# Tzu-Heng (Brian) Huang

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## Education

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| 2021 – 2026 (Expected) | **Ph.D. in Computer Science. University of Wisconsin-Madison.** <br> Advised by Frederic Sala. |
| 2016 – 2020 | **B.S. in Computer Science. National Chengchi University.** <br> Advised by Man-Kwan Shan and Ling-Jyh Chen. Major GPA: *3.96/4.00*. |

## Research Interests

My research focuses on **data-centric AI for multimodal models**, enabling models to learn more from less but higher-quality supervision. Several data lifecycle projects I have worked on, including (i) *online domain mixing* for multimodal models, (ii) *fine-grained data selection* for efficient pretraining (**ICML'25 DataWorld Oral**), (iii) *data curation* via 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 bias-reduced evaluation framework through *programmatic judges*.

## Research Experience

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| Oct. 2025 – Jan. 2026 | **AIML Research Intern. Apple Inc.** <br> advised by Manjot Bilkhu. |
| May. 2025 – Sep. 2025 | **Research Scientist Intern. Meta GenAI (now MSL).** <br> advised by Ernie Chang, Sang Michael Xie, Yiting Lu, and David Kant. <br> — *Learnability-aware Synthetic Data Generation.* |
| May. 2024 – Dec. 2024 | **AIML Research Intern. Apple Inc.** <br> advised by Javier Movellan and Manjot Bilkhu. <br> — *Automated Model-aware Data Selection for Efficient Pretraining.* <br> — *Optimizing Domain Mixtures for MLLM Pretraining.* |
| Aug. 2021 – Present | **Graduate Research Student. UW-Madison.** <br> advised by Frederic Sala. <br> — *Data-centric AI for Foundation Models: Auto-labeling and Data Curation.* <br> — *Parameter Marketplace: Through Model Merging and Auction Agents.* |
| May. 2023 – May. 2024 | **Co-Founder. Awan.AI LLC.** <br> — *Tongue Syndrome Diagnosis and LLM for Traditional Chinese Medicine.* <br> — *Automating TCM Diagnosis: Herbal-based Recommendation System.* |
| Jun. 2019 – Sep. 2019 | **Research Intern. Argonne National Laboratory.** <br> advised by Charlie Catlett and Rajesh Sankaran. <br> — *Ensemble-based Time Series Calibration for Low-cost Sensors.* |
| Sep. 2018 – Aug. 2021 | **Research Assistant. National Chengchi University.** <br> advised by Man-Kwan Shan. <br> — *Spatio-temporal Modeling in Large-scale Sensor Networks.* |
| Feb. 2018 – Jul. 2020 | **Research Intern. Academia Sinica.** <br> advised by Ling-Jyh Chen. <br> — *Large-scale Air Quality Sensor Networks (AirBox).* |

## Publications and Preprints

**1**   **T.-H. Huang**, H. Vishwakarma, and F. Sala, "Time to Impeach LLM-as-a-Judge: Programs are the Future of Evaluation," in *ICML Workshop: Programmatic Representations for Agent Learning (PRAL)*, 2025. 🔗 URL: https://arxiv.org/abs/2506.10403.

**2** 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 *Neural Information Processing Systems (NeurIPS), ICML Workshop: Efficient Systems for Foundation Models (ES-FoMo III), and ICML Workshop: Multi-Agent Systems in the Era of Foundation Models: Opportunities, Challenges and Futures (MAS)*, 2025. 🔗 URL: https://arxiv.org/abs/2506.18203.

**3** 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 *NeurIPS Workshop: Evaluating the Evolving LLM Lifecycle: Benchmarks, Emergent Abilities, and Scaling, and NeurIPS Workshop: Reliable ML from Unreliable Data*, 2025.

**4** 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 *ICML Workshop: Unifying Data Curation Frameworks Across Domains (DataWorld), and ICML Workshop: Data in Generative Models (The Bad, the Ugly, and the Greats) (DIG-BUGS)*, 2025. 🔗 URL: https://arxiv.org/abs/2505.00358.

**5** **T.-H. Huang**, M. Bilkhu, J. Cooper, F. Sala, and J. Movellan, "Evaluating Sample Utility for Efficient Data Selection by Mimicking Model Weights," in *ICML Workshop: Unifying Data Curation Frameworks Across Domains (DataWorld)* *[Oral Paper]*, 2025. 🔗 URL: https://arxiv.org/abs/2501.06708.

**6** **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 Paper (Top 2.08%)]*, 2024. 🔗 URL: https://arxiv.org/abs/2407.11004.

**7** 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.

**8** N. Roberts, X. Li, D. Adila, S. Cromp, **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.

**9** **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.

**10** **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.

**11** **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.

**12** 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.

**13** **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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| 2025 | 🔖 | **Oral Paper: Mimic Score & Grad-Mimic**, selected by ICML'25 DataWorld Workshop. |
| 2024 | 🔖 | **Spotlight Paper (Top 2.08%): The Alchemist**, selected by NeurIPS'24. |
| 2023 | 🔖 | **ICCV Datacomp Competition**, won the first place in the small-scale filtering track. |

## Miscellaneous (continued)

**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

Aug. 2025 **Data Recipes: Automated Labeling and Efficient Selection**, invited by Scaling Intelligence Lab (Azalia Mirhoseini's group) in Stanford University.

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 Univerisity.

Jul. 2019 **LASS Conference: International Session**, invited by Academia Sinica.

Mar. 2019 **Techbang Magazine: PiM25 Project**, invited by Techbang Magazine.

**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, and ICML.

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.