

BOWEN Fan

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ABOUT ME

Machine learning researcher and engineer developing **multimodal** AI systems for **real-world biomedical** problems. I design, validate, and deploy **risk** and **treatment-response** models for critical clinical conditions using datasets ranging from hundreds to tens of thousands of patients. My work integrates **EHRs**, **medical imaging**, and **proteomic, genomic, and transcriptomic** profiles to support patient stratification, biomarker discovery, and clinical decision support. I also contribute to an **agentic AI** framework that aligns cases to medical guidelines and orchestrates LLMs and predictive models for oncology decision support.

Keywords: Biomedical AI; Multimodal ML; Clinical Prediction; EHR; Omics; Agentic AI.

CORE SKILLS

- **Programming & ML:** Python (numpy, scipy, pandas, scikit-learn); gradient boosting (XGBoost, LightGBM); shell scripting
- **Deep Learning:** PyTorch, PyTorch Lightning, HuggingFace
- **Data & MLOps:** Git, DVC, Docker, Cursor, CI/CD workflows
- **Visualization:** matplotlib, seaborn, plotly
- **Domain Libraries:** medical imaging (MONAI, scikit-image); omics (scanpy); agentic AI (LangGraph)
- **Communication & Leadership:** scientific writing, public speaking, project management

OTHER SKILLS

Languages Chinese (Native), English (Proficient), German (Basic), Japanese (Basic); experienced in communicating across multi-cultural environments in Asia and Europe.

Sports Avid fitness enthusiast for CrossFit (Level 1 Trainer), basketball and bouldering, focused on strengthening mental resilience through training and competition.

WORK EXPERIENCE

2024/9-present Postdoctoral Researcher, **Krauthammer Lab**, UZH, Switzerland

- **Project leadership:** co-manage several multi-institution clinical research projects (total funding ≥ 5 million CHF), set roadmaps, align clinical and ML stakeholders, and deliver validated milestones.
- **Operational excellence:** establish experiment tracking, data/model versioning, and documentation standards suitable for regulated, real-world evidence settings.
- **Stakeholder communication:** work closely with clinicians, statisticians, and industry partners to translate biomedical questions into data collection, modelling, and validation plans.
- **Supervision & mentoring:** guide multiple PhD and MSc students through study design, code reviews, paper sprints, and reproducible releases.

2020/03–2024/05 Doctoral Researcher, **Machine Learning and Computational Biology Lab**, ETH Zurich, Switzerland

- Analyzed multi-omic blood profiles to reveal persistent complement activation and thromboinflammation in active long Covid, guiding biomarker development and complement-targeted therapies.
- Built deep-learning models of PCR amplification efficiency that informed primer design and enabled substantially lower sequencing depth with near-complete amplicon recovery.

- Developed and validated AI-based early-warning systems for ICU deterioration prediction (acute kidney injury, pediatric sepsis, multiple organ dysfunction syndrome) from EHR time series.
- Curated and harmonized Switzerland's largest ICU cohort for data-driven sepsis research (**PSSS**, 50k+ admissions), including laboratory, microbiology, and omics data.
- Delivered reproducible research software and analysis pipelines for multimodal biomedical modelling in close collaboration with clinicians and experimental scientists.

EDUCATION

- 2020/3-2024/5 **Ph.D.** in Machine Learning, 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. **Karsten Borgwardt** (now Director of the 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. Ichiro Sakuma
 - **Grade:** 3.9/4.0
- 2013/9-2017/7 **B.Sc.** in Engineering Physics, Tsinghua University, China
- **Grade:** 3.5/4.0

SELECTED PUBLICATIONS

- 2025 **B Fan** et al. *Enhancing Post-Kidney Transplant Prognostication: An Interpretable Machine Learning Approach for Longitudinal Outcome Prediction*. npj Digital Medicine. [link](#).
- T Nandan, **B Fan** et al. *Joint Representation Learning for Oncology Applications*. OUP Bioinformatics [link](#).
- A Gimpel[†], **B Fan**^{†1} et al. *Deep learning uncovers sequence-specific amplification bias in multi-template PCR*. Nature Communications. [link](#).
- A van Hilten[†], F Melograna[†], **B Fan** et al. *Detecting Genetic Interactions with Visible Neural Networks*. Communications Biology. [link](#).
- 2024 X Lyu[†], **B Fan**[†], M Hüser[†] et al. *An Empirical Study on KDIGO-Defined Acute Kidney Injury Prediction in the Intensive Care Unit*. OUP Bioinformatics. [link](#).
- C Cervia, S Brüningk, T Hoch, **B Fan** et al. *Persistent complement dysregulation with signs of thrombo-inflammation in long COVID*. Science. [link](#).
- 2023 D Chen[†], **B Fan**[†] et al. *Unsupervised Manifold Alignment with Joint Multidimensional Scaling*. ICLR. [link](#).
- 2022 **B Fan** et al. *Prediction of recovery from multiple organ dysfunction syndrome in pediatric sepsis patients*. OUP Bioinformatics. [link](#).

ACADEMIC SERVICES

- Supervision 2025-present, Thibault Niederhauser, doctoral student, **Krauthammer Lab**, UZH.
2025-present, Puck Quarles van Ufford, visiting doctoral student, **Krauthammer Lab**, UZH.
2025-present, Xuan Zhao, master's student, ETH Zurich.
2023-2024, Tanya Nandan, master's student, ETH Zurich; now Data Scientist at Novartis.
2022-2023, Mingzhe Chen, master's student, ETH Zurich; now doctoral student, ETH Zurich.
- Reviewing Nature Communications, The Lancet Digital Health, ISMB, RECOMB, NeurIPS, ICLR.
- Teaching **Quantitative Biomedicine** (2024), Prof. Michael Krauthammer, UZH.
Foundations of Data Science (2023), Prof. Catherine Jutzeler, ETH Zurich.
Data Mining (2022), Prof. Karsten Borgwardt, ETH Zurich.

^{††} Equal contribution.