Quantum & Kinetic Problems: Modeling, Analysis, Numerics & Applications

Partially supported by
Centre for Advanced 2D Materials (CA2DM)

Workshop 4: Mathematical Biology: Modeling, Analysis and Simulation
(20 - 23 January 2020)

ORGANIZING COMMITTEE

Co-Chairs

Weizhu Bao
National University of Singapore

Benoit Perthame
Université Pierre et Marie Curie and Sorbonne-Université

Peter A. Markowich
King Abdullah University of Science and Technology

Eitan Tadmor
University of Maryland

Members

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Imperial College London

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Université de Rouen

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Shi Jin
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Henrik Jönsson
University of Cambridge

Choy Heng Lai
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University of Alberta

Christian Lubich
Universität Tübingen

Antonio Helio Castro Neto
National University of Singapore

Lorenzo Pareschi
University of Ferrara

Zhouping Xin
The Chinese University of Hong Kong

Venue:
IMS Auditorium

Admission is free

Quantum and Kinetic Problems: Modeling, Analysis, Numerics and Applications

Workshop 4: Mathematical Biology: Modeling, Analysis and Simulation
(20 - 23 January 2020)

Venue:
IMS Auditorium, 3 Prince George's Park Singapore 118402
Public Lecture (20 Jan): University Hall Auditorium, Lee Kong Chian Wing Level 2,
21 Lower Kent Ridge Road Singapore 119077

Monday, 20 Jan 2020		
Time	**Title**	**Speaker**
0900 - 0910	Registration	
0910 - 0915	Welcome by local organizer	
0915	Chair: Weizhu Bao, National University of Singapore, Singapore	
0915 - 1000	Spontaneous recovery of loop structure in multi-state network systems	Yasumasa Nishiura Tohoku University, Japan
1000- 1045	Network design principle for dual function of adaptation and noise attenuation	Lei Zhang Peking University, China
1045 - 1115	Group Photo & Coffee Break	
1115 - 1200	A new model for the emergence of vascular networks	Diane Peurichard Inria de Paris, France
1200 - 1330	Lunch Break	
1330	Chair: Benoit Perthame, Sorbonne-Université, France	
1330 - 1415	Rigorous derivation of the nonlocal reaction-diffusion FitzHugh-Nagumo system	Francis Filbet Institut de Mathématiques de Toulouse, France
1415 - 1500	Macroscopic description of nonlocal movement of biological systems in R^n and in networks	Gissell Estrada-Rodriguez Laboratoire Jacques-Louis Lions - Sorbonne Université, France
1500 - 1530	Coffee Break	
1530 - 1615	Large scale asymptotics of velocity-jump processes and non-local Hamilton-Jacobi equations	Emeric Bouin Université Paris-Dauphine, France
1615 - 1700	Mathematical modeling and analysis of fractional diffusion induced by intracellular noise	Min Tang Shanghai Jiao Tong University, China
1830 - 1930	Public Lecture: Some Equations from Mathematical Biology University Hall Auditorium 21 Lower Kent Ridge Road Singapore 119077	Benoit Perthame Sorbonne-Université, France

Tuesday, 21 Jan 2020		
Time	**Title**	**Speaker**
0900 - 0915	Registration	
0915	Chair: Lei Zhang, Peking University, China	
0915 - 1000	scRNA-seq data analysis: issues and some recent results	Tiejun Li Peking University, China
1000- 1045	Fokker-Planck equations of neuron networks: rigorous justification and numerical simulation	Zhennan Zhou Peking University, China
1045 - 1115	Coffee Break	
1115 - 1200	The responses of protein structures and protein-protein complexes to mechanical perturbations	Jie Yan National University of Singapore, Singapore
1200 - 1330	Lunch Break	
1330	Chair: Tiejun Li, Peking University, China	
1330 - 1415	A mathematical dissection of the adaptation of cell populations to fluctuating oxygen levels	Tommaso Lorenzi University of St Andrews, UK
1415 - 1500	On the problem of spreading in Lotka-Volterra competition models	King-Yeung Lam, Adrian Ohio State University, USA
1500 - 1530	Coffee Break	
1530 - 1615	Mathematical modeling of propagation of Wolbachia to control dengue spread	Nicolas Vauchelet Université Paris 13, France
1615 - 1700	Estimating the division in unicellular organisms: the incremental model	Marie Doumic Institute for Research in Computer Science and Automation, Inria, France
1800 - 2100	Conference Dinner (Volunteer and self-paid), details TBA	

Wednesday, 22 Jan 2020		
Time	**Title**	**Speaker**
0900 - 0915	Registration	
0915	Chair: Yasumasa Nishiura, Tohoku University, Japan	
0915 - 1000	Modeling morphogenesis in plant stem cell niches	Henrik Jönsson University of Cambridge, UK
1000- 1045	A brain-spired spiking neural model for artificial intelligence	Douglas Zhou Shanghai Jiao Tong University, China
1045 - 1115	Coffee Break	

Wednesday, 22 Jan 2020		
Time	**Title**	**Speaker**
1115 - 1200	Distinguished Visitor Lecture Series: PDEs for neural assemblies; models, analysis and behavior	Benoit Perthame Sorbonne-Université, France
1200 - 1330	Lunch Reception at IMS	
1330	Chair: Henrik Jönsson, University of Cambridge, UK	
1330 - 1415	Bulk-surface coupling: derivation of two models	Xuefeng Wang The Chinese University of Hong Kong, Shenzhen, China
1415 - 1500	Mathematical models of phase separation in binary liquids	Maurizio Grasselli Politecnico di Milano, Italy
1500 - 1530	Coffee Break	
1530 - 1615	Can primitive chemotaxis generate spatial structures?	Michael Winkler Universität Paderborn, Germany
1615 - 1700	Modeling and nonlinear simulation of solid tumor growth with chemotaxis	Shuwang Li Illinois Institute of Technology, USA

Thursday, 23 Dec 2020		
Time	**Title**	**Speaker**
0900 - 0915	Registration	
0915	Chair: Francis Filbet, Institut de Mathématiques de Toulouse, France	
0915 - 1000	A unified and exactly solvable model for dimeric nanomotors	Zhisong Wang National University of Singapore, Singapore
1000- 1045	Revertible velocity jump process and heterogeneous diffusion	Yong-Jung Kim Korea Advanced Institute of Science and Technology, Korea
1045 - 1115	Coffee Break	
1115 - 1200	Existence and stability of nontrivial steady states for the SKT competition model with cross-diffusion	Yaping Wu Capital Normal University, China
1200 - 1330	Lunch Break	
1330	Chair: Nicolas Vauchelet, Université Paris 13, France	
1330 - 1415	Mathematical modeling and analysis to compare different mechanisms of developmental pattern formation	Anna Marciniak-Czochra Heidelberg University, Germany
1415 - 1500	A structured population model for sexual populations	Gaël Raoul Ecole Polytechnique, France

Thursday, 23 Jan 2020		
Time	**Title**	**Speaker**
1500 - 1530	Coffee Break	
1530 - 1615	Multiscale modelling of particles in membranes	Carsten Gräser Freie Universität Berlin, Germany
1615 - 1700	An asymptotic preserving scheme for capturing concentrations in age-structured models arising in adaptive dynamics	Xinran Ruan Sorbonne Université, France
1700 - 1705	Closing Remarks	