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Jinqiao Duan* (duan@iit.edu), Department of Applied Mathematics, Illinois Institute of Technology, Chicago, IL 60616, **Rui Cai** (mathcenter@hust.edu.cn), Center for Mathematical Sciences, Huazhong University of Science and Technology, 1037 Luoyu Road, Wuhan, Hubei 430074, Peoples Rep of China, and **Hui Wang** (mathcenter@hust.edu.cn), Center for Mathematical Sciences, Huazhong University of Science and Technology, 1037 Luoyu Road, Wuhan, Hubei 430074, Peoples Rep of China. *Non-local PDEs and Non-Gaussian Stochastic Dynamics*.

Dynamical systems arising in engineering and science are often subject to random fluctuations. The noisy fluctuations may be Gaussian or non-Gaussian, which are modeled by Brownian motion or α -stable Levy motion, respectively. Non-Gaussianity of the noise manifests as nonlocality at a “macroscopic” level. Stochastic dynamical systems with non-Gaussian noise (modeled by α -stable Levy motion) have attracted a lot of attention recently. The non-Gaussianity index α is a significant indicator for various dynamical behaviors. The speaker will present a few aspects of non-Gaussian stochastic dynamical systems, highlighting how PDEs help quantify stochastic dynamical behaviors, including escape probability (which quantifies likelihood for a complex system changes from one regime to another, when uncertainty is taken into account). Some materials are taken from new books “An Introduction to Stochastic Dynamics” (by Jinqiao Duan, Cambridge University Press, and Science Press, 2015) and “Effective Dynamics of Stochastic Partial Differential Equations” (by Jinqiao Duan and Wei Wang, Elsevier, 2014). (Received August 10, 2015)