Optical Imaging and Inverse Problems

Recent years have witnessed major advances in our understanding of the behavior of light in the presence of complex structures. Such advances have the potential to translate to very valuable insights for practical imaging applications, ranging from breast cancer diagnosis and brain tumor detection to astronomy. Traditionally, ray tracing and geometrical optics have provided the basis for imaging. However, recent optics and photonics research has focused on phenomena at smaller and smaller length scales or multiple scales. Thus, full PDE models and nonlinear imaging techniques have become necessary to adequately capture the useful optical effects. Furthermore, the more recent introduction of the use of multiple waves, multi-physics, or resonances has yielded even more opportunities for the applied and computational mathematics community to contribute. This workshop will bring together mathematicians with applied and computational scientists, physicists, and engineers with the goal of addressing a wide range of questions related to optical imaging modalities.