Mingyang (Yang) Liu

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Education

Imperial College London, Imperial Business School, Department of Finance — Aug 2019 – Aug 2026
- PhD in Finance, conferred August 2026
- MRes in Finance, with Distinction, 2020

Columbia University, Graduate School of Arts and Sciences — Aug 2017 – Feb 2019
- M.A. in Economics (Financial Econometrics)
- Master's thesis: Diffusion Index Forecasting: A Robust Estimator for Common Shock, supervised by Prof. Jushan Bai

University of Michigan, Ann Arbor — Aug 2014 – Apr 2017
- B.S., double major in Economics and Mathematics (Mathematics of Finance and Risk Management track)

Fields

Empirical asset pricing | Machine learning and big data in finance | Financial econometrics
Portfolio choice and risk management

Research Agenda

My papers form one research programme on the ruler: the metric a characteristic-based factor model uses to measure and compare directions in characteristic space. The ruler adds no information, yet it can decide which factors a model identifies (A Geometric Framework), how fitted returns are split between factors and alpha (Characteristic-Space Metrics; Interpreting Estimated Pricing Errors), and which portfolio an investor holds (Same Forecasts, Different Portfolios; The Ruler Matters). A Geometric Framework develops the ruler into No-Arbitrage IPCA, with its identification theory and inference. Each paper isolates one modelling choice; work in progress takes the programme to corporate bonds (with Prof. Paolo Zaffaroni).

References

Professor Paolo Zaffaroni
Professor of Financial Econometrics
Imperial Business School
Imperial College London
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PhD supervisor (main)

Professor Pasquale Della Corte
Professor of Finance
Imperial Business School
Imperial College London
p.dellacorte@imperial.ac.uk
PhD supervisor

Professor Robert Kosowski
Professor of Finance
Co-Director, Imperial Centre of Excellence in Quantitative Finance
Imperial Business School, Imperial College London
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Host, visiting researcher appointment

Fellowships & Awards

- Fully funded doctoral scholarship (Graduate Teaching Assistant Scholarship), Imperial Business School — 2019 – 2025
- MRes in Finance with Distinction, Imperial College London — 2020
- Nominated by students for the Excellence in Teaching Award, Imperial Business School — 2023, 2024
- University Honors, University of Michigan — 2014 – 2016

Job Market Paper

The Ruler Matters: Factor Exposures, Attribution, and Portfolio Risk

Working paper, October 2026 | PDF | Paper page | Slides

Firm characteristics parameterize conditional factor loadings in IPCA, and a larger characteristic library can fit returns better. This paper asks which stock positions the estimated loadings represent. Using the cross-sectional second moment of characteristics as a ruler, it evaluates fixed-dimensional loading spaces by the stocks they select, invariant to latent-factor rotation. In U.S. equities, with the factor count fixed, expanding from 36 to 153 characteristics improves in-sample fit, yet, with an unrestricted intercept, average momentum coverage falls from 82% to 62% and size coverage from 90% to 72%. Reallocating shared factor exposures changes attribution without changing joint fitted returns. With coefficients and the characteristic target fixed, measuring exposure on the current cross section gives lower estimated subsequent variance in all twelve exploratory positive-target comparisons. Factor models should be evaluated by the economic exposures they represent and the portfolio decisions those exposures support, alongside return fit.

Invited seminars: University of Cambridge, Faculty of Economics, 4 November 2026 (scheduled); EPFL, Lausanne, 16 June 2026 (precursor presented as No-Arbitrage Factor Geometry)

Working Papers

Same Forecasts, Different Portfolios: Factor Normalization and Regularization

Working paper, October 2026 | PDF | Paper page

Two separately estimated IPCA normalizations deliver nearly identical return forecasts but gross Sharpe ratios of 0.69 and 1.07 under the same numerical ridge penalty, because regularization penalizes factor exposures in units set by the normalization. The paper derives the transformation that preserves portfolio positions across equivalent model representations; applying it aligns the two portfolios. Using the full fitted mean, including characteristic-associated intercepts, yields a gross Sharpe ratio of 2.51 with little sensitivity to the penalty. Portfolio performance from statistical factor models can thus reflect representation choices that forecasts alone do not reveal.

Characteristic-Space Metrics in Factor Models: Identification and Inference

SSRN preprint, September 2026 | DOI 10.2139/ssrn.7445120 | PDF | Online supplement

Factor models with identical fit can credit returns differently to latent factors, observed factors and an intercept. Fit cannot choose the split; the inner product chosen for characteristic space does. The paper develops rotation-invariant inference that carries the Gram metric's estimation error, with drift-robust confidence intervals near an intercept cap (exposure budget). In simulation with $T = 960$, treating the metric as known gives 95% intervals that cover only 89–92% of the time; the complete-score correction restores coverage to 94–95%.

A Geometric Framework for Identification in Characteristic-Based Factor Models

SSRN preprint, March 2026 (preliminary version) | DOI 10.2139/ssrn.7013178 | PDF | framework paper of the PhD thesis; its inference theory is developed further in Characteristic-Space Metrics

Using a metric taken from the long-run cross-sectional distribution of firm characteristics, the paper derives No-Arbitrage IPCA (NA-IPCA), which nests IPCA, caps how much the intercept may carry and admits rotation-invariant inference. In the headline calibrated simulation, NA-IPCA recovers the latent pricing span where an intercept-free IPCA benchmark does not.

Interpreting Estimated Pricing Errors: Evidence from Characteristic-Based Return Forecasts

Working paper, September 2026 | PDF | Paper page

What does a smaller estimated pricing error (alpha) tell a model user? On 153 U.S. characteristics, crossing the expected-return estimates and factor spaces of one model's equal- and value-weighted fits shows that the gap in alphas mainly reflects different estimated means, not different factor spaces: swapping the loading space moves the residual from 117.4 to 116.7 basis points a month, while swapping the mean moves it to 75.0. Residual diagnostics add little to forecast selection.

Research in Progress

Exposure or Intercept? Identifying Corporate Bond Premia with No-Arbitrage IPCA, with Paolo Zaffaroni

In preparation

Characteristics such as rating, duration and liquidity predict corporate bond returns, but whether this reflects factor exposure or an intercept the factors leave unexplained remains unsettled. We adapt No-Arbitrage IPCA to corporate bonds: loadings are normalized under the characteristics' Gram metric, and a no-arbitrage cap limits how much the intercept may carry, with the zero and unrestricted intercepts of earlier IPCA work on bonds as its two ends. On the public Open Source Bond Asset Pricing panel of TRACE excess returns, we measure how much of the split the data identify and how much the metric, the cap and the observed factors decide.

PhD Thesis

No-Arbitrage IPCA: A Framework for Cross-Sectional Asset Pricing

Imperial College London, 2026 | supervisors: Prof. Paolo Zaffaroni (main) and Prof. Pasquale Della Corte | examined March 2026; degree conferred August 2026 | available on request

Develops the geometric theory of the ruler that the papers above apply. Using the empirical characteristic metric, it extends IPCA to nested QZ-IPCA and NA-IPCA models that separate latent factors, observed factors (Fama–French five plus momentum) and residual pricing under an intercept cap. It provides identification results, an asymptotic linear expansion and a projected alternating least squares estimator; simulations and a Jensen–Kelly–Pedersen U.S. panel show that near-identical fit can coexist with different identified pricing directions.

Teaching & Mentoring

Financial Statistics (MSc Risk Management & Financial Engineering), Imperial Business School; Graduate Teaching Assistant — 2023, 2024

Student rating 4.8 out of 5; nominated by students for the Excellence in Teaching Award in both years. Wrote teaching notes for the course (lecture summaries and worked solutions): Financial Statistics (PDF, 96 pages, shared for academic use).

Imperial Student Investment Fund (a student finance lab), Imperial Business School; Adviser, former Chair of the Executive and Advisory Committees — May 2024 – present

The fund works as a student finance lab in which students apply classroom finance to real markets. With the Head of the Department of Finance, helped develop it as a teaching lab and build its Python research platform on real trade-level market data from the LSEG database; mentored students in turning course theory into investment decisions; led student teams in the 2026 QRT Quantitative Competition, a paper-trading competition (four teams reached the final, two placed second and third); organised and coordinated the lab's teaching activities with Qube Research & Technologies (QRT) and LSEG, including QRT Trading and Risk Management training sessions and portfolio-optimisation training on LSEG Workspace.

Affiliations & Research Positions

Visiting Researcher, Imperial Centre of Excellence in Quantitative Finance, Department of Finance, Imperial Business School, Imperial College London — Jun 2026 – present

Host: Prof. Robert Kosowski, Co-Director of the Centre. Research agenda for the visit: economically constrained machine learning for cross-sectional asset pricing and portfolio choice.

Research Assistant (macro forecasting), Department of Economics, Columbia University — May 2018 – May 2019

Research Assistant (derivatives pricing), Department of Mathematics, University of Michigan — Jun 2016 – Jan 2017

Languages

Chinese (Mandarin, native); English (fluent; working language)

Software

Python (NumPy, pandas, SciPy, scikit-learn, PyTorch), MATLAB, R, SQL, Git. Author of `naipca`, a Python toolkit for IPCA, QZ-IPCA and NA-IPCA (available to academic users on request).

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