

# Courses 2016-17

BCAM Mazarredo 14 ,48009 Bilbao, Basque Country, Spain

May 30 -June 2, 2017, From Tuesday to Friday (10:00 - 12:00) and on Thursday (15:00 - 17:00)  
(5 sessions, a total of 10 hours)

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## **AN INTRODUCTION TO MARKOV PROCESSES ASSOCIATED TO NONLINEAR AND NONLOCAL OPERATORS**

We first introduce basic notions and facts on Markov processes: transition function, associated resolvent, strongly continuous resolvents on  $L^p$  spaces, superharmonic functions, reduced function and capacities, jumps modification, infinitesimal local and nonlocal generators. We give two applications to partial differential (and integro-differential) equations: the stochastic solution of the Dirichlet problem and the solution of the martingale problem. Finally, we present relations between two classes of measure-valued Markov processes (superprocesses and processes with nonlocal branching) and nonlinear operators of the form  $Lu + f(u)$ , where  $L$  is a second order elliptic differential operator and  $f$  is a "branching mechanism", with applications to nonlinear boundary value problems.

**Prerequisites:** functional analysis and probability, basic knowledge.

Registration is free, but **inscription is required before 24th May**: So as to inscribe send an e-mail to [roldan@bcamath.org](mailto:roldan@bcamath.org). Student grants are available. Please, let us know if you need support for travel and accommodation expenses