

Timing Liu

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Education

UNIVERSITY OF CAMBRIDGE Bachelor of Medicine, Bachelor of Surgery (MB BChir)	United Kingdom 2025
DATA CAMP Professional Data Scientist Certification (Completed)	United Kingdom 2023
UNIVERSITY OF CAMBRIDGE Bachelor of Arts (Hons, Engineering)	United Kingdom 2022
NATIONAL JUNIOR COLLEGE (FULL SCHOLARSHIP) Advanced Level	Singapore 2018

Selected Experience

MOORFIELDS EYE HOSPITAL Deep Learning Engineer	United Kingdom September 2021 – Present
<ul style="list-style-type: none">Built neural networks and transformers that combined genetic, Electronic Health Record, and imaging data for improved ophthalmic and systematic disease diagnosis using multimodal machine learning	
WELLCOME SANGER INSTITUTE Statistical Geneticist	United Kingdom June 2020 – October 2022
<ul style="list-style-type: none">Associated the genomic mutations and metabolic metrics in a highly consanguineous population with full funding from the British Genetics SocietyIdentified the gene mutations in the 5' UTR region that could lead to increased diagnosis in the Deciphering Developmental Disorders projectEstimated the prevalence of type 1 and type 2 diabetes in British South Asian cohort of 44k individuals using genetic risk score and characterized the genetic and clinical features of a potentially misdiagnosed group of ~1k individuals.Acquired proficiency in high-performance computing, analysis pipeline construction, and machine learningDiscovered novel associations that can be useful for future drug targets and improving healthcare equality	
CLINICIANWIKI.COM Founder, Full Stack Developer	United Kingdom May 2020 – May 2021
<ul style="list-style-type: none">Led a team to build a non-profit website as a platform to make medical knowledge-sharing more collaborative, open, and accurateBuilt website with customized MediaWiki, Azure DevOps, and cloud computing resourcesDeveloped and executed business, marketing, and human resources strategies	
NATIONAL UNIVERSITY OF SINGAPORE Computational Biologist, Genetic Diagnostic Developer	Singapore May 2017 – March 2023
<ul style="list-style-type: none">Led three projects on preimplantation testing for chromosomal and monogenic disorders with Oxford Nanopore and Illumina sequencing and provided remote bioinformatics supportDesigned R package for aneuploidy detection at the precision of 5 megabases and deployed it via R shiny web appDeveloped a molecular diagnostic assay for Fragile XE Syndrome and transformed the assay into a duplex assay that also diagnoses Fragile X SyndromeInvestigated the local allele frequency of repeats at the Fragile XE Site and the site's association with cognitive disordersAs a high-school graduate, I mentored undergraduate final-year students and prepared high school students for Singapore Science and Engineering Fair 2019 where they were awarded Gold	
MANSFIELD ADVISORS Technical Consultant Junior Analyst	United Kingdom October 2020 – Present December 2020 – Jan 2021
<ul style="list-style-type: none">Facilitated commercial due diligence on major veterinary chains (in Britain, China, Germany, Spain) and on private hospital groups (in Britain)Analyzed UK government vaccination strategy analysis and recommendationsApplied text mining, web-scraping, and modeling skillsAcquired a strong foundation in corporate finance and market analysis of the pharmaceutical and healthcare service industriesSharpened skills in project planning, client meeting, and presentation	
MEDTECH FOUNDATION National Program Director	United Kingdom August 2020 – August 2022

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- Built a resource platform and community for MedTech Foundation members and everyone interested in medical technology with national committee members
- Coordinated with local branch leaders to develop training programs in medical technologies for professionals, undergraduate and postgraduate students
- Doubled the previous network of 7 branches to 14 branches over 5000 members within the first year in office

Computational Skills

Advanced: R, Python, SQL, C#, MATLAB, Shell, *Xamarin, Flutter*, deep learning, time series forecasting

Intermediate: Go, Ruby, PHP, JavaScript, Arduino, Azure, *XAML, HTML, CSS*, signal processing

Selected Journal and Conference Publications

* indicates equal contribution

Deep learning in ophthalmology:

- Zhou Y, ..., **Liu T**, ... Keane P, 2023, A foundation model for diverse and generalisable disease detection from retinal images. *Nature*, <https://doi.org/10.1038/s41586-023-06555-x>
- Wagner S, ..., **Liu T**, ..., Keane P, 2023, Multimodal retinal ophthalmology in schizophrenia: findings from the AlzEye study. *JAMA Psychiatry*, <https://doi.org/10.1001/jamapsychiatry.2023.0171>
- Moraes G, Struyven R, Wagner S, **Liu T**, ..., Keane P, Quantifying changes in retinal morphology on optical coherence tomography in eyes receiving treatment for neovascular age-related macular degeneration (under review)

ARVO 2023:

- Liu T**, Wagner S, ..., Keane P, 2023, Retinal biomarkers for systemic diseases: an oculome-wide association study in 164,784 individuals – Oral Presentation
- Luke C, **Liu T**, ..., Keane P, 2023, Association between retinal microvascular morphology and thyroid dysfunction: a retrospective analysis in 93,814 individuals
- Murray O, **Liu T**, ..., Keane P, 2023, Associations between COPD and retinal vessel density, fractal dimension, and tortuosity density
- Raja L, **Liu T**, ..., Keane P, 2023, Associations of Retinal Vascular Morphology and Inflammatory Bowel Disease: A cross-sectional analysis.
- Wang Y, **Liu T**, ..., Keane P, 2023, Age prediction from retinal fundus images and segmented vessel images using deep learning.
- Zhou Y, ..., **Liu T**, ... Keane P, 2023, Predicting major adverse cardiovascular events with colour fundus photograph in the AlzEye Study

ARVO 2022:

- Liu T**, ..., Keane P, 2022. Association between retinal fractal dimension and schizophrenia

Deep learning in other clinical specialties:

- Liu T*** Lee C*, Floto A, van der Schaar M, Understanding the longitudinal progression of cystic fibrosis using deep learning. (under review)
- Berrevoets J*, **Liu T***, ..., van der Schaar M, Gimson A, Donor-organ allocation using causal deep learning. (to be submitted)

Genetic epidemiology:

- Liu T***, Paterson G*, ..., Martin H, Finer S, Estimating the prevalence and misclassification of diabetes in a population-based cohort of British Pakistanis and Bangladeshis using polygenic risk scores (under review), medRxiv, <https://doi.org/10.1101/2023.08.23.23294497> (One more first-author paper to be submitted)

Computational and molecular biology:

- Liu T**, Wang FS, ..., Chong SS, 2021. Simultaneous Screening of the FRAXA and FRAXE Loci for Rapid Detection of FMR1 CGG and/or AFF2 CCG Repeat Expansions by Triplet-Primed PCR. *The Journal of Molecular Diagnostics* 23, 941–951. <https://doi.org/10.1016/j.jmoldx.2021.04.015>
- Liu T**, ..., Chong SS 2022. CHRAB – a tool for identification and visualization of chromosomal abnormalities in preimplantation embryos using next-generation sequencing data (presented at ESHG 2022)
- Tan V*, **Liu T***, Arifin Z*, ..., Chong SS. 2022. Third-generation single-molecule sequencing for preimplantation genetic testing of aneuploidy and segmental imbalances, *Clinical Chemistry*, <https://doi.org/10.1093/clinchem/hvad062> (presented at ASPIRE Asia Pacific Initiative on Reproduction 2022 and ESGH 2022)
- Liu T** and Chong SS. Peer Review Report For: The FRAXA and FRAXE allele repeat size of boys from the Avon Longitudinal Study of Parents and Children (ALSPAC) Wellcome Open Res 2020, 4:116, <https://doi.org/10.21956/wellcomeopenres.17209.r37691>

Medical statistics:

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Taribagil P, **Liu T**, ..., Sanjay Taribagil. Do we need a co-pilot in the operating theatre? A cross-sectional study on surgeons' perceptions, Scottish Medical Journal, 2023, <https://doi.org/10.1177/003693302312079>
Loh B, Jiang L, **Liu T**, ..., Koh J. Charlson Comorbidity Index is a Strong Predictor of 10-Year Mortality in Surgically Treated Hip Fracture Patients (In press, Geriatric Orthopaedic Surgery & Rehabilitation)
(Three more papers under review)

Selected Awards

Project Prize for my <i>top-ranked</i> project on <i>reinforcement learning</i> , Cambridge University Engineering Department,	2022
Engineers' Progress Prize for completing the course in 1/3 of the time and ranked top 30%, Fitzwilliam College,	2022
Fitzwilliam Chinese Scholarship , Fitzwilliam College,	2022-2025
Summer Studentship , Evelyn Trust,	2022
Travel grant and selected for press release , Association for Research in Vision and Ophthalmology (ARVO),	2022
NHS Clinical Entrepreneur , National Health Service (NHS),	2021
Excelet Research Award , Fitzwilliam College,	2020
Summer Research Grant , British Genetics Society,	2020
Winner , Massachusetts Institute of Technology COVID-19 Challenge,	2020
First Runner-up , Poster Presentation at National University Health System Paediatrics Week,	2019
Valedictorian , Science Research Programme, National University of Singapore,	2018
Best Paper Award as the first author, International Researchers Club Conference on Science, Engineering and Technology,	2018
Gold , Singapore Science and Engineering Fair,	2018
First Runner-up , Poster Challenge, Nanyang Technological University,	2017
Best Poster Award , West Zone Centre of Excellence Science Students Symposium,	2017
Silver , Nanyang Research Programme Symposium,	2017
Academic Award (overall top academic performance), National Junior College,	2015-2016
Champion , Astronomy Competition Advanced Section, Nanyang Polytechnic,	2016

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Other Awards

Panelist, Advances in Ophthalmology Series , Chinese University of Hong Kong,	2023
Fitzwilliam Chinese Undergraduate Bursary Fund , Fitzwilliam College,	2021, 2020
Chris Xie Undergraduate Bursary Fund , Fitzwilliam College,	2020
Louis Wang Undergraduate Bursary Fund , Fitzwilliam College,	2020
Bell, Abbott, and Barnes Fund , University of Cambridge,	2020
Distinction , Chemistry, Physics, Mathematics, Economics and Project Work in SEAB-GCE Advanced Level,	2018
Merit , Pharmaceutical Chemistry, General Paper in SEAB-GCE Advanced Level,	2018
Merit , Anatomy Challenge, Nanyang Technological University,	2018
Second Runner-up , Circuit-Chem Chemistry Practical Challenge, National University of Singapore,	2017
Distinction , Higher Chinese in SEAB-GCE O Level Certificate,	2016
Silver , Singapore Junior Chemistry Olympiad,	2016
Champion , Mandarin Speaking Award, Young Men's Christian Association,	2015

Other Research Experience

CAMBRIDGE CENTRE FOR AI IN MEDICINE	United Kingdom
Data Scientist and Clinical Fellow	August 2021 – Present
<ul style="list-style-type: none">Engaged with multidisciplinary teams at Mihaela van der Schaar's lab optimizing organ transplant and dynamic risk prediction with tabular and time series data	

CANCER SCIENCE INSTITUTE OF SINGAPORE	Singapore
Invited Reviewer	Oct 2020 – Present
<ul style="list-style-type: none">Invited to write a systematic review for liquid biopsy	

SYNTHETIC BIOLOGY SOCIETY, UNIVERSITY OF CAMBRIDGE	United Kingdom
Member	Oct 2019 – Present
<ul style="list-style-type: none">Attended research workshops to learn how to better integrate biological and computational interfaces	

CAMBRIDGE CLINICAL TRIAL UNIT	United Kingdom
Full Stack Mobile Application Developer	Mar 2020 – June 2020
<ul style="list-style-type: none">Developed Xamarin Form mobile applications on iOS and Android for three clinical trials on COVID-19Engaged with ongoing trial report and analysis	

NATIONAL HEART CENTRE SINGAPORE	Singapore
Student Research Team Leader	April 2017 – November 2017
<ul style="list-style-type: none">Led a group of five students to conduct a literature review on the technological development in the treatment of aortic stenosis	

SINGAPORE GENERAL HOSPITAL	Singapore
Research Associate	November 2016 – December 2016
<ul style="list-style-type: none">Collected and analyzed data for a Singapore Health Services funded project to develop a risk score for predicting in-hospital mortality after hip fracture in the elderly patientsBuilt pipeline for disease data extraction	

NANYANG TECHNOLOGICAL UNIVERSITY AND NATIONAL JUNIOR COLLEGE	Singapore
Student Research Team Leader	January 2015 – April 2017
<ul style="list-style-type: none">Led groups students to investigate the parameters that affect the filtration efficiency of membrane bioreactor and efficiency of heavy metal adsorption using agricultural side products (watermelon peels processed with powdered activated carbon)	

Other MedTech/Programming Experience

ARETE MEDTECH	United Kingdom
Software Engineer	June 2020 – August 2020
<ul style="list-style-type: none">Worked with UX/UI designer and hardware engineers to design an app for COPD and Asthma monitoring with Xamarin and Flutter on iOS and AndroidReturn offer for continuing development with a stronger focus on data analysis from December 2020 onwards	

COVMD.ORG	United Kingdom
Co-Founder and Front-End Developer	April 2020 – June 2020

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- Led a team to build a non-profit multilingual website (<https://covmd.org>) as a platform for doctors to provide COVID-19 educational resources and mentorship to doctors in other countries
- Built website on WordPress with various libraries and google analytics tools
- Developed and executed business, marketing, and human resources strategies
- Transitioned project to <https://ClinicianWiki.com>

STOP THE SPREAD

United Kingdom

Front-end Web Developer

Mar 2020 – May 2020

- Developed website (<https://stopthespread.info>) to disseminate accurate information and provide support to the public during the COVID-19 epidemic

MEDTECH FOUNDATION

United Kingdom

Deputy Team Leader and Software Engineer at the Innovation Program

October 2019 – Apr 2020

- Coordinated a team of engineers, biological scientists, and medical students to develop innovative neurosurgical tools to minimize brain tissue damage

Clinical Experience

ADDENBROOKE'S HOSPITAL, LISTER HOSPITAL

United Kingdom

Medical Student

September 2022 – Present

ADDENBROOKE'S HOSPITAL

United Kingdom

Medical Student

September 2020

- Took history from patients remotely as a part of the Preparing for Patients course

NUFFIELD MEDICAL CENTRE

United Kingdom

Medical Student

November 2019 – February 2020

- Took history from patients in the clinic and conducted home visits as a part of the Preparing for Patients course

LIANYUNGANG TRADITIONAL CHINESE MEDICINE HOSPITAL

China

Attachment Student in Cardiology

December 2016 – January 2017

- Attended ward rounds, outpatient clinics and observed interventional cardiology, dental and Traditional Chinese Medicine acupuncture procedures

SINGAPORE GENERAL HOSPITAL

Singapore

Research Associate

November 2016 – December 2016

- Attended ward rounds, outpatient clinic sessions, bedside teaching, and observed at cadaveric dissection classes with the medical students
- Attended teaching sessions with the physio and occupational therapist

Volunteering Experience

TAN TOCK SENG HOSPITAL

Singapore

Volunteer

January 2017 – March 2019

- Visited hospitalized patients biweekly and engaging them with cognitive activities that reduce their risk of delirium
- Coordinated between volunteers to encourage attendance and guiding new volunteers to interact with the elderly
- Organized a String Orchestra performance to bring joy to patients before Christmas
- Learned to speak dialects to communicate with elderly patients

NATIONAL JUNIOR COLLEGE

Singapore

First-Aid Instructor

January 2017 – Dec 2018

- Conducted Cardiopulmonary Resuscitation & Automated External Defibrillators courses to students and community members

NATIONAL YOUTH ENVIROLYMPICS CHALLENGE

Singapore

Logistics Committee Member

March 2016 – August 2016

- Organized an environmental forum with the Minister of Environment and Water Resources as the guest of honor
- Organized collections for electronic wastes from the neighborhood to prepare for an En-mazing race with participants from various schools in Singapore

I ART SG

Publicity Committee Member

Singapore

November 2015 – November 2016

- Publicized blind artists' art exhibitions in Singapore, Hong Kong, and Malaysia

SAGE COUNSELLING CENTRE

Head of Helpdesk

Singapore

November 2015 – November 2015

- Took charge of answering clients who are caregivers for the elderly

Leadership Experience

YOUTH HEALTH AMBASSADOR, NATIONAL JUNIOR COLLEGE

Singapore

Head of Committee

Mar 2017 – Mar 2018

- Decorated the school library with updated information on mental health and motivational quotes
- Organized events to distribute de-stress balls to students taking examinations

SINGAPORE INTERNATIONAL SCIENCE CHALLENGE

Singapore

Head of Poster Challenge

June 2017 – July 2017

- Organized poster exhibition and quizzing for overseas high school students
- Initiated activities that encourage participants to understand more about Singapore culture
- Performed as a String Orchestra member at the opening ceremony

MATHEMATICS SOCIETY, NATIONAL JUNIOR COLLEGE

Singapore

Vice President

July 2016 – July 2017

Member

January 2015 – December 2018

- Conceived and implemented an outreach event that incorporates mathematical questions into Minecraft, a sandbox game, to the new cohort of College members
- Designed questions and acted as an emcee for the Singapore Mathematical Challenge, a mathematical modeling competition organized for all secondary schools across Singapore
- Conducted and coordinated the weekly training sessions in the Society

Music Experience

FITZWILLIAM COLLEGE CHOIR

United Kingdom

First Tenor

October 2019

- Sang at evening services at College Chapel

ASIAN CULTURAL SYMPHONY ORCHESTRA

Singapore

Assistant Sectional Leader, Viola

Jan 2017 – Mar 2017

Violist

June 2016 – September 2019

- Organized and performed at various concerts to promote Asian music through classical instruments

STRING ORCHESTRA, NATIONAL JUNIOR COLLEGE

Singapore

Head of Welfare

July 2016 – July 2017

Quartermaster

July 2015 – July 2016

Assistant Sectional Leader, Viola

July 2016 – July 2018

Violist

May 2016 – December 2018

First Violinist

January 2015 – June 2017

- Organized a group trip to Hong Kong for cultural and musical exchange
- Initiated an instrument loaning system that significantly improved the transparency and efficiency of instrument loaning
- Initiated a room management system to provide a conducive environment to members
- Organized Talent-time, an intra-college event that provided a platform for students to showcase their talent
- Organized various activities and outings to promote bonding between orchestra members
- Trained and guided junior members of the Viola section
- Learned to play the viola in one month when the orchestra needs violists

Extracurricular Courses

WESLEYAN UNIVERSITY

Social Psychology

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UNIVERSITY OF PENNSYLVANIA

CANCER RESEARCH UK

HARVARD UNIVERSITY

JOHNS HOPKINS UNIVERSITY

UNIVERSITY OF CALIFORNIA SAN DIEGO

UNIVERSITY OF CAMBRIDGE

Introduction to Machine Learning, Data Science in Python, Image Processing with MATLAB, Research Data Management, Introduction to Metagenomics, Introduction to Biological Networks, Experimental Design, DNA Methylation Analysis, Ensembl REST API and Genome Browser, Snakemake, JMP Software Tools, Open Targets, InterMine

EMBL EBI

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

JOHNS HOPKINS UNIVERSITY

UNIVERSITY OF MICHIGAN

SINGAPORE MANAGEMENT UNIVERSITY

STANFORD UNIVERSITY

DUKE UNIVERSITY

MAX PLANK INSTITUTE

DATA CAMP

MCMMASTER UNIVERSITY & UNIVERSITY OF CALIFORNIA SAN DIEGO

YALE UNIVERSITY

Entrepreneurship

Epidemics - the Dynamics of Infectious Diseases

Image Analysis with Fiji

Data Analysis for Genomics, Statistical Genetics

Genomic Data Science

Bioinformatics

Network Analysis

Introduction to the Ensembl Genome Browser

Molecular Biology

Mastering Software Development in R

Web Applications for Everybody

Problem Solving with Programming Language Ruby

Machine Learning

Writing in the Science

Population Genetics

Statistical Rethinking

PyTorch, Linear mixed effect modelling

Learning how to Learn

Introduction to Classical Music

Open-source Projects:

Lead developer: CHRA B

Contributor: targets, KING, RETFound, AutoMorph

Editorial Positions

Review Editor, Frontiers in Digital Health

Peer Reviewer

Wellcome Open Research, Frontiers in Digital Health, Saudi Journal of Ophthalmology, BMC Genetics, Ophthalmology Science,

Professional Appointments

Member, Association for Research in Vision and Ophthalmology (ARVO)

Member, Cambridge University Algorithmic Trading Society

Associate Member, American College of Physicians

Language Skills

Native proficiency: English, Mandarin Chinese

Professional working proficiency: Cantonese

Elementary proficiency: French

References

Referees' contact details will be provided upon request.