



LECTURES ON AUDITORY PERCEPTION

[Pr Shihab Shamma](#), U. Maryland

Dans le cadre d'une [Chaire Blaise Pascal](#), Etat - Région Ile de France.
Laboratoire d'accueil: [équipe Audition](#), LPP (CNRS-P5) & DEC (ENS)

These lectures provide highlights on recent advances in understanding the mechanisms underlying auditory perception and its relationship with cognitive processes such as attention, learning, and memory.

Transforming Sound into Neural Activity

Signal processing from the cochlea to the auditory cortex

A computational perspective on the anatomy and physiology of the auditory pathways. At each stage, sound responses are interpreted in light of their functional significance in the perception of the auditory attributes (pitch, timbre, loudness, and location). A mathematical framework for auditory processing is presented that ties together diverse strands based on the concept of *spectral* and *temporal receptive fields* (STRFs). The model provides a versatile representation of sound that has guided research in central auditory processing and the design of systems in audio applications.

March 26, 2012. 15h-16h30. Salle des Actes, [Ecole normale supérieure](#), 45 rue d'Ulm.

The Ultimate Challenge

Coherence in the cocktail party

The ultimate function of sensory systems is to enable the animal to navigate complex noisy environments, avoid predators and pursue prey, locate mates and protect offspring. In human contexts, it is widely known as the cocktail party problem! A situation in which we are able to perceive (at will) one of multiple sound sources despite severe background reverberations and interference. To fully understand such a capability, we need to invoke and integrate harmoniously bottom-up auditory processing and cortical representations, with top-down control, attention, and memory. I shall discuss mathematical formulations of this process and argue for the key role of the *principle of coherence* of sensory cues in guiding the perceptual organization of sensory scenes.

March 28, 2012. 15h-16h30. Salle des Actes, [Ecole normale supérieure](#), 45 rue d'Ulm.