Fall 2016 Mathematical Sciences Colloquium

"Photo-Acoustic Tomography and Thermo-Acoustic Tomography"

Abstract: Photo-acoustic tomography (PAT) and thermo-acoustic tomography (TAT) are novel hybrid modalities in medical imaging. A hybrid modality combines a high-resolution physical phenomenon and a high-contrast one in an aim to preserve the advantages of both. In PAT and TAT, high-resolution ultrasound wave is coupled with high-contrast optical or electromagnetic wave through the photo-acoustic effect. The study of their mathematical models can be divided into two steps. The first step concerns recovery of the radiation absorbed by tissues from the boundary measurement of ultrasound signals. This amounts to solving an inverse source problem for the acoustic wave equation. The second step consists of recovering optical or electromagnetic parameters of tissues from the absorbed radiation. This leads to inverse problems with internal measurement. In this talk, we will discuss the models underlying PAT and TAT and obtain several results concerning uniqueness, stability, and reconstructive procedures of these inverse problems.

Dr. Yang Yang

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Tuesday, November 29, 2016

4:00-5:00pm

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