Geometry Seminar  
Wednesday, May 13th, 4pm, 384-I

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Singular Sets of Harmonic Maps and Minimal Surfaces

If $f : M \to N$ is a stationary harmonic map, then it is well understood how to stratify $M$ by the singular set of $f$ given by $S^k(f)$. Roughly, $S^k(f)$ is the collection of points in $M$ such that no tangent map of $f$ has $k + 1$ degrees of symmetries. It is classical that $\dim S^k(f) \leq k$, however little else is known in general. In this talk we discuss recent work which proves $S^k$ is $k$-rectifiable. If $f$ is minimizing, then we prove uniform $n - 3$ measure bounds on $S(f)$. More effectively, we show $|\nabla f|$ has uniform estimates in weak $L^3$, which is sharp, as there are examples which do not live in $L^3$. The techniques involve an analysis of the recently introduced quantitative stratification, using a new energy covering argument, combined with a new rectifiable-Reifenberg result, and a new $L^2$-subspace approximation result for stationary harmonic maps. Similar statements are proved for integral currents with bounded mean curvature. This is joint work with Daniele Valtorta.