Mixed stochastic differential equations

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Abstract:
The talk will be devoted to the so-called mixed stochastic differential equation (SDE) in $\mathbb{R}^d$:

$$X_t = X_0 + \int_0^t a(X_s)ds + \int_0^t b(X_s)dW_s + \int_0^t c(X_s)dB_s,$$

where $W = \{W_t, t \geq 0\}$ is an $m$-dimensional standard Wiener process, $B = \{B_t, t \geq 0\}$, $k = 1, \ldots, l$ is an $l$-dimensional fractional Brownian motion; the coefficients $a : \mathbb{R}^d \to \mathbb{R}^d$, $b : \mathbb{R}^d \to \mathbb{R}^{d \times m}$, $c : \mathbb{R}^d \to \mathbb{R}^{d \times l}$ are continuous, $X_0 \in \mathbb{R}^d$ is non-random.

Such equations gained a lot of attention recently thanks to their modelling properties. Specifically, mixed equations are able to reflect the nature of randomness on financial markets, which has both a white noise and long memory components.

In my talk I will give a review of our recent results for these equations, including unique solvability, integrability, convergence of solutions, comparison theorems, existence of density, etc.

References