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*Refined Iwasawa invariants*

This talk is based on joint work with Anwesh Ray. We will introduce Iwasawa theoretic invariants that are refinements of the classical  $\mu$ -invariant in Iwasawa theory. A conjecture of Greenberg postulates the existence of one member in each isogeny class of elliptic curves over the rational numbers, which has the property that the  $\mu$ -invariant for its dual Selmer group over the cyclotomic extension vanishes. We will explain how these refined invariants provide a philosophical reasoning for the validity of this conjecture.