

## **A BIOGRAPHICAL SKETCH OF PROFESSOR BRADLEY EFRON: A DISTINGUISHED STATISTICIAN AND THE STAR OF THE SCIENCE**

B. M. GOLAM KIBRIA

*Department of Mathematics and Statistics*  
*Florida International University, Miami, FL, USA*  
*Email: kibriag@fiu.edu*

It is my great honor and delight to write this short biography for Professor Bradley Efron, a great statistician. Efron was born in St. Paul, Minnesota, USA on May 24, 1938. He was educated in the public school system of St. Paul and then to Central High School and was always the best math student in the class. He completed his undergraduate degree in mathematics from the California Institute of Technology and earned his doctorate in statistics from Stanford University in 1964 and joined the department of statistics at the Stanford University in the same year. He was promoted to Associate Professor in 1968 and to full Professor in 1972. He was the Associate Dean for the School of Humanities and Sciences from 1987 to 1990 and served a term as Chair of the Faculty Senate. He also served three terms as Chair of the Department of Statistics, and continues as Chairman of the Mathematical and Computational Sciences Program at the Stanford University. Professor Efron is the *Max H. Stein Professor* of Statistics and Biostatistics at Stanford University's School of Humanities and Sciences and the Department of Health Research and Policy with the School of Medicine.

Professor Efron is renowned for his bootstrap resampling technique, which is the first computer-intensive statistical techniques and has a major impact in the every area of statistical applications. The great merit of bootstrap technique is to expand the statistical methodology to make analysis of complicated problems more practical and applicable. However, it has major applications in the following three situations: i. when the theoretical distribution of a statistic is complicated or unknown, ii. when the sample size is insufficient for straightforward statistical inference and iii. when power calculations have to be performed, and a small pilot sample is available.

Professor Efron made many pioneering and fundamental contributions to diverse fields of statistics: Astrophysics, Clinical Trials, Differential geometry, Empirical Bayes methods, False Discovery Rate, Inference for microarray gene expression data, Likelihood theory, Survival Analysis, Survey sampling, and most popular Bootstrap and Jackknife Statistics. Professor Efron has authored and co-authored around 150 scholarly scientific papers and

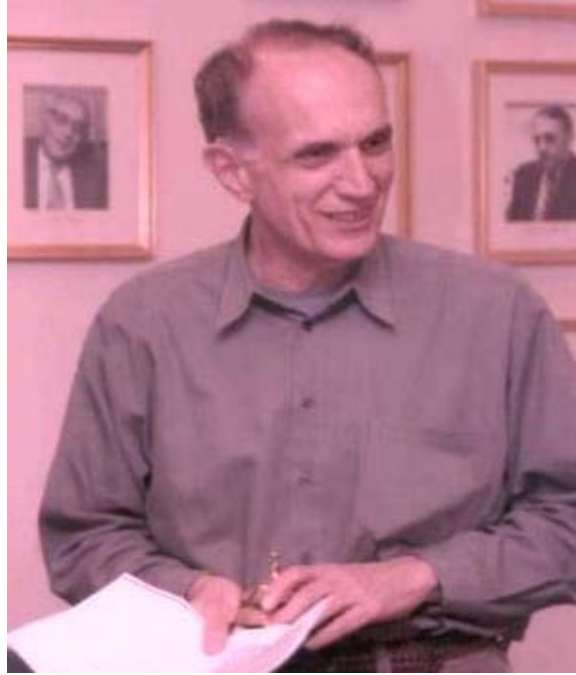


Figure 1: At a party for the undergraduate major in mathematical and computational science

most of them have appeared in many high impact prestigious statistical journals: *Annals of Mathematical Statistics*; *Annals of Statistics*, *Annals of Probability*, *Biometrika*, *Journal of the Royal Statistical Society*, *Journal of the American Statistical Association*; *Science*, *Statistical Sciences* among others. A fuller list of publications have been presented at the end of this article.

Professor Efron has received numerous awards, honors and fellowships for his exceptional research contributions: *The fellowships of the Stanford University, the American Academy of Arts and Sciences, the American Statistical Association, the Institute of Mathematical Statistics, the Royal Statistical Society, the International Statistical Institute and the MacArthur Fellows Program of the John D. and Catherine T. MacArthur Foundation.* He is a member of the *U.S. National Academy of Sciences*, a recipient of the *Ford Prize of the Mathematical Association of America*, both the *Wilks Medal and the Noether Prize of the American Statistical Association and Fisher Prize* in 1995. Efron was awarded the *1998 Parzen Prize* for Statistical Innovation by Texas A&M University, and the first-ever *Rao Prize* for outstanding research in statistics by Pennsylvania State University in 2003. Professor Efron received *Honorary Doctorate Degrees* from the University of Chicago (1995), Universidad Carlos III de Madrid, Spain (1998) and University of Oslo, Norway (2002). He also awarded the *Distinguished Alumni Award*, California Institute of Technology, 2010. Professor Efron received the *2005 National Medal of Science* (the highest scientific honor



Figure 2: US President George W. Bush awards Bradley Efron the 2005 Medal of Science, Washington, July 27, 2005

by the President of United States (Jackson 2007)) for his contributions to theoretical and applied statistics, especially the bootstrap sampling technique; for his extraordinary geometric insight into nonlinear statistical problems; and for applications of Statistics in medicine, physics and astronomy.

Professor Efron has served in many vital committees at Stanford and other universities. Executive Committee of the Assembly of Mathematical and Physical Sciences, Member of the Committee on Resources for the Mathematical Sciences, Member of the Advisory Board at Stanford University, Chairman of the External Advisory Committee on Statistics for University of Maryland, 1985, Chairman, Overseers Committee, Department of Statistics, Harvard University, Member, Review Committee, Department of Statistics, University of Washington. He has served as the president of the American Statistical Association and of the Institute of Mathematical Statistics. He has also served as an Associate as well Editor of the *Journal of the American Statistical Association* and is presently the founding editor of the *Annals of Applied Statistics*.

Professor Efron has produced more than 2 dozens of Ph.D. students. Among them Norman Breslow, Robert Tibshirani, Ronald Thisted and Sam Kou are notable. He is the author of a classic and highly cited monograph, *The Jack-knife, the Bootstrap and Other Resampling Plans* (1982) and has also co-authored (with R. Tibshirani) the text *An Introduction to the Bootstrap* (1994). Professor Efron has many interviews with world leading statisticians due to his invaluable contributions in different fields of statistics. Some journals already have published several special volumes in honor of him. The *Journal of Statistical Research* is publishing two special volumes in honor of him for his outstanding

contribution to Statistical, Mathematical and Physical Sciences.

Professor Efron has given a vast amount of presentations as a keynote, invited, special invited, distinguished speakers and special lectures at different universities and international conference/symposiums. To mention a few, *Annual Meeting of the IMS, Commonwealth Scientific and Industrial Research Organization, National Science Foundation Research Conference, Annual Meeting of Canadian Statistical Association, American Mathematical Society Annual Meeting, Annual Meeting of Psychometric Society, Associated Colleges of the Midwest Conference on Computers and the Liberal Arts, Conference on Jackknife and Bootstrap Techniques, Mathematics Association of America, Recent Advances in Mathematics and Statistics, ASA Joint Statistical Meetings, Gesellschaft fur Angewandte Mathematik und Mechanik (GAMM) Annual Meeting, Annual Meeting of the Spanish Statistical Association, 20th Interface Symposium on Computing Science and Statistics, Symposium on Bootstrapping Methods for Statistical Analysis, 10th Australian Statistical Conference, 4th Latin American Congress of Probability and Mathematical Statistics (CLAPEM), Royal Statistical Society Conference, Third Great Lakes Symposium on Statistical Issues in Health Care and Medicine, Kalamazoo, Michigan, Statistical Symposium on Bootstrap Discrimination and Regression, Paris, Symposium on Statistics and Astronomy, Pennsylvania State, Taiwan National Science Council, 3rd Annual Howard Rowlee Lecture in Mathematics, 5th Annual COSM Lecture, International Classification Society, Splus User's Conference, Austrian Statistical Society 50th Anniversary Meetings, Vienna, International Chinese Statistical Association Applied Statistics Symposium, XII Annual Congress of the Portuguese Statistical Society, Meetings of American Mathematical Society and Mathematics Association of America, Fall Conference on Statistics in Biology* among others.

Professor Efron is an eminent statistician and biostatistician, educator and collaborator in research with many scientists. His contributions to the statistical literature are countless. Even at the age of 72 he is active with researches, Editing *Annals of Applied Probability* and supervising a lot of students. Moreover, a Monograph entitled "Large-Scale Inference: empirical Bayes methods for estimation, testing, and prediction" will appear in the new IMS monograph series in September 2010. Professor Efron has been listed among 10 prominent statisticians like, Sir R. A. Fisher, Kearsy Pearson, Jerzy Neyman for his key contributions and impact for psychology (Wright, 2009). Professor Efron is one of the most influential statisticians in the era. He certainly is the addition to the super stars of statistics like, Sir R. A. Fisher, Professor C. R. Rao, Professor K. Pearson, Professor D. R. Cox and Professor Neyman. He is the pride of science and we certainly wish his healthy long life.

## Publications by Professor Bradley Efron

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