Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

April 19 **Fabio Cipriani**, Politecnico di Milano

Title: *Integrals and potentials of 1-forms on the Sierpinski gasket*
(works in collaboration with Daniele Guido, Tommaso Isola, Jean-Luc Sauvageot)

The Sierpinski gasket K is probably the most studied example of a fractal space and it appears to be highly singular if analyzed by classical differential calculus and geometry. On the other hand, it is in natural way a Dirichlet space as it supports the existence of a generalized Dirichlet integral D and associated Laplace type operator, which naturally reflect the main geometric characteristic of K, namely self-similarity. A first aim of the exposition is to show that, relying on the differential calculus provided by D one may extend to K the tools of potential theory of Riemannian manifolds such as closed and exact smooth differential 1-forms, their line integrals along smooth paths in K and their potentials on the uniform universal cover of K. We then apply these instruments to extend de Rham and Hodge theorems to K and, if time permits, we conclude the talk describing a noncommutative analogue of the Sierpinski gasket.