

# Muqiao Yang

412-708-5576 | [muqiaoy@cs.cmu.edu](mailto:muqiaoy@cs.cmu.edu) | [github.com/muqiaoy](https://github.com/muqiaoy) | [Google Scholar](https://scholar.google.com/citations?user=muqiaoy)

## EDUCATION

### Carnegie Mellon University

*Ph.D. in Electrical and Computer Engineering*

Pittsburgh, PA, USA

*Expected: Early 2024*

### Carnegie Mellon University

*M.S. in Electrical and Computer Engineering*

Pittsburgh, PA, USA

*Dec. 2019*

### The Hong Kong Polytechnic University

*B.E. in Electronic and Information Engineering, Minor in Computer Science*

Hong Kong

*May 2018*

## PUBLICATIONS

- **Muqiao Yang**, Chunlei Zhang, Yong Xu, Zhongweiyang Xu, Heming Wang, Bhiksha Raj, Dong Yu. uSee: Unified Speech Enhancement and Editing with Conditional Diffusion Models. *In submission to ICASSP 2024*.
- Heming Wang, Meng Yu, Hao Zhang, Chunlei Zhang, Zhongweiyang Xu, **Muqiao Yang**, Yixuan Zhang, Dong Yu. Unifying Robustness and Fidelity: A Comprehensive Study of Pretrained Generative Methods for Speech Enhancement in Adverse Conditions. *In submission to ICASSP 2024*.
- **Muqiao Yang**, Umberto Cappellazzo, Xiang Li, Shinji Watanabe, Bhiksha Raj. Improving Continual Learning in Acoustic Scene Classification via Mutual Information. *In submission to ICASSP 2024*.
- Zhongweiyang Xu, Yong Xu, Vinay Kothapally, Heming Wang, **Muqiao Yang**, Dong Yu. SpatialCodec: Neural Spatial Speech Coding. *In submission to ICASSP 2024*.
- Xiang Li, Yandong Wen, **Muqiao Yang**, Jinglu Wang, Rita Singh, Bhiksha Raj. Rethinking Voice-Face Correlation: A Geometry View. *ACM Multimedia (MM)*, 2023.
- Umberto Cappellazzo, **Muqiao Yang**, Falavigna Daniele, Alessio Brutti. Sequence-Level Knowledge Distillation for Class-Incremental End-to-End Spoken Language Understanding. *Conference of the International Speech Communication Association (Interspeech)*, 2023.
- Xukun Zhou, Jiwei Li, Tianwei Zhang, Lingjuan Lyu, **Muqiao Yang**, Jun He. Backdoor Attacks with Input-unique Triggers in NLP. *arxiv preprint arXiv:2303.14325*, 2023.
- **Muqiao Yang**, Joseph Konan, David Bick, Yunyang Zeng, Shuo Han, Anurag Kumar, Shinji Watanabe, Bhiksha Raj. PAAPLoss: A Phonetic-Aligned Acoustic Parameter Loss for Speech Enhancement. *International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2023.
- **Muqiao Yang**, Naoyuki Kanda, Xiaofei Wang, Jian Wu, Sunit Sivasankaran, Zhuo Chen, Jinyu Li, Takuya Yoshioka. Simulating realistic speech overlaps improves multi-talker ASR. *International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2023.
- Yunyang Zeng, Joseph Konan, Shuo Han, David Bick, **Muqiao Yang**, Anurag Kumar, Shinji Watanabe, Bhiksha Raj. TAPLoss: A Temporal Acoustic Parameter Loss for Speech Enhancement. *International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2023.
- **Muqiao Yang\***, Joseph Konan\*, David Bick\*, Anurag Kumar, Shinji Watanabe, Bhiksha Raj. Improving Speech Enhancement through Fine-Grained Speech Characteristics. *Conference of the International Speech Communication Association (Interspeech)*, 2022.
- **Muqiao Yang**, Ian Lane, Shinji Watanabe. Online Continual Learning of End-to-end Speech Recognition Models. *Conference of the International Speech Communication Association (Interspeech)*, 2022.
- Ying Peng, Yihong Dong, **Muqiao Yang**, Songtao Lu, Qingjiang Shi. Signal Transformer: Complex-valued Attention and Meta-Learning for Signal Recognition. *arxiv preprint arXiv:2106.04392*, 2021.
- Xingbo Wang, Jianben He, Zhihua Jin, **Muqiao Yang**, Yong Wang, Huamin Qu. M<sup>2</sup>Lens: Visualizing and Explaining Multimodal Models for Sentiment Analysis. *IEEE Visualization Conference (VIS)*, 2021. (\*Honorable Mention Award)
- Ryan Mohr, Allan Avila, Soham Gosh, Ananta Bhattarai, **Muqiao Yang**, Xintian Feng, Martin Head-Gordon, Ruslan Salakhutdinov, Maria Fonoberova, Igor Mezic. Combining Programmable Potentials and Neural Networks for Materials Problems. AAAI Spring Symposium: MLPS 2021.
- Yao-Hung Hubert Tsai\*, Martin Q. Ma\*, **Muqiao Yang\***, Han Zhao, Louis-Philippe Morency, Ruslan Salakhutdinov. Self-supervised Representation Learning with Relative Predictive Coding. *International Conference on Learning Representations (ICLR)*, 2021.
- Yao-Hung Hubert Tsai\*, Martin Q. Ma\*, **Muqiao Yang\***, Ruslan Salakhutdinov, Louis-Philippe Morency. Multimodal Routing: Improving Local and Global Interpretability of Multimodal Language Analysis. *Conference on Empirical Methods in Natural Language Processing (EMNLP)*, 2020.

- **Muqiao Yang\***, Martin Q. Ma\*, Dongyu Li\*, Yao-Hung Hubert Tsai, Ruslan Salakhutdinov. Complex Transformer: A Framework for Modeling Complex-valued Sequence. *International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2020.
- Mengsu Ding, **Muqiao Yang**, Shimin Chen. Storing and Querying Large-Scale Spatio-Temporal Graphs with High-Throughput Edge Insertions. *arxiv preprint arXiv:1904.09610*, 2019.

## EXPERIENCE

---

- Research Intern** Sept. 2023 – present  
*Google Deepmind, Mountain View, CA* *Mentor: Jianmo Ni, Xiaoting Bi*  
 • Working on learning multimodal discrete and fine-grained user tokens from human interaction data.
- Research Intern** May. 2023 – Aug. 2023  
*Tencent AI Lab, Bellevue, WA* *Mentor: Chunlei Zhang, Yong Xu*  
 • Worked on Unified Speech Enhancement and Generation with diffusion models.
- Research Intern** May. 2022 – Aug. 2022  
*Microsoft, Redmond, WA* *Mentor: Naoyuki Kanda, Xiaofei Wang*  
 • Worked on improving multi-talker Automatic Speech Recognition by simulating realistic conversations.
- Graduate Research Assistant** Jan. 2022 – present  
*Carnegie Mellon University* *Advisor: Bhiksha Raj, Shinji Watanabe*  
 • Working on speech enhancement with an optimization on fine-grained speech characteristic features.  
 • Improved both objective and subjective evaluation metrics by finetuning existing well-trained speech enhancement models with optimization on the extended Geneva Minimal Parameter Set.
- Graduate Research Assistant** Sept. 2020 – Apr. 2021  
*Carnegie Mellon University* *Advisor: Ian Lane, Shinji Watanabe*  
 • Developed end-to-end spoken language understanding to perform intent classification and dialog state tracking.  
 • Applied pretrained ASR encoder and natural language understanding teacher for cross-modal learning.  
 • Working on lifelong learning in Automatic Speech Recognition.
- Research Associate** Feb. 2020 – Sept. 2020  
*Carnegie Mellon University* *Advisor: Ruslan Salakhutdinov*  
 • Replaced Kullback-Leibler divergence with Pearson Chi-square divergence and applied relative ratio estimation to solve robustness problem in mutual information-based representation learning models.
- Graduate Research Assistant** Sept. 2018 – Feb. 2020  
*Carnegie Mellon University* *Advisor: Ruslan Salakhutdinov, Louis-Philippe Morency*  
 • Developed Retrieval-based approach to generate realistic audios from text with ConceptNet and optimize the audio transformation model with an adversarial loss.  
 • Developed multimodal Capsule network for emotion recognition tasks and increased interpretability to identify contributions of each modality by routing coefficients.  
 • Proposed complex transformer and conducted sequence prediction and generation tasks on both datasets and achieved state-of-the-art result on MusicNet automatic transcription.
- Research Intern** May. 2018 – Aug. 2018  
*Chinese Academy of Sciences* *Advisor: Shimin Chen*  
 • Developed PAST, a framework for efficient PARTitioning and query processing of Spatial-Temporal graphs with Apache Cassandra and Apache Spark.
- Undergraduate Research Assistant** Apr. 2017 – May. 2018  
*The Hong Kong Polytechnic University* *Advisor: Man-Wai Mak*  
 • Developed a recommendation system on large-scale Yahoo! datasets with Apace Hadoop and Apache Spark.

## TEACHING

---

- 11-785, Introduction to Deep Learning, Carnegie Mellon University, Spring 2023.
- 18-661, Introduction to Machine Learning for Engineers, Carnegie Mellon University, Fall 2022.
- 18-660, Optimization, Carnegie Mellon University, Spring 2022.
- 10-605, Machine Learning with Large Datasets, Carnegie Mellon University, Fall 2021.

## SKILLS

---

**Programming Languages:** Python, HTML/CSS  
**Languages:** English, Mandarin, Cantonese