

STATISTICS COLLOQUIUM

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TALK: 4:00 PM — SCIENCE CENTER RM. 309

“Modeling and Analyzing High-Frequency Financial Data”

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ABSTRACT

Volatilities of asset returns are central to the theory and practice of asset pricing, portfolio allocation, and risk management. In financial economics, there is extensive research on modeling and forecasting volatility up to the daily level based on Black-Scholes, diffusion, GARCH, stochastic volatility models and implied volatilities from option prices. Nowadays, thanks to technological innovations, high-frequency financial data are available for a host of different financial instruments on markets of all locations and at scales like individual bids to buy and sell, and the full distribution of such bids. The availability of high-frequency data stimulates an upsurge interest in statistical research on better estimation of volatility.

This talk will start with a review on low-frequency financial time series and high-frequency financial data. Then I will introduce popular realized volatility computed from high-frequency financial data and present my work on wavelet based multi-scale methods for analyzing jump and volatility variations and the matrix factor model for handling large size volatility matrices. The proposed wavelet based methodology can cope with both jumps in the price and market microstructure noise in the high-frequency data, and estimate both volatility and jump variations from the noisy data. The matrix factor model is proposed to produce good estimators of large size volatility matrices by attacking on-synchronized problem in high-frequency price data and reducing the huge size of volatility matrices.