

Tzu-Heng (Brian) Huang

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🌐 [zihengh1.github.io](https://github.com/zihengh1)

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Education

- 2021 – 2026 (Expected) 📖 **Ph.D. in Computer Science. University of Wisconsin-Madison.**
Advised by Prof. Frederic Sala.
- 2016 – 2020 📖 **B.S. in Computer Science. National Chengchi University.**
Advised by Prof. Man-Kwan Shan and Dr. Ling-Jyh Chen. Major GPA: 3.96.

Research Interests

My research focuses on *data-centric AI for multimodal models*, enabling models to learn more with less supervision. Several works I have worked on, including (i) *online data mixing* for multimodal models, (ii) *fine-grained data selection* for efficient pretraining (e.g., training CLIP on 100+ million samples), (iii) *data curation* using ensemble and objective detection (*1st place on the DataComp'23 leaderboard*), (iv) a 500x cheaper *auto-labeling* system over LLM annotators (*NeurIPS'24 Spotlight*), and (v) a new accelerated training framework via *model merging*.

Research Experience

- May. 2025 – Sep. 2025 📖 **Research Intern. Meta GenAI Llama Team.**
advised by David Kant, Yiting Lu, and Ernie Chang.
- May. 2024 – Dec. 2024 📖 **AIML Research Intern. Apple Inc.**
advised by Javier Movellan and Manjot Bilkhu.
— *Automated Model-aware Data Selection for Efficient Pretraining.*
— *Optimizing Domain Mixtures for MLLM Pretraining.*
- Aug. 2021 – Present 📖 **Graduate Research Student. UW-Madison.**
advised by Frederic Sala.
— *Data-centric AI for Foundation Models: Auto-labeling and Data Curation.*
— *Parameter Marketplace: Through Model Merging and Auction Agents.*
- May. 2023 – May. 2024 📖 **Co-Founder. Awan.AI LLC.**
— *LLM for Traditional Chinese Medicine and Tongue Syndrome Diagnosis.*
— *Automating TCM Diagnosis: RAG-Enhanced LLMs with Reasoning Agents.*
- Jun. 2019 – Sep. 2019 📖 **Research Intern. Argonne National Laboratory.**
advised by Charlie Catlett and Rajesh Sankaran.
— *Ensemble-based Time Series Calibration for Low-cost Sensors.*
- Sep. 2018 – Aug. 2021 📖 **Research Assistant. National Chengchi University.**
advised by Man-Kwan Shan.
— *Spatio-temporal Modeling in Large-scale Sensor Networks.*
- Feb. 2018 – Jul. 2020 📖 **Research Intern. Academia Sinica.**
advised by Ling-Jyh Chen.
— *Large-scale Air Quality Sensor Networks.*







Research Publications

- 1 J. Saad-Falcon, E. K. Buchanan, M. F. Chen, **T.-H. Huang**, B. McLaughlin, T. Bhathal, S. Zhu, B. Athiwaratkun, F. Sala, S. Linderman, A. Mirhoseini, and C. Re, “Shrinking the Generation-Verification Gap by Scaling Compute for Verification,” in *submission*, 2025.
- 2 J. Zhao, C. Shin, **T.-H. Huang**, S. S. S. Namburi, and F. Sala, “From Many Voices to One: A Statistically Principled Aggregation of LLM Judges,” in *submission*, 2025.






- 3 A. Ge, **T.-H. Huang**, J. Cooper, A. Trost, Z. Chu, S. S. S. Namburi, Z. Cai, K. Park, N. Roberts, and F. Sala, "R&B: Domain Regrouping and Data Mixture Balancing for Efficient Foundation Model Training," in *submission*, 2025.  URL: <https://arxiv.org/abs/2505.00358>.
- 4 **T.-H. Huang**, M. Bilkhu, F. Sala, and J. Movellan, "Evaluating Sample Utility for Efficient Data Selection by Mimicking Model Weights," in *submission*, 2025.  URL: <https://arxiv.org/abs/2501.06708>.
- 5 **T.-H. Huang**, C. Cao, V. Bhargava, and F. Sala, "The ALCHEmist: Automated Labeling 500x CHEaper than LLM Data Annotators," in *Neural Information Processing Systems (NeurIPS)* [**Spotlight (Top 3%)**], 2024.  URL: <https://arxiv.org/abs/2407.11004>.
- 6 W. Tan, N. Roberts, **T.-H. Huang**, J. Zhao, J. Cooper, S. Guo, C. Duan, and F. Sala, "MoRe Fine-Tuning with 10x Fewer Parameters," in *ICML Workshop: Efficient Systems for Foundation Models (ES-FoMo) and ICML Workshop: Foundation Models in the Wild.*, 2024.  URL: <https://arxiv.org/abs/2408.17383>.
- 7 N. Roberts, X. Li, D. Adila, S. Crompt, **T.-H. Huang**, J. Zhao, and F. Sala, "Geometry-Aware Adaptation for Pretrained Models," in *Neural Information Processing Systems (NeurIPS)*, 2023.  URL: <https://arxiv.org/abs/2307.12226>.
- 8 **T.-H. Huang**, C. Shin, S. J. Tay, D. Adila, and F. Sala, "Multimodal Data Curation via Object Detection and Filter Ensembles," in *ICCV Workshop: Towards the Next Generation of Computer Vision Datasets (TNGCV) [1st place on the Datacomp leaderboard (small-scale filtering track)]*, 2023.  URL: <https://arxiv.org/abs/2401.12225>.
- 9 **T.-H. Huang**, H. Vishwakarma, and F. Sala, "Train 'n Trade: Foundations of Parameter Markets," in *Neural Information Processing Systems (NeurIPS)*, 2023.  URL: <https://arxiv.org/abs/2312.04740>.
- 10 **T.-H. Huang**, C. Cao, S. Schoenberg, H. Vishwakarma, N. Roberts, and F. Sala, "ScriptoriumWS: A Code Generation Assistant for Weak Supervision," in *ICLR Workshop: Deep Learning For Code (DL4C)*, 2023.  URL: <https://arxiv.org/abs/2502.12366>.
- 11 N. Roberts, X. Li, **T.-H. Huang**, D. Adila, S. Schoenberg, C.-Y. Liu, L. Pick, H. Ma, A. Albarghouthi, and F. Sala, "AutoWS-Bench-101: Benchmarking Automated Weak Supervision with 100 Labels," in *Neural Information Processing Systems (NeurIPS)*, 2022.  URL: <https://arxiv.org/abs/2208.14362>.
- 12 **T.-H. Huang**, C.-H. Tsai, and M.-K. Shan, "Key Sensor Discovery for Quality Audit of Air Sensor Networks," in *ACM International Conference on Mobile Systems, Applications, and Services (MobiSys)*, 2020.  URL: <https://dl.acm.org/doi/abs/10.1145/3386901.3396606>.

Miscellaneous



Awards

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| 2024 |  Spotlight Paper (Top 3%): The Alchemist , selected by NeurIPS'24. |
| 2023 |  ICCV Datacomp Competition , won the first place in the small-scale filtering track. |
| |  Scholar Award , granted by NeurIPS'23. |
| 2021 |  First-year Departmental Scholarship , granted by UW-Madison. |
| 2020 |  Research Intern Scholarship , granted by National Chengchi University. |
| |  Undergrad Research Scholarship , granted by Ministry of Science and Technology. |





Invited Talks

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| Apr. 2025 |  Spatio-temporal Modeling for Underwater Sensor Networks , invited by National Taipei University of Technology. |
| Dec. 2019 |  Air Quality Sensor Network Developments , invited by Nangang High School (Taiwan). |
| Sep. 2019 |  Internship Research Talk , invited by National Chengchi University. |
| Jul. 2019 |  LASS Conference: International Session , invited by Academia Sinica. |
| Mar. 2019 |  Techbang Magazine: PiM25 Project , invited by Techbang Magazine. |



Miscellaneous (continued)

- Jan. 2019  **Raspberry Pi Jam: PiM25 Project**, invited by Raspberry Pi Foundation (Taiwan).
- Jan. 2019  **Raspberry Pi Meetup: PiM25 Project**, invited by Raspberry Pi Foundation (Taiwan).

Academic Services

- 2021 – Present  **Paper Reviewer**, NeurIPS, ICLR, ICML, CVPR, CoLLAs, and DMLR.
- 2023  **Co-organizer**, AutoML Cup in AutoML Conference.
- 2022 – 2023  **President of Student Association of Taiwan**, UW-Madison.
- 2021 – 2022  **Vice President of Student Association of Taiwan**, UW-Madison.

Skills

- Programming Languages  Python, R, C++/C, SQL, \LaTeX , and Shell Programming.
- Technologies  (Distributed) PyTorch, Tensorflow, Keras, PostgreSQL, and Vim.