FUMINORI TANIZAWA

909-905-9558 | ftanizawa@hmc.edu | fuminoritanizawa.com | Claremont, CA

EDUCATION

Harvey Mudd College — Claremont, CA
B.S. in Mathematical and Computational Biology — Aug 2021 - May 2025 (expected)
Humanity concentration in Environmental Analysis — GPA 3.92/4.00 (Major 3.96)

Selected Coursework: Molecular Immunology, Molecular Genetics, Biostatistics, Advanced Computational Biology, Evolutionary Biology, Developmental Biology, Data Structures, Program Development

PUBLICATIONS

- **Tanizawa F**, Takemoto H. Sleep contributes to preference for novel food odours in *Drosophila melanogaster*. *Scientific Reports*. 2021 Apr 30;11(1):9395. doi: 10.1038/s41598-021-88967-1.

PRESENTATIONS

- **Tanizawa F**, So J., Beaver A., Singer L., Mugnier M. "Characterizing the Effect of the Extravascular Environment on *Trypanosoma brucei* Antigenic Diversity." *Johns Hopkins Career, Academic, and Research Experiences for Students Symposium*. Johns Hopkins School of Medicine, Baltimore, MD, July 2024.
- **Tanizawa F**, Liu C.C., Perez P.A., Srinivasan S. "Genomic Regulators of Lipid Metabolism and Longevity in *C. elegans*." *The 2023 Southern California Conference for Undergraduate Research*. California State University, Long Beach, CA, November 2023.
- **Tanizawa F**, Gowri V., Monteiro A. "Behavioral Effects of Odorant Injection on Larvae and Eggs of *Bicyclus anynana*." *2022 Amgen Scholars Asia Symposium*. National University of Singapore, Singapore, August 2022.
- **Tanizawa F**, Takemoto H. "Sleep Contributes to Preference for Novel Food Odours in *Drosophila melanogaster*." *The Animal Behavior Society Annual Meetings 2020*. The Animal Behavior Society, Virtual Conference, July 2020.

GRADUATE SCHOLARSHIP

Full-ride Scholarship — Tokyo, Japan
Ezoe Memorial Recruit Foundation — Sep 2025 – Aug 2027

- Awarded **$95,000/year** for tuition and **$26,400/year** for stipend.
- Funded for **2 years**, with a **potential extension through the 2029–2030 academic year**, pending annual reviews.

RESEARCH EXPERIENCES

Harvey Mudd College — Claremont, CA
Senior Thesis Student — Aug 2024 – Present
Mentored by Dr. Jae Hur, Department of Biology
Project: Mitochondrial Protein Degradation and Immune Response in *Drosophila melanogaster*

- Proposed and independently led a novel project investigating mitochondrial proteostasis and its role in immunity in *Drosophila*, leveraging recent Hur Lab findings.
- Characterized the role of mitochondrial matrix protease *ClpXP* in innate immune regulation using UAS/GeneSwitch-driven overexpression models in *Drosophila*.
- Designed and optimized bacterial challenge protocols for *Drosophila*, including infection assays, antimicrobial peptide qPCR, and bacterial load quantification with antibiotic-resistant strains.

Johns Hopkins University — Baltimore, MD
Summer Undergraduate Research Fellow — May 2024 – Aug 2024
Mentored by Dr. Monica Mugnier, Department of Molecular Microbiology and Immunology
Project: Characterizing the Effect of the Extravascular Environment on *Trypanosoma brucei* Antigenic Diversity

- Investigated the role of the extravascular environment in driving antigenic variation and immune evasion in *Trypanosoma brucei*, a causative parasite for African sleeping sickness.

- Developed and optimized novel protocols for extracting extracellular fluid (EF) from key extravascular organs (heart, lungs, and gonadal fat) in *T. brucei*-infected mice using intravenous injections, cardiac puncture, and perfusion, followed by SDS-PAGE analysis.
- Performed ELISA on EF samples, identifying significantly reduced IgG/M antibodies levels, suggesting diminished immune pressure in extravascular spaces as a potential driver of antigenic variation in *T. brucei*.
- Presented findings at the Johns Hopkins CARES Symposium with implications for understanding immune evasion in parasitic infections.

Harvey Mudd College Claremont, CA
Undergraduate Researcher Sep 2023 – May 2024
Mentored by Dr. Danae Schulz, Department of Biology
Project: Role of HAT Complex Protein EAF6 in Lifecycle Differentiation of *Trypanosoma brucei*

- Engineered an RNAi plasmid targeting EAF6, a chromatin-interacting protein within the HAT complex, to investigate its regulatory role in *Trypanosoma brucei* lifecycle transitions between bloodstream and insect forms.
- Transformed *T. brucei* with an EP1-GFP reporter system and RNAi construct to enable real-time monitoring of lifecycle differentiation under RNAi-induced conditions.
- Optimized flow cytometry protocols to quantify EP1-GFP expression, troubleshooting RNAi system leakage and confirming EAF6's critical role in facilitating lifecycle differentiation.

Scripps Research La Jolla, CA
Summer Undergraduate Research Fellow May 2023 – Aug 2023
Mentored by Dr. Supriya Srinivasan, Department of Neuroscience
Project: Genomic Regulators of Lipid Metabolism and Longevity in *C. elegans*

- Designed five rescue DNA constructs to investigate the role of the metabolic regulator *hlh-11* in *C. elegans*, incorporating tissue-specific promoters (neuron, coelomocyte, glia, intestine, hypodermis), *hlh-11* cDNA, a fluorescent protein, and a UTR for precise functional analysis.
- Engineered a global *hlh-11* knockout strain using CRISPR/Cas9, designing sgRNA and repair templates, and validated knockouts using the *dpy-10* phenotype as a co-CRISPR marker.
- Crossbred *hlh-11* knockout strain with GFP-tagged rescue constructs, confirming successful recombination through PCR and fluorescence microscopy, and demonstrated tissue-specific *hlh-11* expression for further analysis.

National University of Singapore Singapore, Singapore
Amgen Asia Scholar May 2022 – Aug 2022
Mentored by Dr. Antonia Monteiro, Department of Biological Sciences
Project: Behavioral Effects of Odorant Injection on Larvae and Eggs of *Bicyclus anynana*

- Conducted behavioral assays on the African butterfly *Bicyclus anynana* to explore the transgenerational inheritance of learned odor preferences, advancing the understanding of epigenetic mechanisms.
- Designed and executed experiments demonstrating that larvae acquire and transmit novel host plant odor preferences, providing insights into the heritability of learned behaviors.
- Provided evidence of learned preference transmission across generations, contributing to the Monterio Lab's projects in ecological speciation and host plant adaptation.

Japan Science and Technology Agency Shizuoka, Japan
Visiting High-School Student Jul 2018 – Apr 2021
Mentored by Dr. Hiroyuki Takemoto, Research Institute of Green Science and Technology
Project: Sleep Contributes to Preference for Novel Food Odours in *Drosophila melanogaster*

- **First-author publication in *Scientific Reports***, presenting research on the role of sleep deprivation in sensory-driven behaviors of *Drosophila* at the International Animal Behavior Society conference.
- Proposed and led an independent project for two-years, conducting comprehensive behavioral studies to examine the influence of sleep on olfactory food preferences in *Drosophila*.
- Designed and constructed custom apparatus, including a two-choice odor box, a sleep deprivation centrifuge, and an infrared activity monitoring system, to investigate the role of sleep on olfactory-driven behaviors in *Drosophila*.

TEACHING EXPERIENCES

Biology Department Writing Fellow Harvey Mudd College
Writing Fellow Sep 2024 – Present

- Mentored approximately 40 sophomore students in BIOL054 Experimental Biology Laboratory and BIOL154 Biostatistics, focusing on improving clarity, structure, and data presentation in their lab reports.
- Provided tailored feedback in one-on-one mentoring sessions, helping students enhance their scientific argumentation, writing mechanics, and overall communication of complex biological concepts.

BIOL113 Molecular Genetics Harvey Mudd College
Teaching Assistant and Grader Sep 2023 – Present

- Assisted weekly recitation sessions on key genetic mechanisms, including DNA replication, transcription, and gene expression, for 25-30 sophomore and junior students.
- Provided hands-on support during laboratory exercises, guiding students through PCR techniques, gel electrophoresis, and molecular cloning, ensuring proper understanding and execution of protocols.

BIOL046 Introduction to Biology Harvey Mudd College
Teaching Assistant and Grader Jan 2023 – Present

- Assisted review sessions for 20-25 first-year students, covering foundational topics such as cell structure, genetics, and evolution, fostering deeper comprehension.
- Graded quizzes and written assignments for a class of 200 with grading team, providing detailed feedback to correct misconceptions and support students' first biology learning.

MATH055 Discrete Mathematics Harvey Mudd College
Teaching Assistant and Grader Sep 2024 – Present

- Graded assignments on mathematical proofs, including graph theory, set theory, and combinatorics, for 40-50 sophomore students, providing in-depth feedback to reinforce understanding.
- Assisted weekly office hours to support students with challenging concepts and problem-solving strategies in discrete mathematics.

CSCI060 Principles of Computer Science Harvey Mudd College
Teaching Assistant Sep 2024 – Present

- Assisted review sessions and office hours for 40-50 students, clarifying algorithms, data structures, and programming languages (Java, Racket) to enhance understanding of core concepts.
- Graded homework assignments and helped with exam preparation, covering complexity analysis and theoretical aspects of computer science.

LEADERSHIP & SERVICE

Event Staff Coordinator, Harvey Mudd College Jan 2022 – Dec 2023
Coordinated logistics and managed student event staff for on-campus social events, ensuring safe operations.

Residential Manager, Living Learning Community Sep 2022 – Feb 2023
Managed community-focused activities to foster engagement and build a supportive living environment.

Volunteer, The Prison Education Project Aug 2022 – Dec 2022
Assisted in creating educational materials and providing writing support for incarcerated learners.

Workshop Leader, Atelier Basi May 2021 – Dec 2021
Led workshops for high school students preparing study abroad applications, focusing on essay writing.

Volunteer, Ministry of Education Cultural Exchange Program Aug 2020 – Sep 2020
Participated in a cultural exchange program in Ghana and Japan, supporting educational activities.

HONORS & FELLOWSHIPS

Academics
Dean's List, Harvey Mudd College 2021 – Present

Research

Johns Hopkins University BSI-SIP Scholar	May 2024
National University of Singapore Amgen Scholar	May 2022
Grand Prize Winner, Japan Science and Technology Agency National Research Presentation	Nov 2020
Grand Prize Winner, Japan National High School Student Biology Summit	Aug 2020

Fellowships

Ezoe Memorial Recruit Foundation, Full-ride Scholarship **($120k/year)**	2025 – 2027 (2030)
Tadashi Yanai Foundation, Full-ride Scholarship **($115K/year)**	2021 – 2025
Masason Foundation, Research Grants ($35K)	2018 – 2025
Ben Huppe ’14 Memorial Internships Fellowship, Summer Aid ($7k)	2023
John and Miyoko Davey Foundation, Living-expense	2021-2023

TECHNICAL STRENGTHS

Programming & Bioinformatics Tools

- Advanced in: R, Python, MATLAB, BLAST, C++, Java, Git, HTML/CSS, and LaTeX

Molecular Techniques (5+ years lab experience)

- **Cloning:** Plasmid design, PCR, miniprep, gel extraction, bead cleanup, heat shock, Gibson assembly
- **Gene Editing:** CRISPR-Cas9 (sgRNA & repair template design, gene knockout/knockdown), Tet-On/Tet-Off RNAi, UAS/GeneSwitch system
- **Molecular Analysis:** Flow cytometry, ELISA, RT-PCR, qPCR, immunoprecipitation, Western blot, SDS-PAGE, BCA assay
- **Microscopy Techniques:** Confocal microscopy, immunofluorescence imaging

Model Organism Techniques

- ***Trypanosoma brucei***:
  - Routine culture maintenance, parasitemia quantification
  - Electroporation for plasmid transformation (e.g., RNAi constructs), RNA interference assays
- ***Drosophila melanogaster***:
  - Routine fly maintenance, sex differentiation
  - Behavioral and physiological assays: climbing, lifespan, and immunological assays (bacterial infection, antimicrobial peptide expression, bacterial load quantification).
  - Molecular techniques: RNA extraction, protein degradation assays (Casein-FITC, AMC), and mitochondrial function assays
- ***Caenorhabditis elegans***:
  - Routine culture maintenance, picking, basic genotyping
  - Lifespan assays, immunofluorescent screening
- ***Mus musculus***:
  - Handling, restraint, and general care
  - IV/IP injections, blood collection (submandibular, tail), cardiac puncture, perfusion, tissue extraction
- ***Bicyclus anynana***:
  - Routine maintenance, sex differentiation
  - Behavioral assays, dissection, and neural tissue preparation

Languages

- English & Japanese (Bilingual)