



Supply Chain & Operations Management Seminar

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**Safe Dynamic Pricing: Always-Validity and
Robustness**

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Bio

Will Wei Sun is an assistant professor of Quantitative Methods at Krannert School of Management, Purdue University. Before that, he was an assistant professor at University of Miami Business School and a research scientist in the advertising science team at Yahoo Labs. He obtained his PhD degree in Statistics from Purdue University in 2015. Dr. Sun's research focuses on machine learning, in particular, reinforcement learning and tensor learning, with applications in computational advertising, personalized recommendation system, and Neuroimaging analysis. His research was partially supported by grants from Office of Naval Research and Ross-Lynn Research Scholar Fund.

Abstract

Contextual dynamic pricing aims to set personalized prices based on sequential interactions with customers. The success of existing dynamic pricing algorithms relies on the faithfulness of adopted customer choice model and valuation model. In this talk, I will discuss two procedures toward safe dynamic pricing. The first one considers a new online regularization in high-dimensional dynamic pricing. The proposed online regularization scheme empowers online statistical learning with always-validity over all decision points and envelops prediction error process with time-uniform non-asymptotic oracle inequalities. The second procedure introduces a new distribution-free pricing policy for dynamic pricing with unknown noise distribution. This distribution-free pricing policy learns both the contextual function and the market noise simultaneously. A key ingredient of this method is a novel perturbed linear bandit framework, where a modified linear upper confidence bound algorithm is proposed to balance the exploration of market noise and the exploitation of the current knowledge for better pricing.