Fang Tian

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EDUCATION

National University of Singapore (NUS) Aug 2019 — Jun 2023
Bachelor of Computing (Computer Science) with Honors (Highest Distinction) GPA: 4.84/5.00 [transcript]
Bachelor of Science (Applied Mathematics) with Merit GPA: 4.91/5.00 [transcript]

- *Double Degree Programmes Specialisation:* Multimedia Modelling
- *Focus Area:* Distinction in Artificial Intelligence
- *Dissertation:* Automated ECG Diagnosis using an Explainable AI Framework (Advisor: Prof. Brian Y. Lim)

HONORS AND AWARDS

- **Dean's List** (Top 5% at School of Computing, NUS) [Link] Jun 2023
- **Distinction** in the **Artificial Intelligence** Focus Area [Link] Feb 2022
- **Outstanding Performance** in **Machine Learning** [Link] Jan 2022
  - Placed among the top students in a class of 291 students
- **Outstanding Performance** in **Computer Graphics** [Link] Jan 2022
  - Placed among the top students **(first place)** in a class of 171 students
- **Outstanding Performance** in **Design and Analysis of Algorithms** [Link] Dec 2021
  - Placed among the top students in a class of 263 students
- **Dean's List** (Top 5% at Faculty of Science, NUS) [Link] Jun 2021
- **Science and Technology Undergraduate Scholarship** May 2018
  - A merit-based full scholarship (~150K USD) awarded by the NUS and the Singapore Ministry of Education

RESEARCH EXPERIENCE

Research Assistant (Supervisor: **Prof. B.T. Thomas Yeo**) Aug 2023 — Present
Centre for Translational Magnetic Resonance Research, Yong Loo Lin School of Medicine, NUS

- Responsibilities: analyze functional magnetic resonance imaging (fMRI) data using statistical, computational, and machine learning models; manage the center's research informatics system and HPC infrastructure.
- Conducted experiments to improve the mean-field model (MFM), a computational model for simulating and understanding human brain dynamics.
- Currently developing a generalized additive model (GAM) to investigate how the E/I ratio, a key indicator of brain health estimated by the MFM, evolves across the human lifespan.
- Containerized our fMRI preprocessing pipeline with Docker and Singularity for cross-platform consistency.
- Developed an automated tool that generates intuitive MRI reports, helping patients compare their brain condition to others of the same age (expected to be used in a large hospital serving millions annually).
- Maintaining the website and server of XNAT, the platform that manages and stores our MRI imaging data.

Undergraduate Researcher (Advisor: **Prof. Brian Y. Lim**) Aug 2022 — May 2023
Ubicomp Lab, School of Computing, NUS

- Developed an explainable AI framework that aligns AI predictions with clinical reasoning in electrocardiogram (ECG) diagnosis, providing clinically relevant explanations to support doctors' decision-making. [3]

- Currently extending the framework to other rule-based domains with a user-friendly interface for customizing and integrating logical rules into interpretable AI models. [2]

Research Intern (Advisor: **Prof. B.T. Thomas Yeo**) Feb 2022 — Sep 2022
Computational Brain Imaging Group, Yong Loo Lin School of Medicine, NUS
- Explored with various machine learning models, such as graph neural networks (GNNs), to accelerate the parameter optimization process for the aforementioned computational model MFM.
- Improved the computational efficiency by 5,000 times while preserving simulation accuracy and the MFM's mechanistic insights into brain function. [1]

PUBLICATIONS

1. Tianchu Zeng*, **Fang Tian***, Shaoshi Zhang, Gustavo Deco, Theodore Satterthwaite, Avram Holmes, B.T. Thomas Yeo. Optimizing Biophysically-Plausible Large-Scale Circuit Models With Deep Neural Networks. *to be submitted to Nature Methods*. (* indicates equal contribution) [PDF]
2. **Fang Tian**, Haoyang Chen, Jingwen Bai, Brian Y. Lim. Aligning AI models with Editable Explanations (In Progress). *to be submitted to User Interface Software and Technology (UIST), 2025.*
3. **Fang Tian**, Brian Y. Lim. Automated ECG Diagnosis using an Explainable AI Framework. *Final Year Project (undergraduate dissertation), NUS, 2023.* [PDF]

TEACHING EXPERIENCE

Teaching Assistant, CS3244 Machine Learning Aug 2022 — Nov 2022
School of Computing, NUS
- Conducted tutorial sessions, mentored student projects, and set examination papers

OTHER EXPERIENCE

- **Storyteller:** an iPad application that simplifies storyboard creation for independent filmmakers. As the core developer and project leader, I implemented advanced features like layer management with elegant software design patterns, while effectively managing the team and ensuring timely milestone delivery.
- **WottleNFT:** a Cardano non-fungible token (NFT) marketplace. In this student-initiated startup, I led the front-end development, utilizing Next.js, Ionic, Next SEO, and Tailwind CSS to deliver optimized performance, an intuitive interface, enhanced search engine optimization (SEO), and responsive design.
- **Lunaris:** a native iOS client for NUS's course management system, offering an intuitive interface for browsing modules, downloading files, and managing tasks. This project received the Orbital-Advanced certificate.
- **Ocean-Peggle:** a feature-rich iOS Peggle-inspired game, featuring a custom physics engine, complex ball dynamics, and intricate level mechanics—all developed within an ambitious two-month sprint.

For other exciting projects, please visit https://t-fang.github.io/projects/.

SKILLS

- **Programming languages:** Python, MATLAB, Swift, SQL, Java, Bash, C, C#, JavaScript, TypeScript
- **Machine Learning and Data Science:** PyTorch, PyTorch Geometric, PyTorch Lightning, Optuna, scikit-learn, NumPy, SciPy, Pandas, Tensorflow, Keras
- **Software development:** React, Next.js, Tailwind CSS, HTML&CSS, SwiftUI, UIKit
- **Other skills:** Docker, Singularity, Figma, Linux