

Session 7	Sound Processing Methodologies
Time	14:00 – 14:30
Name	Maneesh Sahani (Gatsby Institute, UCL)
Title	Primitive Auditory Scene Analysis as Inference
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Abstract	<p>How can the auditory system make sense of the maelstrom of voices and sounds at the proverbial cocktail party? One set of clues to the answer comes from studies of auditory perception and scene analysis in more constrained settings. In particular, Gestalt psychology proposes a set of 'laws' which qualitatively describe how auditory features are bound to auditory objects. Three of these form the basis for the model we present here. First, the principle of "good continuation" identifies smoothly varying features with a single source and abrupt changes as a signature of separate sources. Second, the principle of "closure" suggests perceptual completion of fragmentary features. Third, the principle of "common fate" states that different frequency components group together if they undergo similar changes.</p> <p>We derive a simple computational model for auditory scene analysis based on these Gestalt laws. Where previous such efforts have concentrated on tuning parameters in largely deterministic models to fit human behaviour, we instead assume that these perceptual laws reflect statistical regularities in natural sounds and learn the parameters of a probabilistic model from acoustic recordings. Auditory scene analysis, at least in its simple laboratory form, then follows as a process of inference within this learnt model.</p> <p>Joint work with Richard Turner (Cambridge).</p>