Title：A semismooth Newton augmented Lagrangian method for nonsmooth optimization problems over matrix manifolds

Abstract: This talk is devoted to studying an inexact augmented Lagrangian method for solving a class of manifold optimization problems, which have non-smooth objective functions and non-negative constraints. Under the constant positive linear dependence condition on manifold, we show that the proposed method converges to a stationary point of the non-smooth manifold optimization problem. Moreover, we propose a globalized semi-smooth Newton method to solve the augmented Lagrangian subproblem on manifolds efficiently. The local superlinear convergence of the manifold semi-smooth Newton method is also established under some suitable conditions. Finally, numerical experiments on compressed modes and (constrained) sparse PCA illustrate the advantages of the proposed method in terms of accuracy and computational efficiency.