

# 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

## 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

- Conducted research on the immunological response and antigenic variation of *Trypanosoma brucei*, developing and optimizing protocols for extracting extravascular fluid (EVF) from multiple organs of infected mice.
- Performed meticulous dissections and applied various centrifugation speeds to effectively isolate EVF, achieving minimal contamination and maintaining sample purity, validated by SDS-PAGE analysis.
- Tested and compared dissection techniques, including blood washing and perfusion, to identify the most effective methods for obtaining uncontaminated EVF, contributing to protocol standardization.

### 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.
- Conducted imaging of NeuroPAL line and GFP-tagged worm strains using an A1 Confocal Microscope.

### 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 custom-designed experimental apparatuses such as a sleep deprivation centrifuge and an infrared activity monitoring device.
- **First-authored and published a peer-reviewed article** in *Scientific Reports* (Nature Publishing Group) and **orally presented** findings 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<sub>m</sub>), 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	<b>Grand Prize Winner, Minister of Education, Science and Technology Award:</b> Japan Science and Technology Agency National High School Student Research Presentation
	Aug. 2020	<b>Grand Prize Winner, Minister of Health, Labor and Welfare Award:</b> Japan National High School Student Biology Summit
Fellowships	2021 – 2025	<b>Tadashi Yanai Foundation</b> Full-ride Scholarship. (\$105K/year)
	2018 – 2025	<b>Masason Foundation</b> Research Grants. (\$35K)
	2023	<b>Ben Huppe '14 Memorial Internships Fellowship</b> Summer Aid. (\$7K)
	2021 – 2023	<b>John and Miyoko Davey Foundation</b> Living-expenses. (\$12K/year)

TECHNICAL STRENGTHS

Languages	English & Japanese (Bilingual)
Programming Tools	Advanced in R, Python, MATLAB, C++, Java, Arduino, HTML/CSS, $\LaTeX$ , Git
Molecular Techniques	Gel Extraction, Miniprep, Bead Cleanup, PCR, RT-PCR, ELISA, Immunoprecipitation, Plasmid Design, Gibson Assembly, RNAi (Tet-On/Tet-Off), CRISPR-Cas9 (sgRNA & Repair Template Design, Genetic Screening)
Transformation Methods	Heat-shock, Electroporation
Protein Analysis	Western Blot, SDS-PAGE, BCA Assay
Microscopy	General Microscopy Techniques, Proficient in Confocal Microscopy (Nikon A1)
Animal Handling	Handling and Restraining Mice, IV and IP Injections, Submandibular and Tail Blood Collection, Anesthetization, Mouse Behavior Studies
Animal Models	<i>Mus musculus</i> , <i>Drosophila melanogaster</i> , <i>Caenorhabditis elegans</i> , <i>Trypanosoma brucei</i> , <i>Bicyclus anynana</i>