Seminar 1

Title: Joint Maximum Likelihood Detection and Power Allocation in Cooperative
MIMO Systems

Speaker: Thomas Hesketh

Abstract: Cooperative systems with relay nodes can exploit the inherent spatial diversity gains through combination techniques at the destination node, but attempting to combine this layout with a Maximum Likelihood detector (such as a Sphere Decoder) can give rise to a much increased detection complexity and practical implementation problems. Also, the distribution of power within such a system, especially under system-wide constraints, can greatly affect overall performance. In this presentation, we will highlight some solutions to these problems, consider some simulated results, and look at possible expansions of research in this area.

Seminar 2

Title: Lattice Reduction-Aided Regularized Block Diagonalization for Multiuser MIMO Systems

Speaker: Keke Zu

Abstract: In this seminar, a low-complexity lattice reduction aided RBD is proposed. The first SVD is replaced by a QR decomposition, and the orthogonalization procedure provided by the second SVD is substituted by a lattice reduction whose complexity is mainly contributed by a QR decomposition. Analysis and simulation results show that the proposed algorithm can achieve almost the same sum-rate as RBD while offering a lower complexity and substantial BER gains with perfect as well as imperfect channel state information at the transmit side.

Seminar 3

Title: Sparsity-Aware STAP with a Generalised Sidelobe Canceller architecture For Airborne Radar

Speaker: Rodrigo de Lamare

Abstract: In this talk, a l_1 regularized space-time adaptive processing (STAP) techniques with a generalised sidelobe canceler (GSC) architecture for airborne phased-array radar applications is presented. The core idea of the proposed methods is to impose a sparse regularization (l1-norm) to the minimum variance (MV) criterion. By solving this optimization problem, the filter weight vector based on l1-norm regularization is computed. In order to make this method computationally efficient, an l1-based online coordinate descent (OCD) adaptive algorithm which is similar to an RLS adaptive algorithm is developed. Computational complexity analysis shows that the proposed l1-based OCD algorithm has nearly the same cost of the full-rank STAP with an RLS algorithm . The simulation results show that the proposed STAP method converges rapidly and provides a SINR improvement over the full-rank STAP and existing compressive sensing algorithms.