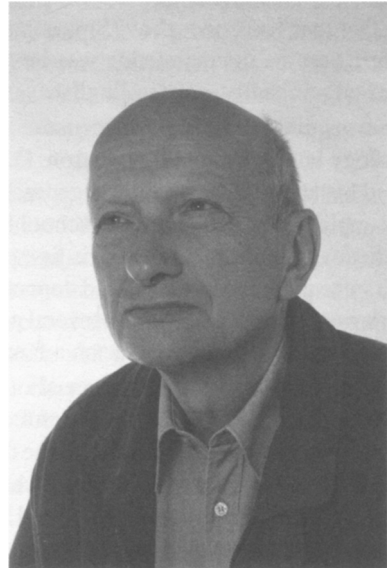# DIETRICH STOYAN: A TRIBUTE ON THE OCCASION OF HIS SEVENTIETH BIRTHDAY

Dietrich Stoyan

Dietrich Stoyan was born on 26 November 1940 in Berlin and raised in a small village near Halberstadt (Harz). He studied mathematics at the Technical University of Dresden from 1959 to 1964, where he also met his future wife, Helga. On graduation they moved to Freiberg, where Dietrich first worked in the fuel research institute and in 1976 was appointed to a position in the Bergakademie (Mining Academy) in Freiberg, where he has worked ever since, rising through the ranks from a Lecturer to Professor in Applied Stochastics and also serving as Rector of the Academy (1991–1997).

Dietrich's mathematical research first favoured queueing theory, one of the main trends of the East German probability school in the 1960s, much influenced by B. V. Gnedenko. He concentrated on obtaining qualitative results for queueing systems that were based on comparing the underlying probability distributions that determine the corresponding systems. His book *Qualitative Eigenschaften und Abschätzungen Stochastischer Modelle* (1977) was based on his habilitation thesis. It was translated into Russian in 1979, with a few changes from V. V. Kalashnikov as Editor and a 16-page appendix on robustness properties of queueing systems by G. Sh. Tsitsiashvili. While this was in preparation, Dietrich and Daryl Daley met in 1978 at a workshop organised by Klaus Matthes at Binz on the island of Rügen, and the two agreed to prepare an English version of the book, starting from an English translation that Dietrich prepared, with amendments, with his wife Helga. Daley edited this, making further revisions and amendments, and sent the manuscript to Wiley in April 1981. In 1983 Wiley published the book under a revised title that better reflected its contents. Dietrich returned to this topic again in his book with Alfred Müller, *Comparison Methods for Stochastic Models and Risks* (2002).

By the early 1970s, it had become clear that many features of queueing systems can be expressed naturally using the ideas of point processes and random measures, as witnessed first in the monograph by König *et al.* (1967), then in the appendix to the German edition of Gnedenko and Kovalenko's (1971) text on queueing, and finally in the three editions of Kerstan *et al.*'s (1974), (1978), (1982) treatise on infinitely divisible point processes and Kallenberg's monograph on random measures. The centre of this research was in the German Democratic Republic, notable also for the fact that Kallenberg (1975) was published by Akademie-Verlag located in East Berlin. The thrust on the queueing side was best represented by the book by Franken *et al.* (1981) published, significantly, only in English.

The concepts of point processes and random measures naturally led to the foundations of stochastic geometry and stereology laid down by G. Matheron, D. G. Kendall, and R. E. Miles. At that time Dietrich also turned his attention to stochastic geometry, in particular the theory of point processes and its various applications. The Freiberg school flourished and soon became a focal point for work on the statistics of point processes. His first paper on stochastic geometry, coauthored with S. Koschitzkii, was published in 1977 and concerned intersections of segment processes with a line. This work was quickly followed by several papers concerning germ–grain models—these generalise the concept of a point process on a family of compact sets.

Successful joint work with Joseph Mecke started at the end of the 1970s and led to a proof of the fundamental stereological formulae based on the careful exploitation of point process techniques. Several papers at that time laid the foundations for the theory of fibre processes. This line of research led naturally to the development of statistical techniques for point processes, in particular to work published jointly with his students J. Ohser and K.-H. Hanisch. This research direction has been extended to cover the statistical analysis of tessellations and some random sets, notably of the Boolean model. In the course of the statistical analysis of random geometric objects Dietrich also contributed to statistical shape theory. His collection of the shapes of sand grains (see Stoyan and Stoyan (1994, Chapter 10)) is now a classical dataset to test how well statistical tools handle random shapes that lack well-identified landmarks.

A born writer of books, a 132-page pocket book appeared in 1983, written jointly with Joseph Mecke. With this seed, Dietrich and Joseph added Wilfrid Kendall to their writing team and produced the much longer work in 1987, written in English and with an expanded title, *Stochastic Geometry and Its Applications*. This book presented a full-scale theory that can indeed be applied in many natural sciences. Its second edition published in 1995 is currently the most cited book on stochastic geometry, and with good reason.

It is difficult to imagine Dietrich's life without his wife Helga, who has been his closest supporter and also the most frequent coathour (as can be immediately confirmed by a quick check on MathSciNet). Helga has always been on his side in science; during his duties as a Rector she kept track of manuscripts, data, programming, appointments, and social activities. Together they published *Fractals, Random Shapes and Point Fields*, which was translated into English in 1994 from the 1992 German original. The topic of statistics of point fields has evolved to a recent monograph (of well over 500 pages) about statistics of point processes, coauthored with J. Illian and A. B. Penttinen.

Applications of mathematics have always been extremely important for Dietrich. This is readily seen from the title of his PhD thesis, *Eine Methode zur Berechnung der zeitlichen Auslastung von Tagebauen mit kontinuierlicher Förderung: unter bes. Berücksichtigung von Bandbetriebstagebauen mit Zwischenbunkerung*. Therein, methods of reliability theory were used to smooth the operation of transportation bands by introducing intermediate bunkers with certain storage capacities. For Dietrich, this was the starting point for numerous further

applications, predominantly in material science and geology. As a result of his interactions in these areas and joint efforts with Klaus Mecke, several collections appeared based on conference proceedings that dealt with the interplay between stochastic geometry and physics. Dietrich has also published many articles in nonmathematical journals. To date, a complete list of journals and collections featuring his work comprises about 150 titles.

In applied probability the name Freiberg already means stochastic geometry. The genealogy of Freiberg graduates leads to a number of prominent universities in Germany, Europe, and overseas. Apart from his own research, Dietrich has cared for about 30 PhD students. Even during his busiest time as the Rector he was always able to find time for visitors and other guests, to discuss research or to help in many other ways, including arranging visits to his garden and skiing in Erzgebirge.

Until 1989 Dietrich stayed away from politics, being characterised in his Stasi dossier as having 'politically negative views'. The abrupt change in the European map brought him to the forefront of the educational reform in East Germany and Saxonia in particular. During his time as the Rector he steered the Bergakademie through the hurdles and problems of the recently unified East Germany, and secured the future of this educational institution as a Technical University through modernisation and by introducing new directions of study (e.g. ecology) alongside its traditional areas. He resisted the temptation to stay in politics after completing his time as Rector, and returned to full-time vigorous research that also included a number of industrial projects.

With the introduction of the single European currency in 2002, Dietrich embarked on yet another new statistical project aimed at following the spread (and mixing) of European coins issued by different European countries. Dietrich's Euro-page has become very popular, even featuring in German newspapers and *Spiegel*.

For years Dietrich has had a passion for botany, especially for photography of alpine plants. Joseph Mecke shares this passion, and the two have walked many times in the Spring to see the orchids around Jena. His sporting interests include cross-country skiing, jogging, and cycling.

Over many years Dietrich has worked for a number of editorial boards and as a member of several research funds. Since 1994, Dietrich has been on the Editorial Board of the Applied Probability journals.

On behalf of all his colleagues we wish Dietrich many years of good health and continued activity.

<div align="center">DARYL DALEY, WILFRID S. KENDALL, ILYA MOLCHANOV, AND EVA VEDEL JENSEN</div>

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