1086-49-2254 **B Jadamba**, Center for Applied and Computational Math., School of Mathematical Sciences, Rochester Institute of Technology, Rochester, NY 14586, **A A Khan*** (aaksma@rit.edu), Center for Applied and Computational Math., School of Mathematical Sciences, Rochester Institute of Technology, Rochester, NY 14586, **M. Sama**, Departamento de Matemática Aplicada, Madrid, Spain, and **B. Winkler**, Center for Applied and Computational Math, School of Mathematical Sciences, Rochester, NY. *A Nonsmooth Convex Optimization Problem in the Inverse Problem of Tumor Identification.*

This talk will focus on the elasticity imaging inverse problem of tumor identification in the human body. To study the inverse problem in an optimization framework, we introduce and analyze two new modified output least-squares (MOLS) objective functionals. We prove that one of the proposed MOLS functionals is convex, circumventing one of the major deficiencies of the existing output least-squares (OLS) functional: its nonconvexity. From the convexity, it follows that the first-order optimality condition expressed as a variational inequality is a necessary and sufficient optimality condition. This is in contrast to OLS, where the corresponding variational inequality is only a necessary optimality condition. Another novelty of this work is in the identification of discontinuous elasticity coefficients in incompressible elasticity using the total variation regularization. Numerical examples for smooth and discontinuous coefficients are given. (Received September 25, 2012)