Yueyang Liu

Email: yl9625@imperial.ac.uk | linkedin.com/in/yueyang-liu
Code available on request

PROFILE

Bioengineering graduate interested in how heart muscle cells build and maintain their contractile structure. MRes project combined stochastic modelling of sarcomere formation with confocal image analysis of zebrafish hearts. Has hands-on lab experience in molecular cloning, protein assays, and bacterial culture and fermentation. Aims to become a hybrid researcher who performs experiments and builds models to boost innovation.

EDUCATION

MRes Bioengineering **2025 – 2026**
Imperial College London
Research Project: Investigating Zebrafish Heart Sarcomeric Organisation During Cardiac Looping
Grade: Merit

BEng Biochemical Engineering **2022 – 2025**
University College London
Grade: Upper Second Class Honours (68%)
Modules: Mathematical Modelling and Analysis; Molecular Biology; Fermentation and Bioreactor Engineering; Biochemical Engineering Practicals

RESEARCH EXPERIENCE

"Investigating Zebrafish Heart Sarcomeric Organisation During Cardiac Looping" **Sep 2025 – Sep 2026**
Research Project, Imperial College London

- Built a lattice-based kinetic Monte Carlo model of actin dynamics in Python. Tuned using FFT analysis, Latin hypercube sampling, and cost-function optimisation.
- Recognised that an actively treadmilling actin fibre network does not sample a Boltzmann distribution. Rebuilt the model on kinetic foundations after first implementing Ising and XY variants with nematic and quartic symmetry and energy functions.
- Produced a measurement analysis pipeline comparing simulated images against real f-actin images for validation and calibration. Found that the model lacked connectivity, hinting at potential crosslinking between orthogonal fibres influencing the final actin network.
- Performed quantitative image analysis in Fiji and Python, measuring fibre and cell morphometry so that model parameters were constrained by measured physical values.

"Plasmid DNA Production Under Varied E. Coli Fermentation Conditions" **Feb – Mar 2023**
Group Research Project, UCL

- Designed and ran a comparison of four fed-batch glucose feed rate and concentration scenarios in a stirred-tank bioreactor, sampling hourly to track growth and plasmid yield.
- Showed that high feed rates with high glucose concentrations caused substrate inhibition and cell death from osmotic pressure. Identified high feed rate with low glucose concentration gave optimal E. coli biomass and plasmid concentration.
- Ran the full downstream workflow after fermentation including centrifugation, chromatographic separation, spectrophotometry and Nanodrop quantification of recovered DNA.

LABORATORY EXPERIENCE

Molecular Cloning and Cell-Free Protein Expression **Jan 2025 – April 2025**
Laboratory Coursework, UCL

- Designed primers with Gibson overhangs and amplified a GFP insert by PCR with Q5 high-fidelity polymerase, followed by column purification.
- Assembled the insert into the pET29a vector by Gibson assembly, isolated the plasmid by miniprep, and verified it by restriction digest (XhoI/NdeI) and DNA gel electrophoresis.
- Expressed sfGFP in a cell-free system and quantified yield against a plate-reader fluorescence standard curve.

DESIGN PROJECTS

"Production of Plant-based Antibodies for Rheumatoid Arthritis from Tobacco" **Sep 2024 – Jun 2025**
Group Design Project, UCL

- Specified a plant-expressed antibody derived from adalimumab and produced the full production plan: process flow, plant design, and mechanical drawings of production equipment.
- Developed SOPs for each operation and machine, ran HAZOP analysis across all process flows, and specified safety precautions and regulatory controls for every production step.

LEADERSHIP, TEACHING, & VOLUNTEERING

Private Tutor **Aug 2025 – Present**
MyTutor, London

- Tutor KS3 and A-Level students in maths, further maths, computer science, and physics, diagnosing and filling knowledge gaps and improving the confidence of students.
- Delivered 200+ lessons, earning 20+ five-star reviews. Plan topics and resources across multiple students and report progress to parents and teachers.

Campus Experience Ambassador / Accommodation Ambassador **Sep 2024, Sep 2025**
UCL, London

- Led hall and Marshgate building tours, covering fire safety and sustainability guidance.

Treasurer (Voluntary) **Jun 2024 – Jun 2025**
UCL Freestyle Dance Society, London

- Prepared and submitted grant applications for events and socials, including one funded in full.
- Received a full grant of £901.89 for society events, instructor pay, and reimbursements.

Team Member **Jun 2023 – Jun 2024**
Wdangcan Creations, Sheffield

- Wrote and optimised C# scripts for game mechanics in Unity, using Git for branching, merging and version control across a shared repository.
- Collaborated across departments in a hybrid team with weekly coordination and delivery cycles.

ADDITIONAL SKILLS

Laboratory: Bacterial culture; Yeast fermentation; SDS-PAGE; Bradford assay
Modelling: Monte Carlo methods, agent-based methods; sensitivity analysis; cost function optimisation
Languages: Python, C#, MATLAB/Simulink, SQL, HTML
Python: NumPy, SciPy, Matplotlib, Pandas, Numba, Dash, Flask
Analysis: Fiji/ImageJ, FFT orientational analysis, quantitative image analysis
Development: Git/GitHub including Actions, VS Code, Anaconda, Unity
Other: B2 Mandarin Chinese; Excel, PowerPoint, Word