

**Abstract:** Traditional speech enhancement systems reduce noise by modifying the noisy signal, which suffers from two problems: under-suppression of noise and over-suppression of speech. Instead, synthesizing clean speech based on the noisy signal could produce outputs that are both noise-free and high quality. We first show that we can replace the noisy speech with its clean resynthesis from previously recorded clean speech from the same speaker. Next, we show that we can use the high quality speech generation capability of neural vocoders for better quality speech enhancement. We term this parametric resynthesis (PR). We show that PR systems generate high quality speech using neural vocoders. We also show that when trained on data from enough speakers, these vocoders can generate speech from unseen speakers, both male, and female, with similar quality as seen speakers in training. Finally we show that, using neural vocoders we can achieve better objective signal and overall quality than the state-of-the-art speech enhancement systems and better subjective quality than oracle mask based system.

**Committee:**

- Professor Michael Mandel, Mentor, Brooklyn College
- Professor Rivka Levitan, Brooklyn College
- Professor Kyle Gorman, The Graduate Center

**Outside member:**

- Ron Weiss Google