I am a Ph.D. and job market candidate in Economics at Duke University. My research is at the intersection of econometrics and finance, with an emphasis on applying high-frequency data and newly developed econometric procedures to solve the problems in asset pricing.

My job market paper *An Efficient Factor from Basis "Anomalies"* seeks to explain and understand the hundreds of "unique anomalies" documented in the existing asset pricing literature. Rather than ponderously adding new variables to the existing multi-factor models, I take a very different approach: solving a mean-variance optimization problem using high-frequency econometric techniques. I demonstrate that a dynamic weighting method with time-varying conditional variance makes the mean-variance efficient portfolio achieve a high ex-post Sharpe ratio. Further, it significantly outperforms and drives out 11 of the most popular factors in a stringent and comprehensive battery of asset pricing tests. Over 90% of the publicly accessible unique factors and trading strategies are completely priced by a 1-factor model and spanned by 3 basis "anomalies".

The empirical evidence and analytical arguments provided by my paper has a direct bearing on the debates in financial economics regarding whether the massive number of return predictabilities can be priced (are the reflection of rational risk-return trade-off). My paper suggests, both empirically and analytically, that return predictabilities are equivalent to 1-factor pricing regardless of rational or behavioral cause. By revisiting the classical works on mean-variance efficiency, my paper demonstrates the importance of high-frequency econometric procedures in portfolio optimization, as well as the neglected importance of portfolio optimization in asset pricing and finance.

A significant part of my Ph.D. studies has also been devoted to managing the massive millisecond TAQ database at Duke University. Based on this valuable dataset, I have two working papers and one work-in-progress that investigates the rich information available in the high-frequency realm.

In *Good Volatility, Bad Volatility and the Cross-Section of Stock Returns*, joint with Tim Bollerslev and Sophia Zhengzi Li, we demonstrate that valuable predictive information can be extracted using the ultra-high-frequency TAQ data. A simple measure of the relative good-minus-bad volatilities results in strong stock-return predictability which in fact drives the skewness "anomalies" previously documented. This measure is closely related to firm's liquidity events, thus could shed light on how liquidity impacts the investment decisions.

In *Factors and Their Economic Value in Volatility Forecast*, joint with Lada Kyj, we propose a new family of simple and reliable realized volatility forecasting models that significantly improves the mean-variance optimization for a typical investor, in a close to practical context. We document that a systemic volatility factor could improve the volatility forecast for about 90% of securities in a massive cross-section. This volatility forecast improvement readily translates into over 80 basis points per year gain in return for a typical mean-variance investor. Since mean-variance efficiency is closely tied to the core of asset pricing, the large cross-section of high-frequency data are very

valuable as they are especially suited to obtain the conditional variances and covariances.

The valuable TAQ dataset is so far cleaned for the 7-th version. The data encompass 22,000 time-series, and occupy 3 Tera-Byte in storage. The enormously rich information embedded in this massive dataset could help to illuminate other important questions of financial economics. In addition to the working papers, in my work-in-progress *Measuring Tail Risks with Threshold Quantile Beta*, joint with Yichong Zhang, we are able to implement a novel quantile regression method with automatic thresholds to uncover the non-linear responses of asset returns to systemic risk-factors in high-frequency setting.

Going forward, my primary objectives will be to explore in greater depths the questions raised by my job market paper: (1) The efficient factor based on three low-turnover "anomalies" is able to eliminate 90% of other low-turnover "anomalies", while a large part of the remaining puzzles in asset pricing lies in the context of event studies in short horizons. The massive high-frequency TAQ data is especially suited for constructing efficient factors at the very short horizon. (2) Next, to complete a coherent risk-return trade-off explanation to asset pricing "anomalies" requires an equilibrium model to illustrate how investor's marginal utility leads to the risk-premium of the mean-variance efficient portfolio. I have already begun the groundwork along these lines by investigating how the conditional risk premium of the efficient 1-factor is empirically tied to the macroeconomic environment. Given the close link between productions and risk-premium established by my job market paper, I will continue to develop a *production-based* general equilibrium model to explain the cross-section and time-series properties of returns.