

# Dan Ley

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## EDUCATION

### UNIVERSITY OF CAMBRIDGE | 2017-21

Course: M.Eng Engineering (Double First) | Supervised by Dr Adrian Weller and Umang Bhatt

Masters project in Explaining Uncertainty in Deep Learning | Award for outstanding project (top 5%)

1st paper accepted to 3 ICLR workshops, 2nd to 4 ICML workshops. Combined paper accepted to AAAI 2022 (first author).

1st Year: Class I - 87% (12th of 324) 2nd Year: Class I - 83% (12th of 310) 3rd Year: Pass (No Classing) 4th Year: Distinction

Coursework: Probabilistic ML, Practical Optimisation, Computational Statistics, Data Compression, Bayesian Inference

Software engineering project for the design, development, testing and maintenance of a logic simulation program in Python

### EXETER MATHEMATICS SCHOOL & QUEEN ELIZABETH'S ACADEMY TRUST | 2010-17

A-Levels: 4 A\*s in Mathematics, Further Mathematics, Physics and Chemistry (college award for Academic Excellence in Maths)

GCSEs: 13 A\*s including Maths, English and Triple Science (school award for Highest Academic Achievement)

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## EXPERIENCE

### JPMORGAN CHASE & CO (AI RESEARCH SCIENTIST) | OCTOBER 2021 - PRESENT

Canary Wharf, London, UK (Work From Home Hybrid)

- Explainable AI research on global counterfactual explanations, implementing a state-of-the-art (NeurIPS) method and identifying inefficiencies, proposing a modified method that executes 8 times faster for the same performance

### UNIVERSITY OF CAMBRIDGE (RESEARCH ASSISTANT) | JULY - SEPTEMBER 2021 (8 WEEKS)

Cambridge, Cambridgeshire, UK (Work From Home)

- Continuation of MEng research on explaining uncertainty in deep learning; training models in PyTorch for generation of counterfactual explanations (Bayesian Neural Networks, Variational Autoencoders)
- Exploring the notion of a distribution over counterfactual explanations for a single input and finalising AAAI'22 submission

### JPMORGAN CHASE & CO (SOFTWARE ENGINEER) | JULY - AUGUST 2020 (5 WEEKS)

Bournemouth, Dorset, UK (Work From Home)

- Object-oriented programming in a finance setting using Python (testing with pytest), Flask, sklearn, tensorflow and SQL
- Planned a solution for a disaster relief charity to port 40% of in-person training to online training and initiated contact with a software-service company to discuss technical and financial details of our solution (£200k+ annual savings proposed)

### IMAGINATION TECHNOLOGIES LTD (HARDWARE ENGINEER) | JULY - SEPTEMBER 2019 (12 WEEKS)

Kings Langley, Hertfordshire, UK

- Co-inventor on 3 separate pending patent applications for arithmetic hardware designs with improved PPA (Power, Performance, Area) over industry standards; worked with the datapath team in an R&D environment
- Learnt to rapidly interpret code from past/current team members and make changes (Linux, Python, Perforce, VHDL)

## PUBLICATIONS

- (1) D. Ley, U. Bhatt, and A. Weller. Diverse, Global and Amortised Counterfactual Explanations for Uncertainty Estimates. In Thirty-Sixth AAAI Conference on Artificial Intelligence, 2021.

<https://arxiv.org/abs/2112.02646>

- (2) D. Ley, U. Bhatt, and A. Weller. Diverse and Amortised Counterfactual Explanations for Uncertainty Estimates. In ICML Workshop on Algorithmic Recourse, 2021.

<https://sites.google.com/view/recourse21/accepted-papers>

- (3) D. Ley, U. Bhatt, and A. Weller.  $\delta$ -CLUE: Diverse Sets of Explanations for Uncertainty Estimates. In ICLR Workshop on Security and Safety in Machine Learning Systems, 2021.

<https://arxiv.org/abs/2104.06323>

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## HONOURS

Scholar of Corpus Christi College, University of Cambridge (2021)

University of Cambridge Information Engineering Prize for Outstanding Research Project – Top 5% of Students (2021)

Travel Award for ICLR Workshop on Security and Safety in Machine Learning Systems (2021)

Dewhurst Scholarships for Outstanding Examination Performance (2018-2021)

## COMPUTING/SOFTWARE DEVELOPMENT

Completed Udemy's Machine Learning A-Z™: Hands-On Python & R In Data Science (Python sections)

Full marks in Python based computing module in first year examinations

Designed, built and maintained calvaryexeter.co.uk for a local church using HTML & CSS in Adobe Dreamweaver (2016-Present)

Group student Python project for text-recognition and characterisation of PDF reports for the UK Hydrographic Office (2016)

Independently built a downloadable computer game with currently over 100,000 downloads online (2012-13)

## MATHEMATICAL BACKGROUND

90% average in First, Second and Third Year Mathematics Modules - Highest Scoring Modules (2017-20)

Senior Team Mathematics Challenge Regional Final Winners and National Final Competitors (2016 & 2017)

British Mathematical Olympiad Qualification through Senior Mathematical Challenge (2016)

50,000 hits on Brilliant.org online through published problems/solutions to mathematics problems

Ranked 1st of over 220,000 users on the JobFlare app (speed tests for cognitive abilities)

## SPORTING ACHIEVEMENT

Football coach for Corpus Christi College FC, University of Cambridge (2021-Present)

Marathon and Double Marathon Runner (2020 & 2021)

Competitive football for Cambridge University Blues and Cambridge City FC Development (2017-2021)

## LANGUAGES

Passive Cantonese (listening), University Spanish module (equivalent to B2 level Spanish), GCSE French and Spanish at A\*