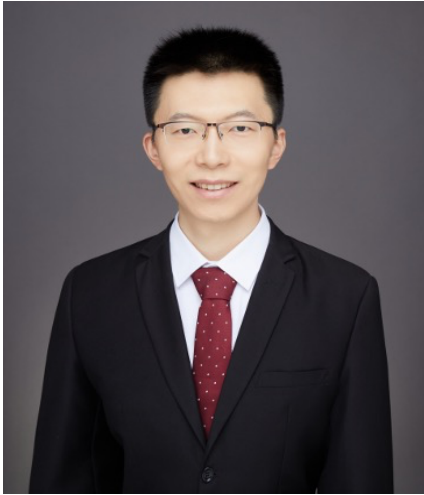# Retail on Autonomous Wheels: Spatial Queueing and Online Facility Location

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地　点：新奥工学大楼 2047 会议室

Abstract: Urban open space emerges as a new territory to embrace retail innovations. Selling products in public spaces with wheeled stores can potentially become ubiquitous in our future cities. Transition into such a "retail-on-wheels" paradigm is being spurred by the rapidly advancing self-driving technologies. This talk will present two of our recent studies into this new retail mode. The first study provides spatial-queueing models, theory, and insights concerning how to deploy and operate autonomous wheeled vending stalls to scale up retail on wheels. Then, in the second study, we formulate an online facility location problem joint with operational-level decisions. The scope of facility location problems continues to expand, while the models of facility location problems have been so far largely restricted to be in a static, offline fashion, prescribing one-shot facility placement based on past and current data on hand. In an online setting such as retail on wheels, the decision-maker is subject to parameter uncertainties. However, she is able to adjust facility locations over time while updating her parameter estimation from historical observations. To this end, we propose an online algorithm that integrates the continuous approximation approach. The algorithm is both computationally efficient and has a near-optimal regret guarantee.

Short Bio: Wei Qi is tenured Associate Professor in the Department of Industrial Engineering of Tsinghua University. Prior to Tsinghua, he was tenured Associate Professor in Operations Management at the Desautels Faculty of Management, McGill University. He also served as Strategic Advisor of the China Energy Group, Energy Analysis and Environmental Impacts Division at the Lawrence Berkeley National Laboratory. His work has contributed to smart-city operations concerning urban energy, mobility, retail logistics, and climate adaptation. His work has been supported by Natural Sciences and Engineering Research Council of Canada (NSERC), National Natural Science Foundation of China (NSFC) and the Fonds de Recherche du Québec (FRQ), among others. His research has appeared in journals including Operations Research, Management Science, Manufacturing & Service Operations Management, IEEE Transactions in Smart Grid, and IEEE Transactions in Power Systems. Wei received academic awards including INFORMS SOLA Chuck ReVelle Rising Star Award, INFORMS ENRE Best Publication Award in Energy, etc. Wei earned a Ph.D. from UC Berkeley, an M.S. from UCLA and a B.E. from Zhejiang University, China.