Computation, Analysis and Applications of PDEs with Nonlocal and Singular Operators
(04 Feb 2022–04 Mar 2022)

Name and Affiliation	Talk Title
Gabriel Acosta University of Buenos Aires, Argentina	Interpolation for weigthed Sobolev spaces ([Video](#))
Christopher Angstmann UNSW Sydney, Australia	Compartment models with non-local operators and related stochastic processes ([Video](#))
Xavier Antoine Université de Lorraine, France	Design of perfectly matched layers for time-dependent space fractional PDEs ([Video](#))
Mejdi Azaiez Polytechnique Institut of Bordeaux, France	High order approximation for Müntz and Müntz-logarithmic polynomials using empirical interpolation method ([Video](#))
Andrea Bonito Texas A&M University, USA	Tutorial: Numerical approximations of elliptic fractional operators ([Video1](#)) ([Video2](#)) ([Video3](#))
Juan Pablo Borthagaray Universidad de la República, Uruguay	Regularity and approximation of fractional quasi-linear operators on Lipschitz domains ([Video](#))
Yongyong Cai Beijing Normal University, China	Numerical methods for computing ground states of spinor Bose-Einstein condensates ([Video](#))
Zhenning Cai National University of Singapore, Singapore	Numerical solver for the Boltzmann equation with self-adaptive collision operators ([Video](#))
Eric Cances Ecole des Ponts ParisTech, France	Electronic transport in materials: the singularity of graphene ([Video](#))
Remi Carles Université de Rennes 1, France	Logarithmic Schrödinger equation with quadratic potential ([Video](#))
José A. Carrillo Oxford University, UK	Nonlocal aggregation-diffusion equations: entropies, gradient flows, phase transitions and applications ([Video](#))
Sheng Chen Beijing Normal University, China	Log orthogonal functions in semi-infinite intervals: approximation results and applications ([Video](#))
Jin Cheng Fudan University, China	Inverse contact problems in elasticity: an non-local formulation ([Video](#))

Name and Affiliation	Talk Title
Marta D'Elia Sandia National Laboratories, USA	Nonlocal kernel network (NKN): a stable and resolution-independent deep neural network ([Video])
Weihua Deng Lanzhou Univ, China	Probability perspective on nonlocal operators and nonlocal PDEs ([Video])
Kai Diethelm University of Applied Sciences Würzburg-Schweinfurt - FHWS, Germany	Numerical aspects of the infinite state representation of fractional differential operators ([Video])
Jinqiao Duan Illinois Institute of Technology, USA	Transition phenomena in non-Gaussian stochastic dynamical systems ([Video])
Christian Glusa Sandia National Laboratories, USA	Scalable methods for nonlocal models ([Video])
Gerd Grubb University of Copenhagen, Denmark	Dirichlet problems and evolution problems for the fractional Laplacian and generalizations ([Video]) ([Slides])
Ling Guo Shanghai Normal University, China	PINNs for solving forward and inverse problems governed by stochasticfractional PDEs ([Video])
Viet Ha Hoang Nanyang Technological University, Singapore	High dimensional finite elements for multiscale Maxwell wave equations ([Video])
Fukeng Huang National University of Singapore, Singapore	A new SAV approach for general dissipative systems ([Video])
Zhongyi Huang Tsinghua University, China	Variational principle based method for image processing ([Video])
Shidong Jiang New Jersey Institute of Technology, USA	A universal method for solving elliptic PDEs with singular boundary data on non-smooth domains ([Video])
Bangti Jin University College London, UK	Discovering the subdiffusion model in an unknown medium ([Video])
Lili Ju University of South Carolina, USA	Unconditionally MBP-preserving exponential time differencing schemes for conservative Allen-Cahn equations ([Video])
Wenyu Lei Scuola Internazionale Superiore di Studi Avanzati, Italy	Approximation of the spectral fractional Laplace-Beltrami operator and its application to Gaussian fields on surfaces ([Video])
Changpin Li Shanghai University, China	Logarithmic asymptotics: analysis and computation ([Video])

Name and Affiliation	Talk Title
Huiyuan Li Institute of Software Chinese Academy of Sciences, China	Novel spectral methods for Schrödinger equations with inverse-power potentials ([Video](#))
Jichun Li University of Nevada, Las Vegas, USA	Finite element analysis and simulation for wave propagation in the Cole-Cole medium ([Video](#))
Dong Liang York University, Canada	Energy-preserving high-order difference methods for nonlocal wave equations ([Video](#))
Honglin Liao Nanjing University of Aeronautics and Astronautics, China	Energy stability of variable-step L1-type schemes for time-fractional Cahn-Hilliard model ([Video](#))
Emmanuel Lorin Carleton University, Canada	Efficient computation of fractional linear algebraic systems ([Video](#))
Zhiping Mao Xiamen University , China	Spectral approximations of fractional Schrödinger equations and the ground states ([Video](#))
Peter A. Markowich King Abdullah University of Science and Technology, Saudi Arabia	Selection dynamics for deep neural networks ([Video](#))
William McLean UNSW Sydney, Australia	Superconvergence for discontinuous Galerkin time stepping ([Video](#))
Markus J. Melenk Technische Universität Wien, Austria	Weighted analytic regularity for the integral fractional Laplacian in polygons and application to hp-FEM ([Video](#))
Kassem Mustapha King Fahd University of Petroleum and Minerals, Saudi Arabia	A second-order accurate numerical scheme for a time-fractional Fokker-Planck equation with a general driving force ([Video](#))
Ricardo Nochetto University of Maryland, USA	Fractional diffusion in Lipschitz domains: Regularity and approximation ([Video](#))
Sheehan Olver Imperial College London, UK	Computing equilibrium distributions with power law interactions ([Video](#))
Zhonghua Qiao The Hong Kong Polytechnic University, China	Stabilization parameter analysis of a second order linear numerical scheme ([Video](#))
Xavier Ros-Oton University of Barcelona, Spain	The Neumann problem for the fractional Laplacian ([Video](#))
Sihong Shao Peking University, China	An efficient 6-D deterministic solver for theWigner-Coulomb dynamics ([Video](#))

Name and Affiliation	Talk Title
Jie Shen Purdue University, USA	Efficient space-time methods for a class of time dependent problems with applications to nonlocal and singular problems ([Video](#))
Changtao Sheng Shanghai University of Finance and Economics, China	Fast implementation of FEMs for nonlocal models in multiple dimensions ([Video](#))
Martin Stynes Beijing Computational Science Research Center, China	Variable-exponent Volterra integral equations (and variable-order fractional derivative problems) ([Video](#))
Chunmei Su Tsinghua University, China	Regularized numerical methods and analysis for the Logarithmic Schrödinger equation ([Video](#))
Hai-Wei Sun University of Macau, China	Strang's splitting method for spatial fractional Allen-Cahn equations ([Video](#))
Qinglin Tang Sichuan University, China	An efficient numerical method to compute the ground state of rotating dipolar BoseEinstein Condensates ([Video](#))
Xiaochuan Tian University of California San Diego, USA	Tutorial: An invitation to nonlocal models ([Video1](#)) ([Video2](#)) ([Video3](#)) Dyadic norm nonlocal function spaces with heterogeneous localization ([Video](#))
Bo Wang Hunan Normal University, China	Fast multipole method in layered media ([Video](#))
Boyi Wang National University of Singapore, Singapore	Dissipation functionals and energy stability of numerical schemes for the time-fractional Allen-Cahn/Cahn-Hilliard equations ([Video](#))
Chong Wang Washington and Lee University, USA	Periodic minimizers of a ternary nonlocal isoperimetric problem ([Video](#))
Hong Wang University of South Carolina, USA	An optimal control of a variable-order fractional PDE ([Video](#))
Li-Lian Wang Nanyang Technological University, Singapore	Tutorial: A tutorial introduction to spectral methods for some singular and nonlocal problems ([Video](#))

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Juncheng Wei The University of British Columbia, Canada	On fractional Gierer-Meinhardt system ([Video](#))
Chuanju Xu Xiamen University, China	Regularization methods for inverse problems of the sub-diffusion equation ([Video](#))
Masahiro Yamamoto The University of Tokyo, Japan	Comparison principles and time fractional diffusion-wave equations ([Video](#))
Jiang Yang Southern University of Science and Technology, China	How to define energy dissipations for timefractional phase-field equations ([Video](#))
Mohsen Zayernouri Michigan State University, USA	Nonlocal subgrid-scale modeling for turbulent flows ([Video](#))
Jiwei Zhang Wuhan University, China	On uniform second order nonlocal approximations to linear two-point boundary value problems ([Video](#))
Yanzhi Zhang Missouri University of Science and Technology, USA	Numerical methods for nonlocal problems with the fractional Laplacian ([Video](#))
Yong Zhang Tianjin University, China	A spectrally accurate numerical method for computing the Bogoliubov-de Gennes excitations of dipolar Bose-Einstein condensates ([Video](#))
Zhimin Zhang Beijing Computational Science Research Center, China	Efficient spectral methods and error analysis for nonlinear Hamiltonian systems ([Video](#))
Zhongqiang Zhang Worcester Polytechnic Institute, USA	Towards high-order methods for fractionaladvection-diffusion-reaction equations in smooth domains ([Video](#))
Tao Zhou The State Key Laboratory of Scientific and Engineering Computing, China	Monte Carlo PINN: deep learning approaches for fractional PDEs ([Video](#))
Zhi Zhou The Hong Kong Polytechnic University, China	Tutorial: An invitation to fractional models ([Video1](#)) ([Video2](#)) ([Video3](#)) Inverse potential problem for fractional subdiffusion from terminal observation ([Video](#))