Yihao LIU

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EDUCATION

Imperial College London **MSc in Health Data Analytics and Machine Learning** **Sep 2026 – Sep 2027**

➢ Awarded the competitive School of Public Health Masters Scholarship to fund this programme.

École Polytechnique (l'X) **BSc in Mathematics and Computer Science** **Sep 2023 – Jul 2026**

➢ Grade: **3.72 / 4.00 GPA**, *Cum Laude*

➢ Relevant modules: Machine Learning; Probability and Stochastic Processes; Measure Theory; Numerical Analysis II; Linear Algebra II; Topology and Multivariable Calculus; Computer Architecture

King's College London **Undergraduate Exchange Semester** **Sep 2025 – Jan 2026**

➢ Grade: **87** (**First-Class Equivalence**); Relevant modules: Medical Imaging (87); Mathematical Finance I: Discrete Time (97); Software Measurement and Testing (88); Human-Computer Interaction (74)

St. Julian's School, Portugal **Sep 2016 – Jun 2023**

➢ **International Baccalaureate: 41 / 45**; 7/7/7 at Higher Level (Physics, Mathematics AA, Economics)

RESEARCH EXPERIENCE

SPH, Imperial College London **Visiting Researcher** **Oct 2025 – Present**

➢ Supervised by Professor Marc Chadeau-Hyam & Dr Dragana Vuckovic, with Dr Rin Wada. Developing the **Prescription-Mediated Multi-Morbidity Index (PMMI)** from UK Biobank GP prescription records to quantify all-cause mortality risk beyond diagnosis-based indices such as Charlson and Elixhauser. Began as my bachelor thesis.

➢ Benchmarking Elastic Net Cox regression, naive and SHARP-calibrated stability selection and Random Survival Forests for high-dimensional feature selection across sex-specific BNF prescription categories, leading to an interpretable integer risk score (in R). Results to follow in a forthcoming preprint.

BMEIS, King's College London **Research Intern** **Jul 2025 – Aug 2025**

➢ Supervised by Professor Kawal Rhode. Built an automated MATLAB pipeline (DICOM preprocessing, Canny and Hough rim localisation, Powell optimisation, Radon deskew, 21-ROI MTF10 mapping) measuring the TOR 18FG phantom's spatial-resolution limit for X-ray quality assurance.

➢ Delivered bias-free analysis in ∼1 second per image, resolving **∼50% finer detail** than human readers, validated against ImageJ ground truth.

PUBLICATIONS

➢ Lian X, Hu X, Li G, Wu S, **Liu Y**, Qin K, Liu K (2025). Hierarchical attention transformer provides assistant suggestions for orbital rejuvenation surgery. *Frontiers in Medicine*, 12. DOI: 10.3389/fmed.2025.1532195

➢ **Liu Y**, Wada R, Vuckovic D, Chadeau-Hyam M. A Prescription-Mediated Multi-Morbidity Index (PMMI) for all-cause mortality risk prediction in UK Biobank. *Manuscript in preparation.*

AWARDS & SCHOLARSHIPS

➢ **School of Public Health Masters Scholarship** 2026-27, Imperial College London

➢ Gold Medal & **Best in Year**, Senior Mathematics Challenge, UK Mathematics Trust (2022)

➢ Global **Gold** Award, Senior Physics Challenge, British Physics Olympiad (2022)

ACADEMIC PROJECTS

École Polytechnique **Chess Solver Engine** **Nov 2024 – May 2025**

➢ Built a Chess Solver Engine in C++ with 3 colleagues (ranked 5th / 26 in School); optimised runtime via Alpha-Beta Pruning and added Machine Learning with data augmentation to reach a Super Grandmaster engine (∼2790 Elo).

Personal Project **Patient Medical Database System** **Sep 2022 – Apr 2023**

➢ Built a desktop patient medical database (Java, SceneBuilder GUI) at a physician's request, backed by a MySQL database with basic encryption for storing patient records.

CLINICAL EXPERIENCE

Shanghai Ninth People's Hospital **Summer Intern** **Jul 2023 – Aug 2023**

➢ Observed plastic and reconstructive surgery (double-eyelid, cleft-lip and nasal reconstruction) and outpatient consultations; joined departmental clinical discussions.

TECHNICAL & RESEARCH SKILLS

➢ **Statistical & ML methods**: survival analysis (Cox PH, Random Survival Forests), penalised regression (elastic net), stability selection (SHARP), high-dimensional feature selection, medical image analysis.

➢ **Programming & tools**: Python (Scikit-Learn, Pandas, NumPy), R, C/C++, Java, MATLAB, SQL/MySQL, Stata, HTML5/CSS/JavaScript.

LANGUAGES

➢ **English** (IELTS 8.5); **Mandarin** (Native); **Portuguese** (Native, DAPLE C1); **French** (DELF B2)