

## SPCOMIT Seminar Invitation

Title: Acoustic scene mapping for robot audition

Speaker: Dr. Christine Evers (Imperial College, London)

### Abstract

The ability to explore the surrounding environment is a major precondition for robot autonomy and is therefore crucial for Human-Robot Interaction (HRI). Audio signals obtained from microphone arrays integrated in the robot platform contain information about the environment that can be exploited constructively for scene analysis, especially in situations where visual sensors suffer from limited Field of View. Acoustic scene mapping is a challenging task as speech in enclosed environments is subject to reverberation, causing localization errors, spurious detections of early reflections, and missing detections of sound sources. Robust multi-source tracking is therefore required to estimate smoothed source trajectories. Moreover, microphone arrays can often localize sound sources only in terms of their instantaneous directions relative to the robot, whereas the source-sensor distance, or range, is generally unmeasured. As the absolute location of a moving robot is often unknown in practice, Acoustic Simultaneous Localization And Mapping (a-SLAM) is required in order to localize the microphone array and jointly map the sound sources.

This talk discusses recent developments in acoustic source tracking and a-SLAM for HRI. A new theoretical framework is introduced that provides robustness against the adverse effects of dominant reflections due to reverberation, and is capable of mapping both static as well as moving sound sources. The theoretical treatment is followed by the presentation and discussion of simulation results.

### Biography:

Christine Evers is a Research Associate at the Department of Electrical and Electronic Engineering at Imperial College London, working in the Speech and Audio Processing (SAP) Group. Her research focuses on Bayesian estimation for audio signal processing with a special interest in human-robot interaction (HRI). She completed her PhD on blind speech dereverberation using sequential Monte Carlo approaches at the University of Edinburgh, School of Engineering in 2010. After her PhD she took a one-year position as a named Research Associate at the University of Edinburgh working on joint speech dereverberation and speaker localization funded by the Ministry of Defence. Between 2011-2014 she worked as a Senior Systems Engineer at Selex ES, Edinburgh, where she was responsible for the research and development of novel target tracking solutions for RADAR. She returned to academia in March 2014 to work with Dr Patrick A. Naylor at Imperial College on the EU Framework Programme (FP) 7 project "Embodied Audition for RobotS". Since 2016, she is a member of the IEEE Technical Committee on Audio and Acoustic Signal Processing.

The seminar will take place on **Monday, 27-6-2016, 11:10, in room 102 building 33.**