Title: Nonlocal elliptic equations: existence and multiplicity results

Abstract: In this talk I shall highlight the main results obtained in my thesis. The main theme of my thesis is based on nonlocal type elliptic equations. In particular, existence of infinitely many nontrivial solutions for a class of equations driven by nonlocal integro-differential operator $\mathcal{L}_K$ with concave-convex nonlinearities and homogeneous Dirichlet boundary conditions in smooth bounded domain in $\mathbb{R}^N$ is shown. Moreover, when $\mathcal{L}_K$ reduces to the fractional Laplace operator $(-\Delta)^s$, and the nonlinearity is of critical-concave type, existence of at least one sign changing solution has been established. These are then further generalized to the case of nonlocal equations with p-fractional Laplace operator. Existence of infinitely many nontrivial solutions for the class of equations with (p,q) fractional Laplace operator and concave-critical nonlinearities have also been studied together with existence of multiple nonnegative solutions when nonlinearity is of convex-critical type.

Also, in a different project I have studied the existence/nonexistence/qualitative properties of the positive solutions of nonlocal semilinear elliptic equations with critical and supercritical type nonlinearities. These are all joint works with my supervisor Dr. Mousomi Bhakta in series of four papers.