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Editorial

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The International Conference on Stereology, Spatial Statistics and Stochastic Geometry in Prague, June 25–28, 2012, was the seventh meeting on this topic organized in the Czech Republic or former Czechoslovakia within past forty years. The first and third Conference took place in High Tatras in Slovakia (1976, 1988). The second one was organized in 1982 in Prague. The political changes then enabled a closer cooperation with the International Society for Stereology which resulted in hosting the 6th European Congress for Stereology in Prague (1993), the fourth meeting in the local series. The last three events with the same name above abbreviated as S4G again took place in Prague: in 1999 at the Physiological Institute of the Academy of Sciences of the Czech Republic and in 2006 and 2012 at the Charles University in Prague, Faculty of Mathematics and Physics, in the building at the main Square of the Lesser Town of Prague, a splendid place close to Charles Bridge and St. Nicholas Church.

There were 120 participants at the 2012 conference, the book of abstracts contained 104 abstracts obtained from participants of 17 countries (Germany 28, Czech Republic 28, France 18, Denmark 6, USA, Australia 4, Spain 3, the rest from the Netherlands, Poland, Sudan, Norway, Switzerland, UK, Armenia, Belgium, Russia, Slovenia, Iceland). There were three plenary lectures, 16 minisymposia with three talks each, 39 contributed talks and 14 posters. Most of the mathematical contributions presented achievements in stochastic geometry and point processes, a smaller number in theoretical stereology, integral geometry and mathematical morphology. Abstracts from spatial statistics were related both to theory and applications in a variety of fields: soil sciences, biology, materials, meteorology, electrical engineering, forestry, zoology. Stereological methods in materials science can be classified by the physical or engineering problem of interest and by the models and methods developed. Biomedical contributions discussed and quantified the problems in anatomy, pathology, neuroscience, plant anatomy, etc. and reflect measurement, microscopy,

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image analysis and colours. The image analysis has its own importance in several fields discussed at the conference.

There was a possibility of publishing selected papers from the meeting in two journals. Papers from applied stereology and image analysis were submitted to the journal Image Analysis & Stereology. Papers from stochastic geometry and spatial statistics (theoretical and methodological) were submitted to a special issue of Methodology and Computing in Applied Probability, called Stochastic Geometry, Stereology and Spatial Statistics.

This issue contains 14 papers widespread over the acceptable scope. There is just one paper from theoretical stereology by E. Vedel and J. Ziegel, which developes local stereological estimators of Minkowski tensors defined on convex bodies in Euclidean space. We continue with four papers devoted to asymptotics in stochastic geometry. L. Heinrich presents a survey of asymptotic results concerning statistics of stationary marked point processes, namely the empirical mark covariance and product density. Z. Pawlas derives a central limit theorem for the number of intersection points of planar stationary line segment processes in expanding rectangular sampling window. Using recent findings based on the Wiener–Ito chaos decomposition and the Malliavin–Stein method, M. Schulte and Ch. Thaele investigate distances between Poisson k-flats. O. Honzl extends results on the asymptotic number of connected components of the complement of a Wiener sausage in the plane.

Other properties of random sets are of interest in the next four papers. K. Staňková Helisová and J. Staněk deal with quermass-interaction processes and use dimension reduction techniques for the model selection. F. Ballani and G. van den Boogaart introduce a parametric family for random convex polytopes suitable for applications and estimate the parameters by maximum likelihood. T. Mrkvička builds an approach of distinguishing different types of inhomogeneity in Neyman-Scott point processes. J. Staněk et al. investigate estimation of characteristics and statistical testing for general random marked sets. The latter two papers demonstrate the properties of the developed methods in both simulated and real data.

Four papers are devoted to the dynamics in stochastic geometry. First two of them are on inhomogeneous space-time point processes and present large simulation studies. E. Gabriel studies the influence of various edge correction methods on non-parametric estimates of second-order characteristics. M. Prokešová and J. Dvořák introduce a flexible shot-noise Cox process model and derive a two-step parameter estimation procedure. Using sequential Monte Carlo methods, M. Zikmundová et al. estimate parameters of a space-time random set based on the union of interacting discs. For dynamic processes of complex spatial physical problems, T. Brereton et al. propose a method for efficient simulation of continuous-time Markov processes. The remaining paper comes from statistical shape theory. V. Patrangenaru extends results on estimating mean 3D projective shape change, with applications in digital imaging.

In this issue mostly complex models of geometric probability are presented together with methods of spatial statistics of discrete random objects developed for practical use. There is a lot of simulations and computing needed to demonstrate the desired properties of theoretical achievements. Therefore we were glad that the Editor-in-Chief Joseph Glaz agreed to present selected results of the S4G'2012 Conference in Methodology and Computing in Applied Probability journal. We thank him and the Springer team and also to all reviewers who took their time to read the papers.