Wavefield Modeling and Signal Processing for Sensor Arrays of Arbitrary Geometry

Abstract: This talk considers wavefield modeling and its application to sensor array signal processing. In particular, we will see that wavefield modeling allows one to develop computationally-efficient and asymptotically-optimal array processing methods regardless of the array geometry. Wavefield modeling also facilitates incorporating array nonidealities, commonly present in real-world arrays, into array processing methods and performance bounds. Parameter estimation and beamforming in the azimuth-elevation-polarimetric domain will be addressed. Tools from harmonic analysis on the sphere, which are needed in wavefield modeling and manifold separation, will also be covered and novel results in the field will be provided. In addition to a review of well-known results in wavefield modeling, on-going research and open-problems in the area will be given.

Bio: Mário Costa was born in Portugal in 1984. He received the M.Sc.(Tech.) degree with distinction in Communications Engineering from Universidade do Minho, Portugal, in 2008, and the D.Sc.(Tech.) degree in Electrical Engineering from Aalto University (former Helsinki Univ. of Technology), Finland, in 2013. He has been with the Department of Signal Processing and Acoustics, Aalto University, Finland, since 2007. During 2007 as a Research Assistant, from 2008 to 2013 as a Researcher, and currently as a postdoctoral Researcher. From January to July 2011 he was an External Researcher at Connectivity Solutions Team, Nokia Research Center. His research interests include sensor array and statistical signal processing as well as wireless communications.

Host: Dr. Arye Nehorai