Haotian "Synco" Tang

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EDUCATION

Columbia University | New York, United States — Sep. 2023 – May. 2025
Master of Science | Major: Biostatistics (Statistical Genetics) | GPA: 3.94/4.00

University of Toronto | Toronto, Canada — Sep. 2018 – Jun. 2022
Honours Bachelor of Science | Specialist: Pharmacology; Major: Genome Biology; Minor: Mathematics

RESEARCH EXPERIENCES

Research Collaborator, Remote — July. 2025 – Current
Supervisor: Jun Wen, PhD, Harvard University
Research Field: Predicting Adverse Drug Reactions with Hypergraph Neural Network

- Designed and implemented a hierarchical hypergraph framework (*HyperADRs*) to model triadic drug–gene–ADR relationships, extending beyond conventional pairwise associations in pharmacogenomics
- Integrated multi-source biomedical knowledge (PharmGKB, DrugBank, PPI networks) to construct relational hypergraphs of drug–gene–ADR triplets
- Applied Hypergraph Convolutional Networks (HGCN) with query-conditioned contrastive learning for ADR prediction, outperforming baseline models (MLP, GCN, GAT, HGNN) under sparse supervision
- Evaluated model performance on inductive prediction tasks, demonstrating significant improvements in AUPR and MRR compared with state-of-the-art methods

Research Assistant, Department of Biostatistics, Columbia University | NY, United States — Apr. 2024 – May. 2025
Supervisor: Shuang Wang, PhD
Research Field: Conducting Literature Review and Simulation on Advanced Multi-Omics Data Analysis for Disease Subtyping

- Conducted a thorough literature review of over a decade's worth of multi-omics data integration techniques, spanning from foundational methods like Similarity Network Fusion (SNF) to cutting-edge approaches such as Multi-Omics Graph Convolutional Networks (MOGONET)
- Gained expertise in applying advanced clustering algorithms such as spectral clustering and Gaussian Mixture and developing complex simulations to evaluate and compare the efficacy of various data integration techniques
- Performed meticulous tuning of parameters within clustering algorithms to refine outcomes and enhance the discrimination accuracy of integrated datasets
- Defined new standards for multi-omics data integration that can be broadly applied to distinguish disease subtypes to improve the diagnosis and treatment of complex diseases

Research Assistant, Department of Biostatistics, Columbia University | NY, United States — Sep. 2024 – May. 2025
Supervisor: Tian Gu, PhD
Research Field: Exploring "All of Us" Database and Conducting Comprehensive Data Analysis with Focus on Breast and Prostate Cancer

- Reviewed literatures on electronic health record (EHR) data elements and cancer-related factors
- Employed the state-of-the-art statistical method, "Angle-based transfer learning (AngleTL)" to analyze extensive breast and prostate cancer data from the "All of Us" database

Research Assistant, Department of Biostatistics, Columbia University | NY, United States — Feb. 2024 – Aug. 2024
Supervisor: Prakash Gorroochurn, PhD and Lisa Hark, PhD, MBA (Department of Ophthalmology)
Research Field: Performing Data Analysis of Randomized Clinical Trials on Vision-Related Quality-of-Life (VRQOL)

- Applied multiple tests to identify VRQOL differences between groups and across each question in the National Eye Institute Visual Function Questionnaire 9-item (NEI-VFQ-9) on the Manhattan Vision Screening Study
- Performed data analysis including multivariable linear regression to find potential predictors for greater improvement on VRQOL and published the findings

Research Assistant, Department of Ophthalmology, Columbia University | NY, United States — Apr. 2024 – Aug. 2024
Supervisor: Alan Morse, PhD
Research Field: Performing Comparative Analysis of Demographic and Clinical Characteristics in Age-Related Macular Degeneration (AMD) and Diabetic Retinopathy (DR)

- Compared demographic and clinical characteristics in AMD and DR to identify disease subtypes with significant differences
- Published findings to highlight the distinct subtypes and emphasize the unique demographic and clinical characteristics

Research Student, Department of Pharmacology, University of Toronto | Toronto, Canada — Sep. 2021 – Apr. 2022
Supervisor: Walter Swardfager, PhD
Research Topic: Elucidating the Role of CYP450 and sEH Pathways in Alzheimer's Disease Pathogenesis

- Explored the pathobiology of Alzheimer's Disease, identifying key SNPs highly related to lipid metabolism that potentially leads to disease development, and leveraging the ADNI database for multidimensional analysis

Research (Work-Study) Student, Department of Cell Biology, University of Toronto | Toronto, Canada Sep. 2021 – Apr. 2022
Supervisor: Megan Frederickson, PhD
Research Topic: Exploring Duckweed-Microbiome Interactions: Species-Specific Dynamics

- Investigated duckweed-microbiome interactions, employing visualization and image analysis techniques

Summer Research Student, National University of Singapore | Singapore Jun. 2019 – Jul. 2019
Supervisor: Tan Siong Kiat
Research Topic: Exploring Forest Biodiversity: Terrestrial Snail Diversity on Tioman Island Singapore

- Conducted environmental assessments on terrestrial snail diversity, utilizing quantitative and analytical methods

PUBLICATION

- Hark, L. A., Gorroochurn, P., **Tang, H**., et al. (2025). Improvement in vision-related quality-of-life using the NEI-VFQ-9 over 1-year in the Manhattan Vision Screening and Follow-up Study (NYC-SIGHT). *Graefe's archive for clinical and experimental ophthalmology, 263*(7), 2069–2079. https://doi.org/10.1007/s00417-024-06727-z
- Morse, A. R., Hark, L. A., Seiple, W. H., Gorroochurn, P., **Tang, H.**, et al. (2025). Association of behavioral factors with activation in patients with age-related macular degeneration or diabetic retinopathy. *Clinical Ophthalmology*, *19*, 3059–3069. https://doi.org/10.2147/OPTH.S542352
- Morse, A. R., Hark, L. A., Seiple, W., Gorroochurn, P., **Tang, H**., et al. (2025) Modifying locus of control beliefs may improve activation in patients with age-related macular degeneration or diabetic retinopathy. *Investigative Ophthalmology & Visual Science, 66*(8), 699. https://iovs.arvojournals.org/article.aspx?articleid=2805311

TEACHING EXPERIENCES

Teaching Assistant, Department of Biostatistics, Columbia University | NY, United States Sep. 2024 – Dec. 2024

- Assisted in the course, Probability, for first-year biostatistics students, aiding in design and grading of assignments, addressing student queries, and optimizing course structure

Teaching Assistant, Department of Environmental Health Sciences, Columbia University | NY, United States Sep. 2024 – Dec. 2024

- Facilitated introductory lectures and grading for the course, Fundamentals of Toxicology for Health-related Disciplines, providing targeted support to struggling students

Teacher and Lecturer, NewChannel International Education Group Limited | Hefei, China Oct. 2022 – Jul. 2023

- Instructed students on subjects of International Advanced Level, including mathematics, physics, chemistry, and biology

INTERNSHIP

Intern, Anhui Fengyuan Pharmaceutical Co., Ltd | Hefei, China Jul. 2021 – Aug. 2021

- Conducted pharmaceutical research on drug injection protocols and evaluated pharmacodynamic and pharmacokinetic properties of propofol emulsions through HPLC and FODT equipment

OTHER PROFESSIONAL AND EDUCATIONAL ACTIVITIES

Editorial Assistant for Dr. Prakash Gorroochurn, Department of Biostatistics, Columbia University | NY, United States Sep. 2024

- Provided editorial assistance in the publication of Dr. Gorroochurn's book titled "The Development of Evolutionary Genetics", published by Springer. Responsibilities included proofreading for typos, ensuring consistency in style and formatting, and verifying factual accuracy to enhance the quality of the final publication.

Exchange Student, University of Oxford | Oxford, United Kingdom Aug. 2019 – Sep. 2019

- Summer Abroad Program with one course taken: Developmental Psychobiology

Exchange Student, National University of Singapore | Singapore Jun. 2019 – Jul. 2019

- Summer Exchange Program with two courses taken: Field Study in Biodiversity; Bahasa Indonesia

ACHIEVEMENTS AND AWARDS

- **Outstanding Master's Teaching Assistant in Biostatistics** (Nominated) awarded to a master's teaching assistant who has demonstrated exemplary commitment to teaching and has significantly contributed to the academic experience. May. 2025
- **Co-Curricular Record** honored by the University of Toronto to recognize that students are involved in a variety of activities with multiple competencies. Jul. 2022
- **CIE Awards** ($4000 and $2200) honored by Center for International Experience, University of Toronto, for students who have excellent academic performance at both the host and exchange universities. Feb. 2019

SKILLS AND INTERESTS

- Experienced in programming languages: R, Python
- Skilled in statistical software: IBM SPSS
- Language proficiency: Chinese (native); English (fluent); Indonesian (beginner)
- Research Interests: Genomics, Multi-omics Data Integration, Gene-drug Interaction