

Dr Matthew McDonnell

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Employment History

Uvue Ltd - Fetch.ai and Mettalex (Spin out of Fetch.ai) June 2019–July 2022

Senior Research Engineer

Research and development of DeFi and other fintech applications

From June 2020 as Mettalex CTO responsible for full technology stack of the Mettalex decentralized commodity exchange.

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.

HSBC

February 2019–June 2019

Development Specialist in the Global Risk Analytics group

Development and productionization of frameworks for modelling Wholesale Credit Risk.

Metail

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, SymPy, Solidity, SQL, SQLAlchemy, Pandas, NetworkX, Scikit Learn, Stan, Edward, Looker, FactSet, Bloomberg, PySpark, TensorFlow, JAX, MATLAB, Google Cloud Platform, 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)