

Haowen He

2114 Krone Engineered Biosystems Building, 950 Atlantic Drive, Atlanta, GA 30332

hhe321@gatech.edu ■ <https://haowen-math.com>

EDUCATION

Georgia Institute of Technology, Atlanta, GA

Doctor of Philosophy (Ph.D.) in Bioinformatics

2023-2028 (Expected)

Co-advisors: Jeffrey Todd Streelman & Peng Qiu

Research Interests: single-cell multi-omics and spatial transcriptomics, functional neurogenomics, graph learning, development and regeneration, evolution of brain and behavior

Rensselaer Polytechnic Institute, Troy, NY

Master of Science (M.S.) in Applied Mathematics

2022-2023

Co-advisors: Kristin P. Bennett & Sally Temple (Neural Stem Cell Institute)

Thesis: "AlzApp: An open-source web application for deep exploration of longitudinal single-cell data reveals early signaling remodeling in frontotemporal dementia"

Bachelor of Science (B.S.) in Mathematics, *magna cum laude*

2018-2022

Advisor: Elizabeth W. S. Kam

Relevant coursework: Mathematical Analysis, Numerical Linear Algebra, Machine Learning for Biology, Advanced Molecular Biology, Sequence Analysis, Data Analytics Research Lab

RESEARCH EXPERIENCE

School of Biological Sciences

Atlanta, GA

Graduate Research Assistant

2023-present

Advisor: Jeffrey Todd Streelman

- Characterizing multi-modal plasticity in the vertebrate forebrain during bower behavior and behavioral withdrawal, integrating single-cell multi-omics and spatial transcriptomics to uncover how distinct behavioral states dynamically reconfigure cellular populations and neural circuits.
- Quantifying single-cell allele-specific expression in F1 hybrid models to dissect the evolutionary divergence of complex social behaviors, mapping enhancer dynamics and evolutionarily conserved gene regulatory features.
- Modeling the development and accelerated regeneration of replacement teeth using coupled pulse-chase experiments with single-nucleus transcriptomics, reconstructing epithelial and mesenchymal stem cell trajectories and decoding the dynamic signaling networks that coordinate context-dependent tissue renewal.

Wallace H. Coulter Department of Biomedical Engineering

Atlanta, GA

Graduate Research Assistant

2023-present

Advisor: Peng Qiu

- Developing scGENUS (single-cell Graph-Enabled Network Unifying Species), a method for modeling complex many-to-many gene homology relationships to integrate transcriptomes across phylogenetically distant vertebrates by redefining the unit of comparison from individual genes to evolutionarily informed gene sets.
- Augmenting the graph-based gene-set framework using a deep learning approach and protein language models to dynamically weight gene features, enabling the deep integration of human immune cell atlases across healthy tissues and tumor microenvironments to characterize state-specific immune program heterogeneity.

Neural Stem Cell Institute (NSCI)

Albany, NY

Graduate Research Assistant

2022-2023

Co-advisors: Sally Temple & Kristin P. Bennett

- Built a web-based, dashboard-style data browsing tool that enables interactive exploration of single-cell RNA sequencing data from cerebral organoid models of frontotemporal dementia.
- Profiled single-cell transcriptomes from FTD-tau cerebral organoids to resolve neuronal subtype heterogeneity and quantify progressive neuronal depletion, identified MAPT-mutant-specific expression signatures and mapped temporal dynamics via pseudotime alignment and intercellular communication modeling.
- Led T32 Summer Alzheimer's Data Science Bootcamp as a co-instructor and developed a series of R and command-line tutorial notebooks detailing scalable scRNA-seq workflows on HPC clusters for trainees in biology.

Darrin Fresh Water Institute at Rensselaer the Jefferson Project at Lake George

Troy, NY

Undergraduate Research Assistant

2020-2022

Advisor: Thomas Morgan

- Characterized the Lake George watershed forest and the species composition of the forest canopy using high-resolution airborne LiDAR point clouds and aerial photography from IBM.
- Developed a novel method for segmenting individual trees from LiDAR point clouds and mapping hemlock occurrences to pinpoint populations vulnerable to the invasive Hemlock Woolly Adelgid.

Institute for Data Exploration and Application (IDEA) Health Data INCITE Lab

Troy, NY

Co-advisors: Kristin P. Bennett & John S. Erickson

- Built an interactive geographic dashboard visualizing anonymized Wi-Fi network density, enabling the campus community to identify low-traffic spaces for safe, extended use during the COVID-19 pandemic.
- Developed quantitative approaches to simulate campus reopening scenarios and predict future conditions, integrating de-densification strategies, network mapping, and social distancing models for college administrators.

PUBLICATIONS JOURNALS

[J1] Talha Mubeen, **Haowen He**, George W Gruenhagen, Anoushka Satoskar, Jeffrey T Streelman, "Cellular basis of accelerated whole-tooth regeneration," *eLife*, 15, RP110584 (2026).

PREPRINTS & IN PREP (CAN PROVIDE DRAFTS BY REQUEST)

[IP1] **Haowen He**, Jeffrey T. Streelman, Peng Qiu "Evolutionarily informed gene sets reveal conserved and lineage-modified transcriptional programs during vertebrate forebrain evolution", bioRxiv: 2026.03.24.713832, submitted.

PRESENTATIONS

TALKS (*=ONLINE)

2025

Center for Integrative Genomics Advanced Research Seminar (CIGars)

Nov 2025

2023

*Data-Driven Alzheimer Research Mini Conference (D2ARC)**

July 2023

HONORS & AWARDS

Pi Mu Epsilon

Inducted Member, National Mathematics Honor Society

2022

TEACHING

School of Biological Sciences, Georgia Institute of Technology

Graduate Teaching Assistant

BIOS 3400: Mathematical Models in Biology

Spring 2024

BIOS 4401: Experimental Design & Statistical Methods

Fall 2023

Wallace H. Coulter Department of Biomedical Engineering, Georgia Institute of Technology

Graduate Teaching Assistant

BMED 3201: Introduction to Machine Learning for Biomedical Engineers

Fall 2024, Fall 2026

Department of Mathematical Sciences, Rensselaer Polytechnic Institute

Undergraduate Teaching Assistant

MATH 4800: Numerical Computing

Summer 2023

MATH 2400: Introduction to Differential Equations

Spring 2023

MATH 1010: Calculus I

Fall 2019 - Fall 2022

↔ designed recitations to streamline the rigorous academic transition

OUTREACH & EXPOSITION

School of Biological Sciences Spring 2026 Seminar Series

Apr 2026

Invited and hosted Dr. Sally Temple as a guest speaker for the SoBS Spring 2026 Seminar Series

D2ARC: Data-Driven Alzheimer's Disease Research Challenge

2022, 2023

Designed the core syllabus and co-instructed the six-week Alzheimer's Data Science Bootcamp

DIVERSITY & INCLUSION

Center for Global Communication+Design Mentor

2019–2022

Led a Chinese mentoring program to support the academic and cultural needs of non-native English speakers

[Updated on 2026-07-05]