

MAHMOUD MAHFOUZ

🏠 London, United Kingdom 📞 +44 (0) 77496 77073 ✉ me@mamahfouz.com 🌐 🎓 🌐 🌐 🌐

AI Research Lead with 10+ years of experience spanning AI research, data science, and software engineering within financial markets. A founding member of J.P. Morgan's AI Research Lab, focused on leading and executing applied AI initiatives that drive innovation and transform firm-wide operations. Technical expertise in generative AI, and LLM-powered multi-agent system design, with a consistent record of translating advanced research into scalable, production-grade solutions. Recognized for fostering cross-functional collaboration and pioneering reusable technical assets and best practices that enhance customer success. Passionate about addressing challenging problems alongside teams and customers that value highly innovative, cutting-edge, research-driven approaches.

EMPLOYMENT SUMMARY

JPMorgan Chase & Co.

AI RESEARCH LEAD

LONDON, UNITED KINGDOM

JAN 2019 – PRESENT

- Founding member of [J.P. Morgan's AI Research](#) lab under Prof. Manuela Veloso (ex-Head of ML at Carnegie Mellon), serving as the first London hire and helping to expand the EMEA team to more than 40 researchers and engineers.
- **Specialties:** LLMs, agent-based AI systems, and deep reinforcement learning.
- **Example Projects:**
 - **LLM-based Multi-Agent Orchestration Framework**
 - Developed a lightweight Python framework to orchestrate LLM-based multi-agent systems with dynamic workflows, memory architectures, document processing, and code execution capabilities. Conceived to overcome shortcomings in popular packages (e.g., LangChain) and built entirely from scratch. The initial version, Chat with Data (RAG-based), was successfully rolled out to over 150 users.
 - **Automated Market Commentary:** Deployed an agent integrated with internal data APIs to automate responses to client queries, reducing manual effort and improving response latency.
 - **Chat with Data:** Engineered a domain-specific agent that translates natural language queries into Python code over structured (tabular) and unstructured datasets, allowing for automated insights from large, complex and diverse datasets (RAG, ReAct, PAL, CodeAct).
- **Trading Signals Extraction from Unstructured Data**
 - Collaborated with interdisciplinary teams to transform daily market intelligence reports into actionable trading signals, laying the groundwork for systematic decision support and automation.
- **Evaluation of LLMs & Post-Training for Financial Reasoning via CFA Exams**
 - Published a paper [\[1\]](#) in EMNLP benchmarking state-of-the-art LLMs on CFA exams, evaluating both proprietary and open-source models on multiple-choice and essay questions. Currently running post-training on smaller language models to enhance financial reasoning.

DATA SCIENTIST

NOV 2017 – JAN 2019

- Designed and deployed machine learning models for time-series anomaly detection and anti-money laundering screening
- Led cross-functional data science initiatives, including alternative data exploration for systematic trading applications and FinTech startups due diligence for the CIB In-Residence program.

SOFTWARE ENGINEER

AUG 2014 – NOV 2017

- Developed and maintained high-performance front-office applications using JAVA, PYTHON, SQL for global trader-facing systems.
- Led integration projects and application enhancements while providing daily production support, resolving various issues in trading system workflows under high-pressure market conditions.

Goldman Sachs

SOFTWARE ENGINEER – *Summer Intern*

LONDON, UNITED KINGDOM

AUG 2013 – OCT 2013

- Enhanced trading software (JAVA, C#) by implementing new features and improving system functionality.

Culham Centre for Fusion Energy

ROBOTICS ENGINEER SUMMER INTERN

OXFORD, UNITED KINGDOM

JUN 2013 – AUG 2013

- Failure Mode, Effects, and Criticality Analysis (FMECA) on the remote-handling [robotic systems](#) used for maintenance and installations in the [Joint European Torus \(JET\)](#) nuclear fusion tokamak.
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Agilent Technologies

INTERNAL TECHNICAL SALES ENGINEER INTERN

READING, UNITED KINGDOM

AUG 2011 – AUG 2012

- Pre- and post-sales technical support for key customers, developed software tools to streamline instrument repair and calibration, and conducted product demonstrations and technical seminars.

EDUCATION

Imperial College London

DOCTOR OF PHILOSOPHY (PHD) (PART-TIME), MACHINE LEARNING

LONDON, UNITED KINGDOM

NOV 2017 – NOV 2025

- **Supervisors:** Danilo Mandic and Anthony Constantinides.
- **Thesis Title:** Learning & Planning for Algorithmic Trading Agents in Multi-Agent Financial Markets
- **Overview:** The thesis investigates algorithmic trading agents within complex multi-agent financial markets. It employs deep reinforcement learning for optimal trade scheduling and execution, agent-based modeling to simulate limit order book dynamics, and large language models/multi-agent systems for high-level decision making. For further details, see [1]–[7]

The University of Manchester

MASTER OF ENGINEERING (MENG), MECHATRONIC ENGINEERING

MANCHESTER, UNITED KINGDOM

SEP 2009 – JUL 2014

- **First Class (Hons)** (75%) with a department-wide rank of **3rd** in Electrical & Electronic Engineering.
- **President's Doctoral Scholar Award** (offered but not accepted) and BP Integrated Master's Scholarship
- **Projects:** Real-Time Position Monitoring System for Humanitarian Demining (78%) (final year team project), Vision-Based Surface Mount Technology Pick-and-Place Machine (77%) (third year individual project)
- **Relevant Modules:** Engineering Mathematics (92%), Software Engineering (87%), Control Systems (69%)

Alexandria House of English

IGCSE & A-LEVEL

ALEXANDRIA, EGYPT

2007 – 2009

- 4 A-Levels: Mathematics, Physics, Information Technology, and Biology (AAAA); and 8 IGCSEs (A*A*A*A*A*A*A*)

SELECTED PUBLICATIONS & PATENTS

- [1] Mahfouz, M., Callanan, E., Sibue, M., Papadimitriou, A., Ma, Z., Liu, X., Zhu, X. **The State of the Art of Large Language Models on Chartered Financial Analyst Exams.** *Proceedings of the 2024 Conference on Empirical Methods in Natural Language Processing (EMNLP): Industry Track*, pp. 1068–1082 (2024).
- [2] Patra, S., Mahfouz, M., Gopalakrishnan, S., Magazzeni, D., Veloso, M. **FinRDDL: Can AI Planning Be Used for Quantitative Finance Problems?** *Proceedings of the 2023 International Conference on Automated Planning and Scheduling: Planning and Scheduling for Financial Services Workshop*, vol. 2023, p. 36, (2023).
- [3] Mahfouz, M., Gopalakrishnan, S., Suau, M., Patra, S., Mandic, D., Magazzeni, D., Veloso, M. **Towards Asset Allocation Using Behavioural Cloning and Reinforcement Learning.** *AAAI Bridge: AI for Financial Services*, (2023).
- [4] Wu, Y., Mahfouz, M., Magazzeni, D., Veloso, M. **Towards Robust Representation of Limit Order Books for Deep Learning Models.** *International Conference on Machine Learning (ICML) Workshop on Representation Learning for Finance and E-Commerce Applications* (2021).
- [5] Mahfouz, M., Balch, T., Veloso, M., Mandic, D. **Learning to Classify and Imitate Trading Agents in Continuous Double Auction Markets.** *Proceedings of the ACM International Conference on AI in Finance (ICAIF 2021)* (2021).
- [6] Vyetrenko, S., Byrd, D., Petosa, N., Mahfouz, M., Dervovic, D., Veloso, M., Balch, T. **Get Real: Realism Metrics for Robust Limit Order Book Market Simulations.** *Neural Information Processing Systems (NeurIPS) Workshop on Robust AI in Financial Services* (2019).
- [7] Balch, T., Mahfouz, M., Lockhart, J., Hybinette, M., Byrd, D. **How to Evaluate Trading Strategies: Single Agent Market Replay or Multiple Agent Interactive Simulation?** *International Conference on Machine Learning (ICML) Workshop on AI in Finance*, (2019).
- [8] Mahfouz, M., O'Toole, B., Schwartzman, D., Nourbakhsh, A., Shah, S. **System and Method for Institutional Risk Identification Using Automated News Profiling and Recommendation.** *US Patent App. 17/654,843* (2022).