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Free boundary minimal disks in convex balls

The classical Lusternik-Schnirelman theorem says that any 2-sphere equipped with an arbitrary metric contains at least 3 embedded geodesic loops. Moving up one dimension, Yau asked about the existence of multiple embedded minimal surfaces of simple topology, namely minimal 2-spheres in 3-spheres or minimal 2-disks in 3-balls. In this talk, I will discuss joint work with Dan Ketover, where we show that every strictly convex 3-ball with nonnegative Ricci-curvature contains at least 3 embedded free boundary minimal 2-disks for any generic metric, and at least 2 solutions even without genericity assumption. Our approach combines ideas from min-max theory, geometric flows, and degree theory.