

Babak Mahdavi-Damghani

QUANTITATIVE FINANCE & MACHINE LEARNING RESEARCHER ·

1 Fairmont Avenue, D1701 New Providence Wharf, E14 9PW, London, UK

☎ (+44) (0) 781 585 2573 | ✉ bmd@eqrc.co.uk | 🏠 <http://eqrc.co.uk/about/> | 📄 <https://github.com/babakmahdavi>

Executive summary

Researcher with a PhD in Machine Learning and applied computation for social sciences and nearly two decades of experience at the intersection of engineering and the applied mathematical, statistical and computational sciences for various applications. Research contributions span algorithmic trading, stochastic modeling, machine learning for financial data, and agent-based modeling, with publications in peer-reviewed journals such as *Algorithmic Finance*, *Wilmott*, and *The Journal of Financial Data Science*. Teaching experience includes lecturing and tutoring at Oxford, Cambridge, and the Certificate in Quantitative Finance programme, covering topics from mathematical methods to advance topics in quantitative finance. Actively engaged in peer review for leading journals. Combines rigorous theoretical work with applied research in markets, developing novel methodologies for volatility modeling, portfolio optimization, and market simulation. Dedicated to advancing the field of Mathematical & Computational Science in their broad definition, while mentoring the next generation of researchers.

Education

University of Oxford

Oxford, UK

DPHIL INFORMATION ENGINEERING (MACHINE LEARNING FOR QUANTITATIVE FINANCE)

2016 - 2019

- Advisor: Pr. Stephen Roberts
- Jury: Pr. Jean Philippe Bouchaud & Pr. Álvaro Cartea
- Industry work experience, Quantitative Research, Trading, Portfolio Management and Risk roles (2010-2016)
- **University of Cambridge**, MSc courses & research in Pure Mathematics & Engineering (2008 - 2009)
- **École Normale Supérieure**, MSc courses & research in Applied Mathematics (2007 - 2008)
- **École Polytechnique**, MSc courses & research in Applied Mathematics (2006 - 2007)

University of Oxford

Oxford, UK

MSc COMPUTER SCIENCE

2005 - 2006

- Advisor: Dr. Vasile Palade & Patrick McSharry
- Final Dissertation awarded an A, judged excellent by the jury

University of Pennsylvania

Philadelphia, USA

BSc SYSTEMS ENGINEERING FOCUSED ON ECONOMIC & FINANCIAL SYSTEMS

2000 - 2004

- Minor in Mathematics
- Senior designed awarded an A (maximum grade)

Awards & Scholarships

- 2016-2019 **DTC Studentship Full award maintenance & fees**, University of Oxford
- 2019 **Algorithmic Trading Programme scholarship**, University of Oxford
- 2006 **Bourse d'Excellence**, École Polytechnique
- 2007 **Bourse d'Excellence**, École Normale Supérieure
- 2001 **Member of the Outstanding Student Honor Society (OSHS)**, (Top 10% rank in class)

Research Interest

Statistics, Financial Mathematics, Quantitative Finance, Optimization, Evolutionary Dynamics, Agent Based Models, Evolutionary Game, Algorithmic Trading, Quantitative Financial Strategies, Cryptocurrencies, Implied Volatility Modelling, Machine Learning, Sequential Monte Carlo Methods,

Publications

SELECTED PUBLICATIONS (GOOGLE SCHOLAR: CITATIONS~300, H-INDEX~10, I10-INDEX~10)

- Babak Mahdavi-Damghani, Stephen Roberts. 2023. Guidelines for building a realistic algorithmic trading market simulator for backtesting while incorporating market impact. *Algorithmic Finance*, vol. Pre-press, pp. 1-25.
- Babak Mahdavi-Damghani, Robert Fraser, James Howell, John Halldorsson. 2022. Cryptocurrency sectorization through clustering and web-scraping: Application to systematic trading. *The Journal of Financial Data Science*, 4 (1), 158-179.
- Babak Mahdavi-Damghani, Konul Mustafayeva, Christian Buescu, Stephen Roberts. 2020. Portfolio optimization for cointelated pairs: SDEs vs Machine learning. *Algorithmic Finance*, 8 (3-4), 101-125.
- Babak Mahdavi-Damghani. 2020. Data-Driven Models & Mathematical Finance: Apposition or Opposition? University of Oxford (Oxford-Man Institute of Quantitative Finance).
- Babak Mahdavi-Damghani. 2017. Introducing the HFTE Model: A Multi-Species Predator Prey Ecosystem for High Frequency Quantitative Financial Strategies. *Wilmott*, 89.
- Babak Mahdavi-Damghani. 2015. Introducing the Implied Volatility Surface Parametrization (IVP): Application to the FX Market. *Wilmott*, 77: 68-81.
- Babak Mahdavi-Damghani. 2013. The Non-Misleading Value of Inferred Correlation: An Introduction to the Cointelation Model. *Wilmott*, 67: 50-61.
- Babak Mahdavi-Damghani, Andrew Kos. 2013. De-arbitraging With a Weak Smile: Application to Skew Risk. *Wilmott*, 64: 40-49.
- Babak Mahdavi-Damghani, Dani Welch, Ciaran O'Malley, Stephen Knights. 2012. The Misleading Value of Measured Correlation. *Wilmott*, 62: 64-73.
- Babak Mahdavi-Damghani (under the pseudonym of Ibn Gosset). 2012. The Unfortunate cosT Of Pattern rEcognition (UTOPE-ia): the Genetic Disorder of the Financial Industry. *Wilmott (Cover Story)*, 60: 28-37.

SELECTED WORKING PAPERS

- Babak Mahdavi-Damghani. Validating the PNL in NLP.
- Babak Mahdavi-Damghani, Stephen Roberts. Addendum on how many times Cointelated pairs cross paths, Oxford-Man Institute of Quantitative Finance.
- Babak Mahdavi-Damghani, Stephen Roberts. Machine Learning Techniques for Deciphering Implied Volatility Surface Data in a Hostile Environment: Scenario Based Particle Filter, Risk Factor Decomposition & Arbitrage Constraint Sampling, Oxford-Man Institute of Quantitative Finance.
- Babak Mahdavi-Damghani, Stephen Roberts. A proposed risk modeling shift from the approach of stochastic differential equation towards machine learning clustering: Illustration with the concepts of anticipative, Oxford-Man Institute of Quantitative Finance.
- Babak Mahdavi-Damghani, Konul Mustafayeva, Stephen Roberts. Convergence of Heston to SVI Proposed Extensions, Oxford-Man Institute of Quantitative Finance.

Selected Presentations

2024. *Guidelines for building a realistic algorithmic trading market simulator for backtesting while incorporating market impact*. **Quant Insight: Machine Learning in Quant Finance**, London, UK.
2019. *A Bottom-up Approach to the Financial Markets: Agent-Based Quantitative Algorithmic Strategies: Ecosystem, Dynamics & Detection*. **Risk Summit**: Event London, UK.
2018. *Portfolio Optimization for Cointelated Pairs: SDEs vs. Machine Learning*. **Mathematics & Finance: Research in Options** Instituto Nacional de Matemática Pura e Aplicada, Rio de Janeiro, Brazil.
2017. *Agent Based Model and Predator Prey Models*. **University of Oxford** Man Group Institute of Quantitative Finance, Oxford, UK.

Teaching Experiences

2019	Oxford Algorithmic Trading Programme , Teaching Assistant	<i>Oxford</i>
2017	High Frequency Trading Ecosystem (HFTE) model , Guest Lecturer	<i>CQF</i>
2017	Financial Markets Ethics , Guest Lecturer	<i>CQF</i>
2015	Cointelation & Inferred Correlation Models , Guest Lecturer	<i>CQF</i>
2015	Implied Volatility surface Parameterization , Guest Lecturer	<i>CQF</i>
2009	Mathematical Methods 1A , Downing College Course Instructor	<i>Cambridge</i>
2009	Mathematical Methods 1A , Engineering Department Course Instructor	<i>Cambridge</i>
2009	Mathematical Methods 1B , Downing College Course Instructor	<i>Cambridge</i>
2009	Mathematical Methods 1B , Engineering Department Course Instructor	<i>Cambridge</i>

Grants and Allocators

2022	\$100,000 , Geneva Trading (for the development of AI models for MFT strategies)
2025	\$250,000 , Nickel Asset Management (for the development of HFT strategies)
2025	\$100,000 , Coincall (for the development of Options strategies)

Professional Experience & Consultancies

2022-2023	Senior Quantitative Researcher , London Stock Exchange Group (LSEG)
2021-2022	Senior Quantitative Trading Strategist , Andurand Capital
2014-2015	Senior Quantitative Analyst , London Clearing House (LCH)
2011-2014	Quantitative Analyst , Credit Suisse
2010-2011	Exotics Trader , Citigroup
2008-2008	Quantitative Analyst , GAM Systematic
2007-2007	High Frequency Quantitative Analyst , Société Générale (Socgen)
2003-2003	Research Associate , General Motors
2002-2002	Marketing Engineer , Siemens

Entrepreneurial Experiences

2014-now	CEO , EQRC
2011-now	CAIO , Stable Match & Oolalaaa
2015-now	CIO , Sunray Properties
2005-2007	CTO , YourRug

Professional Certificates

2019	Oxford Algorithmic Trading Programme , University of Oxford (Oxford, UK)
2010	Approved Person & Derivatives (two different certificates) , Financial Conduct Authority (FCA)

Peer Reviewing

Journal of Machine Learning Research, Journal of Financial Data Science, European Journal of Finance, Wilmott Magazine, Journal of Mathematics, Ledger, Algorithmic Finance, Risk Magazine,

References Available Upon Request

Pr. Stephen Roberts (University of Oxford), Pr. Jean Philippe Bouchaud (École Polytechnique), Pr. Vasile Palade (University of Oxford), Dr. Paul Wilmott (University of Oxford), more available upon request,