1094-49-183 **Radu Balan*** (rvbalan@math.umd.edu), Department of Mathematics, University of Maryland, College Park, MD 20742. *OPTIMAL BEAM PATTERN DESIGN FOR VERY LARGE SENSOR ARRAYS WITH SPARSE SAMPLING.*

The main goal of this work is to adaptively employ a large set of microphone sensors distributed in multiple dimensions to scan an acoustic field. Processing data from a large set of sensors will necessarily involve intelligent definition of suitable subsets of sensors active at various times. This paper presents a novel method for optimal beam pattern design for large scale sensor arrays using convex and non convex optimization techniques to define optimal subsets of sensors capable to select a target location while suppressing a large number of interferences. The first of two optimization techniques we present, uses a LASSO type approach to convexify the corresponding combinatorial optimization problem. The second approach employs simulated annealing to search for optimal solutions with a fixed size subset of active sensors. Our numerical simulations show that for scenarios of practical interest, the convex optimization solution is almost optimal. This is a joint work with Yenming Mark Lai, Heiko Claussen and Justinian Rosca. (Received August 22, 2013)