

Yuqi Sun

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Education

Shanghai Jiao Tong University, BS in Medical Laboratory Science 09/2021 – 06/2025

- GPA: 3.30/4.0 (Ranking: 14/52, qualified for merit based direct AD)
- Relevant Courses: Medical Genetics, Health Statistics, Calculus, Medical Physics, Physiology, Biochemistry, Cell and Molecular Biology, Immunology, Pathology, Anatomy

Publications

- [1] **Sun Y**, Zheng H, Ma M, Gu R, Wang M, Fang S, Sun Y, Yang Q, Zheng J. The tissue-specific effects of glucose - lowering drug targets on aging mediated through DNA methylation: a multi-omics genetic study. (Under Review at *BMC Medicine*, medRxiv 2025.10.13.25337858, poster presentation at *ASHG 2025 Annual Meeting*)
- [2] **Sun Y**, Zheng H, Wang M, Gu R, Wu X, Yang Q, Zhao H, Bi Y, Zheng J. The effect of histo-blood group ABO system transferase (BGAT) on pregnancy related outcomes: A Mendelian randomization study. *Comput. Struct. Biotechnol. J.* 2024 Apr 29;23:2067-2075.
- [3] Jung G, Liang Z, Jain P, Deutsch H, Li F, Rath K, Sun Z, Chen X, Straka J, Kazerooni F. A, **Sun Y**, Koptyra P. M, Sanchez-maldonado S, Familiar A, Waanders J. A, Nabavizadeh A, Huang X, Resnick C. A, Song Y. Role of repulsive guidance signaling and GPR180 in pediatric low-grade glioma infiltration. *NPJ Precis Oncol.* 2025 Nov 11;9 (1):344.

Research Experience

Developing Algorithmic Frameworks for Spatial Multi-Omics Integration and Cell-Cell Communication Inference 06/2025 – Present

Department of Genetics and Genome Science, University of Connecticut Health Center

Advisor: Dongyuan Song, Ph.D.

- Designed and optimized a statistical learning framework for spatial multi-modal integration to characterize cell-cell communication and molecular co-activation in tumor microenvironments
- Developed an ordinal logistic regression model within a Generalized Additive Model (GAM) framework to capture nonlinear spatial effects and assess local/global significance
- Integrated multimodal spatial datasets using image-based registration, VAE-based reconstruction, and Graph Attention Network (GAT) modeling to enhance cross-modality alignment and biological interpretability

Mechanisms Underlying Fusion Genes in Pediatric Low Grade Glioma (pLGG) and Development of *Drosophila melanogaster* Models 07/2024 – 03/2025

Children's Hospital of Philadelphia & Perelman School of Medicine, University of Pennsylvania

Advisor: Yuanquan Song, Ph.D.

- Collaboration with labs of Ali Nabavizadeh, M.D.; Adam C. Resnick, Ph.D.; Kai Wang, Ph.D.
- Constructed 5 *Drosophila* tumor models driven by pLGG-related fusion genes using transgenic and genetic crossing techniques
- Screened 15 druggable DEG candidates through in-vivo imaging, validated phenotypic rescue through confocal imaging, 3D reconstruction, immunohistochemistry, and qPCR
- Integrated cross-species gene interaction networks to identify conserved regulators and validated their functions through in vivo genetic assays

Students' Innovation Training Program (SITP), Shanghai Jiao Tong University, School of Medicine, China (1824955Y) 04/2022 – Present

Shanghai Institute of Endocrine and Metabolic Diseases, Ruijin Hospital, Shanghai Jiao Tong University

Position: Project Leader

Advisor: Jie Zheng, Ph.D.

- **The conserved mechanism of cohesin-mediated histone H2A monoubiquitination in glucose homeostasis**
- Discovered the novel cohesin-dependent mechanism regulating H2A monoubiquitination and revealing its evolutionary conservation across species through integrative ChIP-seq and comparative genomics

- Demonstrated the causal link between cohesin-targeted genes and glucose metabolism using Mendelian randomization, single-cell transcriptomics, and molecular validation
- Establishing mechanistic evidence through TurboID labeling, Co-IP, and β -cell-specific mouse knockouts, uncovering the epigenetic control of glucose homeostasis by the cohesin-PRC1 complex
- **Targeting Glucose-lowering Drug for Anti-aging Interventions and their Mechanistic Effects**
 - Investigated the epigenetic regulation of 159 drug target genes interacting with 37 anti-diabetic drugs via two-sample, two-step MR and multi-omics joint enrichment analyses
 - Identified nine novel drug target genes with tissue-specific regulatory effect of DNA methylation
 - Suggested the central nervous system as a core regulator of systematic aging
- **Identification of Plasma Proteins for Gestational Risk Management**
 - Conducted the causal inference of human plasma protein levels and gestational outcomes using Multi-variable Mendelian Randomization, based on GWAS summary statistics from multiple public database
 - Suggested plasma BGAT level as a key factor in the incidence of gestational venous complications
 - Verified results through a PheWAS study on human blood plasma proteins

Targeting Somatic Mutations to Encode Renal Cell Carcinoma Genesis 07/2023 – 08/2023

Students' Innovation Studio of Molecular Pathology, Ruijin Hospital, Shanghai Jiao Tong University

Advisor: Lei Dong, M.D.

- Formatted and analyzed WGS datasets extracted from 269 patients' clinical tumor sections
- Annotate the HE slide with clinical diagnostic details as reference
- Identified novel mutational signatures in cancer genomes using SigProfiler through COSMIC

Posters & Presentations

Sun Y, Zheng H, Ma M, Gu R, Wang M, Yang Q, Bi Y, Zheng J. "The tissue-specific effects of glucose-lowering drug targets on aging mediated through DNA methylation: a multi-omics genetic study". **October, 2025**. *ASHG 2025 Annual Meeting (Poster presentation)*

Sun Y, Zheng H, Gu R, Wang M, Yang Q, Bi Y, Zheng J. "The mechanism of the effect of diabetes drug targets on aging phenotypes through DNA methylation". **October, 2024** *The Roche University Research Forum (poster presentation)*.

Sun Y, Zheng H, Wang M, Gu R, Wu X, Yang Q, Zhao H, Bi Y, Zheng J. "The effect of histo-blood group ABO system transferase (BGAT) on pregnancy related outcomes". **May, 2024**. *The 8th Navigator of Medical Science Event, Shanghai Jiao Tong University, School of Medicine (poster presentation)*

Sun Y, Zheng H, Wang M, Gu R, Wu X, Yang Q, Zhao H, Bi Y, Zheng J. **December, 2023**. "The effect of histo-blood group ABO system transferase (BGAT) on pregnancy related outcomes". *The 5th SJTU Life Science Innovation Competition, Shanghai Jiao Tong University (poster presentation)*

Grants & Awards

The Roche University Research Fund, 2024	10/2024
<ul style="list-style-type: none"> • Awarded by The Chinese Society of Biochemistry and Molecular Biology, CSBMB • Top 10% among all applicants, ranging from undergraduates to post-doctor fellows 	
The Overseas Research Fellowship, 2024	07/2024
<ul style="list-style-type: none"> • First-class scholarship, awarded by Shanghai Jiao Tong University 	
The 8th Navigator of Medical Science Event	05/2024
<ul style="list-style-type: none"> • Outstanding Academic Poster prize 	
The 5th SJTU Life Science Innovation Competition	12/2023
<ul style="list-style-type: none"> • The 3rd prize (SICCX022-034) 	

Skills

Programming: R, Python, Linux, JavaScript (basic)

Lab techniques: Micro-dissection, Confocal Microscopy, Laser axotomies, Fly Models, Immunohistochemistry staining, Turbol ID, Mammalian Cell Culture, Protein Purification, PCR, Western blot, ELISA

Software: Imaris, Adobe Illustrator, Cytoscape, SPSS, Prism, ImageJ, Procreate, Snap-Gene, BLAST