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|-----------------------|--|------------------------|--------------------------------|
| <b>Research Focus</b> | <b>RL Post-Training and Multimodal Alignment</b> on Language, vision, and audio  |                        |                                |
| <b>Education</b>      | <b>Dartmouth College</b><br>Ph.D. candidate in Computer Science<br>Advisor: <a href="#">Professor Soroush Vosoughi</a>   | Hanover, NH, USA       | Aug. 2023–Feb. 2026 (expected) |
|                       | <b>Brandeis University</b><br>M.S. in Computer Science<br>GSAS Research Fellowship   | Waltham, MA, USA       | Sep. 2021–Jun. 2023            |
|                       | <b>Northeastern University</b><br>B.S. in Computer Science<br>Outstanding Honor Thesis Award   | China                  | Sep. 2017–Jun. 2021            |
| <b>Experience</b>     | <b>Amazon</b><br>Applied Scientist Intern<br><i>RL Post-Training for Multimodal Computer-Use Agents (CUA) in Rufus (reorganized into Amazon AGI Nova prior to internship end)</i><br>Post-trained multimodal LLMs (7–32B) for low-latency Graphical User Interface (GUI) agents via <b>adaptive reasoning</b> .<br>Implemented verl and vLLM to support interleaved <b>on-policy RL</b> and <b>SFT</b> on ground-truth hard trajectories, bridging OOD gaps and stabilizing visual grounding in GUI environments.  | Seattle, WA, USA       | Sep. 2025 – Dec. 2025          |
|                       | <b>Google DeepMind</b><br>Research Intern<br><i>Gemma 3n Post-Training for Real-Time Interaction (Frontier AI &amp; GenAI)</i><br>Developed a synthetic audio–text data framework that eliminates reliance on human-crafted streaming labels while maintaining near-identical accuracy to non-streaming models.<br>Built a <b>full-stack RL+SFT framework</b> for audio LLMs, achieving state-of-the-art performance in real-time streaming ASR/AST.<br>Engineered a high-throughput rollout and training pipeline in PyTorch and SGLang for Gemma 3n, accelerating RL (GRPO, DAPO) by 5×.<br>Contributed to <b>Gemma 3n technical report</b> and open-source support. | Mountain View, CA, USA | Jun. 2025 – Sep. 2025          |

## Selected Publications

**Honda Research Institute USA** San Jose, CA, USA  
Research Intern Jun. 2024–Sep. 2024  
*Multimodal LLM Post-Training (8B–70B) for Social Reasoning*  
Published a *spotlight* paper at ICML 2025 (Top 2.59%). Filed a US patent.  
Developed long-context multimodal LLMs and accelerated inference-time scaling using vLLM framework. Enabled long-context modeling of human behavior and autonomous driving in multimodal environments; scalable to LLMs up to 70B/405B parameters.

### Overcoming Multi-step Complexity in Theory-of-Mind Reasoning: A Scalable Bayesian Planner

**Chunhui Zhang**, Zhongyu Ouyang, Sean Dae Houlihan, Kwonjoon Lee, Nakul Agarwal, Soroush Vosoughi, Shao-Yuan Lo  
*ICML 2025 (Spotlight, Top 2.59%)*  
[Paper](#) | [Code](#)

First scalable solution for multi-step Theory-of-Mind reasoning. Uses Bayesian inverse planning for global planning, then lets LLMs focus on local reasoning. Works on 70B+ models where others fail.

### Growing Through Experience: Scaling Episodic Grounding in Language Models

**Chunhui Zhang**, Elsie Wang, Zhongyu Ouyang, Xiangchi Yuan, Soroush Vosoughi  
*ACL 2025 Main Conference (Oral Presentation, Top 3.24%)*  
[Paper](#) | [Code](#)

Post-trained reasoning LLMs (across 3B, 8B, 70B) on MCTS-sampled data from physical simulators.

### Pretrained Image-Text Models are Secretly Video Captioners

**Chunhui Zhang\***, Yiren Jian\*, Zhongyu Ouyang, Soroush Vosoughi  
*NAACL 2025 Main Conference (Oral Presentation, Top 2.88%)*  
[Paper](#) | [Code](#)

RL post-training recipe that achieved **Top-2** on PapersWithCode video captioning leaderboard, outperforming industry MLLM captioners.

### Knowing More, Acting Better: Hierarchical Representation for Embodied Decision-Making

**Chunhui Zhang**, Zhongyu Ouyang, Zheyuan Liu, Soroush Vosoughi  
*EMNLP 2025 Findings*

Refines vision-language-action LLM representations to enable more effective PPO-based RL training in embodied AI.

### Working Memory Identifies Reasoning Limits in Language Models

**Chunhui Zhang**, Yiren Jian, Zhongyu Ouyang, Soroush Vosoughi

*EMNLP 2024 Main Conference* | [Paper](#) | [Code](#)

Introduced working memory as a diagnostic tool for LLM reasoning limits. This work inspired a follow-up NAACL paper on long-context multimodal understanding.

### Temporal Working Memory: Query-Guided Segment Refinement for Enhanced Multimodal Understanding

Xingjian Diao\*, **Chunhui Zhang**\*, Weiyi Wu, Zhongyu Ouyang, Peijun Qing, Ming Cheng, Soroush Vosoughi, Jiang Gui

*NAACL 2025 Findings* | [Paper](#) | [Code](#)

Inspired by working memory in my EMNLP 2024 paper, this work is a follow-up study on long-context video-language understanding.

## Under Review

### Model Priors Shape Experience: RL for Complex Audio Long-form Reasoners

**Chunhui Zhang**

[Code](#)

*First to implement Qwen2.5-Omni and vLLM for faster RL reasoning across audio and other unified modalities.*

## Selected Collaborations

### Superficial Self-Improved Reasoners Benefit from Model Merging

Xiangchi Yuan, **Chunhui Zhang**, Zheyuan Liu, Dachuan Shi, Soroush Vosoughi, Wenke Lee

*EMNLP 2025* | [Paper](#) | [Code](#)

### SoundMind: RL-Incentivized Logic Reasoning for Audio-Language Models

Xingjian Diao, **Chunhui Zhang**, Keyi Kong, Weiyi Wu, Chiyu Ma, Zhongyu Ouyang, Peijun Qing, Soroush Vosoughi, Jiang Gui

*EMNLP 2025 (Oral Presentation)*

### Is It Navajo? Accurate Language Detection in Endangered Athabaskan Languages

Ivory Yang, Weicheng Ma, **Chunhui Zhang**, Soroush Vosoughi

**Learning Musical Representations for Music Performance Question Answering**

Xingjian Diao, **Chunhui Zhang**, Tingxuan Wu, Ming Cheng, Zhongyu Ouyang, Weiyi Wu, Jiang Gui  
*EMNLP findings 2024*

**Expedited Training of Visual Conditioned Language Generation via Redundancy Reduction**

Yiren Jian, Tingkai Liu, Yunzhe Tao, **Chunhui Zhang**, Soroush Vosoughi, Hongxia Yang  
*ACL 2024 (*Oral Presentation, Top 3.10%*)*

**Aligning Relational Learning with Lipschitz Fairness**

Yaning Jia\*, **Chunhui Zhang**\*, Soroush Vosoughi  
*ICLR 2024 – Note: Co-first author Jia was a master student I mentored.*

**Mitigating Emergent Robustness Degradation on Graphs while Scaling-up**

Xiangchi Yuan\*, **Chunhui Zhang**\*, Yijun Tian, Yanfang Ye, et al.  
*ICLR 2024 – Note: Co-first author Yuan was a master student I mentored.*

**When Sparsity Meets Contrastive Models: Less Data Can Bring Better Class-Balanced Representations**

**Chunhui Zhang**, Chao Huang, Yijun Tian, Qianlong Wen, et al.  
*ICML 2023 – AAAI-DCAA 2023 Best Paper Runner-up Award*

**Chasing All-Round Graph Representation Robustness: Model, Training, and Optimization**

**Chunhui Zhang**, Yijun Tian, Mingxuan Ju, Zheyuan Liu, et al.  
*ICLR 2023*

**Look Twice as Much as You Say: Scene Graph Contrastive Learning for Self-Supervised Image Caption Generation**

**Chunhui Zhang**, Chao Huang, Youhuan Li, Xiangliang Zhang, Yanfang Ye, et al.  
*CIKM, 2022.*

***Full publication list includeing 30+ papers at ICML, NeurIPS, ICLR, ACL, NAACL, EMNLP, WWW (TheWebConf), KDD, CIKM, ICDM, ICWSM, etc. available at [chunhuizng.github.io](https://chunhuizng.github.io)***

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|-------------------|---|------------|
| Honors and Awards | ICML Spotlight Recognition (Top 2.59%)          | 2025       |
|                   | ACL Oral Presentation Award (Top 3.24%)         | 2024, 2025 |
|                   | NAACL Oral Presentation Award (Top 2.88%)       | 2025       |
|                   | AAAI-DCAA Best Paper Runner-up Award            | 2023       |
|                   | Graduate School of Arts and Sciences Fellowship | 2021–2023  |

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| Service | <b>Program Committee/Reviewer:</b> ICML, ICLR, NeurIPS, ACL, NAACL, EMNLP, UAI, AISTATS, AAAI (2023–2025)<br><b>Journal Reviewer:</b> TMLR, IEEE TKDE, IEEE TNSE, ACM TIST, Neurocomputing |
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