Bowen Fan

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Education

2020/3-Present **Ph.D.** in Machine Learning for Healthcare, ETH Zurich, Switzerland

- **ELLIS** doctoral student, MLFPM fellow (**Marie Skłodowska-Curie Doctoral Networks**)
- **Thesis:** *Machine Learning for Biomedical Applications: From Clinical Complications to PCR Bias*
- **Advisor:** Prof. Dr. **Karsten Borgwardt** (now Director of Max Planck Institute of Biochemistry)

2017/9-2019/9 **M.Sc.** in Biomedical Engineering, University of Tokyo, Japan

- **Dean's Choice Award for Best Thesis**: *Surgical Planning for Aortic Valve Repair Surgery*
- Advisor: Prof. Dr. Ichiro Sakuma
- Grade: 3.9/4.0

2013/9-2017/7 **B.Sc.** in Engineering Physics, Tsinghua University, China

- Grade: 3.5/4.0

Research Experience

2020/3-*Present* Doctoral Reseacher, MLCB Lab, ETH Zurich, Switzerland

- Led the machine learning segment of the multi-million CHF PSSS sepsis project; also coordinated regular data quality rounds with interdisciplinary teams to improve data quality.
- Developed a clinically applicable and generalizable early warning system for acute kidney injury in ICU settings.
- Derived novel pediatric sepsis phenotypes through multi-omics data clustering, facilitating personalized treatment strategies for clinicians.
- Explored manifold learning and graph/hypergraph learning approaches for structured biomedical data analysis.
- Integrated probabilistic modeling with deep learning to uncover critical DNA sequence properties for commercial DNA storage pipeline, such as PCR efficiency and structural stability.

2018/9-2020/2 Research Scientist, Lily MedTech Inc, Tokyo, Japan

- Engineered deep learning algorithms to reconstruct Ultrasound CT images from radio-frequency data, aiming to boost early breast cancer detection and contributed to the prototype device of the company.

2017/9-2019/9 Graduate Researcher, BMPE Lab, The University of Tokyo, Japan

- Spearheaded the development of a patient-specific aortic valve functional analysis system, leveraging deep learning and computer vision methods for CT image and point cloud processing.
- Achieved commercialization of the developed pipeline in collaboration with Canon Medical System Corp and UTokyo Hospital clinicians.

Publications & Manuscripts

2024

A van Hilten†, F Melograna†, **B Fan** et al. Detecting Genetic Interactions with Visible Neural Networks. *Submitted*. links.

X Lyu†, **B Fan**†, M Hüser† et al. An Empirical Study on KDIGO-Defined Acute Kidney Injury Prediction in the Intensive Care Unit. *The International Conference on Intelligent Systems for Molecular Biology*. links.

2023 C Cervia, S Brüningk, T Hoch, **B Fan** et al. Persistent complement dysregulation with signs of thrombo-inflammation in long COVID. *Science*. links.

D Chen†, **B Fan**†[1] et al. Unsupervised Manifold Alignment with Joint Multidimensional Scaling, *The International Conference on Learning Representations*. links.

2022 **B Fan** et al.: Prediction of recovery from multiple organ dysfunction syndrome in pediatric sepsis patients. *The International Conference on Intelligent Systems for Molecular Biology*. links.

Q Ma, E Kobayashi, **B Fan** et al. Machine learning-based approach for predicting postoperative skeletal changes for orthognathic surgical planning. *The International Journal of Medical Robotics and Computer Assisted Surgery*. links.

2020 Q Ma, E Kobayashi, **B Fan** et al. Automatic 3D landmarking model using patch-based deep neural networks for CT image of oral and maxillofacial surgery. *The International Journal of Medical Robotics and Computer Assisted Surgery*. links.

2019 **B Fan** et al. Attention-guided decoder in dilated residual network for accurate aortic valve segmentation in 3D CT scans. *MLMECH workshop of MICCAI*. links.

Academic Services

Reviewing OUP Bioinformatics, The Lancet Digital Health, ISMB (2021), NeurIPS (2022), RECOMB (2023), ICLR (2023).

Teaching **Foundation of Data Science** (2023) by Prof. Catherine Jutzeler, ETH Zurich

Data Mining (2022) by Prof. Karsten Borgwardt, ETH Zurich

Skills

Scientific **Python** (machine/deep learning, data science, statistical modeling, visualization), **R** (data science, statistical modeling), **Other Tools** (LaTeX, vim, git, docker, DVC, AWS)

Languages Chinese (Native), English (Fluent), German (basic), Japanese (basic).

Personal CrossFit (Level 1 Trainer), Basketball, Bouldering

[1] †, Equal contribution.