

Che-Wei Hsu

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EDUCATION

Humboldt University (Humboldt Universität zu Berlin) Ph.D. in Developmental Biology and Bioinformatics	2019 - 2022
National Taiwan University M.S. in Agronomy, Crop Division	2016 - 2018
National Taiwan University B.S. in Biochemistry	2012 - 2016

RESEARCH EXPERIENCE

Postdoctoral Researcher <i>Laboratory of Trevor Nolan, California Institute of Technology</i>	September 2025 - Ongoing
Postdoctoral Researcher <i>Laboratory of Sheng-Yang He, Duke University</i> AI-driven single-cell and structural modeling approaches to uncover stress-responsive regulators and engineer heat-resilient plant immune receptors.	September 2024 - August 2025
Postdoctoral Researcher <i>Laboratory of Philip Benfey, Duke University</i> Single-cell analysis of brassinosteroid effects on <i>Arabidopsis</i> root development and soil stress responses in rice roots.	January 2023 - August 2024
Graduate Research Associate <i>Laboratory of Uwe Ohler, Berlin Institute for Medical Systems Biology (MDC-BIMSB)</i> Machine-learning models for single-cell data applied to root cell atlas construction and CRISPR perturbation analysis in neuroblastoma.	2019 - 2022
Graduate Research Assistant <i>Laboratory of Cheng-Ruei Lee, National Taiwan University</i> Tracing the geo-evolutionary history of <i>Arabidopsis thaliana</i> using large-scale ecotype genomic data.	2018 - 2019
Graduate Research Assistant <i>Laboratory of Chih-Wei Tung, National Taiwan University</i> Population genetics of rice: leveraging organelle genomics to guide conservation of the rice gene pool.	2016 - 2018
Undergraduate Research Assistant <i>Laboratory of Chii-Shen Yang, National Taiwan University</i> Archaea-derived rhodopsin engineering for the design of bio-solar cells.	2014 - 2016

PUBLICATIONS

1. **Hsu C.-W.**, C.-Y. Chen, T.M. Nolan, P.N. Benfey, U. Ohler (2025). GeneSys: Generative Modeling of Developmental System. *bioRxiv*. <https://doi.org/10.1101/2025.08.20.671385>.

2. Vučićević D., **C.-W. Hsu**, L.S.L. Zepeda, M. Burkert, A. Hirsekorn, I. Bilić, N. Kastelić, M. Landthaler, S.A. Lacadie, U. Ohler (2025). Sensitive dissection of a genomic regulatory landscape using bulk and targeted single-cell activation. *Cell Genomics*. <https://doi.org/10.1016/j.xgen.2025.100984>.
3. Zhu M.*, **C.-W. Hsu***, L.L. Peralta Ogorek, I.W. Taylor, S. La Cavera, D.M. Oliveira, L. Verma, P. Mehra, M. Mijar, A. Sadanandom, F. Perez-Cota, W. Boerjan, T.M. Nolan, M.J. Bennett, P.N. Benfey, B.K. Pandey (2025). Single-cell transcriptomics reveal how root tissues adapt to soil stress. *Nature* 642, 721–729. <https://doi.org/10.1038/s41586-025-08941-z>.
 - * co-first authors
4. Vukašinović N.*, **C.-W. Hsu***, M. Marconi, S. Li, C. Zachary, R. Shahan, P. Szekley, Z. Aardening, I. Vanhoutte, Q. Ma, L. Pinto, P. Krupař, N. German, J. Zhang, C. Simon, J. Perez-Sancho, P. C. Quijada, Q. Zhou, L.R. Lee, J. Cai, E.M. Bayer, M. Fendrych, E. Truernit, Y. Zhou, S. Savaldi-Goldstein, K. Wabnik, T.M. Nolan, E. Russinova (2025). Polarity-guided uneven mitotic divisions control brassinosteroid activity in proliferating plant root cells. *Cell* 188 (8), 2063-2080. e24. <https://doi.org/10.1016/j.cell.2025.02.011>.
 - * co-first authors
5. Taylor I.W., O.R. Patharkar, M. Mijar, **C.-W. Hsu**, J. Baer, C.E. Niederhuth, U. Ohler, P.N. Benfey, J.C. Walker (2024). *Arabidopsis* uses a molecular grounding mechanism and a biophysical circuit breaker to limit floral abscission signaling. *Proceedings of the National Academy of Sciences* 121 (44) e2405806121. <https://doi.org/10.1073/pnas.2405806121>.
6. Blanco-Touriñán N., S. Rana, T.M. Nolan, K. Li, N. Vukašinović, **C.-W. Hsu**, E. Russinova, C.S. Hardtke. (2024). The brassinosteroid receptor gene *BRI1* safeguards cell-autonomous brassinosteroid signaling across tissues. *Science advances*. <https://doi:10.1126/sciadv.adq3352>.
7. Nolan, T.M.*, N. Vukasinovic*, **C.-W. Hsu***, J. Zhang, I. Vanhoutte, R. Shahan, I. Taylor, L. Greenstreet, M. Heitz, A. Afanassiev, P. Wang, P. Szekely, A. Brosnan, Y. Yin, G. Schiebinger, U. Ohler, E. Russinova and P.N. Benfey. (2023). Brassinosteroid gene regulatory networks at cellular resolution in the *Arabidopsis* root. *Science*. <https://doi.org/10.1126/science.adf4721>.
 - * co-first authors
8. **Hsu, C.-W.**, R. Shahan, T.M. Nolan, P.N. Benfey, and U. Ohler. (2022). Protocol for fast scRNA-seq raw data processing using scKB and non-arbitrary quality control with COPILOT. *STAR Protocols* 3, 101729. <https://doi.org/10.1016/j.xpro.2022.101729>.
9. Shahan, R.*, **C.-W. Hsu***, T.M. Nolan, B. Cole, I. Taylor, L. Greenstreet, S. Zhang, A. Afanassiev, A. Hendrika C. Vlot, G. Schiebinger, P.N. Benfey, and U. Ohler. (2022). A single-cell *Arabidopsis* root atlas reveals developmental trajectories in wild-type and cell identity mutants. *Developmental Cell* 57 (4), 543-560. e9 <https://doi.org/10.1016/j.devcel.2022.01.008>.
 - * co-first authors
 - On the cover of *Developmental Cell*. Art contributed by **C.-W. Hsu**.
10. Carley, L.N., J.P. Mojica, B. Wang, C.-Y. Chen, Y.-P. Lin, K. Prasad, E. Chan, **C.-W. Hsu**, R. Keith, C.L. Nuñez, C.F. Olson-Manning, C.A. Rushworth, M.R. Wagner, J. Wang, P.-M. Yeh, M. Reichelt, K. Ghattas, J. Gershenzon, C.-R. Lee, T. Mitchell-Olds. (2021). Ecological factors influence balancing selection on leaf chemical profiles of a wildflower. *Nature ecology & evolution* 5 (8), 1135-1144. <https://doi.org/10.1038/s41559-021-01486-0>.
11. **Hsu, C.-W.**, C. Lo and C. Lee. (2019). On the post-glacial spread of human commensal *Arabidopsis thaliana*: journey to the east. *New Phytologist* 222 (3), 1447-1457. <https://doi:10.1111/nph.15682>.

TALKS

1. Plant single-cell data analysis workshop. Blacksburg, VA. June, 2025
2. International Conference on Arabidopsis Research. San Diego, CA. July, 2024
3. Masterclass 9-Applying Spatial Transcriptomics in Plants. Cambridge, UK, Online. February, 2024
4. Plant Cell Atlas workshop. Online. November, 2023
5. Duke University. Durham, NC. October, 2023
6. National Taiwan University. Taipei, Taiwan. April, 2023
7. IRTG evaluation seminar. Berlin, Germany. February, 2023

POSTER PRESENTATIONS

1. Gordon Research Conference: Plant Cell Atlas. Portland, ME. August, 2025
2. International Conference on Arabidopsis Research. San Diego, CA. July, 2024
3. American Society of Plant Biologists. Honolulu, HI. June, 2024
4. IRTG evaluation seminar. Berlin, Germany. February, 2023

TEACHING

Guest Lecturer Summer 2025
Single-cell data analysis Virginia Tech

MENTORING

Postdocs
Chia-Yu Chen 2025-Ongoing

Graduate Students
Rogelio Avila Silva 2025-Ongoing
Chi Kuan 2024-Ongoing
Stephanie Peak 2023-Ongoing
Victoria Huryn 2023-2024

Undergraduate Students
Yunus-Emre Kurnaz 2021

PROFESSIONAL ACTIVITIES

Manuscript Reviews 2021-Present
Reviewed over 10 manuscripts in journals including
*Nature, Nature Communications, Bioinformatic, The Plant Journal, Nature Communication
Biology, Physiologia Plantarum*

Journal topic editor
Frontiers in Plant Physiology 2024-2025

Plant Cell Atlas Committee member (Computation, Modeling & AI) 2025

Sigma Xi Scientific Research Honor Society 2025

Shiny Apps for Single-cell Data

Arabidopsis Root Virtual Expression eXplorer (ARVEX):

<https://shiny.mdc-berlin.de/ARVEX/>

2022

Oryza Root Virtual Expression eXplorer (ORVEX):

https://rice-singlecell.shinyapps.io/orvex_app/

2024

REFERENCES

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