

# Computation, Analysis & Applications of PDEs with Nonlocal and Singular Operators

Workshop I  
(7–11 February 2022)



\*[Registration](#) is required for this program.

## Venue

Virtual: The details and link will be sent to you before the program commences after registration has been processed.



## ORGANIZING COMMITTEE

### Co-chairs

Jie Shen  
Purdue University

Li-Lian Wang  
Nanyang Technological University

### Members

Mark Ainsworth  
Brown University

Weizhu Bao  
National University of Singapore

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## Workshop I (7–11 February 2022)

All times are indicated in **GMT+0**.

For time zones conversion: [Click Here](#)

GMT Time Reference						
Greenwich Mean Time UK (GMT+0)	Los Angeles, USA (GMT -8)*	Los Angeles, USA (GMT -8)*	France Germany (GMT +1)	Dubai, UAE (GMT +4)	China Singapore (GMT +8)	Australia (GMT +11)
0100	1700	2000	0200	0500	0900	1200
0730	2330	0230	1830	1130	1530	1830
*(GMT -5) and (GMT -8) are the day before the stated date of the morning talk (GMT+8).						

Monday, 7 Feb 2022		
Time (GMT +8)	Title	Speaker
1520–1530	Opening Remarks	
1530	Session Chair: Weizhu Bao (National University of Singapore)	
1530–1615	Selection dynamics for deep neural networks	Peter A. Markowich King Abdullah University of Science and Technology, Saudi Arabia
1615–1700	Comparison principles and time fractional diffusion-wave equations	Masahiro Yamamoto The University of Tokyo, Japan
1700	Group Photo	ZOOM Online
1700–1710	Break	
1710–1755	Nonlocal aggregation-diffusion equations: entropies, gradient flows, phase transitions and applications	José A. Carrillo Oxford University, UK
1755–1840	Design of perfectly matched layers for time-dependent space fractional PDEs	Xavier Antoine Université de Lorraine, France

Tuesday, 8 Feb 2022		
Time (GMT +8)	Title	Speaker
0900	Session Chair: Li-Lian Wang (Nanyang Technological University)	
0900–0945	Fractional diffusion in Lipschitz domains: Regularity and approximation	Ricardo Nochetto University of Maryland, USA
0945–1030	On fractional Gierer-Meinhardt system	Juncheng Wei The University of British Columbia, Canada
1030–1040	Break	
1040–1125	Nonlocal kernel network (NKN): a stable and resolution-independent deep neural network	Marta D'Elia Sandia National Laboratories, USA
1125–1210	Efficient computation of fractional linear algebraic systems	Emmanuel Lorin Carleton University, Canada
1210–1530	Lunch Break	
1530	Session Chair: Xavier Antoine (Université de Lorraine)	
1530–1615	Inverse contact problems in elasticity: an non-local formulation	Jin Cheng Fudan University, China
1615–1700	The Neumann problem for the fractional Laplacian	Xavier Ros-Oton ICREA and University of Barcelona, Spain
1700–1710	Break	
1710–1755	Logarithmic Schrödinger equation with quadratic potential	Remi Carles Centre national de la recherche scientifique, France
1755–1840	Regularized numerical methods and analysis for the Logarithmic Schrödinger equation	Chunmei Su Tsinghua University, China

Wednesday, 9 Feb 2022		
Time (GMT +8)	Title	Speaker
0900	Session Chair: Hong Wang (University of South Carolina)	
0900–0945	Spectral approximations of fractional Schrödinger equations and the ground states	Zhiping Mao Xiamen University, China
0945–1030	Scalable methods for nonlocal models	Christian Glusa Sandia National Laboratories, USA
1030–1040	Break	

Wednesday, 9 Feb 2022		
Time (GMT +8)	Title	Speaker
1040–1125	Transition phenomena in non-Gaussian stochastic dynamical systems	Jinqiao Duan Illinois Institute of Technology, USA
1125–1210	Probability perspective on nonlocal operators and nonlocal PDEs	Weihua Deng Lanzhou University, China
1210–1840	Free Discussion	

Thursday, 10 Feb 2022		
Time (GMT +8)	Title	Speaker
0900	Session Chair: Zhimin Zhang (Beijing Computational Science Research Center)	
0900–0945	An optimal control of a variable-order fractional PDE	Hong Wang University of South Carolina, USA
0945–1030	Superconvergence for discontinuous Galerkin time stepping	William McLean UNSW Sydney, Australia
1030–1040	Break	
1040–1125	Unconditionally MBP-preserving exponential time differencing schemes for conservative Allen-Cahn equations	Lili Ju University of South Carolina, USA
1125–1210	Stabilization parameter analysis of a second order linear numerical scheme	Zhonghua Qiao The Hong Kong Polytechnic University, China
1210–1530	Lunch Break	
1530	Session Chair: Zhonghua Qiao (The Hong Kong Polytechnic University, China)	
1530–1615	On uniform second order nonlocal approximations to linear two-point boundary value problems	Jiwei Zhang Wuhan University, China
1615–1700	Energy stability of variable-step L1-type schemes for time-fractional Cahn-Hilliard model	Honglin Liao Nanjing University of Aeronautics and Astronautics, China
1700–1710	Break	
1710–1755	Variable-exponent Volterra integral equations (and variable-order fractional derivative problems)	Martin Stynes Beijing Computational Science Research Center, China
1755–1840	Dirichlet problems and evolution problems for the fractional Laplacian and generalizations	Gerd Grubb University of Copenhagen, Denmark

Friday, 11 Feb 2022		
Time (GMT +8)	Title	Speaker
0900	Session Chair: Mark Ainsworth (Brown University)	
0900–0945	Interpolation for weighed Sobolev spaces	Gabriel Acosta University of Buenos Aires, Argentina
0945–1030	Dyadic norm nonlocal function spaces with heterogeneous localization	Xiaochuan Tian University of California San Diego, USA
1030–1040	Break	
1040–1125	Efficient spectral methods and error analysis for nonlinear Hamiltonian systems	Zhimin Zhang Beijing Computational Science Research Center, China
1125–1210	Log orthogonal functions in semi-infinite intervals: approximation results and applications	Sheng Chen Beijing Normal University, China
1210–1530	Lunch Break	
1530	Session Chair: Jie Shen (Purdue University)	
1530–1615	A second-order accurate numerical scheme for a time-fractional Fokker-Planck equation with a general driving force	Kassem Mustapha King Fahd University of Petroleum and Minerals, Saudi Arabia
1615–1700	Strang's splitting method for spatial fractional Allen-Cahn equations	Hai-Wei Sun University of Macau, China
1700–1710	Break	
1710–1755	A spectrally accurate numerical method for computing the Bogoliubov-de Gennes excitations of dipolar Bose-Einstein condensates	Yong Zhang Tianjin University, China
1755–1840	High dimensional finite elements for multiscale Maxwell wave equations	Hoang Viet Ha Nanyang Technological University, Singapore