

# MINGHAO SUN

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## Education

### Zhejiang University, China

*Bachelor in Statistics, Minor in Computer Science*

Sep. 2018 – Jul. 2024

GPA: 3.88/4.00, Top 15%

### National University of Singapore, Singapore

*PhD Candidate, Pharmacy*

Aug. 2024 – Present

*President Graduate Fellowship*

## Relevant Coursework

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|--------------------------|---------------------------|---------------------------|------------------------|
| • Data Structures & Algo | • Statistical Learning    | • Linear Algebra & Calc   | • Regression Analysis  |
| • Database System        | • Artificial Intelligence | • Multivariate Statistics | • Time Series Analysis |
| • Computer Organization  | • Optimization Algorithms | • Numerical Analysis      | • Data Mining          |

## Research Experience

### Zhejiang University, Department of Animal Genetics

*Research Assistant*

Oct. 2023 – Present

*Hangzhou, China*

- Conducted a comprehensive study using WGCNA to explore underlying mechanisms in heart failure heterogeneity.
- Identified significant modules associated with ICM/DCM through the construction of gene co-expression networks.
- First-authored and led the research paper manuscript, currently under review for publication in an SCI-indexed journal.

### Zhejiang University, School of Medicine

*Student Research Training Program (SRTP), rated as national-level, Advisor: Prof. Hong Deng*

May 2021 – Jun. 2022

*Hangzhou, China*

- Contributed to the building of a diagnostic grading system for IgA Nephropathy using Convolutional Neural Networks.
- Preprocessed biopsy images, applying data augmentation & feature extraction methods to optimize model performance.
- Implemented algorithms for detection, segmentation, and classification of glomeruli in various stages of degeneration.

## Selected Publications

- Yang Ye, Qiao Jin, Qian Gong, Aoqi Li, **Minghao Sun**, et al. Bioinformatics and Experimental Analyses Reveal NFIC as An Upstream Transcriptional Regulator for Ischemic Cardiomyopathy. *Genes (Basel)*. 2022 Jun 13;13(6):1051.
- **SUN Minghao**, HUANG Yuqi, DANG Yanna, et al. Molecular characterization of pig LEG1a protein[J]. *Journal of Zhejiang University (Agriculture & Life Sciences)*, 2022, 48(2): 261-268.
- Huang Yuqi<sup>#</sup>, **Sun Minghao**<sup>#</sup>, Lenan Zhuang, and He Jin. Molecular Phylogenetic Analysis of the AIG Family in Vertebrates. *Genes (Basel)*. 2021 Jul 30;12(8):1190. ( <sup>#</sup> denotes equal contribution, sort in alphabetic order)

## Projects

### Machine Learning for Identification of Genomic Biomarkers in Ischemic Cardiomyopathy (ICM) | *ML, Genomics*

- Analyzed extensive genomic datasets to identify key differentially expressed genes (DEGs) in ICM progress.
- Implemented and evaluated five machine learning classification methods (SVM, LASSO, GBM, DT, CNN) to filter and assess candidate diagnostic genes based on classification accuracy and overall weights (a multi-model approach).
- Identified 3 key genes with significant diagnostic potential in ICM and conducted functional enrichment analysis.

### Angiotensin-Converting Enzyme (ACE) Inhibitor Bioactivity Prediction APP | *Python, ML, Drug Discovery*

- Predicted the target protein bioactivity towards inhibiting ACE, which is a drug target for ICM.
- Developed regression models based on Random Forest and conducted comparative analysis of several ML algorithms.
- Engineered a user-friendly bioactivity prediction APP for efficient QSAR modelling and potential candidates analysis.

### Multimodal Single-Cell Integration - Kaggle HPCs Maturation Prediction | *Python, Deep Learning, Multi-modality*

- Integrated multimodal genomic data (DNA, RNA and protein) to unravel genetic interactions.
- Employed Truncated SVD and UMAP for dimensionality reduction, realizing efficient processing of large-scale genomic datasets in hierarchical format. Applied Group K-Fold cross-validation to ensure robust and unbiased model training.

## Teaching Assistant Experience

Biostatistics, Mathematical Finance (2023-2024-2)

Biostatistics (2022-2023-2)

## Technical Skills

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**Programming Languages:** Competent in Python, experience in R, C/C++, Java, HTML, MATLAB, Verilog, Assembly

**Libraries/Frameworks/Database:** PyTorch, SQL, NumPy, Pandas, Tensorflow, Matplotlib, SciPy

**Development Tools:** Git, CUDA, L<sup>A</sup>T<sub>E</sub>X, Linux, Google Colab, Google Cloud Platform

## Selected Honors and Awards

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**Kaggle Competition — Evaluate Student Summaries - Bronze Medal** **Oct. 2023**

Top 7%, 138th out of 2064 Participants

*The Learning Agency Lab, CommonLit*

**Kaggle Competition — LLM Science Exam - Bronze Medal** **Oct. 2023**

Top 9%, 231th out of 2664 Participants

*Kaggle*

**Kaggle Competition — Mircobusiness Density Forecasting - Bronze Medal** **Jun. 2023**

Top 9%, 297th out of 3547 Participants

*GoDaddy*

**Scholarship for Excellence in Special Major** **2020 – 2023**

Top 15% students in specialized and interdisciplinary fields, won consecutively for three years

*Hangzhou, China*

**Zhejiang University Scholoarship — Second Prize** **2020 – 2021; 2022 – 2023**

Top 8% students in Zhejiang University

*Hangzhou, China*

**Zhejiang University Scholoarship — Third Prize** **2021 – 2022**

Top 20% students in Zhejiang University

*Hangzhou, China*

**Student Leadership Award** **2020 – 2021**

Awarded for significant contributions to student-led initiatives/activities on campus

*Hangzhou, China*

## Internship

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**Research Intern — Alibaba DAMO Academy, NLP Research Team** **Jul. 2023 – Oct. 2023**

Focused on sentiment analysis and transfer learning based on large-scale pre-trained models.

*Hangzhou, China*

**Veterinary Assistant — Zhejiang University Veterinary Teaching Hospital** **Jan. 2021 – Mar. 2021**

Clinical Rotation - Internal Medicine, Pharmacy, Diagnostic Lab, and Radiology Department.

*Hangzhou, China*

## Extracurricular

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**Veterinary Practice License** **Expected upon Graduation**

Passed the China Veterinary Licensing Examination in 2023.

*Hangzhou, China*

**Certified First Aider — Red Cross Society of China** **2021 – Present**

Administered immediate first aid for everyday injuries and during major sports events.

*Hangzhou, China*

**Zhejiang University Youth Volunteer Service — 5-Star Honor Award** **2021**

Dedicated over 300 hours to diverse community service including community hospital volunteer service.

*Hangzhou, China*

**Club Activities — Student Association of Science & Technology (SAST)** **Fall 2020 – Fall 2022**

*Vice President (2021 – 2022) & Member (2020 – 2021)*

*Zhejiang University*

- SAST's club tier ranking increased from 4-star to 5-star (highest possible association ranking) during my tenure.
- Orchestrated key events and activities such as the Lazy Man's Innovation Competition and the SAST anniversary.
- Directed a team of over 20 members to serve and promote innovation & entrepreneurship competitions.