

## Modelling binaural speech recognition

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In many cases speech has to be recognized in adverse listening conditions including noise sources from different directions and adverse room acoustics. Furthermore, hearing-impairment compromises intelligibility in such conditions. Binaural processing of the auditory system can cause a substantial improvement of speech recognition.

A binaural speech intelligibility model (Beutelmann and Brand, JASA, 2006) yields accurate predictions of speech reception thresholds (SRTs) in presence of a stationary noise source at arbitrary azimuths and in different rooms. The model combines a multi-frequency channel equalization-cancellation (EC) process and the speech intelligibility index (SII). The effect of hearing loss is simulated by adding uncorrelated masking noises (according to the pure-tone audiogram) to the ear channels.

A recent revision of this model is based on an analytical expression of binaural unmasking for arbitrary input signals and is computationally relatively efficient. An extension for non-stationary interferers was realized by applying the model to short-time frames of the input signals and averaging over the predicted SRT results. Model predictions are compared to binaural speech intelligibility data from normal-hearing and hearing-impaired listeners, incorporating different combinations of rooms, sound source setups and noise types.