

# Yingfang Yuan

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I am a Research Fellow (Postdoctoral Researcher) in the [BCML Lab](#), School of Mathematical and Computer Sciences, Heriot-Watt University, working with Prof. Wei Pang. In addition, I am leading the development AI and Machine Learning modules for Heriot-Watt's MSc Online Coursera course.

## EXPERTISE AND RESEARCH INTERESTS

**Fields:** Machine Learning; Deep Learning; Artificial Intelligence.

**Topics:** Agentic AI; Multi-agent Systems; Graph Neural Networks; AutoML; Inter/Multi-disciplinary AI.

## EDUCATION

- **Heriot-Watt University** Feb. 2020 - Jun. 2024  
(Funded) PhD in Computer Science, viva successfully defended in 2023 Edinburgh, UK
  - **Thesis:** Fast Hyperparameter Optimisation of Graph Neural Network for Molecular Property Prediction.  
**Supervisor:** Prof. Wei Pang; Prof. Mike Chantler; Prof. George M. Coghill
- **University of Aberdeen** Oct. 2018 - Dec. 2019  
(Funded) PhD in Computer Science (Transfer to Heriot-Watt University) Aberdeen, UK
- **University of Liverpool** Sep. 2016 - Nov. 2017  
MSc in Big Data and High-Performance Computing Liverpool, UK
- **Chaoyang University of Technology** Sep. 2013 - Sep. 2014  
Visiting Student Taiwan, China
- **Chengdu Neusoft University** Sep. 2012 - Jun. 2015  
Diploma in Software Engineering Sichuan, China

## EXPERIENCE

- **Heriot-Watt University** Edinburgh, UK  
Research Fellow (*Nominated Postdoc* with Global Talent Visa, starting during the PhD writing-up year) Apr. 2022 – Present
  - PRIME (Protecting Minority Ethnic Communities Online) is a UKRI-funded 3-year project (2022-2025, ~£3.34M).
    - \* The project aims to improve understanding of Minority Ethnic (ME) communities' online experiences, particularly in accessing key services related to health, social housing, and energy.
    - \* Proposed a generic approach using latent class analysis to quantify cross-sectoral discrepancies in user experience across groups.
    - \* Applied graph neural networks to model geodemographic data and support decision-making for policymakers and stakeholders.
    - \* Developed the PRIME Technical Toolkit ([primetoolkit.co.uk](http://primetoolkit.co.uk)).
  - Course Developer - F91DM Data Mining and Machine Learning & F91AI Artificial Intelligence, First UK Coursera MSc Online Course, Heriot-Watt University.

## SELECTED PUBLICATIONS

\* means corresponding author, † means equal contribution

- [1] Yang, Z., Yang, Z., Zhan, S., Yue, T., Pang, W. and Yuan, Y\*, 2026. SVAgent: Storyline-guided Long Video Understanding via Cross-modal Multi-agent Collaboration. *Accepted by Conference on Computer Vision and Pattern Recognition 2026*. **CCF A**
- [2] Yang, Z., Wang, X., Xu, D., Zhang, Y., Chen, K., Pang, W. and Yuan, Y\*, 2026. Do Vision and Text Cues Exhibit Evidential Coupling? Compositional Multimodal Reasoning in Unified Foundation Models. *Submitted to International Conference on Machine Learning 2026*.
- [3] Yang, Z., Xu, D., Pang, W. and **Yuan, Y\***, 2025. Script: Graph-Structured and Query-Conditioned Semantic Token Pruning for Multimodal Large Language Models. *Transactions on Machine Learning Research*.
- [4] Yang, Z., Song, J., Song, S., Pang, W. and **Yuan, Y\***, 2025. MERMAID: Multi-perspective Self-reflective Agents with Generative Augmentation for Emotion Recognition. *Conference on Empirical Methods in Natural Language Processing (EMNLP 2025)*. **CCF B**

- [5] Liu, Z., Li, Y., Xu, Y., Wang, Y., **Yuan, Y.** and Yang, Z., 2025. Evaluating Text Generation Quality Using Spectral Distances of Surprisal. *Conference on Empirical Methods in Natural Language Processing (EMNLP 2025)*. **CCF B**
- [6] Yang, Z<sup>†</sup>., **Yuan, Y<sup>†</sup>**., Jiang, X., An, B. and Pang, W., 2025. InEx: Hallucination Mitigation via Introspection and Cross-Modal Multi-Agent Collaboration. *AAAI 2026*. **CCF A**
- [7] Yang, Z., Pang, W. and **Yuan, Y<sup>\*</sup>**., 2025. X<sup>R</sup>: Cross-Modal Agents for Composed Image Retrieval. *The Web Conference 2026*. **CCF A**
- [8] Yang, Z., Song, J., Luo, Z., Yang, Z., Xu, Y., Lan, J., Zhang, Y., Pang, W., Song, S. and **Yuan, Y<sup>\*</sup>**., 2025. ReChar: Revitalising Characters with Structure Preserved and User-Specified Aesthetic Enhancements. *SIGGRAPH ASIA 2025*.
- [9] **Yuan, Y<sup>†</sup>**., Chen, K<sup>†</sup>., Riziv, M., Baillie, L. and Pang, W., 2025, Quantifying the Cross-sectoral Intersecting Discrepancies within Multiple Groups Using Latent Class Analysis Towards Fairness. *International Joint Conference on Neural Networks (IJCNN 2025) (Oral)*. **CCF C**
- [10] Song, J<sup>†</sup>., **Yuan, Y<sup>†</sup>**., Chang, K., Xu, B., Xuan, J. and Pang, W., 2024, Exploring Public Attention in the Circular Economy through Topic Modelling with Twin Hyperparameter Optimisation. *Energy and AI*, 100433. **Q2**
- [11] **Yuan, Y.**, Wang, W., Li, X. and Pang, W., 2024, Evolving Molecular Graph Neural Networks with Hierarchical Evaluation Strategy. In *Proceedings of the Genetic and Evolutionary Computation Conference* (pp. 1417-1425). **CCF C**
- [12] Yang, Z<sup>†</sup>., **Yuan, Y<sup>†</sup>**., Xu, Y<sup>†</sup>., Zhan, S., Bai, H. and Chen, K., 2023. FACE: Evaluating Natural Language Generation with Fourier Analysis of Cross-Entropy. *Advances in Neural Information Processing Systems (NeurIPS 2023)*, 36, pp. 17038-17056. **CCF A**
- [13] **Yuan, Y.**, Wang, W. and Pang, W., 2021, July. Which Hyperparameters to Optimise? An Investigation of Evolutionary Hyperparameter Optimisation in Graph Neural Network for Molecular Property Prediction. In *Proceedings of the Genetic and Evolutionary Computation Conference Companion* (pp. 1403-1404). **CCF C**
- [14] **Yuan, Y<sup>†</sup>**., Wang, W<sup>†</sup>., and Pang, W., 2021, June. A Systematic Comparison Study on Hyperparameter Optimisation of Graph Neural Networks for Molecular Property Prediction. In *Proceedings of the Genetic and Evolutionary Computation Conference* (pp. 386-394). **CCF C**
- [15] **Yuan, Y.**, Wang, W. and Pang, W., 2021, June. A Genetic Algorithm with Tree-Structured Mutation for Hyperparameter Optimisation of Graph Neural Networks. In *2021 IEEE Congress on Evolutionary Computation* (pp. 482-489). IEEE.
- [16] Wang, W., Moreau, N.G., **Yuan, Y.**, Race, P.R. and Pang, W., 2019. Towards Machine Learning Approaches for Predicting the Self-healing Efficiency of Materials. *Computational Materials Science*, 168, pp. 180-187.

## PROJECTS

- **Agentic AI for Causality Rules in Green Hydrogen Certificate Markets, £7K** Jan. 2026 - Apr. 2026  
Co-investigator
- **Engineering and Physical Sciences Research Council - Digital Circular Chemical Economy, £1.1M** Feb. 2023 - Apr. 2025  
Researcher
  - Examined public attention on the circular economy and group attitudes toward environment-friendly detergent products through multi-objective topic modelling and latent class analysis.
- **Natural Environment Research Council - Explainable Artificial Intelligence Approaches to Understand and Communicate Spatial and Temporal Patterns of Toxic Chemicals, £7K** Feb. 2022 - March. 2022  
Research Programmer
  - Identified key factors influencing soil toxicity using an Explainable AI (XAI) approach.
- **Engineering and Physical Sciences Research Council - Manufacturing Immortality, £2.69M** Jun. 2021 - Jul. 2021  
Research Assistant
  - Contributed to the development of self-healing materials by applying machine learning to predict molecular properties.
- **Engineering and Physical Sciences Research Council - Low Carbon Jet Fuel, £1.8M** Nov. 2020 - Dec. 2020  
Research Assistant
  - Applied topic modelling to analyse texts and identify stakeholder attitudes and actions.

GRANT

- **Graph Neural Networks for Recommendation System with Fairness and Safety,**  
Principle Investigator, total value: £8,690.72, EPSRC IAA.
- Apr. 2023 - Jun. 2023

AWARDS

- **Gold Medal**  
2025 iGEM Competition, Team: OUC-China.
  - **Principal's Research Impact and Engagement Awards (Sustainable Futures)**  
Project: Circular Chemical Economy (UKRI funded), Heriot-Watt University.
  - **Best Presentation, 10th International Conference on Signal Processing**  
Title: Quantifying Discrepancies in Online User Experiences and Modelling Geodemographic Data with Graph Neural Networks: Some Results from the PRIME Project.
- 2025
- 2024
- 2024

TEACHNING AND SUPERVISION

- **Course Developer**  
Data Mining and Machine Learning & Artificial Intelligence (Coursera MSc Online Course), Heriot-Watt University
  - **Lecturer**  
F90AM Advanced Machine Learning, Heriot-Watt University
  - **Supervisor/Co-supervisor**  
Undergraduate, Postgraduate, and PhD students, Heriot-Watt University
  - **Guest Lecturer**  
Exploring Graph Neural Networks: Techniques and Application
  - **Teaching Assistant**  
F20ML Statistical Machine Learning, F20BC/F21BC Bioinspired Computation, Heriot-Watt University
  - **Teaching Assistant**  
CS551G Data Mining and Visualisation, Aberdeen University.
- Oct. 2024 - present
- Feb. 2025 - Feb. 2025
- 2023 - present
- Oct 2024 and Oct 2023
- 2020 - 2022
- 2018 - 2020

SKILLS AND SERVICES

- **Programming Languages:** Python, C, Java, HTML+C, Latex
  - **Languages:** Mandarin (Native), English (Proficiency)
  - **Operation System:** Windows (advanced), Linux (advanced)
  - **Reviewer Services:**  
**Conference:** ICLR; AAAI; CVPR; LOG; ICME; IJCNN; ICCV; ACAIT.  
**Journal:** Information Science; npj Artificial Intelligence; IEEE Transactions on Emerging Topics in Computational Intelligence; Transactions on Parallel and Distributed Systems; Complex & Intelligent Systems; Journal of Heuristics; Applied Artificial Intelligence; Information Processing and Management.
  - **Data Science Coach:** Data Lab Innovation Week 2020.
  - **Vice President:** Chinese Students and Scholars Association, Heriot-Watt University, Sep 2023 - present.
  - **Funding Reviewer:** [REPHRAIN](#), £8.6 million three-year UKRI Research Centre of Excellence; UKRI Metascience Research Grants.

ACADEMIC REFEREE

1. Prof. Wei Pang, MACS, Heriot-Watt University, w.pang@hw.ac.uk.
  2. Prof. John Woodward, Head of MACS (Dubai), Heriot-Watt University, j.woodward@hw.ac.uk.