

Dr Matthew McDonnell

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Employment History

Mettalex	June 2020–Present
Chief Technology Officer	
Responsible for full technology stack of the Mettalex decentralized commodity exchange. Spin out of Fetch.ai. Financial engineering and economic analysis to design the system and produce the Mettalex Litepaper. Research into existing DeFi protocols to specify components for decentralized parts of the system. Design of serverless architectures for backend integration with price feeds, market creation, and decentralized exchange user interface. Technical implementation of prototype smart contract and price feed functionality. Wide ranging management and externally facing responsibilities. Product design with Mettalex CEO and other stakeholders. Engineering management of a team of 5+ remote developers and designers. Technical lead for development of skeleton system in early stages of the project. Product demonstration to external parties including index providers and commodity traders. Negotiation with internal and external teams responsible for devops and outsourced development.	
Fetch.ai	June 2019–Present
Senior Research Engineer	
Research and development of DeFi and other fintech applications. Combination of financial engineering with artificial intelligence models for autonomous economic agents to enable internet of things devices to interact through blockchain technology.	
HSBC	February 2019–June 2019
Development Specialist in the Global Risk Analytics group	
Development and productionization of frameworks for modelling Wholesale Credit Risk.	
Metall	November 2015–February 2019
Data Scientist	
Development of data products and business intelligence based on virtual fitting room technology. Modelling using a range of approaches including Looker, Bayesian techniques, machine learning, deep neural networks, and probabilistic programming languages. Development of machine learning algorithms for user segmentation, conversion prediction, body measurement inference, outfit recommendation, and other applications. Development and deployment of automated analysis pipelines using Python data science tools and Amazon Web Services. Data Science Team Lead from October 2016 to March 2017 involving communication with stakeholders, sprint planning, and line management of two Data Scientists.	
Fidelity Worldwide Investment	July 2014–June 2015
Quantitative Analyst in the Solutions Design group	
Development of volatility controlled multi-asset products within the Fidelity Solutions group. This involved modelling and simulation of portfolio management strategies and strategic asset allocation choices.	
Fidelity Worldwide Investment	September 2011–July 2014
Quantitative Developer	
Development of analysis and simulation tools for equities investment. This covered a number of business areas including quantitative rating of securities, portfolio management, trade cost measurement, and modelling of investment solutions. Promoted to Senior Quantitative Developer in July 2013.	
MathWorks	July 2007–August 2011
Technical Consultant in the Consulting Services group	
Worked with MathWorks customers in a range of industries to increase their productivity and maximize the value of their investment in MathWorks tools. Software development in MATLAB was the major part of this role together with providing coaching and integration advice.	
Griffith University	September 2006–April 2007
Research Fellow in the Hydrogen Cooling group	
University of Oxford	July 2003–August 2006
Postdoctoral Research Assistant in the Ion Trap Quantum Information Processor group	
Keble College, University of Oxford	October 2002–May 2003
Tutor in First Year Classical Mechanics at Keble College	
University of Western Australia	January 1999–July 1999
Research Engineer in the SRC for Advanced Mineral and Material Processing	

Skills

Expert in MATLAB application development. Experienced with Python data science tools.

Mathematical modelling, numerical simulation, data analysis.

Analytical approach to problem solving tasks, attention to detail, ability to work in a team or individual environment.

Python, Solidity, SQL, SQLAlchemy, Pandas, NetworkX, Stan, Edward, Looker, FactSet, Bloomberg, PySpark, TensorFlow, MATLAB, Amazon Web Services, AWS Lambda, Amazon Redshift, Docker, Amazon Elastic Container Service

Seeking

Goal oriented situations requiring innovative problem solving abilities and the opportunity to further develop my technical skills, particularly those relating to software development and mathematical modelling.

A range of interesting technical challenges together with the resources required to meet these challenges successfully.

The opportunity to be involved at all levels of the process, ranging from statistical modelling to code development and integration into a production system.

Education

University of Oxford

October 1999–June 2003

DPhil in Atomic and Laser Physics. Thesis title: “Two-Photon Readout Methods for an Ion Trap Quantum Information Processor”

University of Western Australia

February 1993–November 1998

BSc (Chemical Physics) (hons. 1st Class), BE (Materials) (hons. 1st Class)

Prizes:

1996: Faculty of Science Medal for best Honours Science Student

1996: J.A. Wood Memorial Prize for best Honours Student in the Faculties of Science, Engineering, Medicine, Agriculture and Dentistry

1999: Awarded a Commonwealth Scholarship to study for a DPhil at the University of Oxford

Certifications

Probabilistic Graphical Models, a 3-course specialization by Stanford University on Coursera.

Neural Networks for Machine Learning by University of Toronto on Coursera.

Data Scientist with Python track on DataCamp.

Deep Learning, a 5-course specialization by deeplearning.ai on Coursera.

Bayesian Methods for Machine Learning by National Research University Higher School of Economics on Coursera.

Practical Reinforcement Learning by National Research University Higher School of Economics on Coursera.

Publications

- “Memory coherence of a sympathetically cooled trapped-ion qubit”, Home JP, McDonnell MJ, Szwer DJ, Keitch BC, Lucas DM, Stacey DN, Steane AM, *Phys. Rev. A* **79** 050305 (2009)
- “Long-lived mesoscopic entanglement outside the Lamb-Dicke regime”, McDonnell MJ, Home JP, Lucas DM, Imreh G, Keitch BC, Szwer DJ, Thomas NR, Webster SC, Stacey DN, Steane AM, *Phys. Rev. Lett.* **98** 063603 (2007)
- “Deterministic entanglement and tomography of ion spin qubits”, Home JP, McDonnell MJ, Lucas DM, Imreh G, Keitch BC, Szwer DJ, Thomas NR, Webster SC, Stacey DN, Steane AM, *New J. Phys.* **8** (2006)
- “Laser linewidth effects in quantum state discrimination by electromagnetically induced transparency”, McDonnell MJ, Stacey DN, and Steane AM, *Phys. Rev. A* **70** 053802 (2004)
- “High-efficiency detection of a single quantum of angular momentum by suppression of optical pumping”, McDonnell MJ, Stacey JP, Webster SC, Home JP, Ramos A, Lucas DM, Stacey DN, Steane AM, *Phys. Rev. Lett.* **93** 153601 (2004)