Finite-time blow-up of solutions to semilinear parabolic integro-differential equations

Abstract:

The first part of this talk will be dedicated to a brief review of the theory of finite-time blow-up of solutions to semilinear parabolic PDEs on bounded or unbounded spatial domains $\Omega$. The second part of the talk will focus on semilinear parabolic integro-differential equations where the reaction term is now nonlocal and given by Volterra-type memory term. I will describe the recently obtained (jointly with Lizao Li) extension of Fujita's fundamental 1966 result for PDEs to such nonlocal problems on $\Omega = \mathbb{R}^N$. However, for other unbounded spatial domains $\Omega \subseteq \mathbb{R}^N$ many key questions remain to be answered. The talk will conclude with a short discussion of current and future work on the computational solution of semilinear parabolic integro-differential equations.