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Streams of processing and hemispheric asymmetries in speech perception

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Studies in non-human primates have indicated that, as in the visual system, there are (at least) two streams of processing in the auditory system. These pathways are associated with different types of auditory processes - an anterior 'what' pathway and posterior 'how/where' pathway(s). In this talk I will use these neurophysiological theories as a framework for interpreting findings from a range of PET and fMRI studies of human speech perception and production, and present evidence that the anterior 'what' pathway in humans shows hierarchical processing of the speech signal, reflecting a move from acoustic/phonetic processing to a more abstract representation in the anterior superior temporal sulcus. In contrast, posterior auditory areas in humans are associated with sensory/motor interactions in speech, and with aspects of working memory processing. I will address how these systems are differentially recruited when speech perception is made difficult, due to different types of masking noise. Finally, I will outline differences in the processing of speech in left and right auditory areas.