# Preface

This volume is a collection of peer-reviewed papers presented at the 8th International Conference on Soft Methods in Probability and Statistics—SMPS 2016, held in Rome (Italy) during September 12–14, 2016. The series of biannual international conferences on Soft Methods in Probability and Statistics (SMPS) started in Warsaw in 2002. Subsequent events in this series took place in Oviedo (2004), Bristol (2006), Toulouse (2008), Oviedo/Mieres (2010), Konstanz (2012), and Warsaw (2014). SMPS 2016 was organized by the Department of Basic and Applied Sciences for Engineering and the Department of Statistical Sciences, Sapienza University of Rome, Italy.

Over the last 50 years in different areas such as decision theory, information processing, and data mining, the interest to extend probability theory and statistics has grown. The common feature of those attempts is to widen frameworks for representing different kinds of uncertainty: randomness, imprecision, vagueness, and ignorance. The scope is to develop more flexible methods to analyze data and extract knowledge from them. The extension of classical methods consists in "softening" them by means of new approaches involving fuzzy set theory, possibility theory, rough sets, or having their origin in probability theory itself, like imprecise probabilities, belief functions, and fuzzy random variables.

Data science aims at developing automated methods to analyze massive amounts of data and extract knowledge from them. In the recent years the production of data is dramatically increasing. Every day a huge amount of data coming from everywhere is collected: mobile sensors, sophisticated instruments, transactions, Web logs, and so forth. This trend is expected to accelerate in the near future. Data science employs various programming techniques and methods of data wrangling, data visualization, machine learning, and probability and statistics. The soft methods proposed in this volume represent a suit of tools in these fields that can also be useful for data science.

The volume contains 65 selected contributions devoted to the foundation of uncertainty theories such as probability, imprecise probability, possibility theory, soft methods for probability and statistics. Some of them are focused on robustness,

non-precise data, dependence models with fuzzy sets, clustering, mathematical models for decision theory and finance.

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Maria Brigida Ferraro
Paolo Giordani
Barbara Vantaggi
Marek Gagolewski
María Ángeles Gil
Przemysław Grzegorzewski
Olgierd Hryniewicz

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Ferraro, M.B.; Giordani, P.; Vantaggi, B.; Gagolewski, M.;
Ángeles Gil, M.; Grzegorzewski, P.; Hryniewicz, O. (Eds.)

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