



# Tzu-Heng (Brian) Huang

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in [zihengh1](#)

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

## 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 in dense captioning tasks, (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. 2024 – Dec. 2024  **AIML Research Intern.** Apple Inc.  
advised by Dr. 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 Prof. Frederic Sala.  
— *Data-centric AI for Foundation Models: Auto-labeling and Data Curation.*  
— *Parameter Marketplace: Through Model Merging and Auction Agents.*
- Jun. 2019 – Sep. 2019  **Research Intern.** Argonne National Laboratory.  
advised by Dr. Charlie Catlett and Dr. Rajesh Sankaran.  
— *Ensemble-based Time Series Calibration for Low-cost Sensors.*
- Sep. 2018 – Aug. 2021  **Research Assistant.** National Chengchi University.  
advised by Prof. Man-Kwan Shan.  
— *Spatio-temporal Modeling in Large-scale Sensor Networks.*
- Feb. 2018 – Jul. 2020  **Research Intern.** Academia Sinica.  
advised by Dr. Ling-Jyh Chen.  
— *Large-scale Air Quality Sensor Network Development.*







## Research Publications

- 1 **T.-H. Huang**, M. Bilkhu, F. Sala, and J. Movellan, “Evaluating Sample Utility for Data Selection by Mimicking Model Weights,” in *submission*, 2024.
- 2 **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>.
- 3 W. Tan, N. Roberts, **T.-H. Huang**, *et al.*, “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>.
- 4 N. Roberts, X. Li, D. Adila, *et al.*, “Geometry-Aware Adaptation for Pretrained Models,” in *Neural Information Processing Systems (NeurIPS)*, 2023.  URL: <https://arxiv.org/abs/2307.12226>.







- 5 **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://dl4c.github.io/assets/pdf/papers/30.pdf>.
- 6 **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>.
- 7 **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>.
- 8 N. Roberts, X. Li, **T.-H. Huang**, *et al.*, “AutoWS-Bench-101: Benchmarking Automated Weak Supervision with 100 Labels,” in *Neural Information Processing Systems (NeurIPS)*, 2022.  URL: <https://arxiv.org/abs/2208.14362>.
- 9 **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

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



### Invited Talks

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|-----------|---|--|
| Dec. 2019 |  | <b>IoT Project Development</b> , invited by Nangang High School (Taiwan).                |
| Sep. 2019 |  | <b>Intern Research Talk</b> , invited by National Chengchi University.                   |
| Jul. 2019 |  | <b>LASS Conference: International Session</b> , invited by Academia Sinica.              |
| Mar. 2019 |  | <b>Techbang Magazine: PiM25 Project</b> , invited by Techbang Magazine.                  |
|           |  | <b>Raspberry Pi Jam: PiM25 Project</b> , invited by Raspberry Pi Foundation (Taiwan).    |
| Jan. 2019 |  | <b>Raspberry Pi Meetup: PiM25 Project</b> , invited by Raspberry Pi Foundation (Taiwan). |

### Academic Services

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

## Skills

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