James Ritchie

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Education

- **University of Edinburgh**   **Edinburgh, UK**
  PhD in Machine Learning   *September 2018 - March 2023*

  Thesis: Bayesian Inference for Challenging Scientific Models
  Supervisor: Professor Iain Murray
  Researched new methods to apply Bayesian inference to complex models of scientific phenomena from a range of fields including physiology and astronomy, using recent advances in probabilistic machine learning, generative AI, deep learning and statistics. Designed and ran experiments that successfully validated these methods.

- **University of Edinburgh**   **Edinburgh, UK**
  MSc(R) Data Science   *September 2017 - August 2018*

  Result: Distinction
  Thesis: Bayesian Hyperparameter Optimisation with Progressively Larger Models

- **University of Cambridge**   **Cambridge, UK**
  MEng MA Information and Computer Engineering   *October 2010 - June 2014*

  Result: Honours with Merit

Professional Experience

- **Amazon**   **Berlin, DE (Remote)**
  Applied Science PhD Placement   *September 2021 - November 2021*

  - Worked on recommender systems in the Amazon Music ML team.
  - Implemented and evaluated a new learning-to-rank approach using deep learning.
  - Passed placement review with excellent feedback and received an "inclined-to-hire" offer.

- **University of Edinburgh**   **Edinburgh, UK**
  Teaching Support Provider   *September 2018 - August 2022*

  - Tutoring and marking for postgraduate-level machine learning courses alongside PhD studies.
  - Nominated for the 'Best Student Who Teaches' award in 2019.
  - Student Feedback:
    - "James was very approachable and answered questions in a way that you understood the material easily, which I greatly appreciated in a really hard course."
    - "The tutorials were very enjoyable and interesting . . . The instructor for my group, James Ritchie, was very helpful and took the time to explain concepts that anyone in the group was struggling with."

- **Kriya (formerly MarketFinance)**   **London, UK**
  Data Scientist   *December 2015 - August 2017*

  - Created machine learning models for loan pricing and marketing at a financial technology startup specialising in invoice financing.
  - Deployed models in production as microservices on AWS and Azure.

- Worked as part of an agile team to identify and solve problems using data, communicating results to a range of stakeholders across the business.
- Achievements included:
  - Scraping and cleaning data from the Companies House API and using it to train a machine learning model to identify sales leads, which the sales team then converted into customers.
  - Took the initiative to implement a new ETL pipeline from the company platform to our data warehouse, which vastly increased reliability compared to the old system.
  - Built an application for the risk team to scrape news stories about companies and perform sentiment analysis using natural language processing (NLP). This successfully flagged issues with customers faster than the credit-scoring agencies.

- **Skin Analytics**   **London, UK**
Software Engineer   *July 2014 – February 2015*
Startup using computer vision and machine learning for skin cancer diagnostics. Worked with the CTO and image processing engineers on infrastructure and apps for the company's products.

- **OpenLabTools Project**   **Cambridge, UK**
Team Member   *June 2013 – August 2013*
Wrote computer vision software for an electronic microscope enabling automatic experiment analysis, as part of a team designing and building low cost open-access scientific tools.

- **Shelter Associates**   **Pune, India**
Volunteer Software Developer   *July 2012 – September 2012*
Engineers Without Borders UK placement, volunteering with a local Indian NGO involved in slum redevelopment in the state of Maharashtra. Developed a web application to gather and analyse survey data on urban populations.

Open Source Software

- **scikit-rvm**   *github.com/JamesRitchie/scikit-rvm*
Implementation in Python using the scikit-learn API of the Relevance Vector Machine (RVM) technique used for probabilistic regression and classification in machine learning. I gave a lightning talk on this project and scikit-learn development in general at PyData London.

Awards

- **Cside 2018 Model 1 Winner**
Achieved first place in an inference competition to determine the parameters of ordinary differential equations modelling the cardiac action potential and gave a talk at the associated conference.

Skills and Technologies

Programming Languages: Python
Machine Learning/Statistics: Bayesian inference, deep learning, computer vision, data visualisation, NumPy, SciPy, scikit-learn, Pandas, PyTorch, Jax, Matplotlib.
Software Engineering: Version control (Git), unit testing, continuous integration, web application development, cloud computing (AWS), containerisation (Docker), Linux, SQL (PostgreSQL, Amazon Redshift).