



Lecture series by

## Prof. Maria J. Esteban

Université Paris-Dauphine

Fellow of the Dr. Karl Eisele & Elisabeth Eisele Stiftung

April 1<sup>st</sup> and 3<sup>rd</sup>, 2014

11:00 - 12:30 h and 14:30 – 16:00 h

University of Stuttgart, Campus Vaihingen

Pfaffenwaldring 57, Room 8.122

### Functional inequalities and the symmetry properties of the extremal functions

**ABSTRACT:** This course will follow a series of works about the symmetry properties of extremal functions for (interpolation) functional inequalities playing an important role in the study of long time behavior of evolution diffusion equations.

Optimal constants are rarely known, in fact one can write them explicitly only when the extremals enjoy maximal symmetry. This is why the knowledge of the parameters' regions where symmetry is achieved is of big importance.

This course will present variational methods used to prove existence of extremal functions and then various methods (symmetrization, spectral, etc) used to prove or disprove symmetry. Most of the interesting phenomena arising here will be proved analytically, but numerical results will be also presented, because some of them shed a very interesting light on symmetry breaking phenomena which are of a new and surprising nature.