

Sheng-Kai Hsu

Affiliation: Institute for Genomic Diversity, Cornell University

Email: sh2246@cornell.edu

ORCID: 0000-0002-6942-7163

Positions & Education

Year	Position / Degree
2022–present	Postdoctoral research fellow, Institute for Genomic Diversity, Cornell University <i>Advisor: Edward Buckler</i>
2017–2021	Ph.D., Vienna Graduate School of Population Genetics, Univ. of Veterinary Medicine Vienna <i>Advisor: Christian Schlötterer</i>
2014–2015	M.Sc., Department of Agronomy, National Taiwan University <i>Advisor: Chih-Wei Tung</i>
2010–2014	B.Sc., Department of Agronomy, National Taiwan University

Publications

Peer-reviewed Publications

1. Hale, C.O., **Hsu, S-K.**, Zhai, J., Schulz, A.J., Aubuchon-Elder, T., Costa-Neto, G., Gelfond, A., El-Walid, M., Hufford, M., Kellogg, E.A., La, T., Marand, A.P., Seetharam, A.S., Scheben, A., Stitzer, M., Wrightsman, T., Romay, M.C., & Buckler, E.S. (2025). **Widespread turnover of a conserved cis-regulatory code across 589 grass species.** *Molecular Biology and Evolution.* <https://doi.org/10.1093/molbev/msaf324>
2. Schulz, A.J., Zhai, J., AuBuchon-Elder, T., Andorf, C.M., El-Walid, M.Z., Ferebee, T.H., Gilmore, E.H., Hufford, M.B., Johnson, L.C., Kellogg, E.A., & et al. (2025). **Fishing for a reelGene: evaluating gene models with evolution and machine learning.** *The Plant Journal,* 123(6). <https://doi.org/10.1111/tpj.70483>
3. Ojeda-Rivera, J.O., Barnes, A.C., Ainsworth, E.A., Angelovici, R., Bassi, B., Brindisi, L.J., Brooks, M.D., Busch, W., Buttelmann, G.L., Castellano, M.J., & et al. (2025). **Designing a nitrogen-efficient cold-tolerant maize for modern agricultural systems.** *The Plant Cell,* 37(7). <https://doi.org/10.1093/plcell/koaf139>
4. **Hsu, S-K.**, Emmett, B.D., Haafke, A., Costa-Neto, G., Schulz, A.J., Lepak, N., La, T., AuBuchon-Elder, T.M., Hale, C.O., Raglin, S.S., Ojeda-Rivera, J.O., Kent, A.D., Kellogg, E.A., Romay, M.C., & Buckler, E.S. (2025). **Contrasting rhizosphere nitrogen dynamics in Andropogoneae grasses.** *The Plant Journal,* 123(1). <https://doi.org/10.1111/tpj.70319>
5. Thorhölludottir, D.A.V., **Hsu, S-K.**, Barghi, N., Mallard, F., Nolte, V., & Schlötterer, C. (2025). **Reduced Parallel Gene Expression Evolution With Increasing Genetic Divergence—A Hallmark of Polygenic Adaptation.** *Molecular Ecology,* 34(12). <https://doi.org/10.1111/mec.17803>
6. Lai, W-Y., **Hsu, S-K.**, Futschik, A., & Schlötterer, C. (2025). **Pleiotropy increases parallel selection signatures during adaptation from standing genetic variation.** *eLife,* 13. <https://doi.org/10.7554/eLife.102321.3>
7. **Hsu, S-K.**, Lai, W-Y., Novak, J., Lehner, F., Jakšić, A.M., Versace, E., & Schlötterer, C. (2024). **Reproductive isolation arises during laboratory adaptation to a novel hot environment.** *Genome Biology,* 25(1). <https://doi.org/10.1186/s13059-024-03285-9>
8. Buchner, S., **Hsu, S-K.**, Nolte, V., Otte, K.A., & Schlötterer, C. (2023). **Effects of larval crowding on the transcriptome of *Drosophila simulans*.** *Evolutionary Applications,* 16(10), 1671–1679. <https://doi.org/10.1111/eva.13592>
9. **Hsu, S-K.**, Belmouaden, C., Nolte, V., & Schlötterer, C. (2020). **Parallel gene expression evolution in natural and laboratory evolved populations.** *Molecular Ecology,* 30(4), 884–894. <https://doi.org/10.1111/mec.15649>
10. Jakšić, A.M., Karner, J., Nolte, V., **Hsu, S-K.**, Barghi, N., Mallard, F., Otte, K.A., Svečnjak, L., Senti, K-A., & Schlötterer, C. (2020). **Neuronal Function and Dopamine Signaling Evolve at High Temperature in *Drosophila*.** *Molecular Biology and Evolution,* 37(9), 2630–2640. <https://doi.org/10.1093/molbev/msaa116>

11. Hsu, S-K., Jakšić, A.M., Nolte, V., Lirakis, M., Kofler, R., Barghi, N., Versace, E., & Schlötterer, C. (2020). **Rapid sex-specific adaptation to high temperature in *Drosophila***. *eLife*, 9. <https://doi.org/10.7554/eLife.53237>
12. Hsu, S-K., Jakšić, A.M., Nolte, V., Barghi, N., Mallard, F., Otte, K.A., & Schlötterer, C. (2019). **A 24 h Age Difference Causes Twice as Much Gene Expression Divergence as 100 Generations of Adaptation to a Novel Environment**. *Genes*, 10(2), 89. <https://doi.org/10.3390/genes10020089>
13. Lin, P-C., Tsai, Y-C., Hsu, S-K., Ou, J-H., Liao, C-T., & Tung, C-W. (2018). **Identification of natural variants affecting chlorophyll content dynamics during rice seedling development**. *Plant Breeding*, 137(3), 355-363. <https://doi.org/10.1111/pbr.12584>
14. Hsu, S-K., & Tung, C-W. (2017). **RNA-Seq Analysis of Diverse Rice Genotypes to Identify the Genes Controlling Coleoptile Growth during Submerged Germination**. *Frontiers in Plant Science*, 8. <https://doi.org/10.3389/fpls.2017.00762>
15. Hsu, S-K., & Tung, C-W. (2015). **Genetic Mapping of Anaerobic Germination-Associated QTLs Controlling Coleoptile Elongation in Rice**. *Rice*, 8(1). <https://doi.org/10.1186/s12284-015-0072-3>

Preprints

1. El-Walid, M.Z., Gault, C.M., Costich, D.E., Lepak, N.K., Budka, J.S., Stitzer, M.C., Giri, A., Rees, E., Romay, M.C., Buckler, E.S., & Hsu, S-K. (2025). **Identification of Freezing Tolerance QTLs in *Tripsacum dactyloides* Using Open-Pollinated Bulk Segregant Analysis**. *bioRxiv*. <https://doi.org/10.64898/2025.12.10.693030>
2. Liu, Z-Y., Berthel, A., Czech, E., Stitzer, M., Hsu, S-K., Pennell, M., Buckler, E.S., & Zhai, J. (2025). **GeneCAD: Plant Genome Annotation with a DNA Foundation Model**. *bioRxiv*. <https://doi.org/10.1101/2025.10.31.685877>
3. Zhai, J., Gokaslan, A., Hsu, S-K., Chen, S-P., Liu, Z-Y., Marroquin, E., Czech, E., Cannon, B., Berthel, A., Romay, M.C., Pennell, M., Kuleshov, V., & Buckler, E.S. (2025). **PlantCAD2: A Long-Context DNA Language Model for Cross-Species Functional Annotation in Angiosperms**. *bioRxiv*. <https://doi.org/10.1101/2025.08.27.672609>
4. Oren, E., Zhai, J., Rooney, T., Angelovici, R., Hale, C., Brindisi, L.J., Hsu, S-K., Gault, C., Hua, J., La, T., Lepak, N., Fu, Q., Buckler, E., & Romay, C. (2025). **Grass Rhizome Proteomics Reveals Convergent Freezing-Tolerance Strategies**. *bioRxiv*. <https://doi.org/10.1101/2025.05.15.654294>
5. Hale, C.O., Hsu, S-K., Zhai, J., Schulz, A.J., Aubuchon-Elder, T., Costa-Neto, G., Gelfond, A., El-Walid, M., Hufford, M., Kellogg, E.A., La, T., Marand, A.P., Seetharam, A.S., Scheben, A., Stitzer, M., Wrightsman, T., Romay, M.C., & Buckler, E.S. (2025). **Extensive modulation of a conserved cis -regulatory code across 589 grass species**. *bioRxiv*. <https://doi.org/10.1101/2025.04.23.650228>
6. Stitzer, M.C., Seetharam, A.S., Scheben, A., Hsu, S-K., Schulz, A.J., AuBuchon-Elder, T.M., El-Walid, M., Ferebee, T.H., Hale, C.O., La, T., & et al. (2025). **Extensive genome evolution distinguishes maize within a stable tribe of grasses**. *bioRxiv*. <https://doi.org/10.1101/2025.01.22.633974>
7. Schulz, A.J., Zhai, J., AuBuchon-Elder, T., El-Walid, M., Ferebee, T.H., Gilmore, E.H., Hufford, M.B., Johnson, L.C., Kellogg, E.A., La, T., Long, E., Miller, Z.R., Romay, M.C., Seetharam, A.S., Stitzer, M.C., Wrightsman, T., Buckler, E.S., Monier, B., & Hsu, S-K. (2023). **Fishing for a reelGene: evaluating gene models with evolution and machine learning**. *bioRxiv*. <https://doi.org/10.1101/2023.09.19.558246>

Presentations

- 2025 **The genetic basis of environmental adaptation in Poaceae**. *Poster presentation*, The 67th Annual Maize Genetic Meeting, March 6-9, St. Louis, MO USA
- 2024 **The genetic basis of environmental adaptation in Poaceae**. *Poster presentation*, ICQG7, July 22-26, Vienna, Austria
- 2024 **The phylogenetic variation in the rhizosphere nitrogen cycle of diverse grass species in the Andropogoneae**. *Oral presentation*, The 66th Annual Maize Genetic Meeting, February 29-March 3, Raleigh, NC, USA
- 2024 **The phylogenetic variation in the rhizosphere nitrogen cycle of diverse grass species in the Andropogoneae**. *Oral presentation*, Plant and Animal Genome 31, January 12-17, San Diego, CA, USA
- 2023 **The phylogenetic variation in the rhizosphere nitrogen cycle of diverse grass species in the Andropogoneae**. *Poster presentation*, The 65th Annual Maize Genetic Meeting, March 16-19, St. Louis, MO, USA
- 2021 **Polygenic adaptation drives rapid evolution of pre- and post-mating reproductive isolation**. *Poster*

presentation, The 62nd Annual Drosophila Research Conference, March 20-24, Online
2019 **Sex-specific adaptation to high temperature in Drosophila.** *Oral presentation*, ESEB 2019, August 19-24, Turku, Finland
2018 **Sexually antagonistic gene expression evolution in Drosophila simulans populations adapting to a novel thermal environment.** *Oral presentation*, PopGroup 51, January 3-6, Bristol, UK
2017 **Genetics and molecular analysis of anaerobic germination in rice.** *Poster presentation*, Plant and Animal Genomes 25, January 14-18, San Diego, CA, USA
2013 **Identification of quantitative trait loci (QTL) associated with anaerobic germination of rice (*Oryza Sativa*).** *Poster presentation*, The 7th International Rice Genetics Symposium, November 4-8, Manila, Philippines

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