

# Zhongweiyang Xu

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## EDUCATION

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- **University of Illinois Urbana-Champaign** Champaign, IL  
*MS/PhD Student in Electrical and Computer Engineering; GPA: 4.00* Aug. 2021 – May 2026
- **University of Illinois Urbana-Champaign** Champaign, IL  
*Bachelor of Science in Computer Engineering; GPA: 3.97* Aug. 2018 – May. 2021

## RESEARCH OVERVIEW AND INTEREST

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- **Current:** My research interest is mostly involved with the combination of **multimedia signal processing** and **machine learning** in general. I have worked on **speech separation/enhancement** a lot and also have decent knowledge about other speech related technologies like **speech recognition**, **voice conversion**, **speech synthesizing** and **audio-visual** related topics.
- **Future:** I plan to step more into speech technologies and also involve other sensors like **IMU** Motion sensors into multimedia applications. I also intend to design more efficient models which are realistic in real-world applications like **hearing aids**, **video conferencing**, and **augmented reality**.

## INDUSTRY EXPERIENCE

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- **Tencent Ethereal Lab** Shenzhen, China  
*Research Scientist Intern* May 2021 - Aug. 2021
  - **KiNN:** Develop a Knowledge-inspired Nerual Netork (KiNN) for **real-time computationally efficient ultra-lightweight** model for **speech enhancement**. This model is designed for deployment in the **Tencent Meeting's** (most popular video conferecing app in China) speech AI codec.

## RESEARCH EXPERIENCE

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- **UIUC SyNRG Lab** Champaign, IL  
*Graduate Research Assistant Advised by Prof. Romit Roy Choudhury* May 2021 - current
  - **Learning to Sparate Voices by Spatial Regions (First Author Paper Accepted to ICML2022):**
    1. Propose a spatial **region-wise** separation mechanism for **binaural** speech applications like audio augmented reality and hearing aids.
    2. Use traditional clustering as a teacher model to allow **self-supervised** training for binaural spatial separation, so that personalized model (with personalized HRTF encoded) can be trained simply from personal recordings.
    3. Our model shows superior results comparing with using a general model.
- **UIUC Statistical Speech Technology Group Lab** Champaign, IL  
*Advised by Prof. Mark Hasegawa-Johnson* May 2021 - Feb 2022
  - **Dual-path Attention is All You Need for Audio-Visual Speech Extraction (in preparation for ICASSP2023):**  
Propose a **dual-path multi-modal attention** model for **audio-visual speech extraction** for better **multi-modal fusion**. Our model is able to achieve **17+ dB** for SI-SNRi on LRS3 dataset (in the wild) for 2-5 number of speakers and achieves SOTA performance which exceeds all previous work by a large margin ( $\geq 3\text{dB}$ ).

## TEACHING EXPERIENCE

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- **UIUC CS/ECE374 SP2021:** Introduction to Algorithms & Models of Computation

## PUBLICATIONS

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- **ACM ICML2022:** *Zhongweiyang Xu, Romit Roy Choudhury*, “Learning to Sparate Voices by Spatial Regions”

## PROJECTS

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- **Linux Kernel Project:** Develop an OS Kernel for the OS Class.
- **BeatDance on FPGA:** Develop a GuitarHero-like game on a Cyclone-V FPGA.
- **Two Factor Authentication using Earphones:** Use personal earphone’s production imperfection as a source for 2FA.
- **RISC-V CPU:** Use SystemVerilog to develop a RISC-V CPU with cache and pipeline.
- **Feature Visualization Survey and Experiment:** Write a survey about feature visualization techniques for vision neural networks and also gives several propositions regarding how to interpret features for audio-related models. Experiment on simple visualization of audio separation networks.

## SKILLS

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- **Languages** Python, C, C++, SystemVerilog
- **Coursework and Skills** Machine Learning, Deep Learning, Multimedia Signal Processing, Random Process, Generative AI, Computer Vision, NLP, Optimization, Adaptive Signal Processing, Information Theory, Wireless Sensing, Digital System Design, Operating System.