

Adam McCarthy

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Industry Experience

Ocean Infinity

LONDON, ENGLAND

Head of Machine Learning (Part-time Contract)

February 2017 – Present

Swarms of AUVs scanning the Indian Ocean for MH370 on behalf of the Malaysian government. Lead a global team processing sonar and magnetometer data, detecting targets using CNNs, and mission planning using Bayesian optimisation. Improved efficiency through changes to data collection on-ship and distributed training in AWS using Kubernetes, Horovod, and LustreFS. Regular reports to hedge fund investors to ensure continued funding.

Massachusetts General Hospital Center for Clinical Data Science

BOSTON, MA, USA

Visiting Fellow

June 2017 – September 2017

The center builds ML models to improve clinical workflows at three Boston hospitals. CNNs for images and RNNs for NLP to detect stroke and extract blood vessels. Designed and procured a large GPU cluster along with JIRA and Git. Advised clinicians and the American College of Radiology on model validation. Regular reports to hospital and industry investors to ensure continued funding.

Machine Learning as a Service startup

LONDON, ENGLAND

CTO

October 2016 – February 2017

Led the design and development of a MLaaS system running on AWS. Microservices architecture written in asynchronous Python (3.6) using DynamoDB, EC2, SQS, and Redis. Development of quantitative software to automatically normalise and pre-process data, create ML models in PyTorch, and present a JSON REST endpoint for predictions to the user.

RBS Markets and Investment Banking

LONDON, ENGLAND

Lead Software Engineer, Cloud/HPC Development (Contract)

July 2014 – September 2015

Project lead for a system for deploying HPC clusters on-premises and on-cloud, delivering £80 million cost saving in year one and reducing delivery time from 6 weeks to minutes. Took on project management responsibility, introducing new practices across departments. Microservices integrating cloud, billing, and networking platforms. Wrote code in Python, JS, C#, and Perl with MongoDB.

VideoLAN

PARIS, FRANCE

Senior Software Engineer (Contract)

August 2013 – July 2014

Developed a large-scale, asynchronous REST API and recommendation engine for VLC Media Player using Go, Redis + Pubsub, Riak, Docker, and Elasticsearch. Queue workers performed data mining, with feedback to users via WebSockets.

Nerasys

DUBAI, UAE

Director of Technology

June 2011 – April 2013

Led pre-sales and technical teams for projects across the Middle East and North Africa, including internet filtering and caching for the second largest UAE ISP, load balancing of Vodafone cell call billing infrastructure, and web application security for the King of Jordan and multiple banks.

InterSystems

DUBAI, UAE

Systems Management Specialist

August 2009 – June 2011

Healthcare EPR and Database Vendor. Infrastructure Design and Support including EHR rollout across NHS Scotland, the company's largest project.

Education

University of Oxford

OXFORD, ENGLAND

PhD Computer Science

2016-present

Machine Learning for Cardiovascular Medicine. Supervisors: Blanca Rodriguez and Nando de Freitas

Models of cardiac electrophysiology using ODEs and PDEs, to understand cardiac diseases and simulate drugs prior to clinical trials. Variational Inference and Bayesian Optimisation to personalise models. Extensive use of HPC, TensorFlow, and Scientific Python.

University of Edinburgh

EDINBURGH, SCOTLAND

MSc Informatics (Major: Machine Learning)

2015-2016

Thesis: Sliding Window and Recurrent Classification of ICU Time Series. Supervisor: Chris Williams

Embedded a feed-forward neural network and a recurrent neural network into a linear dynamical system to detect artifacts, improving bedside alarms in the Neuro ICU in Glasgow. Analysis using Saliency Maps, Activation Maximisation, and Output Maximisation. Bayesian Hyperparameter Optimisation.

Publications

- [1] A. McCarthy, B. Rodriguez, and A. Mincholé, "Variational Inference over Non-Differentiable Cardiac Simulators using Bayesian Optimization," in *Machine Learning for Health and Deep Learning for Physical Sciences Workshops, NIPS*, 2017.
 - [2] A. McCarthy and C. K. I. Williams, "Predicting Patient State-of-Health using Sliding Window and Recurrent Classifiers," in *Machine Learning for Health Workshop, NIPS*, 2016.
 - [3] A. McCarthy, B. Smyth, and E. A. Quaglia, "Hawk and Aucitas: e-auction schemes from the Helios and Civitas e-voting schemes," in *Financial Cryptography*, 2014.
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Technical Skills

Machine Learning: Probability, Optimisation, Variational Inference, CNNs, RNNs, MCMC

Programming: *Expert:* Python (NumPy, SciPy, TensorFlow) *Past:* C/C++/C#, Matlab, Go, Java, Perl, JS, ASM

Operating Systems: *Expert:* Linux System Administration *Past:* Linux Kernel Internals

Development: Agile, Continuous Integration, Git, Puppet, Ansible, JIRA, TeamCity

Web: HTML, CSS, Django, Flask/Falcon/Sanic, AngularJS, d3.js, REST APIs

Networking: HTTP, DNS, SMTP, TCP/UDP, IP, SSL/TLS

Awards and Achievements

2018 Amazon ML Research Award

2017 Microsoft Azure ML Research Award

2013 UK Clinical Aptitude Test (UKCAT) 767.5 (99.9th Percentile) [*like US MCAT*]

2011 Dubai Stallions American Football 1st Team

2009 School of Computer Science Award for Best Undergraduate Research

2008 GCHQ Sponsored Undergraduate Technologist Scholarship

2008 University of Birmingham Boat Club 1st VIII

Teaching or Volunteering Experience

Department of Computer Science, University of Oxford

OXFORD, ENGLAND

Tutor, Computer Networks

April 2017 – July 2017

Teach in tutorials to support the Computer Networks undergraduate course.

St Hugh's College, University of Oxford

OXFORD, ENGLAND

Graduate Committee (MCR) Member

December 2016 – December 2017

Elected as a committee member representing the graduates in the college.

St Hugh's College Boat Club, University of Oxford

OXFORD, ENGLAND

Rowing Coach

September 2016 – September 2017

Coaching undergraduate and postgraduate students who row for the college.

Prewired

EDINBURGH, SCOTLAND

Volunteer Programming Tutor

September 2015 – June 2016

Teaching under 19s to code at a charity.

f5 Networks Inc.

DUBAI, UAE

Instructor

January 2012 – April 2013

Ran f5 certification courses in Load Balancing and Web Application Security.

University of Birmingham

BIRMINGHAM, ENGLAND

Teaching Assistant, 06-27821 Java Workshop

September 2007 – June 2008

Teaching Assistant for the first year Java programming course whilst in my second year.

Interests Real Tennis, Rowing, Squash, Chess.