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# Colloquium

## *Numerical Analysis for Fractional Diffusion Equations*

**Professor Zhi ZHOU**

**The Hong Kong Polytechnic University**

### Abstract

Anomalous diffusion has received much attention in recent years. It describes a diffusion process in which the mean square displacement of a particle grows faster (super-diffusion) or slower (sub-diffusion) than that in the normal diffusion process. In analogy with Brownian motion for normal diffusion, anomalous diffusion is the macroscopic counterpart of continuous time random walk. To begin with, I will introduce the anomalous diffusion and its wide applications. Next, as a typical example, the time-fractional diffusion (sub-diffusion) will be studied. The fractional derivative appearing in the model changes dramatically the behavior of solution and hence leads to some computational challenges. Our aim is to develop efficient numerical schemes which are robust with respect to nonsmooth data, and to verify its convergence rate theoretically. Moreover, the space-fractional model (super-diffusion) will also be discussed. Finally, I will give a quick review on the current status of the developments of numerical solutions to fractional diffusion equations.

Date: 13 October 2017 (Friday)  
Time: 4:00pm ~ 5:00pm  
Venue: Room 219, Lady Shaw Building,  
The Chinese University of Hong Kong, Shatin

*All are Welcome*