

# Tzu-Heng (Brian) Huang

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## Education

- 2021 – Jul. 2026 (Expected)    📖 **Ph.D. in Computer Science. University of Wisconsin-Madison.**  
Advised by Frederic Sala.
- 2016 – 2020    📖 **B.S. in Computer Science. National Chengchi University.**  
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*, with the goal of enabling systems to learn more from less but higher-quality supervision. Several *data lifecycle* projects I have worked on, including (i) visual RL with sample-specific, *synthetic data verifiers*, (ii) *online data mixing* for overhead-reduced multimodal training, (iii) *fine-grained data selection* for efficient pretraining (**ICML'25 DataWorld Oral**), (iv) *data curation* via ensemble and objective detection (**1st place on the DataComp'23 leaderboard**), and (v) a 500x cheaper *automated data labeling* system as an alternative to LLM annotators (**NeurIPS'24 Spotlight**).

## Research Experience








- Oct. 2025 – Jan. 2026    📖 **AIML Research Intern. Apple Inc.**  
advised by Manjot Bilkhu and Javier Movellan.  
— *Rubric-based RL for Dense Captioning Tasks.*
- May. 2025 – Sep. 2025    📖 **Research Scientist Intern. Meta GenAI (now MSL).**  
advised by Ernie Chang, Sang Michael Xie, Yiting Lu, and David Kant.  
— *Learnability-aware Synthetic Data Generation.*
- 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    📖 **Founder. Awan.AI LLC (integrated with TechTCM).**  
— *Tongue Syndrome Diagnosis and LLM for Traditional Chinese Medicine.*  
— *Automating TCM Diagnosis: Herbal-based Recommendation System.*
- 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 (AirBox).*

## Publications and Preprints

- 1 **T.-H. Huang**, S. Salekin, J. Movellan, F. Sala, and M. Bilkhu, “RubiCap: Synthesized Rubrics as Rewards to Guide RL for Dense Captioning,” in *submission*, 2026.
- 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 **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>.
- 4 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.  URL: <https://openreview.net/pdf?id=0u53DNvjx7>.
- 5 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>.
- 6 **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>.
- 7 **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>.
- 8 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>.
- 9 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>.
- 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. 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>.
- 12 **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>.
- 13 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>.
- 14 **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

- 2025  **Oral Paper: Grad-Mimic (Top 4/100+)**, 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.
-  **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

- Jan. 2026  **Data Recipes: Labeling, Selection, and Verification**, invited by National Tsing Hua University (NTHU).
-  **Data Recipes: Labeling, Selection, and Verification**, invited by National Taiwan University (NTU).
-  **Data Recipes: Labeling, Selection, and Verification**, invited by Taiwan Semiconductor Manufacturing Company (TSMC).
-  **Data Recipes: Labeling, Selection, and Verification**, invited by National Yang Ming Chiao Tung University (NYCU).
- 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 (NTUT).
- 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.
-  **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  **Active 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,  $\text{\LaTeX}$ , and Shell Programming.
- Technologies  (Distributed) PyTorch, Tensorflow, Keras, PostgreSQL, and Vim.