Sebastian Jaimungal (University of Toronto, Canada): Title: An Introduction to Algorithmic Trading.

This minicourse will focus on various aspects of algorithmic trading ranging from daily time scales down to sub-second time scales. The course will be kept at a bird's eye perspective with the aim of exposing students to a diverse set of problems and tools rather than providing excessive details.

In the first part of the minicourse, I will review basics of microstructure theory and illustrate some stylized facts with real data. Students will learn about the limit order book and how it evolves, the mutually-exciting nature of market orders and how the existence of informed traders explains the bid-ask spread. I will also

briefly explore some statistical machine learning methods for prediction and inference in high frequency datasets.

In the second part of the minicourse, I will introduce the mathematical problems that arise when attempting to solve some algorithmic trading questions. The now classical problem of how to optimally liquidate a large quantity of assets by trading off market impact and price uncertainty will be explained. I will also explore the market making problem whereby an agent determines the optimal position to place limit orders to profit from the bid-ask spread. Time

permitting, some cutting edge research including how to account for model uncertainty in algorithmic trading problems and how to utilize predictive information from multiple assets to improve performance will be discussed.