

Göttingen, Berlin, Munich, Dortmund, Freiberg, Freiburg, ...: Statistics in Germany

In this title, Göttingen stands for Gauss as well as for the mathematical roots of statistics. Freiberg and Freiburg are extremal points (at least in a geographical sense), and the other places are not simply a convex combination of these, but a random selection from a number of important statistics sites in Germany.

Carl Friedrich Gauss (1777-1855) was professor of astronomy and director of the astronomical observatory in Göttingen. He is cited here not only as a creator of a number of statistical tools. Gauss is ranked as one of history's most influential mathematicians, and he also contributed in a remarkable way to many other fields of science, including geodesy, astronomy and physics. Altogether he represents branches of science which soon made Göttingen a leading university in the world.

Göttingen stands for the “golden age” of mathematics and physics in Germany. It is clear that the mathematical achievements at that time also had a large impact on probability and statistics. David Hilbert taught at Göttingen, and he included the call for the axiomatization of probability theory into his famous list of twenty-three problems in mathematics. However, it was part of the 6th problem, which is on the axiomatization of physics. Obviously Hilbert considered probability theory as a branch of physics. This is a natural consequence of the prominent role of statistical mechanics in the second half of the nineteenth century. Subsequently additional impulses came from physicists, the most influential one being Albert Einstein.

Many famous researchers in probability and statistics studied in Göttingen or visited the university. For example, John von Neumann was Hilbert's assistant, and Norbert Wiener visited David Hilbert and Edmund Landau. In 1918, an Institute of Mathematical Statistics was founded in Göttingen. Felix Bernstein was appointed the first Chair of Actuarial Mathematics there in 1921. He had been student of Cantor and Hilbert, and most of his activity was in statistics, actuarial mathematics and mathematical biology. However, in other German universities eminent scholars arose in the field of probability & statistics, too. We only name Felix Hausdorff (Leipzig and Bonn) and Richard von Mises (Dresden and Berlin).

Nevertheless, statistics in the proper sense was not seen as a part of mathematics until the early 20th century. Unlike the English statistical school, the European continental school was mainly occupied with the observation and analysis of social and economic mass phenomena. The 19th century saw a rise of statistical offices, starting with the foundation of the Royal Statistical Office in Berlin 1805, collecting and publishing large amounts data about population, production, and prices. In 1872 a National Statistical Office was built “to collect and check statistical material and process it technically and by scientific methods”. In the beginning, the office included three persons having a university education, the present number is 380.

A hundred years ago German statistics began to emancipate from social and economic sciences. In 1911 the German Statistical Society was founded as a section of the German Society for Sociology. However, the rise of statistics as a mathematically founded methodology and the development of an academic statistical community was massively damaged by the Nazi tyranny. Von Mises emigrated to Turkey and the U.S.A., Hausdorff ended his life to avoid

deportation to an extermination camp. Many other mathematical statisticians were forced to leave Germany, among them Felix Bernstein, William Feller, Emil Gumbel, Felix Pollaczek. Similarly, the Austrian statisticians Abraham Wald, Henry B. Mann, Zygmund W. Birnbaum, Eugen Lukacs, Gerhard Tintner, and Oskar Morgenstern.

The new beginnings of mathematical statistics after World War II were difficult. One reason was the bleeding of the field through the exodus of scholars, another reason the cold war between the two German states. In most West German mathematical faculties pure mathematics was higher valued than applied mathematics and statistics. So, it took until the mid fifties until chairs of mathematical statistics and probability were established in Munich, Hamburg, Heidelberg and Göttingen. New institutes of mathematical statistics were built in Münster in 1959 and shortly after that in Freiburg. Major topics of research at these institutes were the theory of parametric and non-parametric statistical tests, in particular their asymptotics, stochastic processes, decision theory, and sequential statistics. Students of these institutes subsequently spread over all parts of Germany and contributed to the growth of statistics. In East Germany statistics flourished in many places, the most remarkable being the universities of Freiberg, Rostock, Berlin, and Magdeburg. There was a focus on statistics applied to science and technology. Let us mention a few most important developments: Experimental design in Rostock (and also in Freiberg and Magdeburg), stochastic geometry and queuing in Freiberg, regression and modelling in Berlin.

Today the *German Statistical Society* (DStatG) collects statisticians from academia and outside in equal parts. Besides that, many mathematical statisticians are organized in the *Special Interest Group for Probability & Statistics*, a subsection of the *German Mathematical Society*. Most biostatisticians associate in the *German Section of the International Biometric Society*, and many applied statisticians are members of the *German Classification Society* and other scientific societies in special areas of applications. The *DAGStat (Deutsche Arbeitsgemeinschaft Statistik)* is the umbrella organization of fourteen societies that are related to statistics. It has been founded in 2005 to facilitate communication between statisticians working in theory and various fields of application, and to represent the whole spectrum of statistics in the public. Joint statistical meetings were held in Bielefeld 2007, Dortmund 2010, and Freiburg 2013.

There are several international journals that have been originally founded by German statisticians: *Metrika*, has been founded in 1958 by Oskar Anderson and Wilhelm Winkler. It publishes research papers in the field of mathematical statistics and statistical methods. *Statistical Papers*, founded in 1960 by Günter Menges, publishes papers on statistical theory, methods and applications. However, special attention is given to those statistical methods that are relevant to the economic and social sciences. *AStA* looks back on the longest tradition, founded in 1890 by Georg von Mayr. It has been recently split into two journals: The German-language journal *Wirtschafts- und Sozialstatistisches Archiv* focusses on economic and official statistics as well as political and professional issues, while the *Advances in Statistical Analysis*, as an international journal, publishes general contributions to statistics in theory, methods and applications and features clusters of articles in emerging fields.

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