

# Statistics as an Academic Discipline

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Statistics as an academic discipline, having its own department in most research universities, is now well into its middle age. The recent years have seen a wealth of birthday parties. For example, the *IMS Bulletin* recently noted the seventy-fifth birthday celebration of the Statistical Laboratory at Iowa State and the sixtieth birthday of the Statistics Department at North Carolina State, and *Amstat News* highlighted the sixtieth birthday of Statistics at Virginia Tech, Biostatistics at the University of North Carolina, and Biostatistics at the University of Michigan (and the fortieth of Statistics at Michigan), and the fiftieth birthdays of Statistics at Harvard and Statistics at Wisconsin.

In fact, all but a few of the existing Statistics and Biostatistics departments have been created within the past 50–60 years. In many instances, Statistics had a significant presence on campus before the formation of a department, such as a Statistical Laboratory geared toward collaborative consulting. But in many universities Statistics consisted merely of elementary courses scattered around campus, and there was little, if any, scholarly activity in the field. The creation of a formal department typically resulted in a dramatic change-point in the magnitude and nature of such activity at a university.

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## Why This Book?

In many departments, the founders and the movers and shakers who fostered the growth of the Statistics or Biostatistics Department have been retiring and gradually leaving us. As an unfortunate consequence, the institutional memory of the early days of many departments is disappearing rather rapidly.

This book project began at a luncheon on September 15, 2009 at Harvard Square in which the two of us discussed the many recent birthday celebrations and our worries that the early days of Statistics and Biostatistics Departments were not well documented. The purpose of our book is to capture some of this information before it is lost forever. The book consists of 39 chapters, one for each department, that describes some of the key aspects of the history of the department, including its founding, its growth, key people in its development, notable students it produced, major research and pedagogical accomplishments, and a summary of where the department stands today and its vision for the future. Although the degrees of emphases on these aspects vary considerably with the chapters, we hope collectively they provide both a holistic and a detailed picture of the evolution of Statistics in the United States as a scientific discipline. Our goal has been to produce a volume that would arouse readers' interests by providing both historic vignettes and current snapshots of many major departments in Statistics and Biostatistics.

When we originally conceived this project, our vision was broader and included departments around the world in academia as well as in industry and government. It soon became apparent that this was overly ambitious. Because of space limitations for this book, we cover only the major U.S. Statistics and Biostatistics departments that were founded by the mid-1960s or at least had the direct roots of their founding well established by that time. If this book is viewed as successful, we hope that there will be at least one other volume to cover the "rest of Statistics," which of course is substantial.

## The Evolution of Statistics/Biostatistics Departments

We hope that this book will help to show statisticians how our field has evolved, in terms of its academic development in the U.S. We envision that a young statistician who joins a department documented in this book will find it interesting to learn how that department got to where it is today and about some of the notable achievements along the way. We also hope this book could make a valuable contribution to the field of "disciplinary history," and may even encourage other scientific disciplines to consider editing analogous volumes.

Some other articles that contribute to an overview of how academic Statistics arose in the U.S. are listed in the bibliography below. As David (1998) pointed out, in the first part of the twentieth century statisticians tended to work in isolation

within departments such as Mathematics, Economics, Psychology, Education, and Business. Indeed, at the twenty-fifth anniversary of IMS, Craig (1960) stated that “prior to 1920 a scant half-dozen American colleges and universities had, as member of the department, anyone who was seriously interested in the newly developing methods of scientific inference called mathematical statistics. The American Mathematical Society took a very dim view of the whole business and looked upon these mavericks (statisticians) with a suspicion of quackery.”

The first departments to focus primarily on Statistics seem to have been the Johns Hopkins Department of Biometry and Vital Statistics, founded in 1918, and the University of Pennsylvania Department of Economic and Social Statistics, founded in 1931. The Johns Hopkins group seems to have been the first department with the word “Statistics” in its title (in the U.S., as Karl Pearson’s department at University College, London, started in 1911). David (1998) noted that the formation of the Statistical Laboratory at Iowa State in 1933 may have been the first grouping of statisticians recognized as deserving a unit of their own. Other groups formed before World War II included the George Washington Statistics Department in 1935 (the first in a College of Arts and Sciences) and the Statistical Laboratory at the University of California at Berkeley in 1938. Harshbarger (1976) surveyed the early development of statistics groups at many universities. He credits some whose contributions may have been forgotten over the years. (An example is A. E. Brandt, who was apparently influential in having Gertrude Cox named to head the new department at North Carolina State and who himself later founded a department at the University of Florida).

Of course, Statistics departments were not needed in order for instruction in Statistics to take place. According to an interesting overview by Fitzpatrick (1955), such instruction was available by the 1880s at universities such as Columbia, Johns Hopkins, Michigan, MIT, Pennsylvania, Virginia, and Yale. Stigler (1978) pointed out that a PhD in Mathematical Statistics was awarded at Yale in 1876. In his banquet speech on October 26, 2007, celebrating the fiftieth anniversary of Harvard Statistics, Stigler (2008) traced back at Harvard a course in probability during 1909–1910 and a course in Statistics in 1923. Indeed, by the mid-1920s, elementary statistics courses were available in a relatively large number of departments of Economics, Mathematics, and Education (Glover 1926).

About this time, advanced statistics courses became more common in mathematics departments, such as mathematical statistics courses that followed Carl West’s 1918 book, *Introduction to Mathematical Statistics*, or Henry Rietz’s 1924 book, *Handbook of Mathematical Statistics*, or his 1927 book, *Mathematical Statistics*. Noether (1989) observed, “At many institutions, the center of statistics instruction had moved from departments of economics to departments of mathematics. As concerned statisticians began to realize, the move often had the unfortunate consequence that mathematicians entrusted with the teaching of introductory statistics courses preferred to concentrate on mathematical, rather than statistical ideas, resulting in the increasingly held belief that statistics was simply a branch of mathematics.”

Thus, Statistics departmental activity was slow to develop in the first half of the twentieth century. Hotelling (1940, 1949) gave compelling arguments for why Statistics was well deserving of its own department in the university, pointing out that academia had not been well served by having Statistics taught in various departments by teachers inadequately prepared in statistical theory. In short, “The task of leading the blind must not be turned over to the blind.” In addition, he argued against Statistics being organized under the jurisdiction of the Department of Mathematics, pointing out that “The teacher of statistics must have a genuine sympathy and understanding for applications, and these are not well possessed by a great many pure mathematicians, at least in the opinion of some of those concerned with the applications. For so long as such an opinion is maintained, for example by psychologists and economists, these specialists will be suspicious that courses in statistics given by a department consisting largely of pure mathematicians are unsuitable for their purposes. The result is likely to be a sabotaging of attempts at centralization, the different departments reverting to the old and ultimately objectionable system of teaching their own separate courses in statistical methods.”

Post World War II, the chapters in this book show that many renowned statisticians besides Hotelling were also influential in departmental development. Notable examples are Jerzy Neyman at Berkeley, Fred Mosteller at Harvard, and George Box at Wisconsin. Yet, at the same time, these chapters mention people not nearly as well known today yet who had their own significant influence. A prime example is W. Allen Wallis, who was responsible for founding the departments at Chicago and Rochester and indirectly responsible at Stanford and Harvard.

Hogg (1989) gave an entertaining overview of many of the personalities involved in the formation of many departments and Odell (1989) gave a related overview focusing on the Southwest, with both articles mentioning many groups formed too recently to be included in our book. The quarter century following World War II saw rapid expansion of higher education in the U.S., and the field of Statistics was no exception. Minton’s discussion of the Hogg and Odell articles mentioned that by the 1970 *Amstat News* annual listing of colleges and universities offering degrees in Statistics, there were 99 departments or programs with “Statistics” in the title.

## **A View of the Past and a Vision for the Future**

As you read this book, we think you will be pleased and perhaps a bit surprised to hear how many “success stories” there have been in academic Statistics in the U.S. Yes, there is the occasional failure, Princeton and Buffalo being most notable, but even there we see signs of regeneration and hope for the future.

But, as Statistics as an academic discipline grows rapidly, some growing pains are also inevitable. For example, as our subject expands through a variety of new

types of applications, what is the core theory material that should be taught to all statisticians? Some chapters mention how recent economic realities have forced departments to downsize substantially in numbers of faculty. This makes many “growing-pains” issues, such as balancing teaching and research, lack of staff and infrastructural support, etc., even more challenging (Meng 2004). Many administrators undoubtedly still view Statistics merely as a course that many students must take to satisfy some requirement in their chosen field. A very encouraging sign is the development of links that are happening between many departments and other disciplines around the university. In some departments, such links may be crucial to the department’s survival. Also, some departments still do not have much of an undergraduate program, apart from service courses, and many (e.g., Moore 2001) have argued in recent years that our place in academia would be more secure if we offered much more than the first course.

Indeed, there has been a rather substantially increased demand for intermediate courses for graduate students from other disciplines, whose research now call for more sophisticated statistical methods than those they learned in introductory courses. Given the fact that at many colleges and universities, even finding enough qualified teachers for the introductory level courses is an ongoing struggle (Meng 2009), how to provide quality intermediate-level courses is a substantial challenge that our profession now faces. We certainly hope that a future volume of this kind, say 30–50 years from now, will consider our current period as another golden age of our discipline because we turned these “growing pains” into “growing gains,” making our field larger, stronger, and more mature.

## **Proposed Departmental and ASA Documentation of Our History**

We imagined that in preparing their articles, many authors would have or would discover interesting and useful materials archived from the past, for instance from past departmental anniversary celebrations. We have encouraged and continue to encourage departments to post such material and additional documentation such as annual reports and pictures at a link from their departmental home page that is especially devoted to history.

In conjunction with this book, we plan to ask the American Statistical Association (ASA) to set up a location at their website devoted to the history of Statistics departments. At that site, links would be created to the various departmental history sites. This material could then be periodically updated by each department to help create a historical record for each department. More broadly, we envision that a new section of ASA devoted to The History of Statistics could be created to stimulate the organization of Internet records and other archives at departmental links as well as to present sessions with historical content at national meetings. This can help to supplement the historical material that is currently

available, such as the Iowa State “Archives of Statistics” set up through the American Statistical Association, which contains 195 boxes of material including photographs, lectures and symposia, collections from famous statisticians, and other artifacts. See [www.lib.iastate.edu/spcl/manuscripts/MS349.html](http://www.lib.iastate.edu/spcl/manuscripts/MS349.html).

## Acknowledgments and Dedication

Histories are made by people and written by people, but almost never the same group of people, and the passage of time often scatters the material and challenges our memories. Our space for this book has also been very limited, as we could afford to give each department only about 5,000 words, with exceptions for a few departments with substantial history and an unusually major impact in our field (e.g., UC Berkeley). Some readers may feel we should have given more space yet to the major-impact departments at the expense of other departments. We felt, however, that each department has made its own contributions that were worthy of a full chapter at this stage of their history. And we hope that the authors of the chapters for the major-impact departments will consider writing extended, in-depth histories that can appear in future journals and books.

Because of the space constraints, it was a great challenge for the authors of each chapter not only to collect material but also to decide what to include. We therefore would like to sincerely thank all the chapter contributors for very generously devoting their time and energies to this project, and to offer our apologies to a few for whom our request for preparing such a chapter has apparently imposed more burdens than from their own deans. We also offer our apologies to those readers who might find inaccurate recollections or gross omissions. Both the chapter authors and we as editors have tried to avoid either occurrence, but unfortunately separating signal and noise is never something that can be achieved with 100% success, especially when a signal to one person can be noise to another, or vice versa. We can only hope for fewer errors in future editions or volumes of this kind. Also, we sincerely hope that all departments in this book as well as others founded since the mid-1960s will, in the future, prepare extended histories and post them at their departmental websites.

We also are very grateful to the many colleagues who made suggestions about these chapters. The referees we approached nearly unanimously agreed to help us. Their names are listed separately at the end of the book. At the beginning and throughout the project, eminent statisticians such as Sir David Cox, Ingram Olkin, and Stephen Stigler gave us helpful advice about the entire project. We especially thank Ingram for his tireless effort in helping us to review a large number of chapters, providing all of us the benefit of his long memories and vast experiences. Many thanks to John Kimmel, who as then Executive Editor at Springer, kindly encouraged and supported this project. Thanks also to Marc Strauss and Hannah Bracken for their support during the later stages. We thank Alan’s wife, Jacki Levine, for the suggested

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Finally, both of us have benefitted immensely over the years from the friendship and mentorship of Stephen Stigler. Steve was Alan's major professor when he was a graduate student at the University of Wisconsin in 1968–1972. Steve was also the department chair who recruited and then served as a much valued mentor of Xiao-Li during Xiao-Li's tenure from 1991–2001 at the University of Chicago. Indeed our entire profession owes so much to this eminent historian/statistician for bringing vividly to life the fascinating history of our profession. It is therefore with great pleasure that we dedicate the book to Steve, on the occasion of his seventieth birthday.

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