

ANNALES DE LA FACULTÉ DES SCIENCES DE TOULOUSE Mathématiques

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Preface

Tome XXVI, n° 2 (2017), p. i-i.

http://afst.cedram.org/item?id=AFST_2017_6_26_2_r1_0

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Preface

It is a privilege to preface this issue of the *Annales de la Faculté des Sciences de Toulouse* in honour of Dominique Bakry. In December 2014, an international conference was held in Toulouse on the occasion of his 60th birthday. The articles gathered here at this occasion are a tribute of the authors to Dominique Bakry, covering a wide field of interests around the ideas that he set in motion and continues to develop. We thank them all for their contributions. We also thank the editorial board of the *Annales de la Faculté des Sciences de Toulouse*, and in particular its chief-editor J.-P. Otal, for the very efficient handling of the submissions.

After a CNRS position in Strasbourg, Dominique Bakry became Professor at the University of Toulouse, Paul-Sabatier, in 1988. His Phd thesis, under the joint supervision of M. Yor and P.-A. Meyer, was devoted to the general theory of multi-parameter processes. He then explored Riesz transforms and emphasized a new analytic and geometric theory of Markov diffusion operators. This theory, in which he introduced the famous Γ_2 operator and the fundamental notion of curvature-dimension of a Markov generator, has developed into a very fruitful and active research area in which the curvature criteria are cornerstones of deep interaction within analysis, geometry and probability theory. The field was even further enhanced during the last decade in connection with the synthetic curvature of optimal transport of J. Lott, C. Villani and K.-T. Sturm. More recently, Dominique Bakry opened a new research programme on the diagonalization of multi-dimensional diffusion operators in bases of orthogonal polynomials, yielding striking new connections between the functional calculus associated to the carré du champ operator and algebraic geometry. This line of research illustrates his constant dynamic search for new fields of mathematics and for bridges between different concepts.

The current rich activities on the analysis and geometry of diffusion operators and their applications, in particular illustrated in this volume, underline the importance and the relevance of the concepts and principles put forward by Dominique Bakry. We are most happy to dedicate these lines to Dominique Bakry, as a tribute to his achievements, past and future.

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