The 4th China-Japan-Korea Joint Probability Workshop

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福建師範大學 FUJIAN NORMAL UNIVERSITY 1907

Friday, May 22, 2026

Session Chair	Zhen-Qing Chen	
08:45–08:50	Opening Ceremony	
09:00–10:00	Tusheng Zhang	Stochastic reaction diffusion equations driven by space-time white noise
10:00–10:30	Coffee Break	
Session Chair	Tusheng Zhang	
10:30–11:15	Toru Sera	Large deviation estimates related to arcsine laws for the last visit times
11:15–12:10	Jaehoon Kang	Heat kernel estimates for anisotropic jump processes and Dirichlet problems
12:10–14:30	Lunch Break	
Session Chair	Renming Song	
14:30–15:30	Hao Wu	Connection probabilities for loop $O(n)$ models and BPZ equations
15:30–16:00	Coffee Break	
Session Chair	Ildoo Kim	
16:00–16:45	Longmin Wang	Introduction to branching random walks on hyperbolic groups
16:45–17:00	Hua Zhang	Derivative formulae for nonlocal Gruschin's type semigroups
17:00–17:15	Shiping Cao	Boundary trace theorems for reflected jump processes
17:15–17:30	Panyu Wu	Probability distribution of the threshold-diffusion process
17:30–17:45	Wenjie Ye	Large N limit of the Langevin dynamics for the spin $O(N)$ model
18:00–20:00	Dinner	

Saturday, May 23, 2026

Session Chair	Naotaka Kajino	
09:00–10:00	Kyeonghun Kim	The Dirichlet problem for SPDEs with nonlocal operators in $C^{1,\sigma}$ open sets
10:00–10:30	Coffee Break	
Session Chair	Panki Kim	
10:30–11:15	Ryoichiro Noda	Convergence of collision measures of stochastic processes
11:15–12:10	Lu-Jing Huang	Random walk on long-range percolation
12:10–14:30	Lunch Break	
Session Chair	Takashi Kumagai	
14:30–15:30	Tomoyuki Shirai	Correlations between zeros of Gaussian polyanalytic functions
15:30–16:00	Coffee Break	
Session Chair	Jian Wang	
16:00–16:45	Seonwoo Kim	Transience time of the subcritical facilitated exclusion process
16:45–18:00	5 Contributed Talks (15 mins each)	
18:00–20:00	Dinner	

Titles and Abstracts

Random walk on long-range percolation

Speaker: Lu-Jing Huang, Fujian Normal University
Abstract: In this talk, we consider the simple random walk on the one-dimensional critical long-range percolation (LRP). We prove that both the quenched and annealed spectral dimensions of the associated simple random walk are $2/(1+\delta)$, where $\delta \in (0,1)$ is the exponent of the effective resistance in the LRP model. In addition, we will show that there are scale fluctuations for the random walk. Based on joint works with Zherui Fan and Takashi Kumagai.

Heat kernel estimates for anisotropic jump processes and Dirichlet problems

Speaker: Jaehoon Kang, Hankyong National University
Abstract: In this talk, we consider symmetric jump processes with anisotropic jumping kernels given by unions of symmetric cones. We first review heat kernel estimates for such processes in the whole space and discuss their main features. We then briefly discuss the problem of Dirichlet heat kernel estimates in domains and some of the difficulties arising from anisotropy. We conclude with a discussion of an approach and some related computations.

The Dirichlet problem for stochastic partial differential equations (SPDEs) with nonlocal operators in $C^{1,\sigma}$ open sets

Speaker: Kyeonghun Kim, Korea University
Abstract: In this talk I will introduce a Sobolev regularity theory for the Dirichlet problem of SPDEs having spatial non-local operators in $C^{1,\sigma}$ open sets. I will consider substantially large classes of nonlocal operators and generalized Gaussian noise. The existence and uniqueness of strong solutions in weighted Sobolev spaces will be introduced, along with maximal L_p-regularity estimates for the solutions.

Transience time of the subcritical facilitated exclusion process

Speaker: Seonwoo Kim, Yonsei University
Abstract: In this talk, we consider the facilitated exclusion process on the one-dimensional discrete N-torus. Because of the facilitating mechanism, the process freezes in finite time if the particle density of the initial configuration is subcritical, i.e., if it is smaller than (or equal to) $1/2$. We prove that, starting from any subcritical Bernoulli product measure, the correct scale of the transience/freezing time is of order $\log^3 N$. Based on a joint work with Oriane Blondel, Clément Erignoux and Sanha Lee.

Convergence of collision measures of stochastic processes

Speaker: Ryoichiro Noda, Kyoto University
Abstract: We introduce the notion of collision measures, which record the positions and times at which stochastic processes collide, and study their convergence together with that of the underlying processes.

Let $X = (X_t)_{t\geq 0}$ and $Y = (Y_t)_{t\geq 0}$ be independent stochastic processes on a space S. Given a measure μ on S, the collision measure Π associated with μ is formally defined as a random measure on $S \times [0, \infty)$ by

$$\Pi(\mathrm{d}x\,\mathrm{d}t) = \delta_{(x,x)}(X_t, Y_t)\,\mu(\mathrm{d}x)\,\mathrm{d}t,$$

where $\delta_{(x,x)}$ denotes the Dirac delta at (x, x). The measure μ specifies the contribution of collisions occurring at each point x, and thus serves as a weighting measure. A rigorous construction of Π is obtained via the theory of positive continuous additive functionals of Markov processes.

Our main result shows that, when spaces, stochastic processes, their heat kernels, and weighting measures converge in a suitable Gromov–Hausdorff–type topology, the corresponding collision measures also converge, under appropriate assumptions on the heat kernels and weighting measures. This framework covers a broad class of low-dimensional (fractal) spaces, including the Sierpiński gasket and critical random graphs such as critical Galton–Watson trees.

Large deviation estimates related to arcsine laws for the last visit times

Speaker: Toru Sera, The University of Osaka
Abstract: Lévy's arcsine law for one-dimensional Brownian motion is a classical result in probability theory. Among various generalizations of the arcsine law, we focus on the Dynkin-Lamperti theorem, which is a distributional limit theorem for the position of a subordinator (i.e., an increasing Lévy process) just before it exceeds a level t, as $t \to 0+$ or $t \to \infty$. In this talk we recall the Dynkin–Lamperti theorem and then present related large deviation estimates as our main results. Furthermore we demonstrate that our main results can be applied to the last time the Brownian motion on the Sierpinski gasket visits the starting point. This is a joint work with Takahiro Mori (Kyoto Institute of Technology) and Kei Noba (The University of Osaka).

Correlations between zeros of Gaussian polyanalytic functions

Speaker: Tomoyuki Shirai, Kyushu University
Abstract: We consider an orthogonal sequence of Gaussian polyanalytic functions arising from the Gaussian entire function through successive applications of the Landau level raising operator. These functions are also closely related to the short-time Fourier transform of white noise with Hermite windows. We investigate interactions between different Landau levels via the normalized pair correlation of the zeros of Gaussian polyanalytic functions, which reveals a two-dimensional vestige of interlacing property known for orthogonal polynomials. This talk is based on a joint work with L. D. Abreu (University of Vienna).

Introduction to branching random walks on hyperbolic groups

Speaker: Longmin Wang, Nankai University
Abstract: In this talk we consider a transient branching random walk on a non-elementary hyperbolic group and show that the Hausdorff dimension of its limit set (i.e., the accumulation points on the boundary of the group) is determined by the growth rate for the two-point function of the system. As a consequence, the dimension is at most half that of the entire boundary of the group, with equality only on virtually free groups. If time allows, we may also discuss some extensions to percolation on hyperbolic groups.

Connection probabilities for loop $O(n)$ models and BPZ equations

Speaker: Hao Wu, Tsinghua University
Abstract: Critical loop $O(n)$ models are conjectured to be conformally invariant in the scaling limit. In this talk, we focus on connection probabilities for loop $O(n)$ models in polygons. Such probabilities can be predicted using two families of solutions to chordal Belavin-Polyakov-Zamolodchikov (BPZ) equations: Coulomb gas integrals and SLE pure partition functions. The conjecture is proved to be true for the critical Ising model, FK-Ising model, percolation, and uniform spanning tree. Recent progress of radial BPZ equations will also be discussed.

Stochastic reaction diffusion equations driven by space-time white noise

Speaker: Tusheng Zhang, University of Science and Technology of China
Abstract: In this talk, I will report the recent progresses on the well-posedness and ergodicity of stochastic reaction diffusion equations driven by space-time white noise. Typically, the solutions of such stochastic partial differential equations are not semimartingales.