Sarah A. Zhao

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EDUCATION

Massachusetts Institute of Technology, Cambridge, Massachusetts
Master of Engineering, Computer Science, Concentration: BioEECS *Expected May 2025*
- Advised by Prof. Manolis Kellis, Ph.D.
- Thesis topic: Predicting the impact of variants of unknown specificity on cell-type-specific chromatin accessibility
- Expected Coursework: Genetics, Biochemistry, Synthetic Biology, Computational Systems Biology

Bachelor of Science, Computer Science and Engineering, Mathematics | GPA: 4.3/5.0 *May 2024*
- Relevant Coursework: Organic Chemistry, Differential Equations, Linear Algebra, Micro/Nano Processing Technology, Machine Learning, Natural Language Processing, Computer Vision, Design and Analysis of Algorithms, Physics II, Biology

EXPERIENCE

Massachusetts Institute of Technology, Cambridge, Massachusetts
Master's Student, Laboratory of Manolis Kellis, Ph.D. *Sept 2024—Present*
- Variant interpretation for precision medicine
- Building software to identify transcription binding factor sites genome-wide and associate motif variant status with chromatin accessibility

Undergraduate Researcher, Laboratory of Manolis Kellis, Ph.D. *Jan 2024—Aug 2024*
- Direct Advisor: Riley Mangan, Ph.D.
- Developed infrastructure using Go for probabilistic representations of biological sequence data, contributing to open-source genomics software package Gonomics
- Reconstructed ancestral genome based on posterior predictive distributions to identify derived gene regulatory changes between ancient and modern genomes

Massachusetts Institute of Technology, Cambridge, Massachusetts
Undergraduate Researcher, Laboratory of Lindsay Case, Ph.D. *Feb 2024—Aug 2024*
- Direct Advisor: Jibin Sadasivan, Ph.D.
- Constructed protein-protein interaction network using Python and Cytoscape to identify key scaffold proteins in focal adhesions
- Designed and conducted experiments to investigate co-localization between PCBP1 and Paxillin
- Conducted comprehensive literature review on the focal adhesion proteome and phase separation mechanisms

MIT Directed Reading Program, Cambridge, Massachusetts *Jan 2024*
- Studied and presented on parameterized algorithms (based on work by Cygan et al., 2015)

Kongsberg Maritime, Lysaker, Norway *June 2023—Aug 2023*
Machine Learning Intern
- Implemented machine-learning video and image compression algorithms using PyTorch Lightning to decrease file size and improve latency
- Researched and conducted comparative analysis of cutting-edge models and commercial codecs

NCSoft, Seongnam, South Korea *June 2022—Aug 2022*
Machine Learning Intern
- Built and tested models using Pytorch, achieved lifelike text-to-animation with multi language input
- Designed morph targets in Maya for Mandarin lip synching to localise Korean content for Taiwan
- Refactored codebase to comply with current industry code standards and streamline development

Massachusetts Institute of Technology, Cambridge, Massachusetts
Undergraduate Researcher, Laboratory of Faez Ahmed, Ph.D. *Feb 2022—May 2022*
- Direct Advisor: Binyang Song, Ph.D.
- Designed algorithm in Python to process publication abstracts using natural language programming (NLTK, scikit-learn)
- Evaluated data trends based on statistical data analysis & visualised trends using Plotly and Dash

Massachusetts Institute of Technology, Cambridge, Massachusetts
Undergraduate Researcher, Laboratory of Deblina Sarkar, Ph.D. *Oct 2020—Sept 2021*
- Direct Advisor: Yubin Cai, M.S.
- Programmed models in Python to analyse circuit and fabricated microcoils for non-invasive nanosensors monitoring cell response
- Conducted literature review on impact of materials on impedance, conductivity, and thermal activity for neural sensors

PUBLICATIONS

- Yoo D, … **Zhao SA**, … Eichler, EE. (2024). Complete sequencing of ape genomes. *Submitted (Nature). (p. 2024.07.31.605654). bioRxiv.* https://doi.org/10.1101/2024.07.31.605654

(In Preparation)

- **Zhao SA**, …, Lowe CB, Kellis M. pDNA: A High-Performance Software Package for Probabilistic Representations of Nucleotide Sequences.

TEACHING

Massachusetts Institute of Technology, Cambridge, Massachusetts

Teaching Assistant, 6.042/6.1200 Mathematics for Computer Science *Sept 2022—May 2024*

- Led twice-weekly recitations on discrete maths and computer science principles for four semesters
- Developed problem sets, exam questions, and recitation notes
- Supervised course graders

Lab Assistant, 6.009/6.1010 Fundamentals of Programming *Feb 2022—May 2022*

- Advised students in one-on-one meetings during office hours
- Graded student labs and homework assignments

Grader, 8.01 Physics I: Classical Mechanics *Feb 2022—May 2022*

- Evaluated student work and provided feedback

TECHNICAL SKILLS

Computational

- Programming Languages: *Advanced proficiency in* Python, Go, Typescript; *Proficient in* R, Java, C, Assembly; *Additional experience in* Julia, Matlab, Javascript, HTML and CSS
- Machine Learning, Statistics, and Data Science: PyTorch, Tensorflow, NumPy, Pandas, SKLearn

Experimental Biology

- Cell culture, western blotting, immunoprecipitation, plasmid production and cloning, gel electrophoresis

Languages

- Mandarin (Advanced Proficiency), Spanish (Proficient), Korean (Conversational)

CAMPUS INVOLVEMENT

MIT 2024 Ring Committee, Cambridge, Massachusetts

Contributing Artist, Social Chair, *June 2021—June 2022*

- Planned events for more than 1200 students & managed committee correspondence (6 hrs/week)
- Collaborated with jeweller representatives to design ring and coordinate sales (2 hrs/week)

MIT Committee on Discipline, Cambridge, Massachusetts

Undergraduate Student Representative *Sept 2022—May 2024*

- Resolved reported violations of MIT policies and community standards in an objective manner

MIT ActLingual, Cambridge, Massachusetts

Committee Leader *Sept 2020—May 2022*

- Wrote manual on medical interpreting in Spanish and Mandarin, and organised interpretation opportunities in Boston for MIT students

MIT Music & Theater Arts, Cambridge, Massachusetts *Sept 2020—May 2021*

Emerson Scholar, Piano

- Scholarship for exemplary talent and passion for music

SERVICE

MIT MedLinks, Cambridge, Massachusetts

Residential Director *Sept 2022—May 2024*

- Connected students to healthcare services, promoted education campaigns, planned welfare events for ~200 students (4 hrs/week)

MIT ARCTAN (Red Cross), Cambridge, Massachusetts

Community Service Coordinator *Sept 2020—May 2022*

- Coordinated events such as education campaigns, blood drives, CPR training and volunteering

Harvard Phillips Brooks House Association Chinatown Citizenship, Cambridge, Massachusetts

Mock Interview Teacher *Sept 2020—May 2022*

- Facilitated mock interviews to prepare Chinese-native students for the U.S. naturalisation exam
- Redesigned curriculum according to the USCIS 2022 Naturalization Test Redesign