Fuminori Tanizawa

UNDERGRADUATE STUDENT — Computational Biology

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EDUCATION

Harvey Mudd College Sep. 2021 - May 2025 (expected)

B.S. in Mathematical and Computational Biology Claremont, CA

- Overall GPA: 3.92; Major GPA: 3.96; Dean's List all semesters
- Selected Coursework: Molecular Genetics, Molecular Immunology, Biostatistics, Evolutionary Biology, Developmental Biology, Advanced Computational Biology, Data Structures, Program Development, Scientific Computing
- TA/Grader: Molecular Genetics, Intro Bio, Discrete Math, Principles of CS; Chosen as Biology Writing Fellow.

PUBLICATIONS

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

RESEARCH EXPERIENCE AND PROJECTS

Harvey Mudd College Aug 2024 – Present

Molecular Immunology of D. melanogaster — Jae Hur, Ph.D. Claremont, CA

- Proposed the involvement of mitochondrial serine protease *ClpP* in aging-related immune responses in *Drosophila melanogaster*, using the GAL4-UAS system for overexpression and knockdown of *ClpP*, as part of my senior thesis.
- Developed an RNAi-based knockdown model targeting *ClpP*, by creating a UAS-*ClpP* RNAi strain.
- Designed and optimized immunological assays such as the Infection Survival Assay and RT-qPCR quantification of antimicrobial peptides (Diptericin, Drosomycin, Attacin), establishing a new protocol for use in the lab.

Johns Hopkins University May 2024 – Aug 2024

Molecular Immunology of T. brucei — Monica Mugnier, Ph.D. Baltimore, MD

- Investigated the impact of the extravascular environment on antigenic variation in *Trypanosoma brucei*, focusing on developing protocols for extracting extracellular fluid (EF) from the organs of infected mice.
- Dissected heart, lung, and gonadal fat, optimizing techniques such as blood washing, perfusion, and centrifugation to isolate EF with minimal contamination, validated through SDS-PAGE protein profiling on 108 samples.
- Hypothesized that low immune pressure in extravascular spaces drives antigenic variation, supported by conducting ELISA for IgG/M on the extracted EF based on the developed protocol.

Harvey Mudd College Sep 2023 – May 2024

Molecular Immunology of T. brucei — Danae Schulz, Ph.D. Claremont, CA

- Engineered an RNAi plasmid targeting a part of the HAT complex in *Trypanosoma brucei*, the parasite causing African sleeping sickness, to study its role in the parasite's lifecycle transitions between Bloodstream and Insect forms.
- Electro-transformed an RNAi plasmid into *T. brucei*, incorporating an EP1-GFP reporter system to enable real-time monitoring of procyclin expression, encoded by the EP1 gene, as a proxy for lifecycle differentiation.
- Performed detailed flow cytometry to track EP1-GFP expression in *T. brucei*, uncovering EAF6's critical role in facilitating differentiation and indicating potential RNAi system leakage.

Scripps Research May 2023 – Aug 2023

Neuroscience of C. elegans — Supriya Srinivasan, Ph.D. La Jolla, CA

- Constructed and cloned five rescue plasmids to investigate the function of the metabolic regulator gene *hlh-11*, incorporating tissue-specific promoters, *hlh-11* cDNA, a fluorescent protein, and a UTR into the *pUC19* vector.
- Engineered a global knockout of *hlh-11*, deleting all six exons ($\sim$ 3,500 bp), using CRISPR/Cas9, and designed the sgRNA and repair template with an EcoRI site, screening with the *dpy-10* phenotype as a Co-CRISPR marker.
- Generated a worm strain by crossbreeding a *hlh-11* knockdown line with a rescue construct line tagged with GFP to monitor *hlh-11* expression, screening the crosses using PCR and microscopy.

National University of Singapore May 2022 – Aug 2022
Evolutionary Development of B. anynana — Antonia Monteiro, Ph.D. Singapore, Singapore

- Conducted behavioral assays on the African butterfly *Bicyclus anynana* to study the transgenerational inheritance of learned odor preferences, providing insights into epigenetic inheritance mechanisms.
- Designed quantitative behavioral experiments, demonstrating that larvae could learn and transmit novel host plant odor preferences, advancing the understanding of insect behavior and adaptation.
- Demonstrated the ability of *B. anynana* to pass learned preferences for novel odors to subsequent generations, with significant implications for ecological speciation and host plant shifts.

Japan Science and Technology Agency Jul 2018 – Apr 2021
Behavioral Biology of D. melanogaster — Hiroyuki Takemoto, Ph.D. Shizuoka, Japan

- **First-author of a peer-reviewed publication in *Scientific Reports*** and **delivered an oral presentation** at the International Animal Behavior Society conference on sleep's influence on sensory-driven behaviors.
- Conducted in-depth behavioral analyses, identifying the role of sleep in modulating olfactory-driven food selection, validated through supplementary experiments with carefully designed controls.
- Designed and built custom experimental apparatuses, including a sleep deprivation centrifuge and an infrared activity monitoring system, to study the relationship between sleep and olfactory food preferences in *D. melanogaster*.

SELECTED CONFERENCE PRESENTATIONS

- "Characterizing the Effect of the Extravascular Environment on *Trypanosoma brucei* Antigenic Diversity," *Johns Hopkins C.A.R.E.S. Symposium*. Johns Hopkins School of Medicine, Baltimore, MD, July 2024.
- "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.
- "Behavioral Effects of Odorant Injection on Larvae and Eggs of *Bicyclus anynana*," *2023 Amgen Scholars Asia Symposium*. National University of Singapore, Singapore, August 2022.
- "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.

AWARDS & FELLOWSHIPS

Awards	Nov. 2020	Grand Prize Winner, Minister of Education, Science and Technology Award: Japan Science and Technology Agency National Research Presentation
	Aug. 2020	Grand Prize Winner, Minister of Health, Labor and Welfare Award: Japan National High School Student Biology Summit
Fellowships	2021 – 2025	Tadashi Yanai Foundation: Full-ride Scholarship. ($105K/year)
	2018 – 2025	Masason Foundation: Research Grants. ($35K)
	2024	Johns Hopkins University BSI-SIP Fellowship: Summer Intern. ($6K)
	2023	Ben Huppe '14 Memorial Internships Fellowship: Summer Aid. ($7K)
	2022	National University of Singapore Amgen Scholar: Summer Intern. ($7K)

TECHNICAL STRENGTHS (5 years lab experience)

Languages	English & Japanese (Bilingual)
Programming Tools	Advanced in R, Python, MATLAB, C++, Java, Arduino, HTML/CSS, LaTeX, Git
Molecular Techniques	Gibson Assembly (Plasmid Design, PCR, Gel Extraction/Bead Cleanup, Miniprep, Heat Shock), Measurement Tools (RT-PCR; ELISA, Immunoprecipitation; BCA Assay, Western Blot, SDS-PAGE), RNAi (Tet-On/Tet-Off), CRISPR-Cas9 (sgRNA & Repair Template Design, Genetic Screening)
Mouse Techniques	Handling and Restraining Mice, IV and IP Injections, Submandibular and Tail Blood Collection, Anesthetization, Mouse Behavior Studies
Animal Maintenance	*M. musculus*, *D. melanogaster*, *T. brucei*, *C. elegans*, *B. anynana*