

Fuminori Tanizawa

UNDERGRADUATE STUDENT – Computational Biology

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EDUCATION

Harvey Mudd College

B.S. in Mathematical and Computational Biology

Sep. 2021 - May 2025 (expected)

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)

EXPERIENCE AND PROJECTS

Johns Hopkins University

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

May 2024 – Aug 2024

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

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

Sep 2023 – May 2024

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

Neuroscience of C. elegans — Supriya Srinivasan, Ph.D.

May 2023 – Aug 2023

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 (~ 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.

Japan Science and Technology Agency

Behavioral Biology of D. melanogaster — Hiroyuki Takemoto, Ph.D.

Jul 2018 – Apr 2021

Shizuoka, Japan

- Performed comprehensive behavioral analyses of *Drosophila melanogaster*, focusing on sleep patterns and olfactory food preferences, utilizing my unique custom-designed experimental apparatuses such as a sleep deprivation centrifuge and an infrared activity monitoring device.
- **First-authored a peer-reviewed article** in *Scientific Reports* (Nature Publishing Group) and **orally presented** my project at the International Animal Behavior Society conference, elucidating the role of sleep in food odor preference in *D. melanogaster*.

- 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.

Google Research

Bioinformatics via CS Research Mentorship Program — Albert Cohen, Ph.D.

Jan 2023 – May 2023

Online

- Engineered and optimized a Python-based search algorithm for selecting optimal PCR amplicons in *E. coli* DNA, utilizing bioinformatics tools such as Primer3 and Biopython libraries, enhancing computational efficiency and achieving maximal accuracy thresholds.
- Developed and implemented advanced evaluation criteria for 88 DNA samples, incorporating metrics such as GC content, melting temperature (T_m), and specificity to markedly improve the precision and reliability of genetic analysis, and designed in-silico PCR simulations to validate the performance of selected amplicons.
- Accelerated the processing speed of BLAST for sequence alignment tasks, yielding significant performance enhancements in PCR optimization workflows by parallelizing computations and optimizing query handling.

AWARDS & FELLOWSHIPS

Awards	Nov. 2020	Grand Prize Winner, Minister of Education, Science and Technology Award: Japan Science and Technology Agency National High School Student 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)
	2023	Ben Huppe '14 Memorial Internships Fellowship Summer Aid. (\$7K)
	2021 – 2023	John and Miyoko Davey Foundation Living-expenses. (\$12K/year)

TECHNICAL SKILLS

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 Handling	<i>Mus musculus</i> , <i>Drosophila melanogaster</i> , <i>Caenorhabditis elegans</i> , <i>Trypanosoma brucei</i> , <i>Bicyclus anynana</i>