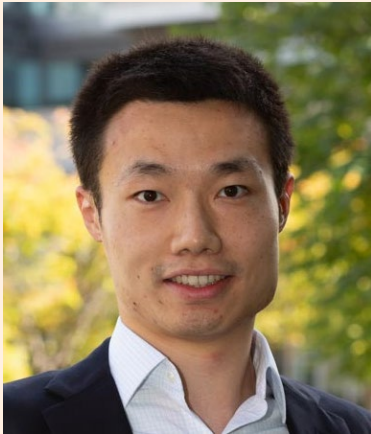


# The Hong Kong University of Science and Technology

Department of Information Systems, Business Statistics and Operations Management

## Statistics Seminar Announcement



### The Statistical Limit of Arbitrage

by

**Mr. Rui DA**  
**University of Chicago**

**Date** : **Thursday, 2 February 2023**  
**Time** : **10:30 am - 11:45 am**  
**Venue** : **ISOM Conference Room, LSK 4047**



#### **Abstract:**

When alphas are weak and rare, and arbitrageurs have to learn about alphas from historical data, there is a gap between Sharpe ratio that is feasible for them to achieve and the infeasible Sharpe ratio that could be obtained with perfect knowledge of parameters in the return generating process. This statistical limit to arbitrage widens the bounds within which alphas can survive in equilibrium relative to the arbitrage pricing theory (APT) in which arbitrageurs are endowed with perfect knowledge. We derive the optimal Sharpe ratio achievable by any feasible arbitrage strategy, and illustrate in a simple model how this Sharpe ratio varies with the strength and sparsity of alpha signals, which characterize the difficulty of arbitrageurs' learning problem. Furthermore, we design an "all-weather" arbitrage strategy that achieves this optimal Sharpe ratio regardless of the conditions of alpha signals. Our empirical analysis of equity returns shows that this optimal strategy, along with other feasible strategies based on multiple-testing, LASSO, and Ridge methods, achieve a moderately low Sharpe ratio out of sample, in spite of a considerably higher infeasible Sharpe ratio, consistent with absence of feasible near-arbitrage opportunities and relevance of statistical limits to arbitrage.

#### **Bio:**

Rui Da is currently a Ph.D. candidate in Econometrics and Statistics at the University of Chicago Booth School of Business. He is broadly interested in asset pricing, machine learning, and financial econometrics.