

Chen Hsieh

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Education

University of Georgia

PhD Candidate, Institute of Bioinformatics

August 2020 – June 2026

National Taiwan University

MSc, Horticultural Crops Science

June 2019

National Taiwan University

BS, Agriculture

June 2017

Research Experience

PhD Dissertation Research

Tsai Lab, Institute of Bioinformatics, University of Georgia

August 2020 – June 2026

- To study the function of lineage-specific genes and the gene duplication landscape in *Populus*, I reprocessed large-scale community RNA-seq data from raw FASTQ to differential expression and visualization to characterize stress-responsive expression across developmental conditions.
- Contributed to *Populus* VariantDB v3.2, a community bioinformatics resource and service facilitating CRISPR gRNA design and functional genomics research (*Tree Physiology*, 2025).
- Applied comparative transcriptomics and phylogenetics to identify a perennial-specific sulfate transporter subgroup associated with lignification (*Tree Physiology*, 2025).
- Built end-to-end workflows for genome-wide protein structure annotation with emphasis on reproducibility, modularity, and HPC scalability.

MSc Research

Plant Biotechnology and Molecular Biology Lab, Dept. of Horticulture and Landscape Architecture, National Taiwan University

Sep 2017 – Jun 2019

- Performed comparative transcriptome analysis revealing mechanisms underlying mycorrhiza-enhanced salt tolerance in rice (co-first-author, *Frontiers in Plant Science*, 2022).
- Automated high-resolution melting (HRM) analysis output processing with custom analysis scripts, streamlining genotyping for a peach (*Prunus persica*) study on chilling requirements (*IJMS*, 2020).
- Designed RNA-seq experiments and identified genome-wide MADS-box gene family to study gibberellin-induced sex determination in bitter melon (*Int. Horticultural Congress at Istanbul, Turkey*, 2018; first prize, *NTU graduate student research poster presentation competition*, 2019).

Technical Skills

Programming Languages: Python · R · Bash/Shell · JavaScript · C/C++

Bioinformatics: RNA-seq pipelines (STAR, HISAT2, DESeq2, edgeR...) · sequence analysis · phylogenetics

Applied AI: LLM API integration · agentic/prompt engineering · automated multi-step data pipelines

Research Engineering: Snakemake · HPC/SLURM · Git/GitHub · Python packaging · Docker

Prototyping: Dashboards (Streamlit/R Shiny) · REST API · IoT systems (Raspberry Pi, ESP32)

Publications and Presentations

Publications

1. **Hsieh, C.**, Chen, Y.-H., Chang, K.-C., & Yang, S.-Y. (2022). Transcriptome analysis reveals the mechanisms for mycorrhiza-enhanced salt tolerance in rice. *Frontiers in Plant Science*, 13, 1072171. doi:10.3389/fpls.2022.1072171
2. Chou, L., Huang, S.-J., **Hsieh, C.**, Lu, M.-T., Song, C.-W., & Hsu, F.-C. (2020). A high-resolution melting analysis-based genotyping toolkit for the peach (*Prunus persica*) chilling requirement. *International Journal of Molecular Sciences*, 21(5), 1543. doi:10.3390/ijms21041543
3. Tuma, T. T., Nyamdari, B., **Hsieh, C.**, Chen, Y.-H., Harding, S. A., & Tsai, C.-J. (2024). Perturbation of tonoplast sucrose transport alters carbohydrate utilization for seasonal growth and defense metabolism in coppiced poplar. *Tree Physiology*, 44(7), tpae061. doi:10.1093/treephys/tpae061
4. Zhou, R., Seth, S. R., Reeves, J., Burns, A. H., **Hsieh, C.**, Horn, T. W., Xue, L.-J., & Tsai, C.-J. (2025). *Populus* VariantDB v3.2 facilitates CRISPR and functional genomics research. *Tree Physiology*. doi:10.1093/treephys/tpaf081
5. Surber, S. M., **Hsieh, C.**, Na, L., Harding, S. A., & Tsai, C.-J. (2025). An updated sulfate transporter phylogeny uncovers a perennial-specific subgroup associated with lignification. *Tree Physiology*. doi:10.1093/treephys/tpaf080

Oral Presentation

- **Hsieh, C.**, Zhou, R., & Tsai, C.-J. (Nov 2023). Investigating de novo gene birth in *Populus*. SMBE Satellite Meeting on De Novo Gene Birth, Texas A&M University.

Selected Poster Presentations

- **Hsieh, C.**, Drowns, M., Zhou, R., & Tsai, C.-J. (Jun 2024). Characterization of stress-responsive lineage-specific genes in *Populus*. IUFRO Tree Biotechnology Conference, Annapolis, MD.
- **Hsieh, C.**, Zhou, R., & Tsai, C.-J. (Aug 2021). Searching for orphan genes in *Populus*. ASPB Worldwide Summit (Online).
- **Hsieh, C.**, Huang, P. L., & Do, Y. Y. (August 2018). Comparative transcriptome analysis of gibberellin-induced sex determination in bitter melon. XXX International Horticultural Congress, Istanbul, Turkey.

Teaching & Mentoring

Graduate & Undergraduate Mentor

2021 – 2025

University of Georgia

- Guided undergraduate students in *Arabidopsis* phenotyping, aseptic handling, and bioinformatics workflows; emphasized independent problem-solving and technical communication.

Guest Lecturer

October 2019

Methods in Horticultural Research (IV), National Taiwan University

- Taught RNA-seq analysis to a non-technical audience; pre-lecture social media content doubled expected attendance; deployed a chatbot for supplementary material delivery.

Undergraduate Research Mentor

September 2017 – June 2018

National Taiwan University

- Mentored an undergraduate in genome-wide sequence analysis of the *JAZ1* gene family in *Musa acuminata*; taught bioinformatics workflows and poster presentation skills. Mentee won first prize at the departmental poster competition.

Leadership & Technical Experience

Technology Consultant & IT Group Convener (volunteer)

April 2022 – Present

Taiwanese Young Researcher Association (Project TYRA)

- Architected a mentor-mentee matching platform that grew from 274 to 700+ annual participants, facilitating 1,876 researcher connections across 4 cohorts (2022–2025); organization now collaborates formally with Fulbright and government education agencies.
- Designed and deployed weekly seminar automation pipeline (Eventbrite API + Google Colab); introduced blockchain-based engagement tracking (POAP).

BIGSA Representative & Seminar Organizer

June 2022 – Present

Bioinformatics Graduate Student Association, University of Georgia

- Served as elected Representative (2022–2023); continued organizing the IOB seminar series, bringing in speakers including Josh Starmer (StatQuest), Robert Edgar (creator of MUSCLE), Ben Langmead (creator of Bowtie/Bowtie2), and Jeffrey Perkel (*Nature* Technology Editor), alongside emerging voices in computational biology and bioinformatics.
- Served as liaison to UGA Graduate Student Association; coordinated department social events.

Team Leader

March 2024, March 2025

HATCH Hackathon, HudsonAlpha Institute for Biotechnology

- Led IOB teams to build prototypes, including a plant-based diet planning system for astronauts using Snakemake, OpenAI API, and Streamlit in 28 hours, and an interactive map for bird tracking in 8 hours; secured sponsorship and managed all team logistics.

Director of Marketing and Communication

July 2025 – December 2025

PhD Consulting Club, University of Georgia

- Grew membership 3× through strategic outreach; designed organizational branding materials; invited club founding member from BCG Henderson Institute; facilitated weekly structured case practice sessions.

Team Leader

December 2017

Open Data Innovative Application Contest — Ministry of Economic Affairs & Council of Agriculture, Taiwan

- Led interdisciplinary team to build the first Mandarin-language chatbot for plant disease diagnosis using open government data; pitched to VCs and secured NTD\$410,000 award.

Awards and Honors

Government Fellowship for Studying Abroad (est. \$150,000 USD)

January 2019

Ministry of Education, Republic of China (Taiwan) — selected through competitive national exam and interview

Summer Research Grant for Doctoral Students (\$1,500)

July 2022

Graduate School, University of Georgia

Communication of Research and Scholarship Grant (\$1,500)

July 2021

Graduate School, University of Georgia

Council of Agriculture Enterprise Prize | HackNTU 2017

August 2017

National Taiwan University

Third Prize, Agrithon (Agriculture Hackathon)

August 2016

Council of Agriculture, Executive Yuan, Republic of China (Taiwan)

Community Service

Vice President

May 2022 – May 2023

Taiwanese Student Association (TSA), University of Georgia

- Hosted cultural events for major Taiwanese holidays; built an interactive onboarding dashboard to help incoming students navigate UGA resources; secured funding through competitive budget requests.

Network Administrator

August 2017 – July 2019

Department of Horticulture and Landscape Architecture, NTU

- Maintained daily network service of 7 department buildings; mentored succeeding network administrator on hardware managing.

Stage Technician (Volunteer)

July 2014 – June 2017

NTU Center for the Arts, National Taiwan University

- Executed lighting and sound system setup for performance teams; collaborated with receptionists and photographers to accomplish event missions.

Stage Technician (Volunteer)

2023 – Present

CAPASUS (Chinese-American Academic and Professional Association in Southeastern United States)

- Provide audio and visual system support for annual conference events.

GSA International Student Committee

Representative, UGA Graduate Student Association