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

2021   **Tanizawa, F.**, Takemoto, H. Sleep contributes to preference for novel food odours in *Drosophila melanogaster*. *Scientific Reports* 11, 9395 (2021)

RESEARCH EXPERIENCE AND PROJECTS

Harvey Mudd College   Aug 2024 – Present
Molecular Immunology of D. melanogaster — Jae Hur, Ph.D.   Claremont, CA

- Proposed and developed an RNAi-based knockdown model targeting mitochondrial serine protease *ClpP* in *Drosophila melanogaster* to explore its involvement in aging-related immune responses.
- Utilized the GAL4-UAS system to achieve tissue-specific overexpression/knockdown of *ClpP*, establishing the foundation for studying its impact on immune system modulation in flies.
- Designed and optimized immunological assays, such as Infection Survival Assay and RT-qPCR quantification of antimicrobial peptides (Diptericin, Drosomycin, Attacin), contributing a comprehensive protocol for the lab.

Johns Hopkins University   May 2024 – Aug 2024
Molecular Immunology of T. brucei — Monica Mugnier, Ph.D.   Baltimore, MA

- Investigated the impact of the extravascular environment on antigenic variation in *Trypanosoma brucei*, a key parasite invasion mechanism, by developing protocols for extracting extracellular fluid (EF) from the organs of infected mice.
- Performed precise dissections and evaluated techniques such as blood washing, perfusion, and centrifugation to isolate EF with minimal contamination, validated by 108 samples through SDS-PAGE analysis.
- Proposed low immune pressure as a potential driver of antigenic variation by establishing an EF extraction method and conducting ELISA for IgG/M on the extracted EF.

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 explore a target gene's function, incorporating tissue-specific promoters, cDNA of interest, a fluorescent protein, and a UTR into the *pUC19* vector plasmid.
- Engineered a global knockout of a key gene, deleting all six exons ($\sim$ 3,500 bp), designing the sgRNA and repair template with an EcoRI site, and screening using the *dpy-10* phenotype as a Co-CRISPR marker.
- Generated a worm strain by crossbreeding a gene mutation line with a rescue construct line of the target gene tagged with green fluorescent protein. Screened 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 a detailed study on the transgenerational inheritance of learned odor preferences in *Bicyclus anynana*, providing insights into epigenetic inheritance mechanisms.
- Designed and executed experiments that demonstrated larvae could learn and pass on novel host plant odor preferences, contributing to our understanding of insect behavior and adaptation.
- Showed the ability of *B. anynana* to transmit learned preferences for novel odors to subsequent generations, highlighting the 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

- Designed custom experimental apparatuses, including a sleep deprivation centrifuge and infrared activity monitoring system, to investigate the link between sleep and olfactory food preferences in *Drosophila melanogaster*.
- Performed in-depth behavioral analyses, identifying the role of sleep in modulating olfactory-driven food selection, and validated findings through statistical modeling and data from sleep-deprived versus control groups.
- **First-author of a peer-reviewed publication** in *Scientific Reports* (Nature Publishing Group), and **orally presented** at the International Animal Behavior Society conference on the role of sleep in modulating sensory-driven behaviors.

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*