



**The Chinese University of Hong Kong
Department of Statistics**

Seminar

**A Parsimonious Personalized Dose Finding Model
via Dimension Reduction**

By

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Abstract

Learning individualized dose rules (IDR) in personalized medicine is a challenging statistical problem. Existing methods for estimating the optimal IDR often suffer from the curse of dimensionality, especially when the IDR is learned nonparametrically using machine learning approaches. To tackle this problem, we propose a novel dimension reduction framework for estimating the optimal IDR. The framework exploits that the IDR can be reduced to a non-parametric function which relies only on a few linear combinations of the original covariate, hence a more parsimonious model can be built. Specifically, we propose two approaches, a direct learning approach that yields the IDR as commonly desired in personalized medicine, and a pseudo-direct learning approach that focus more on learning the dimension reduction space. Under regularity assumptions, we provide the convergence rate for the semiparametric estimators and fisher consistency results for the corresponding value function. The proposed methods are solved using an orthogonality constrained optimization approach that searches the dimension reduction parameters in a Stiefel manifold. The performance of the proposed methods is evaluated via extensive simulation studies and a real data analysis.

Date: January 8, 2019 (Tuesday)
Time: 2:30 p.m. - 3:30 p.m.
Venue: Science Centre L2
The Chinese University of Hong Kong

ALL INTERESTED ARE WELCOME !!