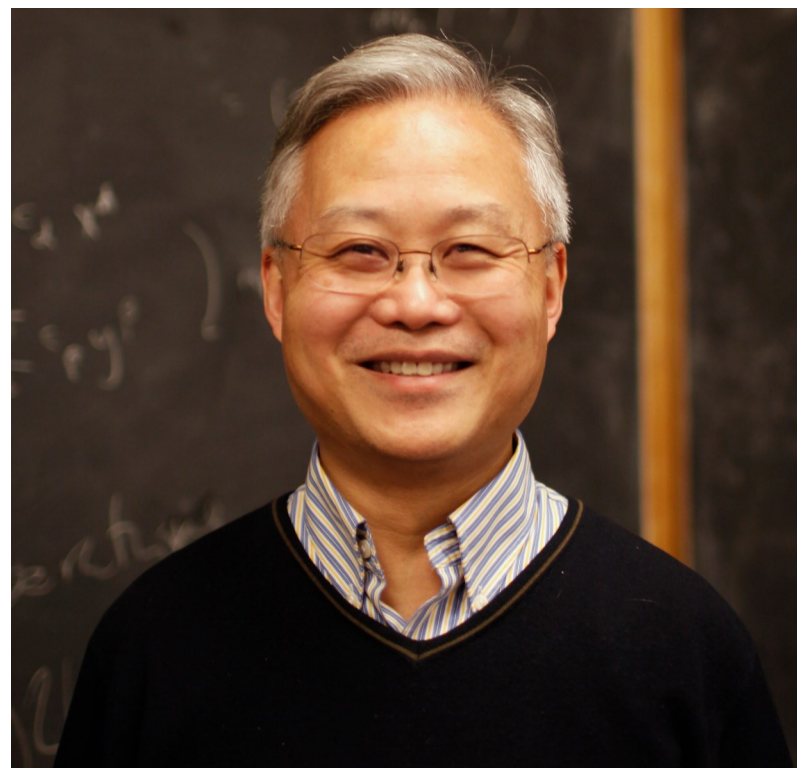


The Department of  
Mathematical Sciences  
Welcomes

**2024 Taft Lecturer**  
**Dr. Zhen-Qing Chen**

Professor  
Department of Mathematics  
University of Washington



**Tuesday March 19th 2024**

**Baldwin Hall Room 544**

**4:00-5:00pm**

## **Heat kernel and transition density function**

There is a rich and fruitful interplay between analysis and probability theory. Transition density function of a Markov process is the fundamental solution, also called heat kernel, of its infinitesimal generator. In this talk, I will explain how probabilistic insights can help in the study of heat kernels in the context of rectilinear fractional Laplacians. These non-local operators are the infinitesimal generators of rectilinear  $\alpha$ -stable processes, which are Levy processes on  $\mathbb{R}^d$ , whose coordinate processes are independent copies of one-dimensional  $\alpha$ -stable processes. They have many distinct properties from that of isotropic fractional Laplacians. I will discuss the geometric characterization of an open subset  $D$  so that the Dirichlet heat kernels  $p_D(t, x, y)$  on  $D$  are strictly positive. I will further present results on the properties of  $p_D(t, x, y)$  including its regularity as well as the sharp two-sided bounds on  $C^{1,1}$ -domain.

Refreshments will be served 3:15-3:45pm in the Math Faculty  
& Graduate Student Lounge Room 4118 French Hall West