

Haowen He

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EDUCATION **Rensselaer Polytechnic Institute (RPI)**, Troy, New York
B.S. in Mathematics GPA: 3.77
M.S. in Applied Mathematics Expected Spring 2023

RELEVANT COURSEWORK Mathematical Analysis (F22), Advanced Molecular Biology (F22), Machine Learning for Biology, Linear Algebra, Advanced calculus, Complex Variables, Sequence Analysis, Biostatistics, Numerical Computing, Health Data Analytics Lab

RESEARCH **Institute for Data Exploration and Application (IDEA)**, Troy, NY Summer 2020
Health Data INCITE Lab,
Advisors: Dr. Kristin Bennett, Dr. John Erickson

- *Worked as an undergraduate research assistant to build an interactive geographic dashboard that presents the anonymous usage of Wi-Fi access points and aggregations of wireless users on the campus network to users so they can make informed decisions on where to go for extended periods of time on campus during the COVID-19 pandemic*
- *Developed quantitative approaches that help college administrators simulate campus re-open plans and predict future conditions, including campus de-densification, campus network mapping, and selected social distancing models*

Modeling and forecasting Cyanobacterial Blooms in a eutrophic drinking-water reservoir, Troy, NY Fall 2020 – Spring 2021
Department of Biological and Environmental Sciences,
Advisors: Dr. Jeremy Farrell, Dr. Sasha Wagner

- *Proposed and analyzed mathematical models describing the population dynamics of harmful algae and toxin production and decay under ecological eutrophication, and studied the bifurcation behaviors and stability of the model*
- *Forecasted and mapped onsets of cyanobacterial blooms via a nonparametric machine learning approach, using a gradient boosted regression tree model*
- *Assessed the effects of surface water temperature, droughts, which caused extremes in reservoir elevation, and chlorophyll on cyanobacterial abundance respectively via Spearman's rank correlation, time series and cluster analysis*

Darrin Fresh Water Institute at Rensselaer, Troy, NY Fall 2021 – Spring 2022
Jefferson Project at Lake George: Watershed Forest Studies,
Advisor: Dr. Thomas Morgan

- *Characterized the forest surrounding Lake George and quantified the species composition of the forest canopy by using an airborne LiDAR point cloud data, acquired by IBM for high resolution topography, and aerial photography*
- *Developed a novel method for segmenting individual trees from the LiDAR points and mapping the occurrences of hemlock in anticipation of investigating Hemlock Woolly Adelgid, an invasive insect that can be deadly to hemlocks*

Data-Driven Alzheimer's Disease Research, Troy, NY Summer 2021 – Present
*Institute for Data Exploration and Application (IDEA),
Neural Stem Cell Institute (NSCI),
Advisor Dr. Sally Temple, Dr. Kristin Bennett, Dr. Keith Fraser*

- *Building and developing a web-based, dashboard-style data browsing tool that enables interactive exploration of single-cell RNA sequencing data*
- *Characterizing gene expression across different neuronal cell types, profiling expression differences between FTD-Tau mutant cells versus controls, mapping expression trajectories over developmental time, modeling cell-cell communication networks, and re-constructing single-cell trajectories using pseudotime based on a large dataset of RNA transcripts from brain organoid models of frontotemporal dementia*
- *Developing a series of R tutorial notebooks, which aim to introduce Seurat-based analysis workflows of a large corpus of scRNAseq data, and assisting with organizing the Alzheimer's Data Science Bootcamp*

**TEACHING &
MENTORING**

Department of Mathematical Sciences, Troy, NY Fall 2019 - Present
I-PERSIST Calculus I Mentor

- *Meeting with two groups of freshmen on a weekly basis*
- *Streamlining incoming students' transition to a rigorous college environment*
- *Giving quizzes, engaging students in activities, and presenting examples*
- *Holding weekly office hours, grading quizzes and providing feedback*
- *Attending weekly supervisory meetings with faculty members*

Center for Global Communication+Design, Troy, NY Spring 2019 – Spring 2022
Undergraduate Writing Tutor

- *Worked with multilingual students and explained typical difficulties with English Writing and Speaking from their major discipline*
- *Led Chinese mentoring program and offered both tutoring and language and culture support to address non-native English-speaking students' learning needs*
- *Developed a series of COMM+D handouts on grammar and punctuation rules, citation formats, and guidelines for specific Rensselaer courses*

SKILLS

R (tidyverse, ggplot2, markdown, Shiny etc.), Python (data analysis & visualization), LaTeX, Jupyter Notebook, JMP, SQL, MATLAB, AMPL, Microsoft Office, Linux Terminal, Written & Oral Communication, Teaching/Mentoring, Collaboration

**HONORS &
MEMBERSHIPS**

- *Dean's Honor Lists*
- *Pi Mu Epsilon, the U.S. honorary national mathematics society*
- *Outstanding Student Intern Award – WARTSILA (Shanghai) Co., Ltd*

**CLUBS &
HOBBIES**

Aikido, Mathematics Problem Solving Club, RPI TV, LGBTQ+ Lavender Ambassadors, Sabre Fencing, RPI Chess Club