

# Ying Liu, Ph.D.

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## PROFILE

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Experienced Machine Learning Research Engineer with a background in both Math and Physics. Currently Head of AI, R&D at TG0 Ltd. My work focuses on building AI algorithm for real-time sequential sensor signal and time-series 3D pose estimation for VR/AR applications, design **end-to-end** ML project architecture and scope.

## SKILLS

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Programming	Python, C++, Docker, Git, TensorFlow, PyTorch, AWS SageMaker/S3, GCP VertexAI, ETL, distributed computing.
Machine Learning	Pose estimation, Object detection, CNN, ViT, RNN/LSTM, VAE, Diffusion, Transformer, LLM, RAG, Few-shot, Liquid Reservoir, Bayesian Method
Research	Published scientific papers, Seek collaborations, Grants.
Communication	Excellent written and verbal presentation skills communicating advanced ML concepts to multiple audiences and at different levels with my technical blog.

## RELEVANT RESEARCH & PROFESSIONAL EXPERIENCE

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**AI Research & Development Lead**, TG0 Ltd., London, UK. 2022 - present

**Machine Learning Engineer** joint project 2021 - 2023

**Machine Learning Engineer** part-time 2019 - 2020

- Developed ML infrastructure for **pose estimation**, predicting 3D body skeleton coordinates from sequence sensor data using **Vision Transformer**, **Liquid Reservoir**, **Model Fusion**.
- Built **LLM** chatbot using openai backbone with fine tune, RAG and nearest neighbour search.
- Software engineering with **PyQt**, **openCV** and **CI/CD** pipeline. Set up company **end-2-end** ML projects.
- Published papers in **gesture recognition** Submitted one in **pose estimation**.
- Stay up-to-date with latest AI techniques with paper club, AI meetup, conference and exhibition,
- Documented data structure, Machine Learning architecture and algorithm script for stakeholders.
- Collaborated with and led a cross functional team including hardware designers, Unity engineers, firmware engineers and software engineers to deliver prototype.
- Led AI team, coaching and mentoring.

**Research Associate of Machine Learning**, University of Leicester, UK. joint project 2021 - 2023

- Developed, trained, and evaluated state-of-the-art machine learning architecture for multi-channel time-series signals from capacitive sensors to solve gesture/pose recognition problems
  - Developed Python-based machine learning software incorporating **CI/CD** practices.
  - Planned and performed signal processing routine on time-series sensor signals.
  - Investigated and developed a bespoke, in-house Python API for signal processing (including Fourier transforms, Hilbert transforms, GASF, filtering, and spectrograms).
  - Constructed pipelines and protocols for data collection, cleaning, processing, and storage.

**Visiting researcher**, QMUL, London, UK.

volunteer 2023 - present

- Developing XAS spectra fitting software using Python with Bayesian Methods.

**Director**, Women Who Code, London, Women Coding Community UK. volunteer 2023 - present

**Machine Learning Lead**, Women Who Code, London, UK. volunteer 2021 - 2023

- Organised and led over 15 public outreach talks focused on teaching Machine Learning principles in an accessible manner and presented over 5 two-hour long talks to encourage women to pursue careers in data science and machine learning.

## EDUCATION

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**Ph.D. in Physics**, Queen Mary University of London, UK.

2016 - 2020

- Investigated CdS quantum dot atomic structure by building computer models to study, analyse, and interpret experimental data; Constructed synchrotron X-ray absorption spectroscopy experiments to collect data and developed Python code to automate data de-noising and data cleaning processes.
- Developed Python software to combine two simulation methods and perform parallel computing to speed up the simulation by over 100%.
- Use Density Function Theory, Molecular Dynamics and reversed Monte Carlo method for atomic structure simulation and searching.

**MSc. in Material Science**, Loughborough University, UK.

2011 - 2012

- High-temp Oxidation behaviour of high Cr containing Ni-based alloys.

## RECENT PUBLICATION AND PUBLIC TALKS

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1. Y. Liu *et al.*, *Nanoscale* **12**, 19325–19332, ISSN: 20403372, (URL: [🔗](#)) (2020).
2. H. Luo *et al.*, *J. Mater. Chem. A* **8**, 14690–14696, (URL: [🔗](#)) (2020).
3. Y. Liu *et al.*, presented at the IJCNN, vol. 2023-June, pp. 1–8, ISBN: 9781665488679, (URL: [🔗](#)).
4. L. Haddad *et al.*, *Nanoscale*, ISSN: 2040-3364, (URL: [🔗](#)) (2024).
5. Y. Liu, “Agile gesture recognition for low-power applications (under review)”.
- XVI UCM Modelling week, (2022): Led “Gesture recognition workshop”.
- Presented in Royal Statistical Society, (2021): “Gesture recognition using CNN”.
- Presented in Leicester Business Festival, (2021): “ML applications in hand controllers”.
- Woman Who Code, Public outreach talks series, (2022); Woman Who Code, ML competition series, (2022, 2023); Woman Who Code, Gesture recognition talks, (2022, 2023).

## PROFESSIONAL TRAINING & DEVELOPMENT

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Innovation Strategy Course (KTN, 2022), DeepLearn Summer workshop (IRDTA, 2021), Completed KTP Associates Module on Project Management (KTN, 2021), Completed Coursera Courses: “Bayesian Methods for Machine Learning”, “Neural Networks and Deep Learning” and “Customising your models with TensorFlow 2”