# Yicong (Bryce) Chen

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## EDUCATION

**University of Washington**                                               Seattle, WA
*Ph.D. in Electrical & Computer Engineering*                     *Sep. 2024 – Present*

- Advisor: Mari Ostendorf

**University of Wisconsin-Madison**                                    Madison, WI
*B.S. in Computer Engineering: Machine Learning and Data Science*     *Sep. 2020 – May 2024*
*Double Major in Computer Science*

- Graduated with Highest Distinction (Top 5%)
- Advisor: Kangwook Lee
- GPA: 3.98/4.00

## RESEARCH INTEREST

My current research interests focus on building and assessing **multimodal foundation models** to address real-world problems involving speech, text, and image modalities. Prior to this, I have also worked on continual federated learning, prompt engineering, text-to-image generation, and multimodal in-context learning.

## EXPERIENCE

**Research Assistant**                                               Sep. 2024 – Present
*Advisor: Mari Ostendorf*                                               *Seattle, WA*

- Developed an evaluation pipeline for an automated sentence recall screener for child speech language disorders.
- Assessed pause-based screening features using multiple **speech LLMs**, ASR models, and alignment tools, showing correlations between pause typicality and clinical screening outcomes.
- Fine-tuning an LLM on forced alignment pause labels to predict pause positions and derive perplexity-based atypicality scores, linking pause pattern deviations to atypical child speech outcomes.

**Undergraduate Researcher**                                         May 2022 – May 2024
*Advisor: Kangwook Lee*                                                 *Madison, WI*

- Established a benchmark to evaluate text-to-image in-context learning in **Multimodal** Large Language Models, leveraging automated VLM-based scoring and demonstrating consistent improvements from **fine-tuning**.
- Introduced **coded prompts**, inspired by coding theory, to process multiple inputs simultaneously in LLMs.
- Designed a novel algorithm that mitigates forgetting by leveraging aggregated buffer gradients, ensuring the retention of prior knowledge across clients in **Continual Federated Learning**.
- Introduced zero-shot text embedding edits for count control in CLIP, improving **object counting** with minimal data and transferring the enhanced count signal to **text-to-image generation** for better number fidelity.
- Enhanced the efficacy of Mixed Sample Data Augmentation (MSDA) by introducing self-distillation for relabeling.
- Enhanced low-resolution cosmic data into high-resolution images using diffusion to aid dark matter research.

**Undergraduate Researcher**                                         Jan. 2022 – May 2022
*Advisor: Dane Morgan*                                                  *Madison, WI*

- Accelerated molecular machine learning by integrating nystroem into the kernel training process with Faber-Christensen-Huang-Lilienfeld (FCHL) representation and kernel ridge regression.

## PUBLICATIONS

[1] Can MLLMs Perform Text-to-Image In-Context Learning?
    Yuchen Zeng*, Wonjun Kang*, **Yicong Chen**, Hyung Il Koo, Kangwook Lee
    *Conference on Language Modeling (COLM) 2024*

[2] Zero-shot Improvement of Object Counting with CLIP
    Ruisu Zhang*, **Yicong Chen***, Kangwook Lee
    *Robustness of Few-shot and Zero-shot Learning in Foundation Models (R0-FoMo) Workshop @ NeurIPS 2023*

[3] Coded Prompts for Large Language Models
Ziqian Lin, **Yicong Chen**, Yuchen Zeng, Kangwook Lee
*Robustness of Few-shot and Zero-shot Learning in Foundation Models (R0-FoMo) Workshop @ NeurIPS 2023*

[4] FedGP: Buffer-based Gradient Projection for Continual Federated Learning
Shenghong Dai, **Yicong Chen**, Jy-yong Sohn, S M Iftekharul Alam, Ravikumar Balakrishnan, Suman Banerjee, Nageen Himayat, Kangwook Lee
*Federated Learning Systems (FLSys) Workshop @ MLSys 2023 • Oral Presentation • Best Paper Award*

[5] AVMeme Exam: A Multimodal Multilingual Multicultural Benchmark for LLMs' Contextual and Cultural Knowledge and Thinking
Xilin Jiang, Qiaolin Wang, Junkai Wu, Xiaomin He, Zhongweiyang Xu, Yinghao Ma, Minshuo Piao, Kaiyi Yang, Xiuwen Zheng, Riki Shimizu, **Yicong Chen**, . . . , Emmanouil Benetos, Mark Hasegawa-Johnson, Romit Roy Choudhury, Nima Mesgarani
*Under review at the Annual Meeting of the Association for Computational Linguistics (ACL) 2026*

## Honors

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| **Graduated with Highest Distinction (Top 5%)** | 2024 |
| **Wisconsin Hilldale Undergraduate Research Fellowship** | 2023 |
| **Dean's Honor List (All Semesters)** | 2020 − 2024 |
| **First Prize, National Olympiad in Informatics in Provinces (NOIP), China** | 2017 |
| **First Prize, National Olympiad in Informatics in Provinces (NOIP), China** | 2016 |

## Projects

**Run Right: Mobile App Design for Personal Running Coach**      Spring 2024
- Developed a mobile app using TensorFlow MoveNet to analyze running form via smartphone video.
- Enabled users to record video and receive actionable feedback to improve running mechanics.

**WISC-SP23 architecture microprocessor design**      Spring 2023
- Designed and implemented a 16-bit, 5-stage pipelined processor (WISC-SP23) using Verilog.
- Developed a two-way set associative instruction cache, a multi-cycle main memory, and other optimizations.

## Skills

**Programming Languages**: Python, Java, C++, C, MATLAB, Verilog, HTML/CSS, JavaScript
**Tools**: Latex, Wandb, AWS, Git, Docker, Google Cloud
**Libraries**: PyTorch, TensorFlow, Hugging Face, Scikit-learn, Pandas, NumPy, Matplotlib
**Languages**: Mandarin Chinese, English