

# First Joint Meeting Brazil Italy of Mathematics

## Special Session: Geometric Analysis

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**Title:** The Ahlfors-Khasminskii duality for fully nonlinear PDEs, and geometric applications

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**Abstract:** Maximum principles at infinity (or *almost maximum principles*) are a powerful tool to investigate the geometry of Riemannian manifolds. Among them, we stress the Ekeland, the Omori-Yau principles and their weak versions, in the sense of Pigola-Rigoli-Setti. These last have nice probabilistic counterparts in terms of stochastic and martingale completeness, which in turn are related to potential theory and parabolicity. The validity of such principles is usually granted via suitable exhaustion functions called Evans-Khasminskii potentials. In this talk, I discuss an underlying, unifying duality that allows to uncover relations between the principles. Indeed, duality holds for a broad class of fully-nonlinear operators of geometric interest. Our methods use the approach to nonlinear PDEs pioneered by Krylov ('95) and Harvey-Lawson ('09 - ), and involve the study of viscosity *almost solutions* of obstacle type problems.

This is joint work with Leandro F. Pessoa.