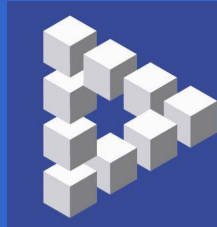




DEPARTAMENTO  
DE ANÁLISIS  
MATEMÁTICO Y  
MATEMÁTICA  
APLICADA



Facultad de Ciencias  
MATEMÁTICAS



# COLLOQUIUM DE ANÁLISIS MATEMÁTICO

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**Texas A&M University**

## **Sobolev embeddings in Dirichlet spaces**

### **Resumen:**

One of the classical Sobolev embeddings  $\mathbb{R}^n$  asserts that functions in the Sobolev space  $W^{1,p}(\mathbb{R}^n)$  with  $1 \leq p < n$  belong to a suitable  $L^q$ -space with an explicit optimal exponent  $q$  that depends on  $n$  and  $p$

This talk focuses on this embedding in the more general framework of Dirichlet spaces with (sub-)Gaussian heat kernel estimates. In particular, we discover how the optimal exponent depends on the Hausdorff dimension, the walk dimension, and also on a further invariant of the space. To this end, we will follow a recent approach to  $(1,p)$ -Sobolev spaces via heat semigroups inspired by ideas going back to de Giorgi and Ledoux.

If time permits, we will outline some results and conjectures concerning critical exponents that include other dimensions of interest in the theory of metric measure spaces. Besides heat kernel estimates, the main assumption on the underlying space is a non-negative curvature type condition that we call weak Bakry-Émery that is satisfied in classical settings as well as in fractals like (infinite) Sierpinski gaskets and carpets. The talk is based on joint work with F. Baudoin.

**Organizado por el Departamento de Análisis Matemático y Matemática Aplicada  
y el Instituto de Matemática Interdisciplinar (IMI)**

**Fecha: Jueves 16 de junio de 2022**

**a las 13:00 horas**

**Lugar: Aula 222**

**Facultad de CC Matemáticas, UCM**