

The Hong Kong University of Science and Technology

## Joint Statistics Seminar

Department of Information Systems, Business Statistics and  
Operations Management  
and  
Department of Mathematics

### **Fragmentations and Tree-like Fractals: a Functional Fixed-point Approach**

by

**Professor Nicolas Broutin**

**Visiting Associate Professor of Mathematics at  
NYU Shanghai**

**Date: November 24, 2017 (Friday)**

**Time: 4:00 pm – 5:00 pm**

**Venue: Room 1001 (1/F, LSK Business Building)**

#### **Abstract**

I will review some models and recent results where “fixed-points” approach or the “contraction method” have played a central role. Recursive partitioning schemes are central to many applications, starting with efficient data structures based on the divide-and-conquer paradigm. For more than 25 years now, arguments based on Banach fixed theorem have long been used to prove “softly” the convergence in distribution of associated real-valued random variables in the context of analysis of algorithms. I will review a number of questions that call for a more general approach for random functions. The applications include the quantification of the cost of partial match search queries in data data such as quad trees and k-trees, the construction of natural fractal tree-like objects such as Aldous' continuum random trees, or certain trees that are dual to recursive geometric partitions, and extend to the convergence of certain random fields. This is based on a collection of joint works with Henning Sulzbach and Ralph Neininger.

All interested are welcome!  
For details, please contact ISOM Department.