Weizhe Lin

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Education

Trinity College, University of Cambridge **10/2021 – 06/2024 (expected)**
PhD in Engineering - Toyota Research Studentship
& Visiting PhD in Chemical Engineering and Biotechnology (Stranks Lab)

Trinity College, University of Cambridge **10/2017 – 06/2021**
BA & M.Eng Information Engineering - Full Oversea Scholarship & Camrbidge Trust Scholarship

The University of Hong Kong **08/2016 – 06/2017**
B. Eng GPA 3.91/4.3 - HKU Entrance Scholarship

Xiamen No.1 High School of Fujian, China **09/2013 – 06/2016**
Ranked 68 out of 200,000 in Joint College Entrance Examination, Fujian Province, China

Work Experience

Intern Applied Scientist at Amazon Development Center, Cambridge **09/2022 – 12/2022**

- Carry out research in Table Question Answering systems.
- Supervisor: Adrià de Gispert Ramis (Principal Applied Scientist)

Intern Researcher at Microsoft Software Technology Center, Beijing **06/2021 – 10/2021**

- Worked in developing cutting-edge knowledge-graph-enhanced recommender systems that bring together structured & unstructured data.
- Supervisor: Linjun Shou (Principal Applied Scientist Manager)

Researcher at Computer Laboratory, University of Cambridge **06/2020 – 09/2020**

- Improved multi-agent path planning with graph attention networks
- Supervisor: Dr. Amanda Prorok

Researcher at Computer Laboratory, University of Cambridge **06/2019 – 09/2019**

- Proposed a network-based novel multi-modal feature fusion framework to aid in prediction of psychological disorder.
- Developed a self-adaptor(fidgeting) detection system for automated detection of psychological distress
- Supervisor: Dr. Marwa Mahmoud

Software Development Contractor for Bingo Century Investment Management Limited **04/2019 - Now**

- Independently developed a real-time news monitoring system with front-end presentation and server-end analysis
- Currently developing an event-driven stock prediction system using Natural Language Processing techniques.

Cloud Engineering Intern in Informetis Europe Ltd. **08/2018 – 09/2018**

- Developed a Django backend system which tacks power usage of IoT devices through their Power Supply monitors. The system is designed to help ML engineers develop more accurate algorithm for tracking various electrical appliances
- Gained skills in database management, involving the use of MySQL, Google Bigtable and Redis Caching.

Projects

Knowledge-based visually-grounded language understanding **2021 - 2024**

- Ph.D. research supervised by Prof. Bill Byrne.
- Investigating efficient knowledge fusion in vision-based language systems, e.g., visual question answering.

Knowledge-aware multi-domain task-oriented dialogue systems (final year dissertation) **2020 - 2021**

- Final year project supervised by Prof. Bill Byrne.
- Utilising neural forms of graph networks in dialogue systems.
- **Awarded Engineering Outstanding Project Prize.**

Graph-based multi-robot path planning **2020 - 2021**

- Supervised by Dr. Amanda Prorok.
- Imitation learning using Graph Neural Network to communicate between agents.
- Utilising graph attention neural network to leverage the performance of moving agents to their goals.

COVID-19 diagnosis assist and CT denoising (AIXCOVNET Project Support Member) **2020 - Current**

- Working with Stranks Lab of Cavendish Laboratory, NHS(Addenbrooke's Hospital), Department of Radiology. Supervised by Sam Stranks. Performing CT denoising on datasets of COVID-19 and other commonly-seen lung diseases.

Image reconstruction for hyperspectral microscopy using deep learning **2019 - Current**

- Working together with Stranks Lab of Cavendish Laboratory. Collaborate with VISION Laboratory of Department of Physics. Supervised by Dr. Sam Stranks.
- Using machine-learning-based methods to denoise and reconstruct physics-informed images obtain by microscopy.
- Highly reduced the required laser exposure time for taking images for physics/material research.

Automatic fidgeting and self-adaptor detection for psychological distress from 2D videos **2019 - 2020**

- Developed a fully automated system to detect the fidgeting behaviour (such as touching face by hand and rhythmic body motion). Supervised by Dr. Marwa Mahmoud.
- Performing classification based on multi-modal features extracted from interview videos.

LearnAh.uk - teach science the fun way using popular science videos **2018 - 2019**

- Recommends popular videos using techniques of machine-learning based text analysis (Latent Semantic Indexing & Latent Dirichlet Allocation) based on teaching plans - **Link**
- UCL Institute of Education Knowledge Lab EDUCATE Graduate (with EU grant) + Y Combinator Startup School Graduate + Runner-up, Cambridge University Entrepreneur £2,000 competition (Social Enterprise)

Achievements

Personal Awards

- Engineering Part IIB Project Prize (final year project **First Class Honour**) (2021)
- Runner-up in Integrated Design Project (Robot design challenge in Dept. of Engineering) (2019)
- Airbus Defense and Space Prize 2018 for Mars Lander Design and Programming Contest (Runner Up) (2018)
- 1st Year Structural Design Course Prize (Dept. of Engineering) (2017)
- Full Oversea Scholarship from Trinity College & Cambridge Trust Scholarship (2017)
- Centenary Prize for Top 3 Information, Electrical and Electronics Engineering Final Project of Hong Kong University (2017)
- Third place in Computer Science Projects of 15th China Future Scientist Award Program (2015)
- Silver Medal in Chinese Physics Olympiad (Fujian Division) (2015)

Publications and Presentations (Link to Google Scholar Page)

- **Weizhe Lin** and Bill Byrne. Retrieval Augmented Visual Question Answering with Outside Knowledge. 2022. In *Proceedings of the 2022 Conference on Empirical Methods in Natural Language Processing (EMNLP)*
- **Weizhe Lin**, Linjun Shou, Ming Gong, Jian Pei, Zhilin Wang, Bill Byrne and Daxin Jiang. Transformer-Empowered Content-Aware Collaborative Filtering. 2022 **(with Microsoft)**. In *Proceedings of the RecSys 2022: Fourth Knowledge-aware and Conversational Recommender Systems Workshop (KaRS)*.
- **Weizhe Lin**, Linjun Shou, Ming Gong, Jian Pei, Zhilin Wang, Bill Byrne and Daxin Jiang. Combining Unstructured Content and Knowledge Graphs into Recommendation Datasets. 2022 **(with Microsoft)**. In *Proceedings of the RecSys 2022: Fourth Knowledge-aware and Conversational Recommender Systems Workshop (KaRS)*.
- **Weizhe Lin**, Bo-Hsian Tseng and Bill Byrne. Knowledge-Aware Graph-Enhanced GPT2 for Dialogue State Tracking. 2021. In *Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing (EMNLP)*. **Read**
- **Weizhe Lin**, Indigo Orton, Qingbiao Li, Gabriela Pavarini, Marwa Mahmoud. Looking At The Body: Automatic Analysis of Body Gestures and Self-Adaptors in Psychological Distress. 2021. *IEEE Transactions on Affective Computing*. **Read**
- Zhilin Wang, **Weizhe Lin** and Xiaodong Wu. Learning similarity between movie characters and its potential implications on understanding human experiences. 2021. *In Proceedings of the 2021 NAACL Workshop WNU: 3rd Workshop on Narrative Understanding.* **Read**
- Qingbiao Li*, **Weizhe Lin* (*equal contribution)**, Zhe Liu and Amanda Prorok. Message-Aware Graph Attention Networks for Large Scale Multi-Robot Path Planning. 2021. *IEEE Robotics and Automation Letters (RA-L)*. **Read**
- **Weizhe Lin**, Indigo Orton, Mingyu Liu, Marwa Mahmoud. Automatic Detection of Self-Adaptors for Psychological Distress. 2020. In *Proceedings of 2020 15th IEEE International Conference on Automatic Face & Gesture Recognition (FG 2020)*. **<Oral session> Read**
- Ziheng Zhang*, **Weizhe Lin* (*equal contribution)**, Mingyu Liu, Marwa Mahmoud. Multimodal Deep Learning Framework for Mental Disorder Recognition. 2020. In *Proceedings of 2020 15th IEEE International Conference on Automatic Face & Gesture Recognition (FG 2020)*. **<Oral session> Read**
- Zhilin Wang, Elena Rastorgueva, **Weizhe Lin** and Xiaodong Wu. No you're not alone A better way to find people with similar experiences on Reddit. 2019. In *Proceedings of the 2019 EMNLP Workshop W-NUT: The 5th Workshop on Noisy User-generated Text*. **Read**
- **Weizhe Lin**, Xiaodong Wu, Zhilin Wang and Elena Rastorgueva. Author2Vec: A Novel Framework for Generating User Embedding. 2019. *on Arxiv.* **Read**
- Zhilin Wang, Xiaodong Wu, **Weizhe Lin** and Elena Rastorgueva. Detecting personal attributes through analyzing online forums. 2019. In *Cambridge Language Sciences Early Careers Researchers Symposium*. **Read**

Papers Under Review and in Preparation

- Kangyu Ji, **Weizhe Lin**, Affan Iqbal, Lin-Song Cui, Yuqi Sun, Tiarnan Doherty, Qingbiao Li, Miguel Anaya, Yu-Hsien Chiang, Javad Shamsi, Thomas Buddenkotte, Elizabeth Tennyson, Evis Sala, Carola-Bibiane Schönlieb and Samuel D. Stranks. Machine learning facilitates discovery in signal-starved imaging. 2021. Under review of *Nature*.
- Kangyu Ji*, **Weizhe Lin* (*equal contribution)**, Qingbiao Li and Sam Stranks. Physics-aware Hyperspectral Image Restoration. 2020. *Finished Paper. Available upon request*

Websites I built

- Website of Hercules Cambridge society:
  https://www.herculescambridge.org.uk
- Website of NLP project LearnAh
  https://learnah.uk

Society

Director of Web Development of Hercules Cambridge (Design Collaboration) **07/2021 – Present**

- Lead the design of society website system. Leader of a small group of (7-8) engineers and designers.
- (**Link to society**)

Data Analysis Mentor of Bridge for Enterprise (NGO) **10/2019 – Present**

- Supervise the development of Investor Selector Project (using NLP to filter investors for startups)
- (**Link to society**)