Optiver

A Mathematician's Journey into the Financial Industry

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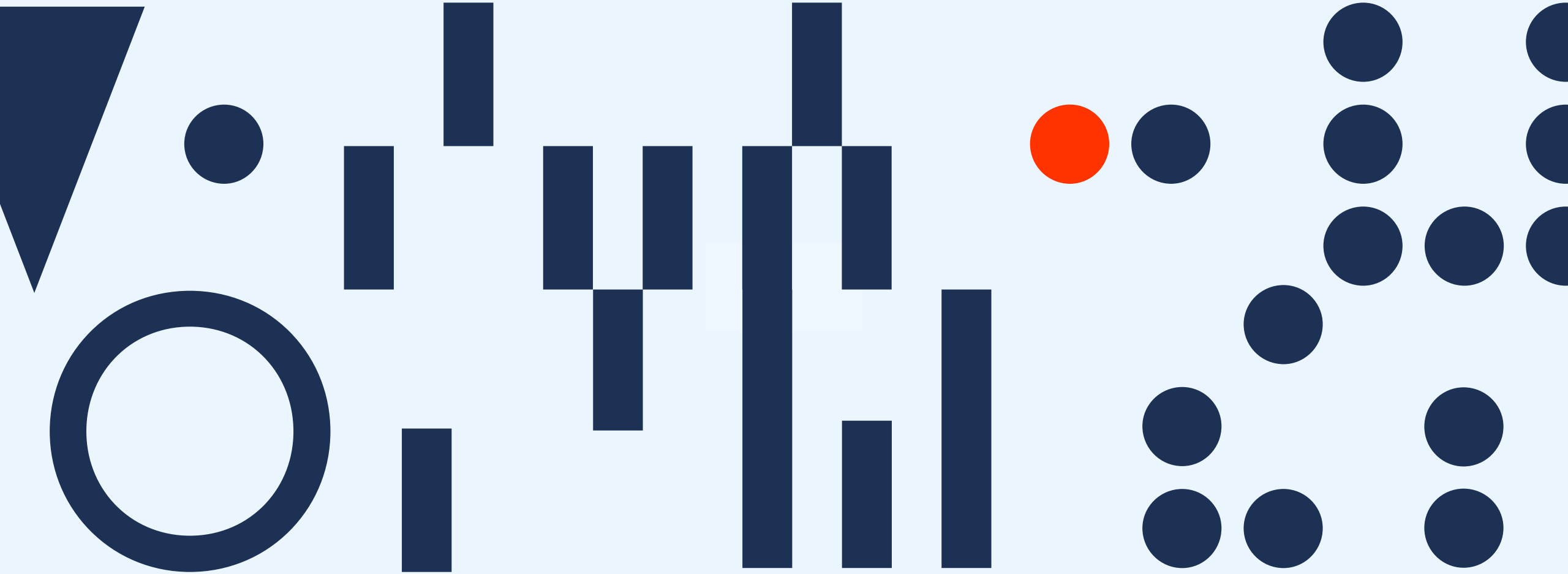
Math4NL Community Event 2025 | 5 December 2025

Algorithmic Trading



The views expressed are those of the speaker in a personal capacity and do not reflect the views or positions of Optiver.

Background

From University to Practice

- **Master in Econometrics & Operations Research**, VU Amsterdam (2002)
  - Simulation and variance-reduction techniques for rare-event estimation

- **PhD in Applied Mathematics (Stochastic Operations Research)**, University of Twente (2007)
  - Processor-sharing queues and resource sharing in wireless LANs

- **Algo roles:** Amsterdam (2007 – 2012), London (2012 – 2023), Amsterdam (2023+). Across three proprietary trading firms and global investment bank:
  - Quant Researcher / Developer, Algo Trader
  - Algo Software Developer
  - Algo Risk & Control Management, Lead Algo Validator
  - Algo Compliance & Governance
  - Automation & AI Transformation
  - Engagement Tutor & Assessor (GetSmarter) – Oxford Algorithmic Trading online certificate programme

Themes:
Fast-paced environments • Curiosity and Continuous learning • Balancing complexity with simplicity • Problem-solving with measurable impact

Background

Mini History of Algorithmic Trading

- Open-outcry **(pre-1990s)** → Electronic, Automated, Algorithmic trading (**Late 1990s – Early 2000s onward**)
- Rise of automation and quantitative models (e.g., statistical arbitrage)
- Advances of technology (lower latency, improved risk-warehousing) and co-location driving competition for speed and accuracy
- Data explosion (tick-data, high-frequency, alternative data, etc.) reshaping market microstructure
- Notable industry failures (from 2000s onward) highlight the need for robust controls
- Wider adoption of automated trading and integrated risk-management tools
- Growth of Machine Learning (prediction, execution, anomaly detection, surveillance, etc.) and their risks
- Ever-increasing regulatory requirements, minimum standards, and demonstrable governance (MiFID-II RTS 6, SEC/FINRA, SFC, etc.)

Themes:
Evolution • Speed and Complexity • Risk and Opportunity • Governance, Control, and Explainability

Optiver

Tech-driven trading firm, Global market maker, Liquidity provider

Founded – 1986
Mission – We improve the market
Number of markets – 100+ exchanges globally
Number of trades – 10+ million per day
Our teams – 2,000+

Role of Mathematics

Within Algorithmic Trading

- **Trading** – Real-time investment and execution decisions, strategy development, continuous monitoring, risk awareness, fast feedback loop, first-line accountability and control.
- **Research** – Pricing models, statistical and probabilistic modeling, data analysis, optimization, strategy development.
- **Development** – Building tools and systems, automation pipeline, data/network/hardware engineering, infrastructure.
- **Risk** – Managing market, operational, and catastrophic risks, pre- and post-trade controls, second-line monitoring and risk assessments.
- **Compliance** – Reputational, market abuse, conduct and disruptive trading risks; interpreting and implementing regulation, establishing policies and procedures; ensuring explainability, second-line oversight, demonstrable governance and control.

Themes:
Expectations vs. practical reality • Learning curve: speed and ambiguity • Cross functional collaboration and teamwork • High-stakes environment (intense competition, mission-criticality, tight regulatory oversight)

Reflections

A Mathematician's Journey into the Financial Industry

- Structured thinking
- Algorithmic and quantitative intuition
- Understanding uncertainty and risk
- Problem-solving and learning from mistakes
- Pattern recognition and other mathematical habits
- Mindshift shift: "*Perfect proofs*" → "*Good decisions fast*"

Reflections / Future

A Mathematician's Journey into the Financial Industry

- **Leverage core strengths** – Logical reasoning, analytical rigour, critical thinking, creativity, quick mental math, a love of games, and deep intellectual curiosity remain powerful differentiators.
- **Learn the language** – Fluency in data, code, rules, effective communication, and market structure is essential for building, understanding, and explaining algorithmic systems.
- **Stay adaptable** – Iterate quickly but in controlled manner, keep learning, deliver reliably, collaborate widely – yet never satisfied with the status quo – continuous improvement is a mindset, not a task.
- **Embrace opportunities** – AI driven transformation offers new frontiers across engineering **x** productivity, technology innovation, governance frameworks, advanced analytics, automation of workflows, and so on.

Questions?

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Stay in touch

Sign up to learn more about Careers at Optiver

Explore Our Open Research Graduate Roles

- Full time positions in Amsterdam and London
- For students graduating in 2026
- Application deadline: **Sunday 7th December**

2026 Career Kickstarter Trading Programme

- When: 2- 6 March or 9-13 March 2026
- May 2025- February 2027 Graduates
- Potential Career Pathway: Full Time Graduate Trader