Alex (Haoyang) Zhou

325 Pleasant St., Concord, NH | US: +1(207)321-1038 | email: alexander.haoyang.zhou@gmail.com

EDUCATION

St. Paul's School, Grade 11, Concord, New Hampshire August 2020 – May 2023

- *Courses Average: HH (A equivalent) |Composite SAT: 1570 (Math: 800; Verbal: 770)*
- *Currently enrolled in:* Advanced Chemistry, Advanced Physics, Multivariable Calculus
- *Completed courses:* Molecular Biology, Advanced CS Topics, Calculus 1-2 Honors
- Involvement: Varsity Rowing Coxswain, Stage Manager

University of Chicago, "Research in the Biological Sciences (RIBS)" Summer 2022

- Studied for-credit college course; covered fundamental knowledge and skills in research
- Conducted projects understanding the viability of C. elegans as a model organism for side effects of SSRI

University of Chicago, "Explorations in Neuroscience: Neurons, Behavior, and Beyond" Summer 2021

- Studied for-credit college course; covered fundamental knowledge of the brain; learned scientific method in neuroscience research

HarvardX, Course "Fundamentals of Neuroscience" Part 1 and Part 3 Winter 2021

- Self-studied and completed online courses based on introductory Neurobiology courses, "The Electrical Properties of the Neuron" and "The Brain"

Fay School, Southborough, MA August 2017 – May 2020

STEM INVOLVEMENT

Harvard University's Engert Lab, *Student Researcher* Summer 2022-Present

- Contribute to a lab within the Molecular & Cellular Biology Dept. focused on neuroimaging
- Utilize lasso, a statistical model to look at biological data (Calcium levels) of zebrafish when they are exposed to visual stimuli to predict neuronal connections/future signals
- Receive and discuss feedback on progress to make adjustments to better resemble Zebrafish.

University of Chicago's Kasthuri Lab, *Student researcher* Summer 2022-Present

- Developing original code in Python to convert the lab's 2D electron microscopy images of mouse brain segments into a 3D model, as only coder in the lab, independently create my own approach
- Aiming to decrease the time required for the lab to trace neural connections (the lab's primary work) by at least ten fold
- Building an auto-part-isolator for the 3D model to separate neurons and organelles from each other
- Presented my work to the full lab, participate in weekly lab meetings, engage in research discussions

Independent Research on Immunotherapy for Alzheimer's Disease Summer 2021– Present

- Compare and analyze publicly available transcriptome data of wild type mice and 5xFAD disease models at ages 4 months, 8 months, 12 months, and 18 months
- Distinguish between aging-specific and neurodegenerative-specific genes at a single-cell level, pinpoint specific go terms relevant to each gene
- Analyze Trem2KO mouse data, observe the effect of Trem2KO on other genes/cell types
- *Submitting for review and publication TBD this fall.*

Independent Research on Traumatic Brain Injury (TBI) Summer 2022

- Compare and analyze pubmed data using R between the 5xFAD mouse model and the TBI model.
- Analyze markers of TBI and FAD (Familial Alzheimer's Disease) in the mouse model.
- Conducted GO analysis on similarities and differences to enhance the understanding of the role of microglia/neuroinflammation in neurodegeneration.

- *Submitted for review and publishing to the National High School Journal of Science.*

The International Genetically Engineered Machine Competition (iGEM) Summer-Fall 2021

- Elected as the team leader of 20+ high school student team; directed overall team operations; delegated sub-team tasks to conduct research, created a website, conducted interviews, designed related products and promote our team
- Conducted lab experiment at Jiangnan University facility mentored by professors there to find a biodegrading method for PET plastic
- Use genetic editing that replaces a nonfunctional region of a plasmid with PETase DNA and inserts the plasmid into the yeast cell (*Candida tropicalis*) to surfacely display PETase using anchor protein.

Independent Coder 2015-Present

- Proficient in multiple coding languages, involved in web development and AI engineering, created a chatbot, prototyped a live communication tool for deaf people, maze finder, auto-generate citation machine, robot programming, and many small projects.
- USA Computing Olympiads (USACO) Silver Division, March 2019, Gold Division, February 2021

AWARDS & CERTIFICATIONS

- USA Biology Olympiad, Honorable Mention (Top 20%), Spring 2022
- USA Computing Olympiad (USACO) Silver Division, March 2019, Gold Division, February 2021
- iGEM Gold and Best Team Presentation, Team Leader, 2021

SKILLS

- Proficient in using tools in R to do basic RNA seq analysis, like PCA, EdgeR, MasigPro
- Molecular biology techniques: DNA isolation, gel electrophoresis, PCR
- Proficient in C and C++
- Competent in basic website development, AI, and Python