

## Research Summary

I'm in my fifth year of the double major Ph.D. program in Computer Science and Cognitive Science at Indiana University Bloomington. I'm working with Prof. Minje Kim in the Signals and AI Group in Engineering (SAIGE) lab.

My research focuses on designing efficient (or low power) neural network algorithms for the application to speech/audio coding and enhancement. This is critical, especially in the era of IoT, for a wide range of devices with limited energy supply (cellphone, hearing aids, smart home assistants, etc). We resort to not only the power of deep learning as a computational paradigm but conventional digital signal processing (DSP) techniques as well: an elegant solution is usually found by bridging these two. For example, we proposed a method to revive the conventional multi-staged residual coding scheme in neural network for speech coding; we also presented a collaborative quantization scheme to enable a trainable LPC quantization along with LPC residual coding. I've also worked on re-engineering psychoacoustics to achieve a more perceptually salient cost function for neural speech and audio processing. These works have led to academic publications, patents, and more research funding.

In short, my research helps to bring BIG data closer to SMALL devices towards future intelligent audio and signal processing standards. My skills and craftsmanship acquired from this Ph.D. program can be highly transferable to my next play in industry with the forecast of a productive and fruitful collaboration.