# 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 Assistant (R&D Substitute Services; Advisor: Dr. Hsueh-Fen Juan) |

**Osaka University (OU), Osaka, Japan**

| | |
|---|---|
| 2023/12 – 2024/01 | Visiting Scholar (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, trajectory inference and drug discovery of exhausted T cell that acquired resistance to immune checkpoint inhibitor in hepatocellular carcinoma.
- Developed a distance-based module detection method capable of revealing module dynamics and identifying transitional genes between cancer stages.
- Investigated lncRNA and gene regulatory network in neuroblastoma progression via scRNA-seq.
- Proposed a combinatorial treatment approach targeting the cholesterol biosynthesis pathway and HER2 in breast cancer based on scRNA-seq analysis.
- Experienced in cell culture and cell viability assays.
- Wrote grant applications and drafted manuscripts.

| | |
|---|---|
| 2023/12 – 2024/01 | **Laboratory for Cell Systems (Host: Dr. 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**, National Taiwan University (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 | **University Student Research Creativity Award**, National Science and Technology Council, Taiwan. |
| 2020/07 – 2021/02 | **Research Grant for University Student**, National Science and Technology Council, 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 *Cancer Research*)

- **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 under preparation for resubmission)
- 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, 117070. (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. (2022)
- Chiao-Hui Hsieh, Yi-Xuan Chen, **Tzu-Yang Tseng**, Albert Li, Hsuan-Cheng Huang, Hsueh-Fen Juan. "Transcriptionally distinct malignant neuroblastoma populations show selective response to adavosertib treatment" (Under review in *Neurotherapeutics*)

## 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

| | |
|---|---|
| 2024/09 | **2024 The 83rd annual meeting of the Japanese cancer association,** Fukuoka, Japan. "A distance-based module detection method infers transitional gene sets and drug discovery via single-cell RNA sequencing" |
| 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.<br>• Three received **Research Grant for University Student** and one won **University Student Research Creativity Award** from National Science and Technology Council, Taiwan. (*Grant: 112-2813-C-002-025-E, 112-2813-C-002-027-E* and *113-2813-C-002-028-E*)<br>• Three attended **2024 SMBE Regional Meeting in Taiwan: Evolutionary Genomics & Bioinformatics (poster)** and one won **best poster award**.<br>• 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.** |