Minghao Sun

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Education

Zhejiang University **Sep. 2018 – June 2024**

Bachelor of Veterinary Medicine & Statistics, minor in Computer Science (GPA:3.88/4.00, Top 15%)

Relevant Coursework

- Data Structure
- Statistical Learning
- Artificial Intelligence
- Multivariate statistics
- Optimization Algorithms
- Numerical Analysis
- Linear Algebra
- Computer Organization

Research Experience

Zhejiang University, Department of Veterinary Medicine (ZhuangLab) **Sep. 2019 – Dec. 2021**

Research Assistant, Advisor: Prof. Jin He & Lenan Zhuang *Hangzhou, China*

- Performed phylogenetic analysis on gene family *ADTRP*, mining their evolutionary relation by maximum likelihood.
- Incorporated scripts using Python and Shell to aggregate RNA sequencing results into an organized format and to load the latest results onto the server, so that automatic analysis can be performed.
- Characterized *Liver Enriched-Gene 1 (LEG1)* from expression profile, glycosylation type and secretion characteristics.
- Performed RNA-seq analysis on Ischemic Cardiomyopathy samples and recognized potential transcriptional regulators.

Zhejiang University, School of Medicine **May 2020 – June 2021**

Student Research Training Program (SRTP), Advisor: Prof. Hong Deng *Hangzhou, China*

- Assisted in development of a kidney disease grading system based on Convolutional Neural Network (CNN).
- Worked with clinical doctors to pick suitable metrics and complete pathological grading of biopsies.
- Collaborated with team members using version control systems such as Git to organize modifications and assign tasks.
- Rated as a national-level student research training program.

Projects

***IgA* Nephropathy Grading Diagnosis System Based on Convolutional Neural Networks** | *Python, PyTorch, AI*

- Performed the detection, segmentation, and classification of glomerulus with varying degeneration degrees based on Convolutional Neural Networks.
- Utilized the PyTorch framework to create a pathological grading system for *IgA* nephrosis.

Molecular Phylogenetic Analysis of Gene Family *ADTRP* | *Python, R, Linux, Probability, Hypothesis Testing*

- Constructed phylogenetic trees by maximum likelihood and Bayes-based approaches to explore evolutional relations.
- Implemented microsyneny analysis, selective force analysis and data visualization.
- Created Python/Linux scripts to realize automatic processing of sequencing data.

Integrative Genomic Analysis of Non-coding RNAs in Breast Cancer Progression | *Python, Cancer Genomics*

- Identified 250+ ncRNAs with differential expression patterns across different stages of breast cancer.
- Elucidated potential pathways implicating ncRNAs in breast cancer progression, suggesting novel therapeutic targets.
- Developed a machine learning model to predict breast breast cancer stages based on ncRNA expression profiles.

Selected Publications

• Huang Yuqi#, **Sun Minghao#**, Lenan Zhuang, and He Jin. Molecular Phylogenetic Analysis of the AIG Family in Vertebrates. *Genes (Basel).* (2021) (IF5: 4.339) Jul 30;12(8):1190. (# equal contribution)

• **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. (Chinese Journal)

Technical Skills

Languages: Python, R, C/C++, Java, HTML, Matlab, Verilog, LC-3 Assembly
Developer Tools: Git, Linux
Libraries/Frameworks: PyTorch, Tensorflow, NumPy, Pandas, Matplotlib, SciPy

Extracurricular

Student Association of Science & Technology (SAST) **Fall 2019 – Fall 2020**

Vice President *Zhejiang University*

- SAST's club tier ranking increased from 4-star to 5-star (highest possible association ranking) during my tenure.
- Coordinated student activities such as the Lazy Man's Innovation Competition and the SAST anniversary.