Joint Seminar

**JSS/CSS/CSE**
**The Hong Kong University of Science and Technology**

# Bayesian Nonparametric Models for Time Evolving Feature Allocations and Sparse Dynamic Networks

**by**

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**Date: November 23, 2015 (Monday)**
**Time: 4:30 p.m. – 5:30 p.m.**
**Venue: LTF (Academic Building, Lift 25)**

## *Abstract*

In this talk, I will present our recent and ongoing work on dynamic models over discrete time. More specifically I will describe two Bayesian nonparametric priors; one over feature allocations for sequential data called the birth-death feature allocation process (BDFP) and one for time-varying networks.

The BDFP models the evolution of the feature allocation of a set of objects N across a covariate (e.g. time) by creating and deleting features. A BDFP is exchangeable, projective, stationary and reversible, and its equilibrium distribution is given by the Indian buffet process (IBP). I will also present the de Finetti mixing distribution underlying the BDFP that plays the role for the BDFP that the Beta process plays for the Indian buffet process. The utility of this prior is demonstrated on synthetic and real world data.

The prior over dynamic networks is an ongoing work. To each node of the network is associated a positive parameter, modelling the sociability of that nodes. Sociabilities are assumed to evolve over time, and are modelled via a dynamic point process model. The model is able to (a) capture smooth evolution of the interactions between nodes, allowing edges to appear/disappear over time (b) capture long term evolution of the sociabilities of the nodes (c) and yields sparse graphs, where the number of edges grows subquadratically with the number of nodes. The evolution of the sociabilities is described by a tractable time-varying gamma process.

We provide some theoretical insights into the model.

***All interested are welcome!***

***For details, please contact ISOM Department.***