Title: Generalizations of the Signed Selmer Groups for Cyclotomic $\mathbb{Z}_p$-Extensions

Abstract: Let $E/K$ be an elliptic curve and $p$ a rational prime. Also let $K_\infty/K$ be the cyclotomic $\mathbb{Z}_p$-extension of $K$ and $\Lambda(\Gamma)$ the Iwasawa module of this infinite extension. A famous conjecture by Mazur states that the $p$-primary component of the Selmer group of $E$ is $\Lambda(\Gamma)$-cotorsion when $E$ has good ordinary reduction at all primes of $K$ lying over $p$. This conjecture was proven in the case $K = \mathbb{Q}$ by Kato, but it is known to be false when $E$ has supersingular reduction type. To salvage this result, Kobayashi introduced the signed Selmer groups, which impose stronger local conditions than their classical counterpart.

In this presentation, I will give a summary of the history and known results concerning the signed Selmer groups, then suggest a way of generalizing their construction so they may be applied for elliptic curves defined over a wider variety of base fields $K$. 