HA DONG

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EDUCATION

Amherst College, *Amherst, MA, USA* — *Expected graduation: May 2026*

- Triple Majors in Neuroscience (Honor), Physics, and Mathematics — cGPA: 3.85/4.0

Harvard University, *Cambridge, MA, USA* — *Feb – June 2025*

- Visiting Student (Spring 2025)

In-person coursework:

Neuroscience Molecular Neuro, Human Neuro, System Neuro, Neuroanatomy, Neurophys, Behavioral Neuro, Bio&AI
Math Calculus, Linear Alg, Abstract Alg, Real Analysis, Graph theory, Combinatorics, Probability
Physics Mechanics, Waves, E&M, Dynamical systems, Modern physics, Signals and Noises, Electron Microscopy

Coursera & MIT Open Learning Library:

Machine Learning with Graphs, Mathematics for Machine Learning, Computer-aided Drug Design, Social Psychology, Minds and Machines, Introduction to Neural Computation, Reinforcement Learning

RESEARCH

Center for Brain Science, *Harvard University, USA | Research Assistant* — *Feb 2025 – present*

PI: Venkatesh N. Murthy

- Develop reinforcement learning and inverse Bayesian inference algorithms using a Finite State Controller formulation of the Partially Observable Markov Decision Process (POMDP) on an odor trail following task.
- Design and implement an experimental apparatus to investigate the effects of conflicting multimodal (auditory and odor) signals on trail following behaviors in mouse.

Break Through Tech AI, *MIT Schwarzman College of Computing, USA | ML Fellow* — *May 2024 – May 2025*

- Attended a 3-month virtual internship focusing on theoretical ML/AI. Submitted a final project focused on the importance of feature selection in the performance of ensemble models using the World Happiness Report 2024 dataset on regression tasks. Received a $1,400 award.
- 4-month internship at *Alkermes plc* — where I used Random Forest to predict potential drug leads for neurodegenerative disease, using high-throughput screening datasets for D2 and 5-HT1/2 receptors. Presented results to the lead board of Alkermes. (see *Projects*)

Biology and Biological Engineering Dept., *Caltech, USA | Undergraduate Research Fellow* — *Jun – Sep 2024*

PI: Markus Meister

- Co-designed and implemented a closed-loop system for experiments on naturalistic hunting behaviors. In this system, artificial prey is programmed to evade a mouse subject following probabilistic escape trajectories.
- Collected neural & behavioral data from closed-loop hunting experiments on mouse implanted by Neuropixel 1.0. Used a generalized linear model – hidden Markov model to analyze internal states underlying hunting behaviors and their correspondence to superior colliculus activities.

Neuroscience Dept., *Amherst College, USA | Gregory S. Call Research Fellow* — *Nov 2023 - present*

PI: Joseph G. Trapani

- Measure and analyze field potential during startle behaviors triggered on ontogenetically modified zebrafish lines to classify long latency and short latency C-start startles. Also currently developing a program for automated classification from video input. *(manuscript in-prep)*

- Support a thesis student in a range of experiments and equipment setup to investigate the impact of low dose cisplatin on hair cell function and mitochondrial morphology/dynamics.

Chemistry Dept., *Vanderbilt University*, *USA* | *Undergraduate Researcher* *May 2023 – present*
PI: Jens Meiler, Yunchao Liu

- Developing knowledge graphs for biochemical & clinical data for cancer drug-repurposing. (*manuscript in-prep*)
- Authored WelQrate, a comprehensive open-source library with 9 large, high-quality HTS datasets of pharmaceutically relevant drug classes and standardized curation pipeline and benchmark. Used the datasets to benchmark probabilistic ML models, sequence-based models, and graph-based models. (see *Publications*)
- Contributed to developing scaffold split and evaluation metrics framework for a novel deep learning model that integrates expert knowledge from the BioChemical library with SOTA graph featurization methods. (see *Publications)*
- Gained first-hand experiences in the drug discovery pipeline, ranging from experimental (protein & RNA assays) to computational (LB-CADD) in a 1-year internship position funded by Vanderbilt's Chemistry Department

Auditory Development Lab, *McMaster University*, *Canada* | *Remote Research Intern* *Dec 2022 – April 2023*
Mentor: Daniel Cameroon

- Analyzed datasets on rhythm complexity using principal component analysis, clustering, and correlation analysis in R and Python. The analysis revealed the significance of different dimensions in rhythm structures on human auditory perception and the urge to dance (groove). Learned programming through RStudio, MATLAB, and Linux system.

Neuroscience Dept, *Amherst College*, *USA* | *Gregory S. Call Research Fellow* *Oct 2022 – Feb 2023*
PI: Sally Kim

- Developed MATLAB data analysis pipeline for neural spines' properties.
- Trained in fundamental molecular neurobiology techniques: DNA transfection, neuron cell passing, hippocampus dissection, and neural/glial prep.

PUBLICATIONS *(Equal contributions are denoted by *, and equal senior authorship by #)*

Liu, Y.*, **Dong, H.***, Wang, X.*, Moretti, R., Wang, Y., Su, Z., Gu, J., Bodenheimer, B., Weaver, C., Meiler, J.[#], & Derr, T.[#] (2024). WelQrate: Defining the gold standard in small molecule drug discovery benchmarking. In *The Thirty-Eighth Annual Conference on Neural Information Processing Systems (NeurIPS)*. https://doi.org/10.48550/arXiv.2411.09820

Liu, Y., Moretti, R., Wang, Y., **Dong, H.**, Yan, B., Bodenheimer, B., Derr, T.,[#] & Meiler, J.[#] (2023). Advancements in ligand-based virtual screening through the synergistic integration of graph neural networks and expert-crafted descriptors. *Journal of Chemical Information and Modeling, 65*(10), 4898–4905. https://doi.org/10.1021/acs.jcim.5c00822

Dong, H., Engelhardt, J. (2024). Sounds of Faith: A Story of Quranic Reciters in the Connecticut River Valley. *Soundscapes of the Connecticut River Valley online archive.* https://www.valleysoundscapes.org/sounds-of-faith-a-story-of-quranic-reciters-in-the-connecticut-river-valley-2024/

PRESENTATIONS

Dong, H., Meister, M., Pollak, D. (2024). The States of Hunting [Oral]. In *California Institute of Technology's Summer Research Poster Seminar 2024*.

Dong, H., J. Meiler, Y. Liu (2024). Advances in drug discovery [Oral]. In *Five College Consortiums's AI in the Liberal Arts Undergraduate Conference.*

Dong, H., J. Meiler, Y. Liu (2023). Deep Graph Learning Benchmark for Ligand-based Drug Discovery [Oral]. In *Amherst College Summer Research Poster Presentation 2024*.

JOURNAL REVIEWING

Journal of Computational Biophysics and Chemistry
NeurIPS

INVITED WORKSHOPS & PANELS

STEM Research Invitational, Amherst College | *Panelist* *Nov 2023*
Provost's Annual Retreat on Teaching and Learning, Amherst College Provost | *Panelist* *Sep 2023*
UNESCO Teacher Task Force on Teachers for Education | *International Panelist* *Jan 2022*

FELLOWSHIPS

P3 Fellow, Pedagogical Partner Program, *Amherst College, MA* *Sep 2023 – Jun 2024*

- Selected by the *Center for Teaching and Learning* into a committee of 7 students who collaborate with the faculty in designing course aspects to help increase student engagement.
- Worked closely with Prof. Mia de los Reyes (Astronomy) to evaluate pedagogical strategies and student engagement through class audits; provided analytical feedback and collaborated on enhancing teaching approaches.

Diversity, Equity, and Inclusion (DEI) Fellow, *Amherst College, MA* *Feb - Sep 2023*

- Selected by the *Biology Department* into a committee of 4 students working to promote equitable, inclusive, and human-centric curricula in biology courses at Amherst College.
- Planned and operated *Biology Focus Group* (see *Projects*)

Ed Pros Fellowship*, Amherst College, MA* *Sep 2022 – present*

- Participate as one of 24 students across different class years whose interests and demonstrated potential in research and education, selected by the *Loeb Career Center*. Attend weekly seminars with interactive activities, discussions, guest speakers, and off-campus treks designed to expand knowledge of teaching, learning, and education professions.

Meiklejohn Fellowship*, Amherst College, MA* *Sep 2022 – present*

- Offered by the *Loeb Career Center* to prepare highly-achieved first-generation students for the professional world through personal mentoring, career counseling, workshops, and internship grant.

AWARDS, SCHOLARSHIPS, AND HONORS

2025, Charles Hamilton Houston Summer Research Grant, Amherst College
2024, Scholar Award, The Thirty-Eighth Annual Conference on Neural Information Processing Systems
2024, Gregory S. Call Student Research Grant, Office of the Provost and Dean of the Faculty, Amherst College
2023, Meiklejohn Summer Research Grant, Amherst College
2022, The Grosfeld Family Scholarship, Amherst College
2021, Twenties Outstanding Young Vietnameses Award, Government of Vietnam
2021, Labor Order: Third Class, Government of Vietnam
2021, Gold Medal, International Medicine Olympiad
2021, Youth with Impacts National Award, Vietnam Youth Federation
2020, Top 50 Global, the Global Student Prize, Chegg.org & Varkey Foundation
2020, Silver Medal, Rudolf Ortvay International Competition in Physics for Undergraduates
2020, Silver Medal, International Biology Olympiad
2020, Best Poster Prize, International Biology Olympiad
2020, Gold Medal, National Biology Olympiad, Ministry of Education and Training of Vietnam
2020, Gold Medal, National Science Contest, Vietnam National University
2020, Certificate of Merits, Minister of Education and Training of Vietnam

SKILLS

Experimental: DNA, RNA, and protein handling; PCR; restriction enzymes; cell transfection; affinity chromatography; western blot; enzyme activity assay; immunostaining; NeuroPixel 1.0; animal care; behavioral assays on mouse, *Drosophila,* and zebrafish; TEM/STEM/HRTEM/SEM; ultramicrotomy

Computational Chemistry: RosettaLigand Docking, BioChemical Library, Rdkit, PubChem & ChemBL

Machine Learning & Data Analysis: Linux, cmd, Python, Rstudio, Scilab, Pytorch & PyG, Sklearn, Git, STELLA II, ImageJ, OpenEphys, Kilosort, DeepLabCut, Boris

TEACHING & CAMPUS INVOLVEMENT

House Counsel, *Harvard University | Dudley House Counsel member* *Feb 2025 – present*

- Organize multiple events for 100+ students in the Dudley community throughout the Spring 2025 semester.

Biotechnology Club, *Amherst College | Co-President* *Aug 2024 – present*

- Launched some of the first-ever student activities at Amherst to promote Life Science on-campus: *bi-weekly Journal Club sessions* (where we discussed scientific papers in biotech), *Lunch with Professors!* (where students chat with invited faculty members over a meal), and *Computational Biology Workshops* (where we provided students with coding exercises and biostatistics skills).

Strategic Learning Center*, Amherst College | Academic Coach* *Sep 2023 - present*

- A part of a team of 4 students who spearheads a college-funded initiative equipping students with learning strategy, time management skills, and study motivation through peer-to-peer consultation.
- Our program assisted 200+ students (2023-2024) in developing plans and skills that align with their academic goals.

Math., Biology, and Physics Dept., *Amherst College | Teaching Assistant & Peer Tutor* *Jan 2023 - present*

- Assisted professors in the biology, physics, and mathematics departments to support 200+ students in *Genes, Mols, and Cells*; *Maxwellian Synthesis*; and *Introduction to Analysis* through preparing class materials, hosting office hours, setting up equipment and lab specimens, conducting test experiments, and grading.
- Provided weekly 1-1 tutoring lessons to 8 students on courses ranging from introductory to advanced courses in Math, Physics, and Biology.

PROJECTS

Does HMAX subject to Müller-Lyer illusion? *(Machine Learning)* *2025*

Advisor (from Neuro240 course, Harvard): Gabriel Kreiman

Trained a Support Vector Machine on HMAX embeddings for length classification tasks and tested the model on illusion dataset. Observed human-like illusion effects experienced by the trained model.

Forecasting Bioactivity: Building Predictive Models for Drug Discovery (*Machine Learning*) *2024*

Advisors (from Alkermes plc): Joerg Bentzien (Director Computational Chemistry), Polina Vanyukov (Assoc. Dir, Enterprise Analytics), Shinichiro Wachi (Principal Scientist Research)

Contributed to a team of four in project planning, coding, writing, and presentation as parts of an internship offered by Alkermes plc, with the goal to generate predictive models for multiple bioactivity endpoints targeting serotonin (5-HT) and dopamine (D) receptors using ChEMBL data and ensemble models.

Biology Focus Group (*Pedagogy*) *2023*

Advisors: Biology Department Faculty, Amherst College

Lead the writing, research, interviews, and data analysis of a department-funded research project addressing the lack of access to learning opportunities for underrepresented students. Our results & analyses from over 10 focus groups (~50 students) were distributed and used by the faculty as a reference for improving pedagogical practice.

Biology For All Vietnam (*Non-profit*) *2019 – 2022*

Founded and directed an award-winning non-profit educational project that provided free advanced Biology courses for 23 high schools across the country and partnered with local governments to train talented students from underprivileged backgrounds. Our students then have won 78 National Biology Olympiad medals, 3 International Biology Olympiad medals, and admissions to the country's most prestigious medical/science universities.

REFERENCES

References available upon request