

Matthew Chang

Irvine, CA | matthewchang@college.harvard.edu | matthewjchang.com

Education

Harvard College

Cambridge, MA

A.B., Physics and Electrical Engineering

Aug 2025

Activities: Harvard Aerospace Club (Board), AI Grand Prix (Co-Lead), Harvard College Debating Union, Harvard Outing Club

Coursework: Linear Algebra, Electrodynamics, Data Structures, Digital Fabrication, Quantum Mechanics I, Epistemology

Woodbridge High School

Irvine, CA

Valedictorian, Student Body President

Aug 2021 – Jun 2025

Honors: National Merit Scholar, World Science Scholar, U.S. Presidential Scholars Semifinalist, Caroline D. Bradley Scholar

Publications

- **Chang, M.**, Simon, M., Rafailovich, M., Zhang, P., & Deng, Y. (2024). In-silico study of the temperature effect on binding dynamics between SARS-CoV-2 spike glycoprotein and polylactic acid surface. American Chemical Society Spring 2024 Meeting, New Orleans, LA. Oral presentation. <https://doi.org/10.1021/scimeetings.4c10572>
- Kliman, A., Wu, Y. X., **Chang, M.**, & Grun, F. (2024). Mapping nutrient movement, developmental morphogen gradients and electromotive drug delivery with MALDI-TOF Imaging Mass Spectrometry. 72nd American Society for Mass Spectrometry 2024 Annual Conference, Anaheim, CA. Oral presentation.
- **Chang, M.** (2024). A Deep Learning-Based, Bioinformatic Analysis of Foliar Fungal Endophytes in Litter Decomposition. 2024 American Association for the Advancement of Science Annual Meeting. Poster presentation.
- Wang, A., Chen, S., Xie, E., **Chang, M.**, Zhu, A., Hansen, A., Jerome, J., & Rafailovich, M. (2024). Utilizing Machine Learning to Model and Predict Interdependency of Bulk Molecular Weight, Solute Concentration and Thickness of Spin Coated Polystyrene Thin Films. MRS Communications. <https://doi.org/10.1557/s43579-024-00527-6>

Honors & Awards

- **1st Place in Microbiology**, Regeneron International Science & Engineering Fair (ISEF) 2024
- **Top 100 in Nation**, American Legion Boys Nation Senator 2024
- **Top 50 in Nation**, USA Biology Olympiad (USABO) National Semifinalist 2024
- **USA Delegate**, 2023 United Nations Climate Change Conference (COP28) 2023
- **1st Place in Life Sciences**, National Junior Science & Humanities Symposium (JSHS) 2023

Research Experience

Research Science Institute (RSI) Scholar

Jun 2024 – Aug 2024

Broad Institute of Harvard and MIT

- Selected as 1 of 100 students worldwide for the 2024 Research Science Institute (RSI) Program.
- Developed PRSmix-funct, a TensorFlow-based machine learning framework for accurate polygenic risk score prediction.
- Implemented matrix-based computations of risk alleles and SNP effect sizes using All of Us Research Workbench and R.

Student Researcher, University of California, Irvine

Jan 2019 – Jun 2025

Mass Spectrometry Facility, Department of Chemistry

- Performed metabolomic profiling of *Dionaea muscipula* using MALDI-IMS, published in 2024 ASMS Annual Conference.
- Developed a low-cost malaria diagnostic using ML (92% accuracy), an iOS app, and a 3D-printed smartphone microscope.
- Identified plant stress biomarkers under climate-induced salinity via LC-MS/MS and analyzed data using Python and R.

Simons & Garcia Summer Research Scholar

Jun 2023 – May 2025

Stony Brook University, Department of Applied Mathematics

- Selected as 1 of 40 high school seniors nationwide for the 2024 Simons Summer Research Fellowship.
- Designed all-atom molecular dynamics simulations of SARS-CoV-2 spike glycoprotein and polylactic acid using GROMACS.
- Computed binding energies to identify strong amino acid interactions; paper in-review at Journal of Molecular Modeling.

Skills

- **Programming:** Python, C/C++, Rust, Java, Linux, C#, OCaml, HTML/CSS, React, React Native, LaTeX
- **Hardware:** Arduino, Raspberry Pi, embedded systems, 3D printing, CAD, circuit design, GPU/HPC computing
- **Languages:** English, Korean