

Preface

The term *High Dimensional Probability* in the title of this volume refers to a circle of ideas and problems that originated in *Probability in Banach Spaces* and the *Theory of Gaussian Processes* more than forty years ago. Initially, the main focus was on the study of necessary and sufficient conditions for the continuity of Gaussian processes and of classical limit theorems—laws of large numbers, laws of iterated logarithm and central limit theorems in Banach spaces.

Gradually, it was realized that solving these problems requires taking into account some important geometric structures associated with random variables in high dimensional and infinite dimensional spaces. For instance, in the case of Gaussian processes, it was understood that a natural way to characterize the properties of their sample paths (boundedness, continuity, etc.) is to relate them to certain geometric characteristics (metric entropy, majorizing measures, generic chaining) of the parameter space equipped with the metric induced by the covariance structure of the process. Similar considerations turned out to be very useful and powerful in the study of limit theorems in Banach spaces and empirical processes. It was also understood that the crux of the problem is related to rather general probabilistic phenomena in high dimensional spaces such as, for instance, measure concentration. Parallel developments occurred in some other areas of mathematics such as convex geometry, Banach spaces, asymptotic geometric analysis, combinatorics, random matrices and stochastic processes. Moreover, the methods of high dimensional probability were found to have a number of important applications in these areas as well as in Statistics and Computer Science. This breadth is very well illustrated by the contributions present in this volume.

Most of the papers in this volume were presented at the *Vth International Conference on High Dimensional Probability* (HDP V) held at *le Centre International de Rencontres Mathématiques*, in Luminy, France on May 26-May 30, 2008. This was the fifteenth in a series of conferences that began in Strasbourg in 1973 and continued with nine conferences on *Probability in Banach Spaces* and five conferences on *High Dimensional Probability*.

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