

Leandro Sánchez-Betancourt

Curriculum vitae

701 Weeks Building
Imperial College London
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Last updated: September 2021

Academic appointments

- 2021–present **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.
Uncertain execution in order-driven markets.
Supervisor: Professor Álvaro Cartea.
- 2016–2017 **MSc in Financial Mathematics**
King's College London, Department of Mathematics.
Dissertation: Stochastic control for optimal dynamic trading strategies.
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

- 2021–2022 Co-investigator in the AFM-ATI collaboration. Funding for the project: £ 200,000.
- 2019–2021 Graduate Teaching and Research Scholar in Mathematics, Oriel College, Oxford.
- 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).
- 2017–2020 Mathematical Finance Scholarship, awarded by the Mathematical Institute, Oxford.
- 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.
- 2016 Scholarship for graduate studies at King's College London, awarded by Secretaría de Educación Pública, México (SEP).
- 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.

Publications* and submitted* papers

- * M. Forde, L. Sánchez-Betancourt and B. Smith (2021). *Optimal Trade Execution for Gaussian Signals with Power-law Resilience*. Quantitative Finance (to appear) [📄](#)
- * G. Bouzianis, L. P. Hughston, S. Jaimungal and L. Sánchez-Betancourt (2021). *Lévy-Ito Models in Finance*. Probability Surveys **18**, 132-178. [📄](#)

- * Á. Cartea, S. Jaimungal and L. Sánchez-Betancourt (2021). *Deep Reinforcement Learning for Algorithmic Trading*. In *Machine Learning in Financial Markets: A guide to contemporary practices* (to appear). Edited by C.-A. Lehalle and A. Capponni. Cambridge University Press. [↓](#)
- * 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. [↓](#)
- * Á. Cartea, I. Perez Arribas and L. Sánchez-Betancourt (2020). *Optimal Execution of Foreign Securities: A Double-Execution Problem with Signatures and Machine Learning*. [↓](#)
- * Á. Cartea, S. Jaimungal and L. Sánchez-Betancourt (2019) *Latency and Liquidity Risk*. [↓](#)
- * Á. Cartea and L. Sánchez-Betancourt (2021). *Optimal Execution with Stochastic Delay*. [↓](#)

Industry experience

- 2017–present **Research intern**, *LMAX Exchange*, London.
 Researcher in topics regarding latency, high-frequency trading, and FX trading.
 Micro-structure comparison between trading-on-firm venues against those with last look.
- 2015–2016 **Consultant**, *Indra Business Consulting*, Mexico City.
 Mathematical support for migration of Santander's risk-management platform.
 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 experience

- 2021–present **Postdoc**, *Imperial College London*.
 • Quantitative Risk Management (Core module for the MSc Mathematics and Finance)
- 2019–2021 **Graduate Teaching and Research Scholar**, *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 **Teaching appointments**, *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.
- Jul 2016 **Diplomat lecturer**, *Universidad Marista*, Mexico City.
 Lecturer for “Diplomat of Financial Derivatives”, Equity, FX and commodity derivatives module.
- Jul 2015 **Diplomat lecturer**, *Universidad Marista*, Mexico City.
 Lecturer for “Diplomat of Financial Risks”, Market risk module.
- 2014–2016 **Lecturer**, *Universidad Marista*, Mexico City.
 Undergraduate lecturer position:
 • Stochastic processes, Statistics, Probability.

Languages

- Spanish **Native speaker**
 English **Fluent**

Academic visits, team projects, and outreach

- Jul 2019 **Financial Mathematics Team Challenge, Rio de Janeiro, Brazil.**
Team project: 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.**
Team project: Deep Machine Learning and Volatility Prediction.
- Jun 2018 **Academic visit to University of Toronto, Ontario, Canada.**
Collaboration with Professor Sebastian Jaimungal.
- 2018–2020 **Christopher Hatton School, London.**
I led a weekly Math Club meeting for two years. I coached the students on Mathematical Olympiad problems for their age group.

Presentations made at conferences, seminars, and summer schools

- Jun 2021 **Big Data and Machine Learning in Finance Conference, Politecnico di Milano.**
Presentation given (online): Optimal Execution of Foreign Securities: A Double Execution Problem with Signatures and Machine Learning.
- Jun 2021 **SIAM Conference on Financial Mathematics.**
Presentation given (online): Optimal Execution with Stochastic Delay.
- Feb 2021 **IEOR seminar, Berkeley.**
Presentation given: Latency in Order-Driven Markets.
- Oct 2020 **Mathematical Finance Internal Seminar, University of Oxford.**
Presentation given: Optimal Execution with Stochastic Delay.
- Oct 2019 **21st Actuarial Congress: “A Model to Follow”, Universidad Marista, Mexico City.**
Presentation given: Latency in Electronic Markets.
- Sep 2019 **12th European Summer School on Financial Mathematics, Padova.**
Presentation given: Optimal Order Placement with Random Measures.
- Jun 2019 **SIAM Conference on Financial Mathematics, Toronto.**
Presentation given: Optimal Order Placement with Random Measures.
- Mar 2019 **1st Oxford-ETH Workshop on Financial Mathematics, Oxford.**
Presentation given: Optimal Order Placement with Random Measures.
- Aug 2018 **11th European Summer School on Financial Mathematics, Paris.**
Presentation given: Maximizing Fill Ratios in FX Markets with Latency, Volatility and Model Ambiguity.
- Jul 2018 **10th World Congress of the Bachelier Finance Society, Dublin.**
Presentation given: Maximizing Fill Ratios in FX Markets with Latency, Volatility and Model Ambiguity.
- May 2018 **Actuarial Sciences Conference, Universidad Marista, México City.**
Presentation given: The Shadow Price of Latency.
- May 2018 **Mathematical Finance Internal Seminar, University of Oxford.**
Presentation given: The Shadow Price of Latency.
- Jan 2018 **Market Microstructure, Imperial-CFM workshop, London.**
Poster presentation: Overcoming Latency in the Targeting of Fill Ratios.
- Dec 2017 **LMAX Seminar, London.**
Presentation given: Overcoming Latency in the Targeting of Fill Ratios.

References

1. **Professor Álvaro Cartea.**
The Mathematical Institute, Oxford OX2 6GG, United Kingdom.
alvaro.cartea@maths.ox.ac.uk
2. **Professor Samuel N. Cohen.**
The Mathematical Institute, Oxford OX2 6GG, United Kingdom.
samuel.cohen@maths.ox.ac.uk

3. **Professor Lane P. Hughston.**
Department of Computing, Goldsmiths University of London,
New Cross, London SE14 6NW, United Kingdom.
l.hughston@gold.ac.uk
4. **Professor Sebastian Jaimungal.**
Department of Statistical Sciences, University of Toronto,
Toronto, Ontario M5T 1P5, Canada.
sebastian.jaimungal@utoronto.ca