Riccardo Ali

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Education

University of Cambridge, Trinity College Oct. 2023 - June 2024
MPhil Advanced Computer Science *Overall grade: 86%*

- Research dissertation: *"Constraints for Asynchronous Algorithmic Alignment with Cocycles"*. Supervised by Professors Pietro Liò, Jamie Vicary and Petar Veličković.
- Courses in Geometric Deep Learning, Theory of Deep Learning, Computational Semantics, Category Theory and Modelling with Gaussian Processes.

University of Manchester Sep. 2020 - June 2023
BSc Computer Science and Mathematics *Overall grade: 85%*

- Research dissertation: *"Connections between Category Theory, Information Theory and Machine Learning"* with Professor Gavin Brown.
- Best 1st year student in the department and top 5% in second year.
- Courses in Measure Theory, Topology, Probability, Algebraic Structures, Differential Geometry, Logic, Algorithms, Machine Learning and Symbolic AI.

Further Research Experience

Bias/Variance is not the same as Approximation/Estimation | *Python, sklearn, Maths* July 2023 - Feb. 2024

- Co-authored a paper *published* at TMLR bridging different risk decompositions in Machine Learning.
- Formulated and proved novel theorems and discussed their interpretations in applied settings.

Personalising Crutch Geometries through Bayesian Optimisation | *Python, GPy* Oct. 2023 - Jan. 2024

- Developed software to build better and personalised crutches in a team of 4. Achieved 41% loss decrease compared to NHS crutches.
- Formalised the problem mathematically to design a new loss function integrating physical data and experiments.
- 2nd place at Bridge Awards (University of Cambridge) innovation competition.

Unsupervised Clustering of Public Opinion | *Python, Pytorch, Keras, NLP* Nov. 2022 - April 2023

- Researched a novel ML framework for Twitter opinion mining and characterisation with modern NLP techniques.
- Led a team of 3 and wrote a manuscript presented at the Consulate General of Italy in London.

AI Research Engineer | *Python, Pytorch, Tensorflow, Keras, Computer Vision* June 2021 - Sep. 2021

- Worked in AINOSTICS to research deep learning models for brain micro-lesions segmentation.
- Outperformed state-of-the-art models in segmenting White Matter Hyperintensities.
- Acquired solid software development practices (documentation, GitHub, cloud computing) and Machine Learning pipelines development.

Teaching Experience

Mathematics Tutor Sep 2018 - Present
Freelance *Remote*

- Tutored more than 6 students in A-levels Mathematics.

Data Science Society Head of Workshops Sep. 2021 - Sep. 2022
University of Manchester *Manchester, UK*

- Delivered 4 workshops on AI topics (fundamentals, U-Nets, Word Embeddings, Hyperparameter Optimisation) and coordinated 30 committee members.

Work Experience

Software Engineer June 2023 - Aug. 2023
J.P. Morgan *London, UK*

- Site Reliability Engineering in Security Services.
- Worked in a team of 4 to build a monitoring system with anomaly detection features in Python.
- Integrated the system in a user-friendly UI to accommodate for complex product specifications.

Software Engineer June 2022 - Aug. 2022
J.P. Morgan *London, UK*

- Corporate Investment Banking: Algorithmic Trading and Electronic Market Making.
- Worked in a team of 7 on a 20000+ files repository to modernise and upscale a trading platform in Python.

Awards

Bridge Awards 2nd place | *University of Cambridge* Mar. 2024
2nd place in innovation competition won with Personalised Crutch Geometries through Bayesian Optimisation.

MIMUC 1st place | *Manchester Interdisciplinary Undergraduate Conference* Mar. 2023
Best talk titled *"Different flavours of sameness"* on Geometry, Topology and Category Theory.

LMS Scholarship | *London Mathematical Society* Aug. 2022
Awarded scholarship on merit to fully fund the LMS Summer School in Mathematical Research.

MIMUC 2nd place | *Manchester Interdisciplinary Undergraduate Conference* Mar. 2022
2nd-best talk titled *"Theory and Praxis of Equivalence"* on Category Theory and Machine Learning.

Micheal Jealous Memorial Prize | *The University of Manchester* Aug. 2021
Best first-year student in the department, ranked 1st out of 400+.

NLP Challenge 3rd place | *G-Research* Nov. 2021
3rd classified team in G-Research's Natural Language Processing challenge.

Summer Schools

Mediterranean Machine Learning Summer School — Google Deepmind Sep. 2023
- 20% admission rate.
- 22 hours of lectures and 16 hours of labs on topics ranging from computer vision to graph neural networks.

Summer School in Mathematical Research — London Mathematical Society Aug. 2022
- Awarded scholarship for merit: only 2 students per UK university selected to attend.
- Attended workshops in Algebraic Topology, Category Theory, Measure Theory, Stein's Method in Probability.

Other Academic Activities

Intro Fellow Oct. 2023 - Present
Cambridge AI Safety Hub *Cambridge, UK*
- Weekly paper readings in AI safety and representation learning.
- Talks with industry leaders on various topics, including mechanistic interpretability, alignment and AI policy.

Seminar Chairman Nov. 2023
University of Manchester *Manchester, UK*
- Chairing the Institute of Data Science and Artificial Intelligence's seminar series with Cristian Bodnar.
- Successfully invited 2 guest speakers (Petar Veličković and Cristian Bodnar) to give a seminar on Geometric Deep Learning and its applications.

Data Science Society Chairman Sep. 2022 - Sep. 2023
University of Manchester *Manchester, UK*
- Collaborated with academic and industrial partners to deliver 3 Hackathons and 40 workshops.
- Doubled the number of society sponsors compared to the previous year and raised more than £3000.

Mathematics Society Conference Secretary Sep. 2021 - Aug. 2022
University of Manchester *Manchester, UK*
- Successfully invited 8 researchers to give talks on their research field.
- Topics included Algebraic Geometry, Category Theory, Galois Theory, Differential Geometry and Fractal Geometry.