

## **ACOUSTIC SIGNAL PROCESSING FOR NEXT GENERATION MULTICHANNEL HUMAN-MACHINE INTERFACES**

**Prof. Walter KELLERMANN**

Chair, Multimedia Comms. and Signal Proc., Univ. Erlangen-Nuremberg, Germany

### Abstract

The acoustic interface for future multimedia and communication terminals should be hands-free and as natural as possible, which implies that the user should be free to move and should not need to wear any devices.

For digital signal processing this poses major challenges both for signal acquisition and reproduction, which reach far beyond the current state of the technology.

For ideal acquisition of an acoustic source signal in noisy and reverberant environments, we need to compensate acoustic echoes, suppress noise and interferences and we would like to dereverberate the desired source signal.

On the other hand, for a perfect reproduction of real or virtual acoustic scenes we need to create desired sound signals at the listeners ears, while at the same time we have to remove undesired reverberance and to suppress local noise.

In this talk we will briefly analyze the fundamental problems for signal processing in the framework of MIMO (multiple input - multiple output) systems and discuss current solutions.

In accordance with ongoing research we emphasize nonlinear and multichannel acoustic echo cancellation, as well as microphone array signal processing for beamforming, interference suppression, blind source separation, and source localization.

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Universidad Carlos III de Madrid

Campus de Leganés

Avda. De la Universidad, 30

28311 Leganés (Madrid)

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(SRC: mcal@tsc.uc3m.es)