Tzu-Yang Tseng (yang2tseng@gmail.com)

EDUCATION

National Taiwan University (NTU), Taipei, Taiwan

2022/09 – 2023/06 M.S. – Graduate Institute of Biomedical Electronics and Bioinformatics (GPA: 4.30/4.30)
- Graduated 1st out of 60
- Graduate Representative
- Thesis: Transcriptional regulation of T cell exhaustion in immune checkpoint blockade resistance at single-cell resolution (Advisor: Dr. Hsueh-Fen Juan)

2018/09 – 2022/06 B.S. – Major in Life Science, Minor in Economics (GPA: 3.85/4.30)
- Thesis: Drug discovery by integrative single-cell RNA sequencing and perturbational gene-expression data (Advisor: Dr. Hsueh-Fen Juan)

2020/09 – 2023/06 Credit Program – Biotechnology Program (Total credits: 25)

2020/09 – 2022/06 Credit Program – Molecular Medical Sciences Program (Total credits: 25)

WORK EXPERIENCE

National Taiwan University (NTU), Taipei, Taiwan

2023/08 – Present Research and Development Substitute Services (Advisor: Dr. Hsueh-Fen Juan)

Osaka University (OU), Osaka, Japan

2023/12 – 2024/01 Visiting Scholar – Institute for Protein Research (Host: Dr. Mariko Okada)

RESEARCH EXPERIENCE

2019/06 – Present **Systems Biology Lab (Advisor: Dr. Hsueh-Fen Juan)**
- Studied single-cell multiomics sequencing analysis (scATAC-seq and scRNA-seq) with a focus on gene regulatory network inference and drug discovery of exhausted T cell that acquired resistance to immune checkpoint blockade in hepatocellular carcinoma.
- Developed a distance-based module detection method to identify transitional modules via scRNA-seq.
- Investigated lncRNA and gene regulatory network in neuroblastoma progression via scRNA-seq.
- Proposed a combinatorial treatment approach targeting the cholesterol biosynthesis pathway in breast cancer.
- Experienced in cell culture and cell viability assays.
- Wrote grant applications and drafted manuscripts.

2023/12 – 2024/01 **Laboratory for Cell Systems (Host: Mariko Okada)**
- Studied mathematical modelling and cell signaling systems.
- Established a mathematical model of cellular senescence and simulated the nuclear NFκB level under different conditions.

2023/07 – 2023/10 **Collaborate with Dr. Paul Charles Evans, Queen Mary University of London, London, UK**
- Focused on heart disease and used the scDrug pipeline to identify drugs targeting disease-causing endothelial cell clusters.

GRANTS AND AWARDS

2023/12 – 2024/01 **NTU International Cooperation Add-on Project** (with Dr. Mariko Okada, Osaka University)
Two-month visit to Osaka University. (*Grant: 112L8503*)

2021/11 **Presidential Award**, NTU, Taiwan. (Awarded to the top 5%)

2021/07 – 2021/08 **Summer College Student Fellowship**, NTU Center of Developmental Biology and Regenerative Medicine, Taipei, Taiwan.

2021/06 **College Student Research Creativity Award**, Ministry of Science and Technology, Taiwan.

2020/07 – 2021/02 **College Student Research Fellowship**, Ministry of Science and Technology, Taiwan.
"Drug discovery for breast cancer by integrative single-cell RNA sequencing and perturbational gene-expression data" (*Grant: 109-2813-C-002-053-E*)

PUBLICATIONS

- **Tzu-Yang Tseng,** Ching-Hung Hsieh, Hsuan-Cheng Huang, Yu-Ching Wu, Chiun Hsu, Chia-Lang Hsu, Da-Liang Ou, Hsueh-Fen Juan. "Transcriptional dynamics of T-cell exhaustion in immune checkpoint resistance at single-cell resolution" (Submitted to *Advanced Science*)

- **Tzu-Yang Tseng**, Chiao-Hui Hsieh, Jie-Yu Liu, Hsuan-Cheng Huang, Hsueh-Fen Juan. "Single-cell RNA sequencing unveils cholesterol biosynthesis as a therapeutic target in malignant breast cancer: a combinatorial treatment approach" (Manuscript in preparation)
- Yi-Xuan Chen, Chiao-Hui Hsieh, **Tzu-Yang Tseng**, Albert Li, Hsuan-Cheng Huang, Hsueh-Fen Juan. "Targeting high-risk neuroblastoma subpopulations at the single-cell level of effective drug repurposing" (Under review at *New Biotechnology*)
- Yih-Yun Sun, Chiao-Yu Hsieh, Jian-Hung Wen, **Tzu-Yang Tseng**, Jia-Hsin Huang, Yen-Jen Oyang, Hsuan-Cheng Huang, Hsueh-Fen Juan. "scDrug+: predicting drug-responses using single-cell transcriptomics and molecular structure" *Biomedicine & Pharmacotherapy,* 177, 11707. (2024)
- Chiao-Yu Hsieh, Jian-Hung Wen, Shih-Ming Lin, **Tzu-Yang Tseng**, Jia-Hsin Huang, Hsuan-Cheng Huang, Hsueh-Fen Juan. "scDrug: From single-cell RNA-seq to drug response prediction" *Computational and Structural Biotechnology Journal*, 21, 150-157. (2023)

TALKS

2024/04	**NTU-OsakaU Bilateral Symposium on Systems Biology in Human Disease,** Taipei, Taiwan. "Transcriptional regulation of T cell exhaustion in immune checkpoint blockade resistance at single-cell resolution"
2022/03	**International Symposium on Evolutionary Genomics and Bioinformatics 2022 – co-hosted with the Institute for Protein Research (IPR), Osaka University,** Taipei, Taiwan. "Drug discovery by integrative single-cell RNA sequencing and perturbational gene-expression data" (**Oral Presentation Award**)

CONFERENCE ABSTRACTS

2024/05	**2024 Conference of Advanced Computing and Imaging in Biomedicine – Asia Pacific Spatial Omics Technology,** Taipei, Taiwan. "Transcriptional regulation of T cell exhaustion in immune checkpoint inhibitor resistance by integrative single-cell RNA-seq and spatial transcriptomics data"
2023/11	**2023 Multiomics and precision medicine joint conference,** Taipei, Taiwan. "Single-cell RNA-seq uncovers cancer-associated fibroblast subgroup linked to immune resistance in hepatocellular carcinoma" (**Poster Award**)
2023/09	**2023 The 82nd annual meeting of the Japanese cancer association,** Yokohama, Japan. "Transcriptional regulation of T cell exhaustion in immune checkpoint blockade resistance at single-cell resolution" (**Travel Grant**)
2022/11	**2022 Multiomics and precision medicine joint conference,** Taipei, Taiwan. "Single-cell multi-omics analysis reveals transcriptional regulatory network of CD8+ T cell exhaustion under anti-PD-1 resistance in hepatocellular carcinoma and predicts potential small molecular drug to avoid T cell dysfunction" (**Poster Award**)

TEACHING AND MENTORING

2022/05 – Present	**Mentorship**, mentored **four** medical school students and **one** undergraduate student at Dr. Juan's lab. • Three received **College Student Research Fellowship** and one won **College Student Research Creativity Award** from Ministry of Science and Technology, Taiwan. (*Grant: 112-2813-C-002-025-E, 112-2813-C-002-027-E* and *113-2813-C-002-028-E*) • Three attended **2024 SMBE Regional Meeting in Taiwan: Evolutionary Genomics & Bioinformatics (poster)** and one won best **poster award**. • Two received **Summer College Student Fellowship**, NTU Center of Developmental Biology and Regenerative Medicine, Taipei, Taiwan.
2023/02 – 2023/06	**Teaching Assistant** for **Bioinformatics (3)** and **Advanced in Computational and Systems Biology (4)**

EXTRACURRICULAR ACTIVITIES

2024/03	Volunteer at 2024 SMBE Regional Meeting in Taiwan: Evolutionary Genomics & Bioinformatics.
2017/10	**TMU-MIT Sana Hackathon**: Evolving HIoT Big Data to Health Artificial Intelligence
2016/08	Completed **Dale Carnegie Training Course** and got **Highest Award for Achievement.**