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Abstract The University of Wisconsin Statistics Department commemorated its fiftieth anniversary in 2010. A gala celebration marked the event. However, the year when Statistics was first introduced in the University of Wisconsin is unclear.



University of Wisconsin Department of Statistics

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AQ1

The University of Wisconsin Statistics Department commemorated its fiftieth anniversary in 2010. A gala celebration marked the event. However, the year when Statistics was first introduced in the University of Wisconsin is unclear. Perhaps it was the establishment of a meteorological station in the 1850s in a building that was soon nicknamed “Old Probabilities”. Perhaps it was in the Religion Department in the 1870s when they discussed Cross-validation. It certainly predated 1890, when George Comstock, the Director of Washburn Observatory, published a text based upon his course on the Method of Least Squares, targeted to “students of physics, astronomy, and engineering.” The first page of that book shows an estimated density function; the second chapter was about “The Distribution of Residuals.”

The next few decades were relatively quiet. Probability was taught in the Mathematics Department, including a course offered by Warren Weaver (faculty 1920–1932). Henry Scheffé, who achieved later eminence at Berkeley with his classic book *The Analysis of Variance*, took Weaver’s course. Scheffé received both BA and PhD degrees from Wisconsin and taught there from 1935 to 1937, but he taught only pure Mathematics, not Statistics. What statistics activity there was at the time was diffuse. There was some active statistical interest in the agricultural area, particularly in Agronomy where James Torrie was hired in 1940 as a red clover and soybean breeder. He and R. G. D. Steel published their book *Principles and Procedures of Statistics* in 1960. Courses were also taught in Economics and Business. A loose *Division of Statistics* organization provided a cloak for such activities.

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26 Why did little more happen until George Box arrived in 1959? We must look
27 back to the curious events of 1940–1941, when a bold attempt to create a statistics
28 program crashed and burned. In 1940, the University of Wisconsin invited Milton
29 Friedman to visit the Economics Department with the specific charge of
30 strengthening their statistical offerings. Friedman, who won a Nobel Prize in 1976
31 for his work on monetary theory and the consumption function, is now much better
32 known as an economist. However, in 1940, he was more of a mathematical
33 statistician. His PhD thesis advisor was the well-known Harold Hotelling, who
34 later headed the Statistics Department at Chapel Hill, NC.

35 Friedman came to Wisconsin in fall 1940 as a visiting Lecturer. He produced a detailed
36 9-page report on the dismal situation faced by a Wisconsin student interested in studying
37 statistics, and he suggested the creation of a new Department of Statistics. He wrote:

38 A student cannot secure training at the University of Wisconsin sufficient to qualify him to
39 teach advanced statistics or to do independent work in the field of statistical methods.
40 Even if he takes all the work offered he will be but indifferently qualified to do research
41 involving the application of modern statistics.

42 The administration was greatly impressed, and in the spring offered him a
43 position as Associate Professor, charged to implement the program he had out-
44 lined. He indicated he would accept, but before the appointment could be approved
45 by the Regents, a dispute broke out. A group of senior professors in Economics,
46 led by Edwin Witte, demanded that the Regents cancel the offer, claiming that, as
47 able as Friedman might be, he was too young for such an appointment. He was,
48 after all, merely a visiting lecturer! The students in the Economics department
49 backed Friedman. On June 3, 1941, Friedman decided he did not want to come
50 where he was not wanted, and he withdrew to return to the National Bureau of
51 Economic Research in New York and a subsequent career in economics.

52 Friedman emerged intact, but Wisconsin did not; it would be 18 years before a
53 second attempt would be made. During the year Friedman was at Wisconsin, 18
54 faculty members joined to form a Division of Statistics. The initial intention was to
55 coordinate courses in statistics throughout the university and to supervise a minor in
56 Statistics. Among the initial members were A. B. Chapman, C. Eisenhart, J. H. Torre,
57 F. A. Gaumnitz, and M. H. Ingraham. By the mid-1950s, when pressure for a broader
58 set of statistical offerings was growing, Gaumnitz was Dean of Commerce and
59 Ingraham was Dean of Letters and Science. Letters of support for a new department
60 of statistics were gathered from several departments and colleges.

61 During the Spring of 1958, Stephen Kleene, Chair of Mathematics, approached
62 Jerzy Neyman to see if he was interested in starting a new Statistics department;
63 nothing came of this. The administration then invited George E. P. Box, who was
64 visiting at Princeton, where he headed the Statistical Techniques Research Group.
65 With the support of the Dean of Engineering and the Dean of Letters and Science,
66 Rudolf Langer, head of the Mathematics Research Center, offered George a 1-year
67 visiting position. George came in 1959, was appointed Professor of Mathematics
68 in January 1960 and formed the Department of Statistics in the fall. He was on the
69 faculty 1960–1991, until his retirement.

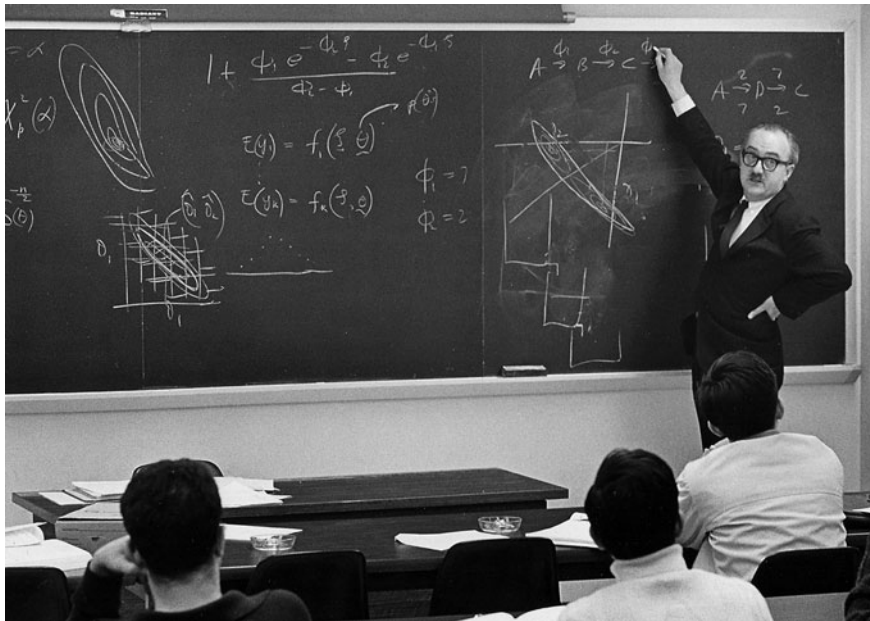


Fig. 1 Department of Statistics, George Box discussing nonlinear estimation with attentive students (1960s)

70 George had years of experience in the practical benefits of statistical knowledge
71 from his work with the British Army in World War II, and afterward in the
72 Dyestuffs Division of Imperial Chemical Industries in Manchester, UK. He had
73 worked with scientists of all types; he was adroitly skillful in negotiating with all
74 manner of potential partners; and he could personally demonstrate the enormous
75 value that statistical applications could bring to research work. These skills
76 facilitated the building of connections across the university and, in particular, did
77 not arouse any defensive reactions such as those shown by senior economists in
78 1941. On the contrary, he was welcomed by all, and especially by the Division of
79 Statistics members. The new department would not only teach the *science* of
80 statistics; it would demonstrate that statistics could be applied to *practical problems*
81 to the advantage of all participants. Therefore, an important feature in
82 building up the faculty would be to make a number of joint appointments, with the
83 cooperation of willing partner departments. Each such new appointee would thus
84 have to be doubly acceptable. By the mid 1960s, George had developed a strong
85 research program with members of the Chemical Engineering Department; this
86 fueled work on nonlinear estimation, including reaction models (Fig. 1).

87 George Box's early appointments set the tone: John Gurland (1960–1987) and
88 Norman Draper (1961–1999) were already in Madison, visiting the Mathematics
89 Research Center. To this core were added three joint appointees, whose theses
90 George had mentored at Wisconsin: George Tiao (1962–1983), Business; W. G.
91 (Bill) Hunter (1963–1986), Engineering; and S. M. (Sam) Wu (1965–1979),



92 Mechanical Engineering. Subsequent hires in the 1960s, Jerome Klotz (1965–1999),
93 Gouri Bhattacharyya (1966–1995), Richard Johnson (1966–2008), George Roussas
94 (1966–1976), Stephen Stigler (1967–1978), Grace Wahba (1967–?) and Bernie
95 Harris (1967–2002) strengthened the theoretical component of the department and
96 led to its reputation for both strength and balance. The attached chart (Fig. 6) shows
97 how hiring progressed from there.

98 A consulting laboratory (StatLab) was created in 1966 with faculty member
99 Don Watts (1965–1970) as the first head. The StatLab exposed our own students to
100 the practical statistical problems encountered by faculty and students throughout
101 the university and trained them to be useful consultants. This led to the idea of a
102 visiting Statistician in Residence, an experienced person who would not only be
103 able to help nonstatisticians with their statistical problems but also provide a
104 variety of statistical know-how to our students. One-year appointments were made
105 to J. Stuart Hunter (1967–1968), Graham Wilkinson (1968–1969), Don Behnken
106 (1969–1970), G. Morris Southward (1970–1971), Harvey Arnold (1972–1973),
107 and Svante Wold (1973–1974). Brian Joiner, cocreator of Minitab, joined the
108 faculty in 1974 and ran the StatLab until he resigned in 1984 to form his own
109 private consulting company. Asit Banerjee was hired after Joiner to run the
110 StatLab, which closed around 1987.

111 The UW-Madison PhD dissertations in Statistics span a wide range of topics,
112 from pure theory to development of applied methods, and in recent years there has
113 been an increasing emphasis on statistical computing. Our PhD program has
114 produced over 400 PhDs. Many of our graduates have held leading positions in
115 academia, industry and government.

116 Around 1977–1978, George Box initiated a major change, separating the PhD
117 and the Masters Degree requirements. The courses, examinations and other
118 requirements are now totally separate. The masters program has evolved in
119 requirement of a one-semester consulting course and a week-long written and oral
120 exam driven by scientists with real data problems. This masters program is highly
121 regarded and widely emulated and has yielded over 500 MS graduates.

122 Our undergraduate major in Statistics was for a long time a rather small affair.
123 However, society recognizes the need of statistical reasoning and the jobs have
124 emerged. Demand for BS degrees has followed, and our program has grown.
125 Further, the recognition that Statistics is an information science (or data science)
126 has led to new collaborations and a continually increasing interest in Statistics
127 within our campus.

128 Research highlights from the early years include George Box’s development of
129 time series, first with Gwilym Jenkins and then with George Tiao. Box and
130 Norman Draper made substantial advances in the theory of response surface
131 designs and Draper and Harry Smith published one of the early regression texts
132 that emphasized the study of residuals. Box and Tiao produced a classic work on
133 Bayesian analysis that featured the analysis of real problems. Richard Johnson and
134 Dean Wichern published their popular text on applied multivariate analysis and
135 George Roussas authored a monograph that increased access to Le Cam’s conti-
136 guity work. Grace Wahba began her series of publications on the statistical



137 application of splines and Stephen Stigler emerged as an expert on the history of
138 statistics with a series of articles, followed later by a book. The basic required
139 Mathematical Statistics courses for graduate students, 709–710, were recast and
140 improved by Gouri Bhattacharyya. Gouri later collaborated with Richard Johnson
141 on a couple of introductory statistics texts.

142 The faculty's research work was published for many years in a series of
143 red-covered technical reports, sent to a large mailing list. Most of them appeared
144 subsequently in the peer-reviewed statistics Journals published by the major
145 Statistical Societies. ASA and IMS meetings typically included several faculty
146 speakers. The Department's early initial decades were thus an exceptional period
147 of production and growth and it quickly became one of the top departments in the
148 country. Greg Reinsel (1976–2004) became a leading researcher on time series and
149 supported numerous students through his collaboration with George Tiao on
150 decades-long analyses of stratospheric ozone pollution data and global warming
151 temperature data. Greg's sudden death in 2004 while jogging shocked us all.
152 Chien-Fu "Jeff" Wu (1977–1990) conducted a very active research program in the
153 design and analysis of experiments until he moved on to increased responsibilities
154 elsewhere.

155 Grace Wahba (1967–) a member of the National Academy of Sciences, has
156 been a world leader in the study of ill-posed problems. Tom Leonard (1980–1995),
157 Kam Tsui (1980–) and Michael Newton (1991–) enhanced the Bayesian component
158 of the program both in teaching and research. Doug Bates (1980–2011) is an
159 expert in nonlinear estimation, and has been active in the development of the R
160 statistical software language since its very beginning. In the late 1980s, Wei-Yin
161 Loh (1982–) turned his attention to the design of classification and regression tree
162 algorithms, 10 years before the development of machine learning. Jed Frees
163 (1984–1997) held a joint appointment with the School of Business and Tom Kurtz
164 (1986–2008) shared an appointment with the Department of Mathematics. Jun
165 Shao (1996–) published a book on Mathematical Statistics which has become a
166 standard reference. Richard Johnson (1966–2008) was founding editor of Statistics
167 and Probability Letters and served in that capacity for 25 years. Kjell Doksum
168 (2002–2010) was a welcome addition for both our teaching and research program.
169 Chunming Zhang (2000–) demonstrates wide expertise in model selection and
170 functional analysis. Zhengjun Zhang (2005–?) has been a pioneer in extreme value
171 theory, with particular attention to finance applications. Yazhen Wang (2009–)
172 focuses as well on financial statistics, with particular emphasis on long term
173 memory processes. Zhiguang "Peter" Qian (2006–) works on design of experi-
174 ments, computer models, the interface between statistics and optimization and
175 statistical methods for high-technology. Bret Hanlon (2010–) studies variable
176 selection and branching processes with a variety of applications.

177 Joint appointments with intimate connections to other scientific units of the
178 campus were central to Box's vision for the Department of Statistics. Over the
179 years, the joint appointment positions became concentrated in two programs,
180 Biometry in the School of Agriculture and Life Sciences and Biostatistics in the
181 Medical School. The Biometry program began in the late 1970s with Kim

182 Andriano (1979–1981) and directed in its early years by Erik Nordheim (1977–).
183 The program was strengthened by Brian Yandell (1982–) and Murray Clayton
184 (1983–?), and more recently by Bret Larget (2002–?), Jun Zhu (2005–) and Cecile
185 Ane (2006–). Murray Clayton was director of Biometry from 2005 to 2010,
186 followed recently by Jun Zhu. The Biometry masters program is unique, as
187 students are coadvised by a Biometry faculty member and their Biology PhD
188 advisor. Biometry faculty maintain active collaborations across the biology
189 departments in agriculture, veterinary medicine and basic biological sciences, with
190 considerable expertise in statistical genomics and spatial statistics.

191 John Van Ryzin (1969–1979) led a group including John Crowley (1973–1981)
192 that strengthened research and consulting connections with medical faculty and
193 scientists. The Biostatistics Program started from the UWCCC Biostatistics Shared
194 Resource. Dave DeMets (1982–) was hired to oversee statistical activities in the
195 Medical School, which evolved from division to center in 1986 and to department
196 by 1991. Karl Broman (2007–), Rick Chappell (1990–), Jason Fine (1998–2008),
197 Sunduz Keles (2004–), Christina Kendzioriski (2001–?), Michael Kosorok
198 (1992–2006), Michael Newton (1991–), Barry Storer (1984–1996), and Sijian
199 Wang (2008–) have enhanced and broadened the Biostatistics program. A name
200 change to the Department of Biostatics & Medical Informatics (BMI) in 1996
201 reflected the changing demands on this group. Recent collaborations between
202 biostatistics and informatics faculty have risen from this wise pairing of comple-
203 mentary fields.

204 Statistics and BMI maintain close relationships. Graduate students in Statistics
205 and Biostatistics reside in the same program, creating a unique synergy to the
206 benefit of both departments. Most Biostatistics faculties have joint appointments in
207 Statistics, and several other Statistics faculty have affiliate appointments in BMI.
208 One example of this blending is the leadership our campus plays in Statistical
209 Genomics, with faculty from Statistics, BMI and Biometry building courses,
210 training students and leading workshops in this emerging field.

211 Fifty plus years on from the department founding, we recall these and others
212 who played vital roles in this exciting period. Some have died: John Gurland
213 (1960–1987), Bernie Harris (1967–2002), Jim Hickman (1972–1993, joint with the
214 Business School), Bill Hunter (1963–1986, joint with Engineering), Jerry Klotz
215 (1965–1999), Greg Reinsel (1976–2004), Jerry Senturia (1972–1978), John Van
216 Ryzin (1969–1979) and Sam Wu (1965–1979, joint with Mechanical Engineering).
217 Retired faculties include Gouri Bhattacharyya (1966–1995), George Box
218 (1960–1991), Norman Draper (1961–1999), Richard Johnson (1966–2008), Brian
219 Joiner (1974–1984), Bob Miller (1968–2005, joint with the Business School) and
220 Bob Wardrop (1974–2006). Others have scattered near and far: Jim Bondar
221 (1966–1970), Don Watts (1965–1970), Irwin Guttman (1962–1970), Tom Leonard
222 (1980–1995), George Roussas (1965–1976), Joe Sedransk (1969–1974), Stephen
223 Stigler (1967–1979), George Tiao (1962–1983), and Chien-Fu Jeff Wu
224 (1977–1990). Early visitors included J. Stuart Hunter (1960–1961), and Gywylm
225 Jenkins (1964–1965). We fondly remember all of these colleagues.



Fig. 2 Our first secretary, June Maxwell (1961–1963)

226 Last, but certainly not least, we remember the office staff: June Maxwell
 227 (1961–1963), Mary Ann Clarke (1962–1994), Mary Esser (1963–1997), Wanda
 228 Gray (1967–1987), Gloria Scallisi (1988–2000), and Candy Smith (1970–2008)
 229 from past days, and all their successors, currently Nancy Brinkerhoff (2002–), Jude
 230 Grudzina (1997–) and Denise Roder (1997–).

231 We have had many stellar students over the years. Our 560 MS and 400 PhD
 232 degree graduates are scattered all over the world. We are deeply proud of them,
 233 even though we cannot claim credit for *all* their achievements. Many will
 234 remember the outrageously funny student-faculty Christmas skits, which were
 235 featured at George Box’s annual Christmas party for many years. The students
 236 made fun of the faculty, and vice versa. For example, one such offering featured
 237 “an all star cast plus Brian Joiner”. Another had the ambiguous line, “The students
 238 are revolting”.

239 The Department has resided in four different physical locations over the years.
 240 Initially, we occupied a three-bedroom house on Johnson Street. George Box and
 241 Norman Draper each had a bedroom while the first four students occupied the
 242 master bedroom. June Maxwell (Fig. 2) ran the Statistics Department from the
 243 ground floor as its Secretary for the first years, demonstrating great ingenuity in
 244 tackling the many teething problems that inevitably arose.

245 When our old house was demolished for a new building on the site, we moved
 246 to a rented set of small apartments above Tiedeman’s drug store at 710 University
 247 Avenue at Lake Street. The building was owned by three very nice elderly sisters,
 248 two of whom were badly handicapped. The university tried to take over the



Fig. 3 The Computer Science and Statistics Center, 1210 West Dayton Street (1967–2004)

249 building in those early days but the sisters (now dead) prevailed in court. Our
 250 second floor space, shared with another department consisting of one professor and
 251 his secretary, had many bathrooms and one large six-sided lecture room where
 252 George Box once jokingly confided a secret “just between these six walls”. Within
 253 those same six walls, a student taking his final PhD orals responded impatiently to
 254 one of the examiners, “That’s a *silly* question.” The ensuing explosion and uproar
 255 required a 10-min break, with the candidate sent into the corridor. After offering an
 256 apology, he passed, and later had a successful career in another country.

257 Figure 3 shows (partly) the Computer Science and Statistics Center, our third
 258 building, which we shared with Computer Science. Initially the two departments
 259 were mixed together, but little cooperation was generated. As Computer Science
 260 expanded rapidly, stages 2 and 3 of the building were added, but when the site was
 261 filled entirely, Statistics was expelled to the former main city hospital at 1300
 262 University Avenue in 2004. We now occupy a strange series of separate and/or
 263 nested rooms that remind us nostalgically of those above Tiedeman’s drug store.
 264 Appropriately, we live in a veritable distribution of offices. No boring same-size
 265 offices for *us*.

266 Figure 1 shows our founder George Box in class in the 1960s. Note the suit and
 267 tie in more formal times. On the board is the famous $A \rightarrow B \rightarrow C$ example of
 268 nonlinear estimation in reaction models. As we write this, George is in his 90s.
 269 Many of our former students have reminisced about George’s “Monday Night
 270 Beer Sessions” held in the basement of his house, during which a speaker, most
 271 often from another field, would informally introduce a research problem he or she
 272 was studying, and would then be involved in a general discussion of how statistical



273 methods could impact the research. “I learned more in those sessions than I did in
274 regular class” is a sentiment often heard expressed by our alumni.

275 Wisconsin statistics faculty wrote many important books that had worldwide
276 sales over many years. Among these were: *The Future of Statistics* (Watts ed.
277 1968); *Evolutionary Operation: A Statistical Method for Process Improvement*
278 (Box and Draper 1969); *Contiguity of Probability Measures: Some Applications*
279 *in Statistics* (Roussas 1972, digital version 2008); *A First Course in Mathe-*
280 *matical Statistics* (Roussas 1973); *Statistical Concepts & Methods* (Bhattachar-
281 *yya and Johnson 1977); Statistics, Principles and Methods* (Bhattacharyya and
282 Johnson 1984); *Nonlinear Regression Analysis and Its Applications* (Bates and
283 Watts 1988); *Spline Models for Observational Data* (Wahba 1990); *Bayesian*
284 *Inference in Statistical Analysis* (Box and Tiao 1992); *Time Series Analysis* (Box,
285 Jenkins and Reinsel 3rd ed. 1994); *Statistics for Business: Data Analysis and*
286 *Modelling* (Cryer and Miller 1994); *The Jackknife and Bootstrap* (Shao and Tu
287 1995); *Practical Data Analysis with Designed Experiments* (Yandell 1997);
288 *Business Statistics—Decision Making with Data* (Johnson and Wichern 1997);
289 *Applied Regression Analysis* (Draper and Smith 3rd ed. 1998); *Statistical Rea-*
290 *soning and Methods* (Johnson and Tsui 1998, alternate edition, 2003.); *Mixed*
291 *Effects Models in S and S-Plus* (Pinheiro and Bates 2000); *Mathematical Stat-*
292 *istics* (Shao 2nd ed. 2003); *Statistics for Experimenters* (Box, Hunter and Hunter
293 2nd ed. 2005); *Data Monitoring in Clinical Trials: A Case Studies Approach*
294 (DeMets et al. 2005); *Mathematical Statistics: Exercises and Solutions* (Shao
295 2005); *Response Surfaces, Mixtures and Ridge Analyses* (Box and Draper 2nd ed.
296 2007); *Applied Multivariate Statistical Analysis* (Johnson and Wichern 6th ed.
297 2007); *Introduction to Statistical Methods for Clinical Trials* (Cook and DeMets
298 2008); *Fundamentals of Clinical Trials* (Friedman et al. 2010); *Probability and*
299 *Statistics for Engineers* (Miller and Freund 8th ed. 2011 but revised by Johnson
300 since the 4th ed).

301 Sadly, we don't have complete pictures of the department. Figures 4 and 5
302 show some faculty from the twenty-fifth and fiftieth anniversary gatherings,
303 respectively. Figure 6 shows all faculties ever in the UW-Madison Statistics
304 Department. See our web page (www.stat.wisc.edu) for current regular and affil-
305 iated faculty, and for a collection of historical pictures.

306 The succession of chairs of the Statistics Department is: George E. P. Box
307 (1960–1969), Irwin Guttman (1965–1966), Norman Draper (1968–1973,
308 1994–1997), George Tiao (1973–1975), John van Ryzin (1975–1977), Gouri
309 Bhattacharyya (1977–1979), John Gurland (1979–1981), Richard Johnson
310 (1981–1984), Robert Miller (1987–1991), Douglas Bates (1991–1994), Greg
311 Reinsel (1997–2001), Erik Nordheim (2001–2005), Jun Shao (2005–2009), Kam-
312 Wah Tsui (2009–2011), Brian Yandell (2011–?).

313 While in Wisconsin, some of our faculties have been society presidents: George
314 Box (ASA 1978; IMS 1980); Tom Kurtz (IMS 2006); Jun Shao (ICSA 2007). We
315 have also had several editors of journals: Doug Bates (core development team of
316 R, *Current Index to Statistics* 2001–2003); Richard Johnson (*Statistics & Proba-*
317 *bility Letters* 1985–2010); Brian Joiner (*Current Index to Statistics*); Michael



Fig. 4 Statistics Department twenty-fifth Anniversary. George Box is flanked by Claire Box and Dennis Cox. Rich Johnson and his wife Bobby are behind, as are Bob Wardrop, Thomas Wehrly, Tom Leonard, Ian Hau, Connie Shapiro (Page), David DeMets, Kam Tsui, Kyungmann Kim, and Doug Nychka



Fig. 5 Fiftieth Anniversary Organizing Committee (June 3–4, 2010). From left, Kjell Doksum, Grace Wahba, Jun Shao, Kam Tsui, Rich Johnson, Brian Yandell, and Kyungmann Kim

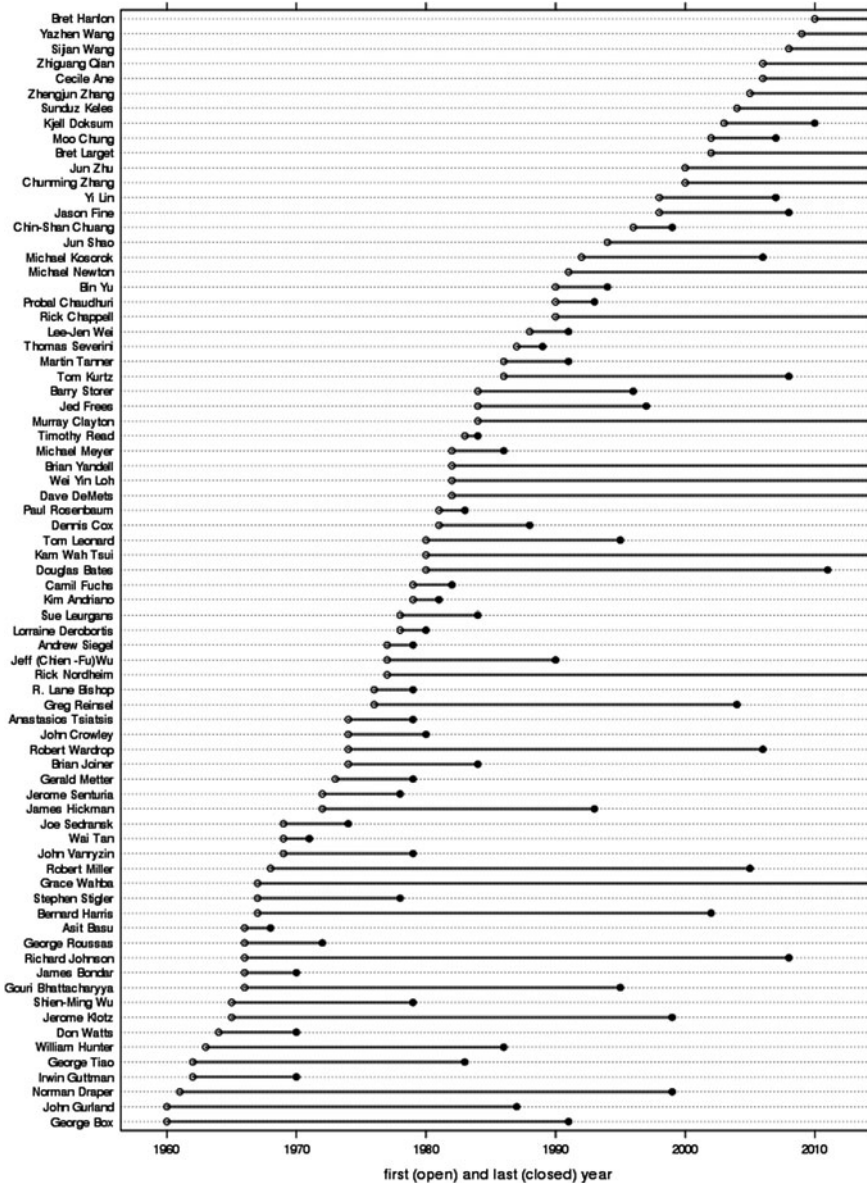


Fig. 6 History of statistics faculty at UW-Madison

318 Newton (*Annals of Applied Statistics* 2006–2009); Jun Shao (*Journal of Multi-*
319 *variate Analysis* 2002–2005, *Sankhya* 2002–2007); Brian Yandell (*Amstat Online*
320 1999–2002)

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