Kuangyi Zhang

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PROFESSIONAL SKILLS

- Analysing large-scale healthcare and imaging data from biobanks and clinical trials, using statistical methods, mathematical modelling, and state-of-the-art machine learning models.
- Demonstrated excellent ability in Python, R, SAS, MATLAB and C programming.
- Rich experience in working with high-performance computing resources and in Linux and Windows environments.

WORK EXPERIENCE

Nuffield Department of Population Health, University of Oxford 2023.09-2024.09

Statistical Programming Training Fellow (full-time)

- Completed 3 three-month placements in epidemiological research and machine learning.
- Analysed biobank data (UK Biobank and China Kadoorie Biobank) and clinical trial data (EMPA-KIDNEY).
- Trained in SAS and R systematically through coursework and practical applications to analyse large-scale healthcare data, and to provide high-quality figures and tables for publications.
- Trained in Python and machine learning for analysing medical images, with experience in working with biomedical research computing facilities and working in both Linux and Windows environments.

Institute of Automation, Chinese Academy of Sciences 2022.05-2021.05

Machine Learning Research Intern (part-time)

- Completed a 1-year project in realising real-time video denoising on mobile CPUs by machine learning models.
- Re-implemented state-of-the-art video/image denoising models and leveraged advanced methods for optimising machine learning models.
- Trained in Python systematically, experienced in working with cloud computing platforms and working in both Linux and Windows environments.

EDUCATION

Nuffield Department of Clinical Medicine, University of Oxford 2022.10-2023.09

MSc in Modelling for Global Health

- Grade: Merit
- Modules included: R for modellers; Medical statistics; Mathematical modelling of infectious diseases; Model fitting and uncertainty; Pharmacokinetic-pharmacodynamic modelling; Genetics and Evolution for infectious diseases modellers; Spatial analysis of public health data
- Dissertation: Pharmacometrics Evaluation of Antimalarial Drugs

School of Electronic Engineering, Beijing University of Posts and Telecommunications 2018.09-2022.07

BEng in Electronic Engineering

- CGPA: 91.65/100 (rank: **3rd**/138)
- Modules included: advanced mathematics; programming language C; MATLAB; Python; data structure and algorithms; probability theory and stochastic processes; quantum physics; solid state physics; signal and systems; electromagnetic fields and waves; foundation of microwave engineering
- Dissertation: Uncertainty Analysis of Brain Tumour Segmentation Models Using Deep Neural Networks

School of Peida Ye (honour), Beijing University of Posts and Telecommunications 2019.09-2021.07

Artificial Intelligence and Machine Learning (Minor)

PUBLICATIONS AND PATENTS

Publication (* indicates co-first authors)

[1] Wei Yang, Shi-Bin Fu, Yong Lu, **Kuang-Yi Zhang**, Jin-Mei Liu, Hao-Ran Gao, Xiao-Hui Wang, Yuan-An Liu, and Ping Zhang. "Response of Raman-active modes in monolayer 1 T'− WTe_2 to charge doping." Physical Review B 106, no. 20 (2022): 205415.

[2] **Kuangyi Zhang**, Pang Yao, Maria Kakkoura, Andri Iona, Alison Offer, Derrick Bennett, and Huaidong Du. "Unintentional weight loss and mortality risk in >0.5 million Chinese adults." In preparation.

[3] Charlotte Thomas*, **Kuangyi Zhang***, Richard Hoglund, and Joel Tarning. "Population pharmacokinetic-pharmacodynamic modelling of pyronaridine-artesunate and primaquine in healthy Thai subjects." In preparation.

[4] Imen Hammami*, **Kuangyi Zhang***, and Jemma Hopewell. "Predicting pericardial adipose tissue from native T1 mapping in the UK Biobank imaging study". In preparation.

Patent:

[1] Junli Yang, **Kuangyi Zhang**, Weijiang Zhao, Zhiyi Wan, Bingwei Wang, Limei Qi, Feifei Kou, Tong Jiao, Pengze Li. 2023. A method, system and storage medium for extracting roads from remote sensing images. China National Intellectual Property Administration (CNIPA) filed May 29, 2023. Patent pending.

RESEARCH EXPERIENCES

Epidemiological research: **Aldosterone and risk of kidney disease progression in EMPA-KIDNEY** (2024.07 – 2024.09)

Supervisors: Dr Natalie Staplin, University of Oxford

- The project aims to examine the shape and strength of the associations between aldosterone and the risk of kidney disease progression, and to assess the effect of allocation to empagliflozin on aldosterone in the subset with follow-up measurements.
- **Data:** Phase 3 and post-trial data from EMPA-KIDNEY.
- **Methods:** Cox proportional hazard regressions with adjustment for relevant confounders. Regression dilution ratios were calculated for follow-up measurements of aldosterone. Subgroup analyses were performed. ANCOVA was performed for comparisons between the allocated treatment arms.

Medical image AI: **Deep learning for segmentation and quantification for pericardial adipose tissue in cardiac MRIs** (2024.04 – 2024.07)

Supervisors: Dr Imen Hammami, Prof. Jemma Hopewell, University of Oxford

- The project aims to prepare large-scale data with consistently quantified pericardial adipose tissue (PAT) for downstream epidemiological analyses.
- **Data:** UK Biobank imaging data.
- **Methods:** Adjusted a state-of-the-art machine learning model (Fully Convolutional Transformer) for UKB data, trained it on 3,462 cardiac MRIs plus manual contours of PAT from doctors, and used it to segment PAT on the rest ~63k MRIs.

Epidemiological research: **Unintentional weight loss and mortality risk in >0.5 million Chinese adults** (2024.01 – 2024.04)

Supervisors: Dr Pang Yao, Dr Maria Kakkoura, Prof. Huaidong Du, University of Oxford

- The project aims to examine the prospective relationships between unintentional weight loss and the risk of all-cause and cause-specific mortality (including cancer, cardiovascular diseases, and COPD mortality) in Chinese.
- **Data:** China Kadoorie Biobank.
- **Methods:** Linear regressions, logistic regressions, Cox proportional hazard regressions with adjustments of relevant covariates. Subgroup analyses and sensitivity analyses were performed.
- **This project led to a poster presentation at the Showcase of Nuffield Department of Population Health, Oxford, and a paper in preparation.**

Masters dissertation: **Pharmacokinetic-pharmacodynamic (PK/PD) modelling for antimalarial drugs**

(2023.04 – 2023.06)

Supervisors: Prof. Joel Tarning, Dr Richard Hoglund, Mahidol-Oxford Tropical Medicine Research Unit

- The project aims to evaluate the PK/PD properties of artesunate-pyronaridine when given alone and in combination with primaquine to healthy Thai volunteers.
- **Data:** Phase 1 trial data from the study NCT01552330.
- **Methods:** non-linear mixed effects models (evaluated several disposition models, absorption models, variability models and covariate models (drug-drug interaction)) for PK analysis; linear models and maximum effect models for PD analysis (focused on the potential QT prolongation); non-parametric bootstrapping, goodness-of-fit plots, visual predictive checks for model evaluations.

Mathematical modelling: **Fitting the SIR model by Bayesian inference with Markov Chain Monte Carlo sampling**

(2023.01 – 2023.04)

Supervisor: Prof. Ben Cooper, University of Oxford

- The project aims to describe the transmission features of a newly emerged communicable disease.
- **Methods:** Bayesian inference, Markov Chain Monte Carlo (MCMC) sampling methods (NUTS variants), ODE-based SIR compartment models, and mathematical modelling based on facts.

Undergraduate dissertation: **Uncertainty analysis of machine-learning-based brain tumour segmentation models**

(2022.04 – 2022.06)

Supervisor: Dr Kun Cheng, Beijing University of Posts and Telecommunications

- The project aims to analyse the uncertainty of deep learning models in brain tumour segmentation tasks.
- **Data:** brain MRI dataset (MICCAI BraTS 2020).
- **Methods:** Using uncertainty evaluation strategies, including ensemble methods and data augmentation, an advanced machine learning model (nnU-Net) was employed as the representative model for uncertainty analysis.
- **This project was awarded as the Best Undergraduate Dissertation of BUPT 2022 (Percentage: 1.8%).**

Winter school: **Artificial Intelligence and Machine Learning** (2021.01 – 2021.02)

Supervisor: Assist Prof. Mehul Motani, National University of Singapore

- **Grade:** Distinction.
- 16 hours of lectures and 8 hours of tutorials about basic machine learning: linear regression, ridge regression, logistic regression, Cox regression, decision trees, random forest, support vector machines (SVM), neural networks, etc.
- **Dissertation:** Predicted the population trends of Singapore and China using regression models.

SCHOLARSHIPS AND AWARDS

The BUPT Best Undergraduate Dissertation	2022
Beijing Best Graduate 2022	2022
The BUPT First Class Scholarship	2021, 2020, 2019
The BUPT Excellent Student Awards	2021, 2020
The BUPT Outstanding Student Leader	2019