Han Xuanyuan

BA & MEng Computer Science Graduate, University of Cambridge
Research interests: GNNs, Robustness, Interpretability, Applications

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Education

2018–2022 **University of Cambridge, Churchill College**, Cambridge, UK.

- **MEng Computer Science:** Distinction (highest grade, ≈ GPA 4.0)
  - *Research-focused master's to prepare students for research in academia and industry.*
  - **Relevant modules:** probabilistic machine learning, graph neural networks, natural language processing, reinforcement learning, syntax and parsing.
- **BA Computer Science**: First class honours (highest grade, ≈ GPA 4.0)
  - **Relevant modules:** bioinformatics, computer architecture, computer vision, compilers, cryptography, data science, deep learning, discrete maths, information theory.

2016–2018 **Gower College**, Swansea, UK.

- **A-levels**: A*A*A*A* in Maths, Further Maths, Physics and Computer Science. (98% overall, highest in cohort)

2011–2016 **Bishop Gore School**, Swansea, UK.

- **GCSEs**: 12 A*s and 1 Distinction (highest grade in all subjects)

Publications

2023 *Global Concept-Based Interpretability for Graph Neural Networks via Neuron Analysis*
H. Xuanyuan, P. Barbiero, D. Georgiev, L. Magister and P. Lio', *The 37th AAAI Conference on Artificial Intelligence*.

2022 *Efficient privacy-preserving inference for convolutional neural networks*
H. Xuanyuan, F. Vargas and S. Cummins, *ICLR 2022 Workshop on Privacy, Accountability, Interpretability, Robustness, Reasoning on Structured Data*.

Industry experience

Jul 2022–Present **Software Engineer**, *DRW*, London.

- Developing low-latency systems for quantitative trading and research.

Jun–Sep 2021 **Intern: imaging and vision**, *Amazon Lab126*, Cambridge.

- Interned in the Camera Hardware Team. Researched and developed a novel solution for a computer vision problem of high interest in industry using machine learning approaches.

Jul–Sep 2020 **Intern: machine learning on time series**, *Informetis*, Cambridge.

- Researched and developed novel explainable deep learning models for time series analysis on smartmeter energy data, significantly outperforming the existing method.

Research projects

2022 **Interpretability of Graph Neural Networks**, *Master's thesis*.

- Proposed concept-based approaches to address local and global explainability for Graph Neural Networks. Supervised by Prof. Pietro Lió.

2022 **Neural Motion Planner**.

- Developed a GNN-based motion planning method for autonomous robots in high-dimensional state spaces.

2022 **Multi-agent DQN benchmark**.

- Proposed a new benchmark task for evaluating the performance of multi-agent DQN models in reinforcement learning.

2021 **Text classification with graphs**.

- Identified and addressed flaws within the methods of several state-of-the-art text classification methods that rely on GNNs.

2021 **Privacy-Preserving Inference using Homomorphic Encryption**, *Bachelor's thesis*.
- Proposed a new approach for privacy-preserving inference in CNNs with reduced latency compared to the state of the art. Supervised by Dr. Stephen Cummins and Francisco Vargas.

Talks

2022 **The Interpretability of Graph Neural Networks**, *AI research group, Department of Computer Science and Technology, University of Cambridge*.

2020 **Text Summarisation with TextRank**, *Churchill College, University of Cambridge*, Awarded distinguished talk.

Technical skills

Java, Python (PyTorch, Tensorflow, OpenCV), C++, MATLAB, Android development, Unix

Achievements

2022 **Churchill College Prize Scholarship**, *Awarded for academic excellence*.

2022 **Hack Cambridge**, *Winner*.

2022 **Google Hashcode**, *Top 1% of over 9000 participating teams*.

2021 **Churchill College Prize Scholarship**, *Awarded for academic excellence*.

2021 **Hack Cambridge**, *Finalist*.

2018 **Netcraft Award**, *Awarded for top 10 computer science result in UK*.

2017 **CREST Awards in Engineering**, *Gold Award*.

2017 **UKMT STMC Regional Finals**, *First place*.

2016 **British Mathematical Olympiad**, *Distinction*.

Other

Languages English (Native), Mandarin (Working proficiency)

Interests Powerlifting, cycling, philosophy, writing