



Habilitationsvortrag im Fachbereich Mathematik

Dr. Rodrigo Avalos

**am 10. Juli 2026 um 11:30 Uhr
in Raum 7E02 / Hörsaalzentrum Morgenstelle**

“The Nash embedding theorems”

The objective of this talk is to provide a review of J. Nash’s embedding theorems in the context of Riemannian geometry. The conclusion of Nash’s work is that any Riemannian manifold can be isometrically embedded in a Euclidean space of sufficiently large dimension. This result constitutes a cornerstone in Riemannian geometry, closing the long-standing problem of showing that the class of intrinsically defined Riemannian manifolds is the same as that given by the Riemannian submanifolds of Euclidean space. Moreover, historically, these results provided deep connections with the theory of partial differential equations and led to analytic developments with a broad scope of applications. In this setting, the goal for this talk is to contextualise the problem and its historical relevance; review prior results before Nash’s work; stress the difficulties faced by the general problem for smooth metrics; showcase the key ideas from Nash to overcome these difficulties; and comment on recent developments and open problems related to Nash’s theorems. These last developments include the search for the optimal codimensions for the isometric embedding and extensions to semi-Riemannian geometry.