Leandro Sánchez-Betancourt

Curriculum vitae

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Last updated: April, 2025

Academic posts

2023–present **Senior Research Fellow**, *Mathematical Institute, University of Oxford and Oxford-Man Institute of Quantitative Finance*,
Mathematical and Computational Finance research group.

2023–present **Non-Stipendiary Lecturer in Mathematics**, *New College, University of Oxford*,
Probability and Statistics.

2022–2023 **Lecturer in Financial Mathematics**, *Department of Mathematics, King's College London*,
Financial Mathematics research group.

2021 **Research Associate**, *Department of Mathematics, Imperial College London*,
Mathematical Finance research group.

2019–2021 **Graduate Teaching and Research Scholar**, *Oriel College, Oxford*.

Education

2017–2021 **DPhil in Mathematics**
University of Oxford, Mathematical Institute.
Dissertation: Uncertain execution in order-driven markets.
Supervisor: Professor Álvaro Cartea.
Prize: Bruti Liberati prize for best PhD thesis in Quantitative Finance.

2016–2017 **MSc in Financial Mathematics**
King's College London, Department of Mathematics.
Overall mark: Distinction (94/100).
Prize: Best overall performance student award.

2010–2014 **BSc in Actuarial Sciences**
Universidad Nacional Autónoma de México, Facultad de Ciencias.
Overall mark: 10/10.
Prize: Gabino Barreda Medal (for top student).

Awards, accomplishments, and scholarships

2023 Bruti Liberati Prize for best PhD thesis in Quantitative Finance € 3,000.
Awarded by the Bachelier Finance Society and the Politecnico di Milano, in cooperation with Springer.
Committee: Prof. E. Barucci, Prof. J. Cvitanić, Prof. M. Grasselli, Prof. X. Guo, Prof. H. Xing

2021–2023 Co-investigator in the AFM-ATI collaboration. Funding for the project £ 249,000.

2019–2021 Graduate Teaching and Research Scholar in Mathematics, Oriel College, Oxford ∼ £ 20,000.

2019 Winner of the Financial Mathematics Team Challenge, Rio de Janeiro, Brazil.

2018–2021 Scholarship for doctoral studies at Oxford, awarded by Consejo Nacional de Ciencia y Tecnología, México (CONACyT) ∼ £ 50,000.

2017–2020 Mathematical Finance Scholarship, awarded by the Mathematical Institute, Oxford £ 24,000.

2017 Best overall performance student award, for the highest marks in the MSc in Financial Mathematics, Department of Mathematics, King's College London.

2016 Scholarship for graduate studies at King's College London, awarded by CONACyT ∼ £ 22,000.

2016 Scholarship for graduate studies at King's College London, awarded by Secretaría de Educación Pública, México (SEP) ∼ £ 3,000.

2016 Gabino Barreda medal, for top student in four-year undergraduate program, awarded by Universidad Nacional Autónoma de México (UNAM).

2011/12/13 Excellence Scholarship, awarded by SEP.

2008/09 Winner of the Mathematical Olympiad of México, at state level.
2007/08/09 Winner of the Mathematical Competition, over all schools of UNAM.
2004/05 Winner of the Mathematical Olympiad of Cuba, at national level.

Professional memberships

Society for Industrial and Applied Mathematics (SIAM)
Bachelier Finance Society (BFS)
London Mathematical Society (LMS)
Institute of Mathematics and its Applications (IMA)

Journal Articles*

- ⋆ R. Boyce, M. Herdegen, and L. Sánchez-Betancourt (2025+). *Market Making with Exogenous Competition*. (Forthcoming) SIAM Journal on Financial Mathematics.
- ⋆ G. Duran-Martin, L. Sánchez-Betancourt, A. Shestopaloff, and K. Murphy (2025). *A unifying framework for generalised Bayesian online learning in non-stationary environments*. Transactions on Machine Learning Research.
- ⋆ P. Bergault and L. Sánchez-Betancourt (2025). *A Mean Field Game between Informed Traders and a Broker*. SIAM Journal on Financial Mathematics **16** (2), 358-388.
- ⋆ Á. Cartea and L. Sánchez-Betancourt (2025). *Brokers and Informed Traders: dealing with toxic flow and extracting trading signals*. SIAM Journal on Financial Mathematics **16** (2), 243-270.
- ⋆ Á. Cartea, S. N. Cohen, R. Graumans, S. Labyad, L. Sánchez-Betancourt, and L. van Veldhuijzen (2025). *Statistical Predictions of Trading Strategies in Electronic Markets*. Journal of Financial Econometrics **23** (2), nbae025.
- ⋆ L. P. Hughston, and L. Sánchez-Betancourt (2024). *Valuation of a Financial Claim Contingent on the Outcome of a Quantum Measurement*. Journal of Physics A: Mathematical and Theoretical **57** (28), 285302.
- ⋆ G. Bouzianis, L. P. Hughston, and L. Sánchez-Betancourt (2024). *Information-based Trading*. International Journal on Theoretical and Applied Finance **27** (03n04), 2350030.
- ⋆ S. Jaimungal, S. Pesenti, and L. Sánchez-Betancourt (2024). *Minimal Kullback-Leibler for Constrained Lévy-Itô Processes*. SIAM Journal on Control and Optimization **60** (2), 982-1005.
- ⋆ C. Bellani, D. Brigo, M. S. Pakkanen, and L. Sánchez-Betancourt (2024). *Price impact without averaging*. Applied Mathematical Finance **30** (4), 175-206.
- ⋆ Á. Cartea and L. Sánchez-Betancourt (2023). *Optimal Execution with Stochastic Delay*. Finance and Stochastics **27** (1), 1-47
- ⋆ Á. Cartea, S. Jaimungal, and L. Sánchez-Betancourt (2023). *Reinforcement Learning for Algorithmic Trading*. In Machine Learning and Data Sciences for Financial Markets: A Guide to Contemporary Practices. Edited by C.-A. Lehalle and A. Capponni. Cambridge University Press.
- ⋆ Á. Cartea, I. Perez Arribas, and L. Sánchez-Betancourt (2022). *Double-Execution Strategies using Path Signatures*. SIAM Journal on Financial Mathematics **13** (4), 1379–1417.
- ⋆ M. Forde, L. Sánchez-Betancourt, and B. Smith (2022). *Optimal Trade Execution for Gaussian Signals with Power-law Resilience*. Quantitative Finance **22** (3), 585–596.
- ⋆ Á. Cartea, S. Jaimungal, and L. Sánchez-Betancourt (2021) *Latency and Liquidity Risk*. International Journal on Theoretical and Applied Finance **24** (06n07), 2150035.
- ⋆ G. Bouzianis, L. P. Hughston, S. Jaimungal, and L. Sánchez-Betancourt (2021). *Lévy-Ito Models in Finance*. Probability Surveys **18**, 132-178.
- ⋆ Á. Cartea and L. Sánchez-Betancourt (2021). *The Shadow Price of Latency: Improving Intraday Fill Ratios in Foreign Exchange Markets*. SIAM Journal on Financial Mathematics **12** (1), 254–294.
- ⋆ L. P. Hughston and L. Sánchez-Betancourt (2020). *Pricing with Variance Gamma Information*. Risks **8** (4), 105:1-22.

Conference/workshop papers*

⋆ K. Li, M. Cucuringu, L. Sánchez-Betancourt, and T. Willi (2024). *Mixtures of Experts for Scaling up Neural Networks in Order Execution*. 5th ACM Internaltional Conference on AI in Finance (ICAIF), New York, USA.

⋆ A. Bogdan, L. Sánchez-Betancourt, S. Sarkadi, and C. Ventre (2024). *Detecting Collective Liquidity Taking Distributions*. 5th ACM Internaltional Conference on AI in Finance (ICAIF), New York, USA.

⋆ G. Duran-Martin, M. Altamirano, A. Shestopaloff, L. Sánchez-Betancourt, J. Knoblauch, M. Jones, F-X. Briol, K. P. Murphy (2024). *Outlier-robust Kalman Filtering through Generalised Bayes*. International Conference on Machine Learning (ICML).

⋆ J. Jerome, L. Sánchez-Betancourt, R. Savani, and M. Herdegen (2023). *Model-based gym environments for limit order book trading*. Proceedings of the 4th ACM International Conference on AI in Finance (ICAIF), New York, USA.

⋆ M. Höglund, E. Ferrucci, C. Hernández, A. Muguruza Gonzalez, C. Salvi, L. Sánchez-Betancourt, Y. Zhang (2023). *A Neural RDE approach for continuous-time non-Markovian stochastic control problems*. Workshop on New Frontiers in Learning, Control, and Dynamical Systems at the International Conference on Machine Learning (ICML).

Submitted*/working+ papers

∗ A. Aqsha, P. Bergault, and L. Sánchez-Betancourt (2025). *Equilibrium Reward for Liquidity Providers in Automated Market Makers*.

∗ Á. Cartea, and L. Sánchez-Betancourt (2025). *A Simple Strategy to Deal with Toxic Flow*.

∗ E. Barucci, A. Mathieu, and L. Sánchez-Betancourt (2025). *Market Making with Fads, Informed, and Uninformed Traders*.

∗ Á. Cartea, T. Bhudisaksang, and L. Sánchez-Betancourt (2025). *Adaptive-Robust Portfolio Optimisation*.

∗ A. Aqsha, F. Drissi, and L. Sánchez-Betancourt (2024). *Strategic Learning and Trading in Broker-Mediated Markets*.

∗ Á. Cartea, F. Drissi, L. Sánchez-Betancourt, D. Siska, and L. Szpruch (2024). *Strategic Bonding Curves in Automated Market Makers*.

∗ Á. Cartea, S. Jaimungal, and L. Sánchez-Betancourt (2024). *Nash Equilibrium between Brokers and Traders*.

+ S. N. Cohen, L. Sánchez-Betancourt, and L. Szpruch (2023). *The Economics of Interest Rate Models in Decentralised Lending Protocols*.

+ Á. Cartea, G. Duran-Martin, and L. Sánchez-Betancourt (2023). *Detecting Toxic Flow*.

Industry experience

2017–2024 **Researcher**, *LMAX Exchange*, London.
Researcher in topics regarding latency and high-frequency trading.
Comparison between trading-on-firm venues and those with last look.
Externalisation and internalisation problems.

2015–2016 **Consultant**, *Indra Business Consulting*, Mexico City.
Mathematical support for migration of Santander's risk-management platform.
Mathematical analysis of methodological changes in derivative pricing in Murex.

2014–2015 **Risk analyst**, *Citigroup*, Mexico City.
Development of internal debt rating model in collaboration with Citigroup New York.
Responsible for monthly calculations of the regulatory reserves.

Teaching

2024–present **Lecturer**, *Mathematical Institute, University of Oxford*.
Financial Derivatives (Michaelmas term), Market Microstructure and Algorithmic Trading (Hilary term).

2024–present **Reading groups**, *Oxford-Man Institute of Quantitative Finance, University of Oxford*.
Lectures on BSDEs, Stochastic Control, and Stochastic Differential Games with Financial Applications (Michaelmas term 2024). Market Microstructure (Michaelmas term 2025)

2024–present **Lecturer**, *Oxford-Man Institute of Quantitative Finance, University of Oxford*.
Machine Learning in Finance (Michaelmas term).

2023–present **Tutor**, *New College, Oxford*.
Probability, Statistics

2023–2024 **Lecturer**, *Mathematical Institute, University of Oxford*.
Fixed Income and Credit

2022–2023 **Lecturer**, *King's College London*.
Mathematical Finance II: Continuous Time

2021 **Lecturer**, *Imperial College London*.
Quantitative Risk Management (Core module for the MSc Mathematics and Finance)

2019–2021 **Tutor**, *Oriel College, Oxford*.
Probability, Probability prelims (Michaelmas term 2019, 2020), Integration, Statistics, Integral transforms (Hillary term 2020, 2021), Statistics and data analysis (Trinity term 2020, 2021).

2018-2019 **Tutor**, *Queen's College, Oxford*.
Probability (Michaelmas term 2018), Statistics and data analysis (Trinity term 2019).

2018-2021 **Tutor**, *Mathematical Institute, University of Oxford*.
Graduate courses: Algorithmic trading, Asset pricing, Stochastic control, Market micro-structure.

2018-2021 **Teaching assistant**, *Mathematical Institute, University of Oxford*.
Graduate courses: Stochastic control, Market micro-structure, Algorithmic trading, Asset pricing.
Undergraduate courses: Stochastic differential equations, Mathematical models for financial derivatives.

Presentations at conferences, seminars, and summer schools

(both contributed talks and invited*)

2025 Advances in Stochastic Control and Reinforcement Learning Workshop, Banff, Canada.*
Financial Mathematics Team Challenge, Cape Town, South Africa.*
SIAM Conference on Financial Mathematics, Miami.
Advances in Mathematics of Randomness for Handling Risks in Finance and Insurance, CIRM, Luminy.*

2024 Algo-trading & DeFi Workshop, Politecnico di Milano, Milan.*
Stochastic Finance at Warwick seminar, Coventry.*
Mathematics of Random Systems workshop, Oxford.*
AFM-FCA workshop, London.*
Oxford-Princeton Mathematical Finance meeting, Princeton University, New Jersey.
Manchester Probability Seminar, University of Manchester.*
IMS Young Mathematical Scientist Forum in Applied Mathematics, Singapore.*

2023 4th ACM International Conference on AI in Finance, New York.
Berlin Seminar on Stochastic Analysis and Stochastic Finance, Humboldt University of Berlin.*
Mathematical Finance Internal Seminar, University of Oxford.*
Financial and Actuarial Mathematics at UCLA, Los Angeles.*
Politecnico di Milano, financial engineering seminar, Milan.*
Mathematical finance seminar at Columbia, New York.*
Blockchain@X-OMI – Workshop on Blockchain and Decentralized Finance, Paris.*
European Finance Association annual meeting, Amsterdam.*
11th AMaMeF Conference, Bielefeld.*
SIAM Conference on Financial Mathematics, Philadelphia.
Man Group research seminar, London.*
Financial Technology conference, Oxford-Man Institute of Quantitative Finance, Oxford.*
University of Edinburgh Quantitative Finance seminar, Edinburgh.*

2022 Quantitative Finance Seminar, Fields Institute, Toronto.*
Finance and Economics, Alan Turing Institute, London.*
Stochastic Finance at Warwick seminar, Coventry.*
SIAM Conference on Mathematics of Data Science, San Diego.
11th World Congress of Bachelier Finance Society, Hong Kong.
CFM-EconophysiX lab seminar, Paris.*
University of Edinburgh Quantitative Finance seminar, Edinburgh.*
1st London/Oxford/Warwick Financial Mathematics Workshop, London.*

2021 CFE 2021, King's College London.*
Big Data and Machine Learning in Finance Conference, Politecnico di Milano, Milan.
SIAM Conference on Financial Mathematics, virtual.
IEOR seminar, Berkeley.

2020 Mathematical Finance Internal Seminar, University of Oxford.

2019 21st Actuarial Congress: "un modelo a seguir", Universidad Marista, Mexico City.*
12th European Summer School on Financial Mathematics, Padova.
SIAM Conference on Financial Mathematics, Toronto.
1st Oxford-ETH Workshop on Financial Mathematics, Oxford.

2018 11th European Summer School on Financial Mathematics, Paris.
10th World Congress of the Bachelier Finance Society, Dublin.
Actuarial Sciences Conference, Universidad Marista, México City.
Mathematical Finance Internal Seminar, University of Oxford.
Market Microstructure, Imperial-CFM workshop, London.

Service to the community

2024–present Associate Editor of São Paulo Journal of Mathematical Sciences. Springer.

Refereeing SIAM Journal on Financial Mathematics (SIFIN); Operations Research (OR); Finance and Stochastics (Finance Stoch); Mathematical Finance (MAFI); Quantitative Finance (QF); Applied Mathematical Finance (AMF); International Conference on AI in Finance (ICAIF); Probability, Uncertainty and Quantitative Risk (PUQR); Economic Modelling (EM); International Journal of Theoretical and Applied Finance (IJTAF).

Conference organisation Mini-symposium organiser at: SIAM conference on financial mathematics and engineering 2021, 2023, 2025, and Bachelier world congress 2024.
Co-organiser of the seminar series on "Statistics and Machine Learning in Finance" (link).
Workshop Co-Chair for 2023 International Conference on AI in Finance (ICAIF).
Scientific and organising committee: London-Oxford-Warwick mathematical finance workshop 2024 (link).
Scientific and organising committee: OMI statistical machine learning and finance workshop 2024 (link).

PhD examiner for transfer of status*, confirmation+, and final viva⋆

2025 Jakob Albers+ (Oxford), Michael Giegrich⋆ (Oxford), Shijia Jin⋆ (Monash University), Patrick Chang+ (Oxford).

2024 Gabriel Garcia Arenas+ (Oxford), Jakob Albers* (Oxford), Kang Li* (Oxford), Yanzhao Yang* (Oxford), Laura Körber⋆ (TU Berlin), Marcello Monga⋆ (Oxford), Jason Rader+ (Oxford), Cephas Svosve+ (Oxford), Zihan Guo* (Oxford).

2023 Karolina Bassa* (Oxford).

Academic visits, outreach, and team projects

Dec 2024 **Academic visit to Université Paris-Dauphine, France**.
Collaboration with Professor Philippe Bergault.

Oct 2024 **Research in pairs, Oxford**.
Visit from Professor Lane P. Hughston to carry out research under an LMS 'research in pairs' grant.

Sept 2022 **Autoriteit Financiële Markten, Amsterdam, The Netherlands**.
Research on agent-based market simulators, clustering of trading algorithms, and detection of market manipulation.

Jul 2019 **Financial Mathematics Team Challenge, Rio de Janeiro, Brazil**.
Hedging derivatives with price impact. Mentor: Dr Ryan Donnelly.
My role was that of team leader in this outreach project. Our team won the competition.

Jun 2019 **Fields-China Joint Industrial Problem Solving Workshop in Finance, Fields Institute, Toronto**.
Deep Machine Learning and Volatility Prediction.

Jun 2018 **Academic visit to University of Toronto, Canada.**
Collaboration with Professor Sebastian Jaimungal.

2018–2020 **Christopher Hatton School, London**.
I led a weekly Math Club for two years. I coached the students on Mathematical Olympiad problems.

References

1. **Professor Álvaro Cartea**.
   Mathematical Institute, University of Oxford, OX2 6GG, Oxfordshire, United Kingdom.
   alvaro.cartea@maths.ox.ac.uk
2. **Professor Samuel N. Cohen**.
   Mathematical Institute, University of Oxford, OX2 6GG, Oxfordshire, United Kingdom.
   samuel.cohen@maths.ox.ac.uk
3. **Professor Mihai Cucuringu**.
   Department of Mathematics, UCLA, MS 6363, Los Angeles, United States of America.
   mihai@math.ucla.edu
4. **Professor Lane P. Hughston**.
   Department of Computing, Goldsmiths University of London, SE14 6NW, London, United Kingdom.
   l.hughston@gold.ac.uk
5. **Professor Sebastian Jaimungal**.
   Department of Statistical Sciences, University of Toronto, M5T 1P5, Ontario, Canada.
   sebastian.jaimungal@utoronto.ca