

# SCHOOL OF DATA SCIENCE

## SEMINAR SERIES

### Total Variation Regularized Frechet Regression for Metric-Space Valued Data

Date: 22 January 2019 (Tuesday)

Time: 10:00am to 11:00am

Venue: P7303, 7/F, Yeung Kin Man Academic Building (YEUNG),  
City University of Hong Kong

**Dr Lin, Zhenhua**  
Postdoctoral Fellow  
University of California, Davis



#### Guest Speaker's profile

Zhenhua is a postdoctoral fellow from University of California, Davis, mentored by Professor Hans-Georg Muller and Professor Jane-Ling Wang. He obtained his Ph.D. in statistics from University of Toronto, a master degree in statistics and a master degree in computing science from Simon Fraser University, and a Bachelor degree in computer science from Fudan University. He maintains a broad interest in the field of statistics and computing science, including functional data analysis, non-Euclidean data analysis, high-dimensional data analysis and statistics for streaming data.

#### Abstract

Non-Euclidean data that are indexed with a scalar predictor such as time are increasingly encountered in data applications, while statistical methodology and theory for such random objects are not well developed yet. To address the need for new methodology in this area, we develop a total variation regularization technique for nonparametric Frechet regression, which refers to a regression setting where a response residing in a generic metric space is paired with a scalar predictor and the target is a conditional Frechet mean. We show that the resulting estimator is representable by a piece-wise constant function and investigate the convergence rate of the proposed estimator for data objects that reside in Hadamard spaces. The method can also be applied to the problem of estimating multiple change-points in a sequence of non-Euclidean data. This is illustrated via the application to modeling the dynamics of brain networks and the study of evolving mortality distributions endowed with the Wasserstein distance.