MATH RESEARCH WEEKEND

February 7-8, 2020

Department of Mathematics, SUNY Geneseo

Dr. Akhtar Khan, Professor

School of Mathematical Sciences, RIT

Title: Elasticity Imaging Inverse Problem of Locating Cancerous Tumors

Abstract: Most models in applied and social sciences are given using the broad spectrum of partial differential equations (PDEs) involving parameters that characterize the physical features of the model. For instance, the diffusion coefficient in the Cauchy equation, the rigidity coefficient in fourth-order PDEs emerging from the plate models, and the Láme parameters in linear elasticity describe characteristics of the underlying medium. The direct problem in this context is to solve the PDE or the associated variational problem. By contrast, an inverse problem asks for the identification of the coefficients when a certain measurement of a solution to the underlying direct problem is available. This talk will focus on the elasticity imaging inverse problem of identifying cancerous tumors, which generalizes the practice of palpation by making use of varying elastic properties of healthy and cancerous tissue to locate tumors. More specifically, it is possible, using ultrasound, to measure interior displacements in human tissue (for example, breast tissue). Since cancerous tumors differ markedly in their elastic properties from healthy tissue, the tumors can be located by solving the elasticity. The talk will discuss the underlying mathematical ideas. The outcome of detailed numerical computations carried out using the tissue phantom data will show the efficacy and the feasibility of the developed framework.

Come and join Dr. Akhtar Khan in this year's MRW to learn about inverse problem of locating cancerous tumors and get some experience with what mathematical research is all about.

Note that the due date is Wednesday, February 5, 2020 at 4pm. To apply, click on `https://forms.gle/TXXEt2kxGMhpPLx88`

Program Schedule:

Friday, February 7, 2020:

(i) 3:30-4:30 pm: Colloquium Talk (Newton 203)

(ii) 5:00-5:30 pm: Pizza dinner (South 336)

(iii) 5:30-7:30 pm: First session (South 336)

Saturday, February 8, 2020 (South 336):

(i) 9:00-11:59 am: Second session

(ii) 12:00-1:00 pm: Lunch

(iii) 1:00-4:00 pm: Third session