

MATHEMATISCHES FORSCHUNGSINSTITUT OBERWOLFACH

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## Probabilistic Techniques in Modern Statistics

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17 May – 23 May 2015

ABSTRACT. The aim of the workshop was to bring together researchers in modern probability theory and statistics to discuss recent advances and challenging open problems at the intersection of both fields. It focussed on the most promising areas in which fruitful interactions between probability theory and statistics are currently developing.

*Mathematics Subject Classification (2010)*: 60, in particular: 60B12, 60B20, 60D05, 60E07, 60F17, 60Gxx; 62, in particular: 62B15, 62Gxx, 62Jxx, 62Mxx.

### Introduction by the Organisers

The workshop **Probabilistic Techniques in Modern Statistics** was organized by Vladimir Koltchinskii (Georgia Tech), Richard Nickl (University of Cambridge), Markus Reiss (Humboldt-Universität, Berlin) and Sara van de Geer (ETH, Zürich) and it took place on May 17–May 23, 2015.

The goal of the workshop was to bring together researchers in modern probability, statistics and related areas and to discuss recent advances and open problems at the intersection of these fields. The main focus was on the areas of the most intense interactions of probability and statistics with a significant impact on the development of novel methods of statistical inference for complex, high- and infinite-dimensional data sets. Among recent advances in these areas are deep understanding of the role of concentration of measure and concentration inequalities in high-dimensional inference, the development of non-asymptotic theory of random matrices and the progress on generic chaining and concentration bounds for empirical and related classes of stochastic processes.

The list of specific topics discussed at the workshop included:

- concentration of measure and its applications in statistical inference;
- probabilistic and geometric methods in high-dimensional statistics;
- Gaussian and empirical processes methods;
- non-asymptotic bounds for random matrices;
- statistics of stochastic processes;
- nonparametric methods, model selection and adaptive estimation;
- Bayesian nonparametrics.

In total, 51 mathematicians and statisticians participated in the workshop, including a number of junior researchers and PhD students. The program included 25 regular talks (their abstracts are given below) and a short evening session with several presentations by PhD students: Nicolay Baldin (Berlin), Claire Boyer (Toulouse), Emilie Devijver (Orsay), Ester Mariucci (Grenoble) and Benjamin Stucky (Zurich).

The workshop has stimulated fruitful discussions, exchanges and potential collaborations between probabilists and statisticians working in cutting edge areas of their fields.

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