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Model-based signal processing for hearing aids

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The aim of the work presented in this talk is to investigate potential applications of models of human auditory processing to signal processing in hearing aids. In particular, it is shown that auditory models may be used as objective indicators of the perceptual quality of single- and multichannel noise reduction strategies. Furthermore, a general framework for computational auditory scene analysis (CASA) is introduced and applied to the problem of estimating spatial direction and spectral envelope of super-imposed sound sources from a binaural input signal. Finally, implications of using nonlinear peripheral models for the design of compression systems in hearing aids are discussed. In particular, results from a multi-band instantaneous compression scheme are presented, which is based on a novel nonlinear auditory filterbank controlled by the instantaneous frequency calculated in frequency sub-bands.