Silas (Chuhanwen) Sun

Education

Karolinska Institutet Stockholm, Sweden
Master of Biomedicine *Aug. 2023 – Present*

- **Coursework:**
  - **Life of sciences**: Frontiers in Biomedicine, Bioethics, Applied Biomedical Communication, Biomedical Research Literacy, Bioentrepreneurship
  - **Statistics & Informatics**: Applied Biostatistics, Bioinformatics

Tsinghua University Beijing, China
Bachelor of Life Science, GPA: 3.67 *Sept. 2019 – Aug. 2023*

- Second-class Prize Scholarship of Tsinghua University
- Excellent Scholarship of Comprehensive Quality at Tsinghua University
- **Coursework:**
  - **Life of sciences**: Molecular Biology, Genetics, Cell Biology, Fundamental Neuroscience, Biology of Brain Disorders, Physiology
  - **Statistics & Informatics**: Calculus, Linear Algebra, Programming Fundamentals, Probability and Statistics, Statistics for Psychology, The Fundamentals of Computer Programming (Python), Information Retrieval
  - **Other core courses**: Organic Chemistry, Physical Chemistry, Basic Practical Biochemistry

Publications

2.1 Published Papers

1. Zhuang, Y., Li, Z., Xiong, S., Sun, C., Li, B., Wu, S.A., **Sun, C.**, et al. (2023). Circadian clocks are modulated by compartmentalized oscillating translation. *Cell*, 186(15), 3245-3260.e23. DOI: 10.1016/j.cell.2023.05.045

2.2 Papers in Preparation or Under Review

1. **Sun, C.**, Zhang, Y. (2024). STHD: probabilistic cell typing of single Spots in whole Transcriptome spatial data with High Definition. *bioRxiv*. DOI: 10.1101/2024.06.20.599803
2. Wu, Y., Zhang, T., Zhou, H., Wu, H., **Sun, C.**, et al. (2024). DeepCRE: Transforming Drug R&D via AI-Driven Cross-drug Response Evaluation. *arXiv preprint arXiv:2403.03768*. Under review at *Science Advances*. DOI: 10.48550/arXiv.2403.03768
3. Jia, J.$^{\#}$, Liu, M.$^{\#}$, Xi, X., **Sun, C.**, et al. Spatiotemporal Dynamics of Mononuclear Phagocytic Cells Reveals New Cell Clusters and Key Regulators responsible for Plaque Instability in Atherosclerosis. Under review.

Internships and Summer Research

Air Tsinghua Beijing, China
Research Intern *Jul. 2022 – Aug. 2023*

- **Drug Repurposing: Multi-Drug-Transfer-Learning *supervised by Prof.Xuegong Zhang***
  - Multi-layers data preparation including RNA-Seq, methylation, SNV, and CNV data from public databases.
  - Deconvolution and dimension reduction for cell type estimation and tumor sub-clustering.
  - Visualized repurposed drugs using Sankey diagrams and contributed to article writing with detailed figures.
- **Drug Sensitivity Dataset Integration *supervised by Dr.Yushuai Wu***
  - Integrated drug-cell line data from over 15 published databases for a standardized comprehensive database.
  - Applied methods like MCMC for drug sensitivity curve fitting, deriving metrics for visualization to interpret data and probe database heterogeneity causes.
- **Biological Research Knowledge Logic Chain QA *supervised by Dr.Yushuai Wu***
  - Refined published binary outcomes to construct a biochemical and pharmaceutical knowledge graph.
  - Filtered and standardized relevant published articles from PubMed for downstream use.
  - Employed prompt-based with the GPT-3.5 model to generate QA dataset for multiple question types.

Department of Automation, Tsinghua University Beijing, China

Research Assistant *Jun. 2023 – Jul. 2024*

- **Spatiotemporal Dynamics Analysis of Instable Atherosclerosis Plaque *supervised by Dr.Jinmeng Jia***
  - Utilized sc-RNA sequencing and spatial transcriptomics to analyze plaque microenvironment dynamics, discovering a new subset of monocytes (PIMs) critical to plaque instability and identifying potential biomarkers and therapeutic targets for early atherosclerosis detection and prevention.
  - Involved in paper writing and subsequent revisions.
- **Potential Consistency Analysis in Vascular Remodeling Diseases *supervised by Dr.Jinmeng Jia***
  - Integrated multiple vascular remodeling disease sequencing data to identify consistencies and differences in subtypes and exploring potential disease variations and treatment methods.

Department of Neurosurgery, Duke University Durham, NC, USA

Short-term Visiting Scholar *Apr. 2024 – Sep. 2024*

- **Probabilistic Cell Typing in Whole Transcriptome Spatial Data *supervised by Prof.Yi Zhang***
  - Collaborated closely with Prof.Yi Zhang in developing innovative cell typing methods for VisiumHD data.
  - Conducted comprehensive benchmarking across multiple published methods, analyzing and optimizing performance across all available VisiumHD datasets.
  - Conducted downstream analysis based on high resolution cell typing results.
  - Participated in manuscript writing and figure preparation for publication.

Research Experience

Department of Cell and Molecular Biology, Karolinska Institute Stockholm, Sweden

Research Project in Bioinformatics *Oct. 2023 – Present*

- **Spatial profiling data analysis in triple-negative breast cancers *supervised by Dr.Jean Hausser***
  - Developed Tumor Promoting Microenvironment Characterization method to evaluate pro/anti-proliferative microenvironments of TNBC.
  - Applied advanced computational techniques to evaluate Niche-Phenotype Mapping and associations with recurrence in immune-enriched and immune-poor TNBC.

IDG/M^{c}Govern Institute, Tsinghua University Beijing, China

Capstone Project in Molecular and Cellular Biology *Jul. 2022 – Sept. 2023*

- **Investigation into pathophysiological roles of ATXN2/2L in neuron system *supervised by Dr.Yi Lin***
  - Constructed stable U2OS ATXN2/2L cell lines; performed IP, IF, and in vitro protein purification to analyze PolyQ impact on phase separation.
  - Created and evaluated a cerebellum-specific ATXN2/2L knockout mouse model through behavioral tests.
  - Integrated diverse experimental data for comprehensive academic presentation and writing.

Tsinghua Laboratory of Brain and Intelligence Beijing, China

Research Projects in Behavioral Neuroscience *Sept. 2021 – Jul. 2022*

- **Parkinson's Disease mouse modeling and CX3CR1 knockout studies *supervised by Prof.Yichang Jia***
  - Developed and validated a reliable PD mouse model using rotenone and MPTP; conducted behavioral tests and quantitative analysis using ImageJ and SPSS.
  - Constructed a CX3CR1 knockout mouse model to study learning and memory; performed contextual fear conditioning tests and RibotTag-based RNA extraction for sequencing analysis.

Research Interests

Data-driven investigation of complex diseases, focusing on multi-omics data integration. Emphasis on integrating single-cell transcriptomics, spatial transcriptomics, and other high-dimensional omics data to elucidate molecular mechanisms underlying various pathologies.

Skills

- **Programming:** Python, C, R, Matlab
- **Languages:** English (CET4: 550, CET6: 525, IELTS: 7.5)