Title: Area minimizing currents: singularities and tangent cones

Abstract: The Plateau problem asks about the surfaces of least m-dimensional area spanning a given m-1 dimensional boundary. However, to guarantee existence of minimizers, one must relax to a weaker notion of "surface" and "boundary", which means that "surfaces" have little a priori regularity. The problem of determining the size and structure of the interior singular set of area-minimizing surfaces has been studied thoroughly in a number of different frameworks, with many ground-breaking contributions in the last century. In the framework of integral currents, when the codimension of the surface is higher than 1, the presence of singular points with flat tangent cones creates an obstruction to easily understanding the size and structure of the interior singularities, as well as how the surface behaves at such singular points.

I will discuss the history of this problem, as well as joint works with Camillo De Lellis and Paul Minter, where we build on Almgren's celebrated dimension estimate on the interior singular set, and establish (m-2)-rectifiability of the interior singular set of an m-dimensional area-minimizing integral current, as well as uniqueness and classification of the tangent cone at \mathcal{H}^{m-2}-a.e. interior point.