March 25, 2024
2:00pm-3:00pm
KAP 414

Prof.   Jinniao Qiu

(University of Calgary)

Stochastic Black-Scholes equation and
approximations for option pricing under a non-Markovian framework

Abstract: In a new paradigm of finance, the volatility exhibits roughness and path-dependence. This makes the pricing model notably non-Markovian. We shall talk about the option pricing problems with a general random volatility process. As the framework is non-Markovian, the value function for a European option is not deterministic; rather, it is random and satisfies a backward stochastic partial differential equation (BSPDE) or so-called stochastic Black-Scholes equation. The wellposedness of such kind of BSPDEs and associated Feynman-Kac representations will be discussed. These BSPDEs are then used to approximate American option prices. Moreover, a deep leaning-based method is also proposed and investigated for the numerical approximations to such BSPDEs and associated non-Markovian pricing problems. Two numerical examples under rough volatilities will be presented for both European and American options. This talk is mainly based on joint work with Christian Bayer and Yao Yao.

Zoom Link: USC Math Finance Colloquium

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