Min-max widths in Riemannian geometry

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The min-max theory for the area functional is a Morse theory on the space of surfaces contained in a three-dimensional Riemannian manifold. The theory experienced remarkable developments in the past decade, and found deep applications in differential geometry.

The min-max widths are invariants that naturally emerge from this theory as special critical values of the area. It is very interesting to compare these numbers to other geometric quantities, such as the volume and curvature bounds of the ambient manifold.

In this talk, we discuss some classification results of Riemannian manifolds involving the min-max widths of the area functional. In addition, we discuss a new notion of width of curves, generalising the classical one for plane curves.

The main results of this talk are part of an ongoing joint work with Lucas Ambrozio (IMPA) and Roney Santos (UFC).