

Zhijiang Ye



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EDUCATION

Emory University , Atlanta, GA	08/2022 - 05/2026 (<i>Expected</i>)
- Cumulative GPA: 3.992/4.000; Dean's List	
- Bachelor of Science in Biology (<i>Honors in progress</i>); Major GPA: 4.000/4.000	
- Bachelor of Science in Applied Mathematics; Major GPA: 4.000/4.000	

RESEARCH EXPERIENCE

Sarafianos Lab, Laboratory of Biochemical Pharmacology, Emory School of Medicine	<i>Atlanta, GA</i>
<i>Undergraduate Researcher</i>	
PI: Dr. Stefan G. Sarafianos	
Research Mentor: William McFadden, Ph.D. Candidate	
Gallic Acid Displays Inhibitory Activity Against HIV-1 Capsid Protein	01/2024 - Present
- Drafting an honors thesis on the biochemical mechanism of the gallic acid's antiviral effect against the HIV-1 capsid protein	
- Conducted Thermal Shift Assays (TSA) on common vitamins, organic acids, and acid metabolites to probe their binding activities to HIV-1 capsid hexamers, quantifying ΔT_m (melting point difference) to screen their antiviral activities. Identified gallic acid that demonstrates inhibitory activity	
- Conducted Biolayer Interferometry (BLI) to extract kinetic constants for gallic acid and benchmark binding dynamics for capsid inhibitors such as PF74	
- Performing X-ray Crystallography to obtain structures of gallic acid-bound HIV-1 capsid proteins	
Development of Protrace, a Plate Reader Analysis Tool with GUI	06/2025 - Present
- Drafting as an honors thesis	
- Developed <i>Protrace</i> , a cross-platform desktop app with a Python backend for multi-well microplate reader analysis (BioTek 96-well reader, Sartorius BLI, etc.) in a full pipeline setting (import, analysis, plotting, and export)	
- Designed a user-friendly UI/UX for researchers with slight or no programming backgrounds, reducing the learning curve	
Thermal Shift Analysis in R (TSAR) Package Algorithm Improvement	05/2025 - 08/2025
- Developed a <i>cubic-spline with beta-knots method</i> , a new curve-fitting approach, as a solution to the boundary-oscillation issue in the legacy model. Achieved a 30% L_2 -error reduction compared to the legacy model	
- Incorporated the <i>cubic-spline with beta-knots method</i> as a callable function within the package and into the Shiny GUI	
Hepatitis B Virus Protein Analysis	10/2023 - 12/2023
- Conducted data extraction and curation for protein analysis by manually compiling UniProt IDs for Hepatitis B Virus-related proteins	
Department of Mathematics, Emory University	<i>Atlanta, GA</i>
<i>Independent Researcher</i>	
Research Advisor: Dr. Yuanzhe Xi	
Reinforcement Learning for Multigrid Tuning of HYPRE	09/2025 - Present

- Implementing a reinforcement learning-based tuner for *HYPRE BoomerAMG* that learns a policy over the joint action space of selected parameters and adjusts them between runs
- Testing different reinforcement learning setups and benchmarking them against *GPTune* and *GPTuneBand* to evaluate stability and sample efficiency

Department of Mathematics, Emory University

Atlanta, GA

Independent Researcher

Research Advisor: Dr. Alessandro Veneziani

Quantitative Hybrid Model for Wear Estimation

01/2025 - 05/2025

- Co-authored and published in *ICDSIS 2025 (IEEE)*
- Proposed a *bimodal beta model* for probabilistic prediction of footprint. Validated the footstep patterns via Brownian-motion simulation and fit the model parameters via a KDE grid search
- Proposed *HEWAN (Hybrid Euler-Bernoulli-Winkler-Archard with Natural Factors)* model with an analytic solution, which quantifies the dynamic pressure on the structural load of the tread via a piecewise Euler-Bernoulli/Winkler beam with Archard theory and environmental effects.
- Developed a LiDAR-integrated inverse *HEWAN* method to estimate tread-use patterns from scanned spatial features of the worn tread, facilitating industrial applications
- Designed original illustrations and figures to clearly communicate the research workflow and outcomes

Junkipedia, National Conference on Citizenship (NCoC)

Atlanta, GA (Hybrid)

Year-long Research Internship

Supervisor: Cameron Hickey, CEO of NCoC

Hierarchical Weak-supervision for Text Classification

07/2025 - Present

- Established a two-stage LLM weak-supervision pipeline for *Junkipedia* post classification. Validated on 24,000+ posts and deployed by *Junkipedia*
- Performed time series modeling on classified *Junkipedia* posts. Presented the methods and results as a poster at *AI.Xperience 2025 at Emory*
- Utilizing Non-negative Matrix Factorization (NMF) to summarize domain vocabularies. Implemented Sentence-BERT embeddings and clustering analysis for context-aware grouping and customizable domains

PUBLICATIONS

- [1] *Preprint submitted to bioRxiv; planned submission to mBio* McFadden, W. M.[†], Gao, X.[†], **Ye, Z.[†]**, Wen, X., Lorson, Z. C., Zhang, H., Fahim, J., Emanuelli, A., Kirby, K. A., & Sarafianos, S. G. (2025). "TSAR, Thermal Shift Analysis in R, identifies endogenous molecules that interact with HIV-1 capsid hexamers.", 2025. *bioRxiv*. DOI: 10.1101/2023.11.29.569293.
- [2] *In submission to Scientific Reports (Nature Portfolio)* Tran, T. Q. M., Erkelens, B., **Ye, Z.**, N. V. N. Tran, Vinh, T., Jun, L. W., Ho, L., Nguyen, L., Huynh T. B. Chau, Al Diab Al Azzawi, M., Tran, L., Thuy, D. H. D., Tran, P., Le, M. H. N., & Huy, N. T. (2025). "Impact of APOE4 Genotype on Efficacy and Safety of Monoclonal Antibody Therapies in Alzheimer's Disease.", 2025.
- [3] He, E.[†], **Ye, Z.[†]**, & Zou, C.[†] (2025). "Quantitative Hybrid Structure Analysis of Equipment Wear under Dynamic Pressure based on Digital Intelligent Algorithm." *2025 3rd International Conference on Data Science and Information System (IEEE)*, May 16-17, 2025. DOI: 10.1109/ICDSIS65355.2025.11071008.

[†] These authors contributed equally.

PEER-REVIEWED SOFTWARE

- [1] In preparation; planned update to the Bioconductor TSAR Gao, X., McFadden, W. M., **Ye, Z.**, & Sarafianos, S. G. (2025). "TSAR: Thermal Shift Analysis in R (v1.9.1) [R package]." *Bioconductor*, 2025. (Existing package: *TSAR: Thermal Shift Analysis in R*. Bioconductor. DOI: 10.18129/B9.bioc.TSAR.)

PRESENTATIONS & POSTERS

- [1] Wei, A.[†], He, E.[†], & Han, J.[†], **Ye, Z.**[†] (2025). "Engaging Constituents: How 2024 U.S. Federal Election Candidates Communicate Civic Participation Opportunities." *AI.Xperience 2025, Emory University Center of AI Learning*, August 6, 2025.

[†] These authors contributed equally.

TEACHING EXPERIENCE

Teaching Assistant, Emory University Department of Biology <i>Supervisor: Dr. Megan F. Cole</i>	08/2023 - 12/2024 Atlanta, GA
- Guided students in biology lab courses (BIOL 141L and 142L), assisting with experiment setup and concept explanation, ensuring safe and rigorous lab techniques - Facilitated with the lab instructor through material preparation. Assisted with supervision, reinforcing lab adherence	

LEADERSHIP & SERVICE EXPERIENCE

Undergraduate Volunteer, Winship Cancer Institute Department of Hematology <i>Winship Cancer Institute</i>	08/2024 - 05/2025 Atlanta, GA
- Transferred lab samples of patients from the hematology clinic to the processing lab - Supported patients with wayfinding and general inquiries	
Vice President, Emory University MatheMatics Association (EUMMA) <i>Emory University</i>	08/2025 - Present Atlanta, GA
- Led executive board meetings, coordinated event planning, and coordinated room reservations for organization events - Trained members on math modeling, introduction to AI, and Kaggle competitions	
Secretary, Emory University MatheMatics Association (EUMMA) <i>Emory University</i>	03/2023 - 08/2025 Atlanta, GA
- Scheduled events, managed organizational calendars, and sent timely reminders to ensure high engagement and smooth operation of activities	
Peer Mentor, Emory Chinese Student Association (ECSA) <i>Emory University</i>	07/2023 - 12/2023 Atlanta, GA
- Helped freshman undergraduates and incoming transfer students in college life, sharing with them my experience in college and academic advice - Led a group for mentees with similar interests and intended majors. Answered questions and concerns related to college life	

HONORS & AWARDS

Meritorious Winner (globally top 6%), Mathematical Contest in Modeling (MCM)	<i>Spring 2025</i>
Fellowship Holder, Emory Pathways Global Award	<i>Spring 2025</i>
Finalist, American Statistical Association (ASA) DataFest 2025	<i>Spring 2025</i>
Creative Intelligence Award, Atlanta Mathematics of Data Science Bootcamp	<i>Spring 2025</i>

PROFESSIONAL COMPETENCIES

Information Technology

- Core Competencies: Numerical analysis, data analysis, mathematical and statistical modeling, machine learning, deep learning, reinforcement learning, package development
- Programming: Python, R, Java, JavaScript, HTML/CSS
- Computational Biology & Structural Tools: BLAST, UniProt, PDB, PyMOL, ChimeraX, AlphaFold
- Computational Chemistry & Molecular Modeling: Spartan
- Scientific Illustration & UI/UX: Python/R visualization, Figma, ChemDraw, BioRender
- Typesetting: L^AT_EX, Markdown

Language

- Mandarin Chinese: Native
- English: Fluent
- Japanese: Elementary

RELEVANT ADVANCED COURSEWORK

B.S. in Biology

- Human Physiology *Spring, Sophomore*
- Organic Chemistry I, Organic Chemistry I Lab *Summer, Sophomore*
- Organic Chemistry II, Organismal Form and Function *Fall, Junior*
- Organic Chemistry II Lab, Cell Biology, Biochemistry *Spring, Junior*
- Evolutionary Biology, Biotechnology and Molecular Biology *Fall, Senior*
- HIV Epidemiology, Molecular Toxicology *(Expected) Spring, Senior*

B.S. in Applied Mathematics

- Linear Algebra (Honors), Ordinary Differential Equations *Fall, Freshman*
- Multivariable Calculus and Discrete Math (Honors) *Spring, Freshman*
- Mathematical Statistics I, Programming for Math of Data Science (Python) *Fall, Sophomore*
- Mathematical Statistics II, Partial Differential Equations, Physics E&M *Spring, Sophomore*
- Numerical Analysis *Fall, Junior*
- Numerical Differential Equation, Intro to Computer Science II *Spring, Junior*
- Probabilistic Machine Learning *Fall, Senior*
- Non-Linear Optimization *(Expected) Spring, Senior*

ADDITIONAL INFORMATION

Links

- LinkedIn: <https://www.linkedin.com/in/zhijiangye>
- GitHub: <https://github.com/Chloriiin>
- Personal Website: <https://chloriiin.github.io>

Hobbies

Bass Performance, Band, Music Composition, Chinese Cuisine