Xu, Jinchao Xu

12:00pm - 12:30pm

An error bound of PINNs for solving differential equations
Takashi Matsubara, Takaharu Yaguchi

3:30pm
-
5:30pm

MS55-2 Dynamical Systems, Structure Preservation and Deep Learning
Location: S16-03-07

3:30pm - 4:00pm

Designing Stable Neural Networks using Convex Analysis and ODEs
Ferdia John Sherry, Elena Celledoni, Matthias Joachim Ehrhardt, Davide Murari, Brynjulf Owren, Carola-Bibiane Schönlieb

4:00pm - 4:30pm

Stability of numerical methods on Riemannian manifolds with applications to neural networks.
Brynjulf Owren, Elena Celledoni

4:30pm - 5:00pm

Deep learning and oscillatory dynamical systems
Richard Tsai

5:00pm - 5:30pm

Reversible numerical methods in deep learning
Sofya Maslovskaya, Sina Ober-Blobbaum, Christian Offen, Pranav Singh, Boris Wempe

SciCADE 2024 Location: S16-03-07 (Blk S16 Level 3 Room 7)

Date: Tuesday, 16/July/2024

10:30am - 12:30pm MS55-3 Dynamical Systems, Structure Preservation and Deep Learning
Location: S16-03-07

10:30am - 11:00am

A Structure-Preserving Kernel Method for Learning Hamiltonian Systems

Jianyu Hu, [Juan-Pablo Ortega](#), Daiying Yin

11:00am - 11:30am

Kernel-based techniques for the learning of Poisson systems

[Jianyu Hu](#), [Juan-Pablo Ortega](#), Daiying Yin

11:30am - 12:00pm

Multi-Resolution Learning of Partial Differential Equations with Deep Operators and Long Short-Term Memory Networks

[Katarzyna Michalowska](#)

12:00pm - 12:30pm

On The Temporal Domain of Differential Equation Inspired Graph Neural Networks

[Moshe Eliasof](#)

3:30pm - 6:00pm MS55-4 Dynamical Systems, Structure Preservation and Deep Learning
Location: S16-03-07

3:30pm - 4:00pm

Almost sure convergence of stochastic Hamiltonian descent methods

[Máns Williamson](#)

4:00pm - 4:30pm

Geometric Learning with Group Convolutions: PDE-Based Equivariant Neural Networks and Optimal Transport.

[Gautam Pai](#)

4:30pm - 5:00pm

Convolving dynamics between scales

[James Jackaman](#)

5:00pm - 5:30pm

Stochastic interpolation, score matching and generative models

[Eldad Haber](#)

SciCADE 2024 Location: S16-03-07 (Blk S16 Level 3 Room 7)

Date: Wednesday, 17/July/2024

10:30am - 1:00pm **MS41-1 Machine Learning and Novel Numerical Methods for Dynamical Systems**
Location: **S16-03-07**

10:30am - 11:00am

Theoretical Insights into the Structure of SGD Noise

Lei Wu

11:00am - 11:30am

SAV-based optimization methods for the training in deep learning

Zhiping Mao

11:30am - 12:00pm

Gaussian process for parameter estimation in dynamic systems

Hongqiao Wang

12:00pm - 12:30pm

A Minimal Control Family of Dynamical System for Universal Approximation

Yifei Duan, Yongqiang Cai

12:30pm - 1:00pm

Weak Generative Sampler to Efficiently Sample Invariant Distribution of Stochastic Differential Equation

Zhiqiang Cai, Yu Cao, Yuanfei Huang, Xiang Zhou

SciCADE 2024 Location: S16-03-07 (Blk S16 Level 3 Room 7)

Date: Thursday, 18/July/2024

10:30am - 12:30pm MS55-5 Dynamical Systems, Structure Preservation and Deep Learning
Location: S16-03-07

10:30am - 11:00am

PiLocNet: Physics-informed neural network on 3D localization with rotating point spread function

Mingda Lu, Zitian Ao, [Chao Wang](#), Sudhakar Prasad, Raymond Chan

11:00am - 11:30am

Compositional Physics Informed Neural Network

Pratham Lalwani, [Andy Wan](#)

11:30am - 12:00pm

Surrogate Simulations of Charged Particle Dynamics Using Structure-Preserving Neural Networks

[Jian Liu](#)

12:00pm - 12:30pm

An attempt to apply particle method for the Cahn-Hilliard equation to preserve some invariant properties

[Daisuke Furihata](#)

3:30pm - 5:30pm MS41-2 Machine Learning and Novel Numerical Methods for Dynamical Systems
Location: S16-03-07

3:30pm - 4:00pm

Bridging data and dynamics in single-cell transcriptomics analysis through machine learning

[Peijie Zhou](#)

4:00pm - 4:30pm

Thermodynamically Consistent Model Reduction of Polymeric Fluid Dynamics using OnsagerNet

[Haijun Yu](#)

4:30pm - 5:00pm

A hybrid adaptive sampling for solving Fokker-Planck equations

[Jiayu Zhai](#)

5:00pm - 5:30pm

Functional Tipping Indicators via Schrödinger Bridge

[Jin Guo](#), [Ting Gao](#)

Date: Friday, 19/July/2024

10:30am - 11:30am MS10-2 Recent Advances in Complexity Reduction for High-dimensional Problems
Location: S16-03-07

10:30am - 11:00am

High-order parallel time integrators for dynamical low-rank approximation

[Jonas Kusch](#)

11:00am - 11:30am

Generalised Petrov-Galerkin Dynamical Low Rank Approximations

[Thomas Trigo Trindade](#), Fabio Nobile

SciCADE 2024 Location: S16-03-09 (Blk S16 Level 3 Room 9)

Date: Monday, 15/July/2024

10:30am - 12:30pm MS50-1 Recent Development of Generative Models in Computational Mathematics and Data Sciences
Location: **S16-03-09**

10:30am - 11:00am

Generalization of DeepONets for Learning Operators Arising from a Class of Singularly Perturbed Problems
Zhongyi Huang

11:00am - 11:30am

Exploring the Optimal Choice for Generative Processes in Diffusion Models
Yu Cao, Jingrun Chen, Yixin Luo, Xiang Zhou

11:30am - 12:00pm

On Asymptotic-Preserving Neural Networks for the Semiconductor Boltzmann Equation
Liu Liu

12:00pm - 12:30pm

A convergent interacting particle method for computing KPP front speeds in random flows
Tan Zhang, Zhongjian Wang, Jack Xin, Zhiwen Zhang

3:30pm - 5:30pm MS24 Mathematical and Machine Learning Methods in Imaging and Inverse Problems
Location: **S16-03-09**

3:30pm - 4:00pm

Sampling Strategies in Sparse Bayesian Inference
Yiqiu Dong

4:00pm - 4:30pm

Neural Expectation Maximization for Self-supervised Blind Image Deblurring
Ji Hui

4:30pm - 5:00pm

PDEformer: Towards a Foundation Model for Solving Parametric PDEs and Beyond
Bin Dong

5:00pm - 5:30pm

Bi-modality Images Transfer with a Discrete Process Matching Method
Zhe Xiong, Qiaoqiao Ding, Xiaoqun Zhang

SciCADE 2024 Location: S16-03-09 (Blk S16 Level 3 Room 9)

Date: Tuesday, 16/July/2024

10:30am - 12:30pm	MS50-2 Recent Development of Generative Models in Computational Mathematics and Data Sciences Location: S16-03-09
	10:30am - 11:00am Structure-preserving generative models and their statistical guarantees <u>Wei Zhu</u>
	11:00am - 11:30am Convex Relaxation for Fokker-Planck Yian Chen, <u>Yuehaw Khoo</u> , Lek-Heng Lim
	11:30am - 12:00pm Probabilistic Forecasting with Stochastic Interplants and Follmer Processes <u>Yifan Chen</u>
	12:00pm - 12:30pm Randomized methods for computing optimal transport without regularization and their convergence analysis <u>Yue Xie</u> , Zhongjian Wang, Zhiwen Zhang
3:30pm - 6:00pm	MS11-1 Recent Advances in Scientific Computing and Learning Location: S16-03-09
	3:30pm - 4:00pm Fast Butterfly-compressed Hadamard-Babich Integrator for High-Frequency Helmholtz Equations in Inhomogeneous Media <u>Jianliang Qian</u> , Yang Liu, Jian Song, Robert Burridge
	4:00pm - 4:30pm Mathematical and numerical study of the signal-propagation problem in axon <u>Tao Yin</u>
	4:30pm - 5:00pm Deep neural networks with mathematical background for image segmentation <u>Hao Liu</u>
	5:00pm - 5:30pm Well-posedness and numerical analysis of a class of hemivariational inequalities governed by fluid-fluid coupled flow <u>Feifei Jing</u>
	5:30pm - 6:00pm Fast minimization for curvature based regularization models based on bilinear decomposition <u>Huibin Chang</u>

SciCADE 2024 Location: S16-03-09 (Blk S16 Level 3 Room 9)

Date: Wednesday, 17/July/2024

10:30am - 1:00pm MS11-2 Recent Advances in Scientific Computing and Learning
Location: S16-03-09

10:30am - 11:00am

Phase field topology optimization in 3D and 4D printing

Harald Garcke, [Kei Fong Lam](#), Robert Nurnberg, Andrea Signori

11:00am - 11:30am

Wasserstein Hamiltonian Flow and Its Structure Preserving Numerical Schemes.

[Jianbo Cui](#)

11:30am - 12:00pm

Spherical Essentially Non-Oscillatory (SENO) Interpolation

[Shingyu Leung](#)

12:00pm - 12:30pm

Convergence Analysis of Nonlinear Kaczmarz Method for Systems of Nonlinear Equations with Component-wise Convex Mapping

[Chong Chen](#)

12:30pm - 1:00pm

Efficient threshold dynamics methods for topology optimization for fluids and heat transfer problems

[Huangxin Chen](#)

SciCADE 2024 Location: S16-03-09 (Blk S16 Level 3 Room 9)

Date: Thursday, 18/July/2024

10:30am - 12:30pm	MS11-3 Recent Advances in Scientific Computing and Learning Location: S16-03-09
	10:30am - 11:00am Fast and accurate solvers for three dimensional wave scattering problems <u>Jun Lai</u>
	11:00am - 11:30am Rigidity of PDE operators on model identification from scarce data <u>Roy Yuchen He</u>
	11:30am - 12:00pm Numerical Algorithms for Inverse Spectral Problems Based on Trace Formulas <u>Xiang Xu</u>
	12:00pm - 12:30pm Modeling Randomness Effects in High-Entropy Alloys <u>Luchan Zhang</u>
3:30pm - 5:30pm	MS42 Machine Learning in Multiscale and Reduced Order Methods for the Simulation of Physical Systems Location: S16-03-09
	3:30pm - 4:00pm Moving Sampling Physics-informed Neural Networks induced by Moving Mesh PDE <u>Qiaolin He</u>
	4:00pm - 4:30pm High order asymptotic computations for the Dirichlet eigenvalue problem in perforated domain with multiscale cavities. <u>Qiang Ma</u>
	4:30pm - 5:00pm A Framework for Generalization Analysis of Machine-Learned Interatomic Potentials: A Case Study on Crystalline Defects <u>Yangshuai Wang</u>
	5:00pm - 5:30pm Automated discovery of fundamental variables hidden in experimental data <u>Kuang Huang</u>

Date: Friday, 19/July/2024

10:30am - 11:30am	MS51 Recent Trends in Stabilized FE Methods for Fluid Flows Location: S16-03-09
	10:30am - 11:00am Variational Multiscale FEM for Cahn-Hilliard-Navier-Stokes Model <u>Anil Rathi, B. V. Rathish Kumar</u>
	11:00am - 11:30am Variational multiscale Stabilized FEM for unified FSI model <u>DIPAK KUMAR SAHOO, B V RATHISH KUMAR</u>

SciCADE 2024 Location: S17-04-04 (Blk S17 Level 4 Seminar Room 3)

Date: Monday, 15/July/2024

10:30am
-
12:30pm

MS02 Advances in Markov chain Sampling Methods
Location: **S17-04-04**

10:30am - 11:00am

Non-reversible guided Metropolis kernel
Kengo Kamatani, Xiaolin Song

11:00am - 11:30am

Optimistic Estimation of Convergence in Markov Chains with the Average Mixing Time
Geoffrey Wolfer, Pierre Alquier

11:30am - 12:00pm

Importance Sampling for Rare Event Tracking in Ensemble Kalman Filters
Nadhir Ben Rached, Erik von Schwerin, Gaukhar Shaimerdenova, Raúl Tempone

12:00pm - 12:30pm

Predictive Resampling for Martingale Posteriors
Edwin Fong

3:30pm
-
5:30pm

MS47 Recent Advances in Numerical Homogenization
Location: **S17-04-04**

3:30pm - 4:00pm

An efficient exponential integrator for generalized multiscale finite element methods
Eric Chung

4:00pm - 4:30pm

Reliable coarse-scale approximation of spatial network models
Moritz Hauck, Axel Målqvist, Roland Maier

4:30pm - 5:00pm

Wavelet-based Edge Multiscale Parareal Algorithm for subdiffusion equations with heterogeneous coefficients in a large time domain
Guanglian Li

5:00pm - 5:30pm

Numerical Methods for Multiscale Equations with Discontinuous Coefficients
Chen Hui Pang, Viet Ha Hoang

SciCADE 2024 Location: S17-04-04 (Blk S17 Level 4 Seminar Room 3)

Date: Tuesday, 16/July/2024

10:30am - 12:30pm MS23-1 Modeling and Simulations for Multiphase Interface Problem
Location: S17-04-04

10:30am - 11:00am

Multiscale topology optimization method for lattice materials

Yibao Li, Binhu Xia

11:00am - 11:30am

A novel steepness-adjustable harmonic volume-of-fluid method for interface capturing

Weidan Ni, Qinghong Zeng, Yucang Ruan, Zhiwei He

11:30am - 12:00pm

Decoupled multiscale finite element methods for the Stokes-Darcy model

Haibiao Zheng

12:00pm - 12:30pm

Structure preserving primal dual methods for free interface dynamics as gradient flows with respect to transport distances

Chaozhen Wei

3:30pm - 6:00pm MS23-2 Modeling and Simulations for Multiphase Interface Problem
Location: S17-04-04

3:30pm - 4:00pm

A fourth-order kernel-free boundary integral method for variable coefficients elliptic PDEs

Yaning Xie

4:00pm - 4:30pm

Three-layer Hele-Shaw problem driven by a sink

Meng Zhao

4:30pm - 5:00pm

Exploring Cancer Mechanisms: Mechanical and Chemical Interactions in Tumor Growth

Min-Jhe Lu

5:00pm - 5:30pm

A Cartesian grid method for nonhomogeneous elliptic interface problems on unbounded domains

Wenjun Ying

5:30pm - 6:00pm

A parameter-free staggered-grid Lagrangian scheme for two-dimensional compressible flow problems

Xihua Xu

SciCADE 2024 Location: S17-04-04 (Blk S17 Level 4 Seminar Room 3)

Date: Wednesday, 17/July/2024

10:30am MS30-1 Advanced Numerical Methods for CFD with Applications

Location: S17-04-04

-
1:00pm

10:30am - 11:00am

Robust and Efficient Unstructured Finite Volume Method for Compressible Flow Simulations

Xiaoquan Yang, Jia Yan, Jue Ding

11:00am - 11:30am

A mechanism-informed reinforcement learning framework for shape optimization of airfoils

Jingfeng Wang, Guanghui Hu

11:30am - 12:00pm

A compact fully-discrete high-order schemes for complex flow simulation

Shucheng Pan, Tong Zhou

12:00pm - 12:30pm

A discontinuity feedback factor for compressible flow simulation

Xing Ji

12:30pm - 1:00pm

Numerical Simulation of High Enthalpy Flows using Gas-Kinetic Scheme with Multi-Temperature Model

Hualin Liu, Xing Ji

SciCADE 2024 Location: S17-04-04 (Blk S17 Level 4 Seminar Room 3)

Date: Thursday, 18/July/2024

10:30am - 12:30pm MS22 Stochastic Numerics with Applications to Sampling
Location: S17-04-04

10:30am - 11:00am

Unbiased Kinetic Langevin Monte Carlo Methods

Neil Kumar Chada, Benedict Leimkuhler, Daniel Paulin, Peter Whalley

11:00am - 11:30am

Enhanced Gradient Flows of Parameters and Probability Measures for Statistical Inference

Sam Power, Rocco Caprio, Adam Johansen, Jen Ning Lim, Juan Kuntz

11:30am - 12:00pm

Application of the Hopf algebra structures of exotic aromatic series to stochastic numerical analysis

Adrien Laurent, Eugen Bronasco

12:00pm - 12:30pm

Collective Behavior in Interacting Particle Systems

Benedict Leimkuhler, René Lohmann, Greg Pavliotis, Peter Whalley

3:30pm - 5:30pm MS30-2 Advanced Numerical Methods for CFD with Applications
Location: S17-04-04

3:30pm - 4:00pm

A staggered Lagrangian MHD method based on subcell Riemann solver

Zhijun Shen

4:00pm - 4:30pm

Physical-constraint-preserving high-order DG method for compressible multi-medium flows

Fan Zhang

4:30pm - 5:00pm

Multiple-GPU accelerated high-order gas-kinetic scheme for direct numerical simulation of compressible turbulence

Liang Pan

5:00pm - 5:30pm

Multi-scale finite element method (MsFEM) for incompressible flows

Loïc Balazi, Grégoire Allaire, Pascal Omnes

Date: Friday, 19/July/2024

10:30am - 11:30am MS30-3 Advanced Numerical Methods for CFD with Applications
Location: S17-04-04

10:30am - 11:00am

High-fidelity simulation based on multi-moment finite volume method on hybrid unstructured grids

Bin Xie, Feng Xiao

11:00am - 11:30am

Advanced computing process in HODG framework

Kun Wang, Tiegang Liu

SciCADE 2024 Location: S17-04-05 (Blk S17 Level 4 Seminar Room 2)

Date: Monday, 15/July/2024

10:30am - 12:30pm **MS13 Numerical and Data-driven Tools for Stochastic Delay and Nonlocal Equations**

Location: **S17-04-05**

10:30am - 11:00am

On the Euler method for stochastic delay differential equations

Dimitri Breda, Stefano Maset

11:00am - 11:30am

Regularity and numerics for fractional stochastic elliptic PDEs on graphs

David Bolin, Mihály Kovács, Vivek Kumar, Alexandre B. Simas

11:30am - 12:00pm

Sparse identification of stochastic delay differential equations

Dimitri Breda, Dajana Conte, Raffaele D'Ambrosio, Muhammad Tanveer, Ida Santaniello

12:00pm - 12:30pm

Unified Framework for Momentum Stochastic Gradient Descent: Insights from Linear Multistep Methods

Qian Guo

3:30pm - 5:30pm **MS26-1 Dynamical Low Rank Approximation: From Theory to Applications**

Location: **S17-04-05**

3:30pm - 4:00pm

An overview of dynamical low-rank techniques for hyperbolic problems

Lukas Einkemmer

4:00pm - 4:30pm

Dynamical Low-Rank Approximation of SDEs

Yoshihito Kazashi, Fabio Nobile, Fabio Zoccolan

4:30pm - 5:00pm

Semi-Implicit Dynamical Low Rank Approximation: Convergence to Equilibrium

Stefan Schnake, Eirik Endeve, Cory Hauck, Peiming Yin

5:00pm - 5:30pm

Dynamical low-rank tensor methods for quantum simulations

Dominik Sulz, Christian Lubich, Gianluca Ceruti, Jonas Kusch

SciCADE 2024 Location: S17-04-05 (Blk S17 Level 4 Seminar Room 2)

Date: Tuesday, 16/July/2024

10:30am - 12:30pm MS26-2 Dynamical Low Rank Approximation: From Theory to Applications

Location: S17-04-05

10:30am - 11:00am

Dynamical low-rank approximation accelerated by the discrete empirical interpolation method

Benjamin Carrel, Bart Vandereycken

11:00am - 11:30am

Neural Network Training with Dynamical Low-Rank Inspired Optimizers

Steffen Schotthoefer, Jonas Kusch, Gianluca Ceruti, Emanuele Zangrando, Francesco Tudisco

11:30am - 12:00pm

Multi-level dynamical low-rank approximations for stochastic problems in radiation therapy

Pia Katharina Stammer, Jonas Kusch, Danny Lathouwers, Chinmay Patwardhan, Niklas Wahl

12:00pm - 12:30pm

Parametric PDEs and low-rank approximation of function-valued matrices

Stanislav Budzinskiy

12:30pm - 1:00pm

Cost-Effective Time Integration of Nonlinear Tensor Differential Equations on Low-Rank Tucker Tensor and Tensor Train Manifolds

Behzad Ghahremani, Hessam Babaei

3:30pm - 6:00pm MS38 High-Performance Computational Methods for Wave Phenomena and Related Applications

Location: S17-04-05

3:30pm - 4:00pm

Machine Learning and Seismic Tomography

Xu Yang

4:00pm - 4:30pm

A class of second-order dissipative hyperbolic PDEs and their applications in variational problems

Guozhi Dong

4:30pm - 5:00pm

Seismic tomography with random batch gradient reconstruction

Yixiao Hu, Lihui Chai, Xu Yang, Zhongyi Huang

5:00pm - 5:30pm

Scalable Iterative Data-Adaptive RKHS Regularization

Haibo Li, Jinchao Feng, Fei Lu

5:30pm - 6:00pm

Adjoint method for elliptically anisotropic wave equations with application in medical and seismic imaging

Ping Tong

SciCADE 2024 Location: S17-04-05 (Blk S17 Level 4 Seminar Room 2)

Date: Wednesday, 17/July/2024

10:30am - 1:00pm MS35-1 Discretization Methods Involving Multiple Levels and Scales

Location: S17-04-05

10:30am - 11:00am

Error bounds for discrete minimizers of the Ginzburg-Landau energy in the high- κ regime

Benjamin Dörich, Patrick Henning

11:00am - 11:30am

A multcale generalized FEM based on locally optimal spectral approximations for high-frequency wave problems

Chupeng Ma, Christian Alber, Robert Scheichl

11:30am - 12:00pm

Hierarchical Super-Localized Orthogonal Decomposition Methods for Multiscale Elliptic Problems

José Carlos Garay, Hannah Mohr, Daniel Peterseim

12:00pm - 12:30pm

Information Geometric Regularization of the Barotropic Euler Equation

Ruijia Cao, Florian Schaefer

12:30pm - 1:00pm

Numerical homogenization of nondivergence-form PDEs in a Cordes framework

Timo Sprekeler

SciCADE 2024 Location: S17-04-05 (Blk S17 Level 4 Seminar Room 2)

Date: Thursday, 18/July/2024

10:30am - 12:30pm **MS34 Computational Techniques for Bayesian Data Assimilation**
Location: **S17-04-05**

10:30am - 11:00am

Ensemble Kalman Inversion in high dimension

Xin Tong

11:00am - 11:30am

Tensor-Train Methods for Sequential State and Parameter Estimation in State-Space Models

Tiangang Cui, Yiran Zhao

11:30am - 12:00pm

Ensemble Kalman Filtering Meets Gaussian Process State-Space Models

Zhidi Lin

12:00pm - 12:30pm

Convergence rates of non-stationary and deep Gaussian process regression

Conor Moriarty-Osborne, Aretha Teckentrup

3:30pm - 5:30pm **MS27 SDE Methods and Data Science Applications**
Location: **S17-04-05**

3:30pm - 4:00pm

Wasserstein convergence and bias estimates for kinetic Langevin integrators

Peter Archibald Whalley

4:00pm - 4:30pm

Sampling on manifolds via SDEs

Karthik Bharath, Alexander Lewis, Akash Sharma, Michael Tretyakov

4:30pm - 5:00pm

On the ergodicity and sharp error estimates of the stochastic gradient Langevin dynamics

Lei Li, Jian-Guo Liu, Yuliang Wang

5:00pm - 5:30pm

Wasserstein Convergence Guarantees for a General Class of Score-Based Generative Models

Xuefeng Gao

Date: Friday, 19/July/2024

10:30am - 11:30am **MS35-2 Discretization Methods Involving Multiple Levels and Scales**
Location: **S17-04-05**

10:30am - 11:00am

Solving Jump-Coefficient Problems with High Accuracy Using Immersed Three-Field Formulation

Michał Wichrowski

11:00am - 11:30am

Homogeneous multigrid for hybrid discretizations: application to HHO methods

Daniele A. Di Pietro, Zhaonan Dong, Guido Kanschat, Peipei Lu, Pierre Matalon, Andreas Rupp

SciCADE 2024 Location: S17-05-11 (Blk S17 Level 5 Seminar Room 5)

Date: Monday, 15/July/2024

10:30am - 12:30pm MS43-1 Mathematical Methods for Scientific Machine Learning
Location: S17-05-11

10:30am - 11:00am

Convergence of the Randomized Kaczmarz Algorithm in Hilbert Spaces

Xin Guo, Junhong Lin, Dingxuan Zhou

11:00am - 11:30am

Classification with Deep Neural Networks

Lei Shi

11:30am - 12:00pm

Ensemble Kalman filtering for epistemic uncertainty

Chatchuea Kimchaiwong, Jeremie Houssineau, Adam Johansen

12:00pm - 12:30pm

Deterministic Sampling Algorithms

Colin Fox, Li-Jen Hsiao, Jeong-Eun {Kate} Lee

3:30pm - 5:30pm MS43-2 Mathematical Methods for Scientific Machine Learning
Location: S17-05-11

3:30pm - 4:00pm

Adaptive Finite Element Interpolated Neural Networks

Santiago Badia, Wei Li, Alberto F. Martin

4:00pm - 4:30pm

Interplay between Machine Learning and Optimisation via Algorithmic Stability

Yiming Ying

4:30pm - 5:00pm

Global Well-posedness and Convergence Analysis of Score-based Generative Models via Sharp Lipschitz Estimates

Zhongjian Wang

5:00pm - 5:30pm

Nonparametric Distribution Learning via Neural ODEs

Jakob Zech

SciCADE 2024 Location: S17-05-11 (Blk S17 Level 5 Seminar Room 5)

Date: Tuesday, 16/July/2024

10:30am - 12:30pm **MS52 Structure-Preserving Reduced Complexity Modelling and Machine Learning**

Location: **S17-05-11**

10:30am - 11:00am

Learning of Lagrangian odes and pdes from data with UQ

Christian Offen

11:00am - 11:30am

Time Series-Aware Structure-Preserving Neural Networks

Benedikt Brantner

11:30am - 12:00pm

Generalized Hamiltonian Neural Networks for Parameter-dependent Hamiltonian Systems

Philipp Horn, Barry Koren

12:00pm - 12:30pm

Autoencoders for structure-preserving model reduction of stochastic Hamiltonian systems

Tomasz Michal Tyranowski

3:30pm - 6:00pm **MS28 Rough Analysis Methods in Numerical Schemes and Machine Learning**

Location: **S17-05-11**

3:30pm - 4:00pm

Numerics on regularization by noise

Chengcheng Ling

4:00pm - 4:30pm

Optimal rate of convergence for approximations of nonlinear SPDEs with additive space-time white noise

Helena Katharina Kremp

4:30pm - 5:00pm

Primal and dual optimal stopping with signatures

Christian Bayer, Luca Pelizzari, John Schoenmakers

5:00pm - 5:30pm

A multiplicative surface signature through its Magnus expansion

Joscha Diehl, Ilya Chevyrev, Kurusch Ebrahimi-Fard, Nikolas Tapia

SciCADE 2024 Location: S17-05-11 (Blk S17 Level 5 Seminar Room 5)

Date: Wednesday, 17/July/2024

10:30am - 1:00pm MS12-1 Recent Advances in Inverse Problems and Imaging

Location: S17-05-11

10:30am - 11:00am

A priori bounds and a reconstruction method for scattering and inverse scattering by random structures

Gang Bao, [Yiwen Lin](#), Tianjiao Wang, Xiang Xu

11:00am - 11:30am

Inverse scattering with multi-frequency sparse data

[Xiaodong Liu](#)

11:30am - 12:00pm

Mathematical Theory for Electromagnetic Scattering Resonances and Field Enhancement in a Subwavelength Annular Gap

[Wangtao Lu](#)

12:00pm - 12:30pm

The forward and inverse problems for the time-domain wave equation in three dimensions

[Haibing Wang](#)

12:30pm - 1:00pm

Deep decomposition method for the limited aperture inverse obstacle scattering problem

[Yunwen Yin](#), [Liang Yan](#)

SciCADE 2024 Location: S17-05-11 (Blk S17 Level 5 Seminar Room 5)

Date: Thursday, 18/July/2024

10:30am - 12:30pm **MS10-1 Recent Advances in Complexity Reduction for High-dimensional Problems**

Location: **S17-05-11**

10:30am - 11:00am

Regularized dynamical parametric approximation

Christian Lubich, Caroline Lasser, Joerg Nick, Michael Feischl

11:00am - 11:30am

Dynamical approximation and sensor placement for the state estimation of transport problems

Cecilia Pagliantini, Olga Mula, Federico Vismara

11:30am - 12:00pm

Sparse grid techniques for particle-in-cell simulation of kinetic plasmas

Lee Forrest Ricketson

12:00pm - 12:30pm

A hierarchical low-rank algorithm for the kinetic chemical master equation

Lukas Einkemmer, Julian Mangott, Martina Prugger

3:30pm - 5:30pm **MS32 Advances on Numerical Methods for Singular Perturbation Problems**

Location: **S17-05-11**

3:30pm - 4:00pm

Error Analysis of Weak Galerkin FEM for Singularly Perturbed Fourth-order Parabolic PDEs

Natesan Srinivasan, Aayushman Raina

4:00pm - 4:30pm

Numerical solution for singularly perturbed time-delayed parabolic problems involving two small parameters

Jugal Mohapatra, Sushree Priyadashana

4:30pm - 5:00pm

On simple numerical scheme for interface problem

Shuo Zhang

5:00pm - 5:30pm

Fractal cubic spline method for nonself-adjoint singularly perturbed boundary-value problems

Guru Prem Prasad Mahalingam, Balasubramani N, Natesan S

Date: Friday, 19/July/2024

10:30am - 11:30am **MS12-2 Recent Advances in Inverse Problems and Imaging**

Location: **S17-05-11**

10:30am - 11:00am

Some results for the equivalent characterization of non-radiating sources

Jue Wang

11:00am - 11:30am

Obstacle scattering and inverse scattering in complex backgrounds

Lei Zhang

SciCADE 2024 *Location: S17-05-12 (Blk S17 Level 5 Seminar Room 4)*

Date: Monday, 15/July/2024

10:30am MS54-1 Theoretical and Numerical Aspects of Integrable Systems

Location: **S17-05-12**

-

12:30pm

10:30am - 11:00am

Nondegenerate N-soliton solutions for coupling PDEs

Ji Lin

11:00am - 11:30am

Some New Results on Integrable Integro-differential Equations

XingBiao Hu

11:30am - 12:00pm

Symmetry study of a novel integrable supersymmetric dispersionless system

Man Jia

12:00pm - 12:30pm

The general rogue wave patterns of nonlinear Schrödinger equation

Liming Ling

3:30pm

MS54-2 Theoretical and Numerical Aspects of Integrable Systems

Location: **S17-05-12**

-

5:30pm

3:30pm - 4:00pm

Localized waves solutions of the massive Thirring model via bilinear KP-hierarchy reduction and PINN deep learning

Junchao Chen

4:00pm - 4:30pm

Lax pairs informed neural networks solving integrable systems.

Yong Chen

4:30pm - 5:00pm

The spatial structure, discrete solitons and stability analysis of the non-integrable discrete Hirota equation

LiYuan Ma

5:00pm - 5:30pm

Darboux transformation of generalized Camassa-Holm equation

Lin Luo

SciCADE 2024 *Location: S17-05-12 (Blk S17 Level 5 Seminar Room 4)*

Date: Tuesday, 16/July/2024

10:30am MS54-3 Theoretical and Numerical Aspects of Integrable Systems

Location: **S17-05-12**

-

12:30pm

10:30am - 11:00am

Applications of non-intersecting paths to integrable systems

Shi-Hao Li

11:00am - 11:30am

Analytic and numerical aspects of Novikov-type equations and their multipeakons

Xiang-Ke Chang

11:30am - 12:00pm

On the Coupled Modified Complex Short Pulse Equation

Hongqian Sun, Shoufeng Shen, Zuonong Zhu

12:00pm - 12:30pm

Solutions to semi-discrete integrable equations on theta-function periodic backgrounds

Ruomeng Li

3:30pm

MS17-1 Recent Advances in Structure Preserving Numerical Methods

Location: **S17-05-12**

-

6:00pm

3:30pm - 4:00pm

Unconditionally energy-stable algorithms for porous media flow: From the Darcy scale to the Pore Scale

Shuyu Sun

4:00pm - 4:30pm

Deep adaptive density approximation for Fokker-Plank type equations

Tao Zhou

4:30pm - 5:00pm

A nonconventional stability analysis for a Crank-Nicolson scheme solving degenerate quenching equations

Qin Sheng

5:00pm - 5:30pm

Data Augmentation for Neural Operator-Based PDE Solvers through Inverse Evolution

Chaoyu Liu

5:30pm - 6:00pm

Functional Equivariance and Modified Vector Fields

Sanah Suri

SciCADE 2024 *Location: S17-05-12 (Blk S17 Level 5 Seminar Room 4)*

Date: Wednesday, 17/July/2024

10:30am - 1:00pm MS17-2 Recent Advances in Structure Preserving Numerical Methods

Location: **S17-05-12**

10:30am - 11:00am

Recent progress on topology optimization

Xiaoping Wang

11:00am - 11:30am

Operator splitting schemes for port-Hamiltonian differential-algebraic equations

Michael Günther, Andreas Bartel, Andreas Frommer, Malak Diab, Nicole Marheineke

11:30am - 12:00pm

Exponential time differencing-Padé finite element method for nonlinear convection diffusion reaction equations with time constant delay

Qiumei Huang

12:00pm - 12:30pm

Convergence analysis of a positivity-preserving numerical scheme for the Cahn-Hilliard-Stokes system with Flory-Huggins energy potential

Yunzhuo Guo, Cheng Wang, Steven M. Wise, Zhengru Zhang

12:30pm - 1:00pm

Energy stable and maximum bound principle preserving schemes for the Q-tensor flow of liquid crystals

Zhonghua Qiao

SciCADE 2024 *Location: S17-05-12 (Blk S17 Level 5 Seminar Room 4)*

Date: Thursday, 18/July/2024

10:30am MS54-4 Theoretical and Numerical Aspects of Integrable Systems

Location: **S17-05-12**

-

12:30pm

10:30am - 11:00am

Application of tetragonal curves to coupled Boussinesq equations

Xianguo Geng

11:00am - 11:30am

Dynamics of higher-order peaked and smooth solitary waves

Xiaochuan Liu

11:30am - 12:00pm

New revival phenomena for the Kadomtsev-Petviashvili equation

Jing Kang

12:00pm - 12:30pm

Dubrovin-Frobenius manifolds and the extended Weyl group of type B

Dafeng Zuo

3:30pm

MS54-5 Theoretical and Numerical Aspects of Integrable Systems

Location: **S17-05-12**

-

5:30pm

3:30pm - 4:00pm

On the coupled Sasa-Satsuma equation

Bao-Feng Feng, Chengfa Wu

4:00pm - 4:30pm

Large genus asymptotics for a class of enumerative invariants

Di Yang

4:30pm - 5:00pm

Darboux transformations for the nonlinear Schrodinger and derivative nonlinear Schrodinger type systems

Zhiwei Wu

5:00pm - 5:30pm

Solitons in the integrable and nearly-integrable fractional nonlinear wave equations

Zhenya Yan

Date: Friday, 19/July/2024

10:30am MS54-6 Theoretical and Numerical Aspects of Integrable Systems

Location: **S17-05-12**

-

11:30am

10:30am - 11:00am

Asymptotics of the integrable equations with WKI-type spectral problem

Jian Xu

11:00am - 11:30am

Some properties of spatially discrete Boussinesq hierarchy and their continuous counterparts

Haigiong Zhao

SciCADE 2024 Location: S17-06-11 (Blk S16 Level 6 Seminar Room 6)

Date: Monday, 15/July/2024

10:30am
-
12:30pm

MS29 Efficient Methods for Uncertainty Quantification in Differential Equations

Location: **S17-06-11**

10:30am - 11:00am

Kernel methods for solving rough nonlinear partial differential equations

Ricardo Baptista, Edoardo Calvello, Matthieu Darcy, Houman Owhadi, Andrew Stuart, Xianjin Yang

11:00am - 11:30am

“The Mean-Field Ensemble Kalman Filter: From Analysis to Algorithms”

Edoardo Calvello

11:30am - 12:00pm

A Budgeted Multi-Level Monte Carlo Method for Estimates on the Full Spatial Domain

Niklas Baumgarten

12:00pm - 12:30pm

Multilevel Monte Carlo Methods with Smoothing

Anastasia Istratuca, Aretha Teckentrup

3:30pm
-
5:30pm

MS40-1 Iterative Numerical Methods for Optimization and Control

Location: **S17-06-11**

3:30pm - 4:00pm

Saddle Point Preconditioners for PDE-constrained optimisation: a case study from Data assimilation

Jemima M. Tabcart, John W. Pearson

4:00pm - 4:30pm

Solving tree-coupled linear systems

Christoph Hansknecht

4:30pm - 5:00pm

Parallel-in-time Preconditioner for Parabolic Optimal Control Problems

Po Yin Fung, Sean Hon

5:00pm - 5:30pm

A Diagonalization-Based Parallel-in-Time Preconditioner for Instationary Flow Control Problems

Bernhard Heinzlreiter, John Pearson

SciCADE 2024 Location: S17-06-11 (Blk S16 Level 6 Seminar Room 6)

Date: Tuesday, 16/July/2024

10:30am - 12:30pm MS40-2 Iterative Numerical Methods for Optimization and Control
Location: S17-06-11

10:30am - 11:00am

Non-smooth shape optimization with applications for fluid-mechanical problems under uncertainty

Tim Suchan, Caroline Geiersbach, Volker Schulz, Kathrin Welker

11:00am - 11:30am

Multi-level Optimal Control with Neural Surrogate Models

Estefania Loayza Romero, Dante Kalise, Kirsten A. Morris, Zhengang Zhong

11:30am - 12:00pm

Transformers Meet Image Denoising: Mitigating Over-smoothing in Transformers via Regularized Nonlocal Functionals

Tam Nguyen, Tan Minh Nguyen, Richard Baraniuk

12:00pm - 12:30pm

Self isolation or social distancing: a nonlocal PDE-constrained optimisation approach for disease containment

Andrés Miniguano-Trujillo

3:30pm - 6:00pm MS44 Novel Flux Approximation Schemes for Convection-Diffusion-Reaction Models
Location: S17-06-11

3:30pm - 4:00pm

Mathematical and numerical modelling of multi-component diffusion

Jan ten Thije Boonkkamp, Jan van Dijk

4:00pm - 4:30pm

Complete Flux Scheme for time Fractional ADR Equation

Rinki Rawat, Chitranjan Pandey, B.V. Rathish Kumar, J.H.M ten Thije Boonkkamp

4:30pm - 5:00pm

A complete flux scheme for anisotropic advection-diffusion equations

Hanz Martin Cheng, Jan ten Thije Boonkkamp

5:00pm - 5:30pm

Finite volume Complete Flux Scheme for the Incompressible Navier-Stokes Equations

Chitranjan Pandey, J.H.M ten Thije Boonkkamp, B.V. Rathish Kumar

5:30pm - 6:00pm

A Novel Finite Volume Complete-Flux Scheme for Boussinesq Model

B.V. Rathish Kumar, Chitranjan Pandey, Thije Boonkkamp, . Jan ten

SciCADE 2024 Location: S17-06-11 (Blk S16 Level 6 Seminar Room 6)

Date: Wednesday, 17/July/2024

10:30am
-
1:00pm

MS49-1 Recent Advances on the Theory and Computation of Integral and Integro-differential Equations

Location: **S17-06-11**

Chair: Hui Liang

10:30am - 11:00am

Numerical solution of fractional integro-differential equations with singularities

Kaido Latt, Arvet Pedas

11:00am - 11:30am

A collocation method based on central part interpolation for fractional integro-differential equations

Mikk Vikerpuur

11:30am - 12:00pm

Implicitly linear Jacobi spectral-collocation methods for two-dimensional weakly singular Volterra-Hammerstein integral equations

Qiumei Huang, Huiting Yang

12:00pm - 12:30pm

Multiscale Model Reduction for Heterogeneous Perforated Domains based on CEM-GMsFEM

Yin Yang, Wei Xie, Yunqing Huang, Eric Chung

12:30pm - 1:00pm

An efficient second-order discontinuous finite volume element scheme for the three-dimensional neutron transport equations

Yanni Gao, Xueding Hang, Guangwei Yuan

SciCADE 2024 Location: S17-06-11 (Blk S16 Level 6 Seminar Room 6)

Date: Thursday, 18/July/2024

10:30am - 12:30pm **MS03 Applications and Scientific Computing on PDE-based Inverse Scattering**

Location: **S17-06-11**

10:30am - 11:00am

Theories and applications for multi-layered medium

Yujun Deng

11:00am - 11:30am

A novel Newton method for inverse elastic scattering problems

Yan Chang, Yukun Guo, Hongyu Liu, Deyue Zhang

11:30am - 12:00pm

Computational imaging of small-amplitude bi-periodic surfaces with double negative material

Yuliang Wang

12:00pm - 12:30pm

Inverse medium problems with single measurement

Shiqi Ma

3:30pm - 5:30pm **MS09 Theory and Numerics of Inverse Problems**

Location: **S17-06-11**

3:30pm - 4:00pm

A novel quantitative inverse scattering scheme using interior resonant modes

Xianchao Wang

4:00pm - 4:30pm

Inverting the local transverse and mixed ray transforms

Jian Zhai

4:30pm - 5:00pm

Reconstruction of acoustic sources from multi-frequency phaseless far-field data

Sun Fenglin

5:00pm - 5:30pm

Fractional random walks on graphs

Giovanni Covi

Date: Friday, 19/July/2024

10:30am - 11:30am **MS49-2 Recent Advances on the Theory and Computation of Integral and Integro-differential Equations**

Location: **S17-06-11**

Chair: Qiumei Huang

10:30am - 11:00am

Solving fractional differential equations in unbounded domains via rational approximation

Huifang Yuan

11:00am - 11:30am

A general collocation analysis for weakly singular Volterra integral equations with variable exponent

Hui Liang, Martin Stynes