

## **An Interview with JESSE C. ARNOLD by Bill Woodall**

**Jesse Arnold was born in Bowie, Texas on September 28, 1937. He attended Wichita Falls Senior High School and obtained a B.S. in Mathematics from Southeastern State University in Durant, OK in 1960 with a minor in Physics. After obtaining a M.S. (1965) and Ph.D. (1967) from Florida State University, Professor Arnold joined the Department of Statistics at Virginia Tech, where he served as department head from 1973-1982. Professor Arnold is an Elected Member of the International Statistical Institute and a Fellow of the American Statistical Association. He is a past President of Biometrics, Eastern North American Region of the International Biometrics Society (1981) and Chair of the ASA Section on Statistical Education (1984). Professor Arnold has published many papers in leading statistical journals and directed the research of 14 Ph.D. students at Virginia Tech. In 1984 the Department of Statistics established the annually-awarded Jesse C. Arnold Graduate Student Teaching Award.**

**Bill: First, I would like to say it is an honor to work with you on this interview. You were a very positive influence on me while I was a graduate student. In addition, I am glad that our time on the Virginia Tech faculty overlapped for two years before your retirement in 2002.**

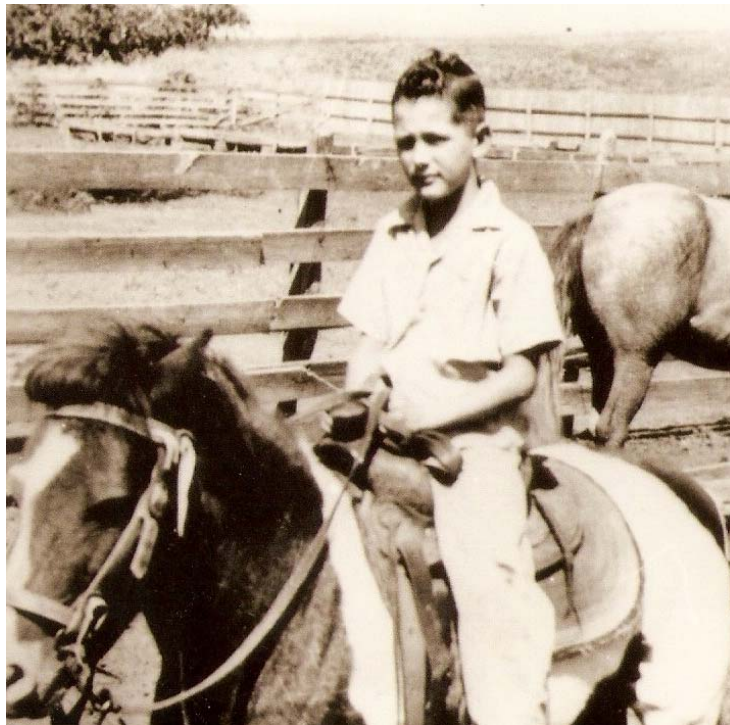
**What was your childhood and early education like?**

**Jesse:** During my younger years our family lived in the country in Texas. The family was loving, but quite poor. In the first six grades I went to three small schools, one of which was a one room school with one teacher for six grades. There were 18 students in the entire school. A girl and I comprised the entire fifth grade.

When I was in second grade our house burned and my mother and I lived in a vacant filling station for two years. My father was serving in WWII at the time. I was clearly behind when we moved to a city with a good school system to begin the seventh grade. This required me to

work hard to catch up. My parents did not have a college education, but they always emphasized the value of getting an education.

During high school I took tennis seriously and fortunately earned a full tennis scholarship for my undergraduate studies at Southeastern State University. Since I could not afford college, this was an outstanding break. I owe tremendous thanks to our family doctor (the late Dr. William Powers) who had been the Texas men's champion in tennis. He took me under his wing, paid for private lessons, sent me to tournaments, and paid for my equipment when I was in high school. This enabled me to attend college.



**On Horseback in Texas**

**Bill:** What was your undergraduate experience like?

**Jesse:** My undergraduate years were very enjoyable. I played on the tennis team for four years, was on the debate team, and was fortunate

to serve as class president of my sophomore, junior and senior classes, as well as president of my social fraternity. I ultimately earned a major in mathematics and minors in physics and chemistry. However, my most important accomplishment was meeting my future wife, Peggy, who was a university cheerleader.



**As an Undergraduate**



**Peggy as a University Cheerleader**

**Bill: How did you get interested in statistics?**

**Jesse:** As often was the case in those years, I wound up in Statistics by accident. During my senior year I accepted an assistantship in mathematics at another university. Later that academic year, I also received an unsolicited assistantship offer in Statistics from Florida State University. Married at the time, Peggy and I decided to go to Florida State and if I did not like Statistics, we would go back to graduate school in mathematics. I have never had misgivings, however, about my decision to go into Statistics.

**Bill: What were some of your experiences as a graduate student at Florida State?**

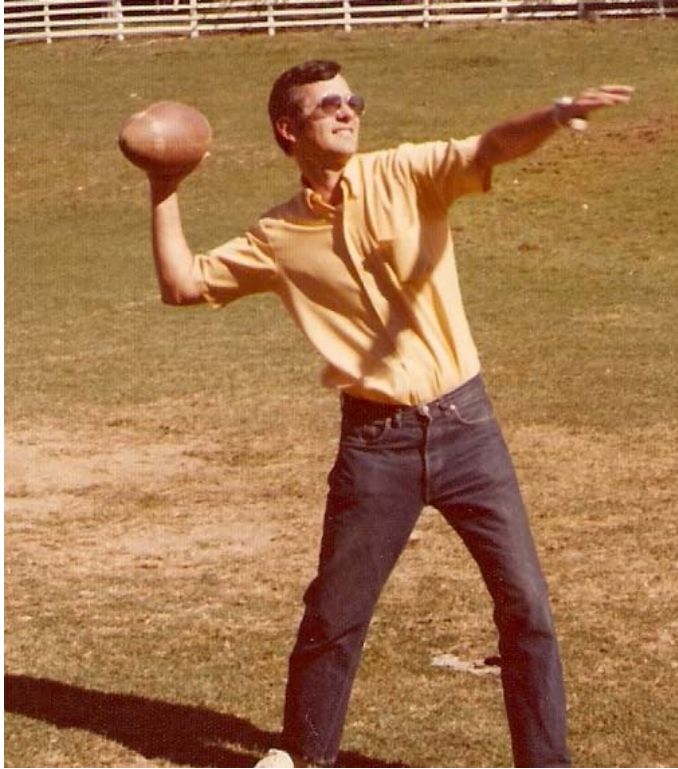
**Jesse:** Graduate school was generally good. Some of my fellow students included Richard Scheaffer (one time department head at the University of Florida), Ron Randles (also one time head at the University of Florida), and Dan Solomon (former head at North Carolina State and now Dean of the College of Physical and Mathematical Sciences). I admired Frank Wilcoxon as a teacher and, although students were afraid of Richard Savage, he made us think.

I had a major interruption at the end of my first year of graduate school. At that time the country had a mandatory draft for military service. As I was about to be drafted, I applied for and was granted a commission in the U.S. Public Health Service as a commissioned officer. I was stationed at the Communicable Disease Center (now called the Centers for Disease Control and Prevention) in Atlanta, Georgia. The experience I gained there working with medical doctors and scientists for two years led to my interest in Biostatistics. I then returned to Florida State and continued pursuing a Ph.D. in Statistics. I finished my graduate work in 1967, taught one year at Florida State, and then pursued a position in academia.

**Bill: What attracted you to Virginia Tech?**

**Jesse:** The department head at Florida State at that time was Ralph Bradley, who previously had been on the faculty at Virginia Tech (then known as VPI) for ten years. He suggested that I apply to Virginia Tech. When I interviewed with Boyd Harshbarger and the faculty at that time, I was very impressed with the department and with the beautiful countryside around Blacksburg. My plans at the time were to ultimately return to Texas. I never expected to spend the rest of my academic career at Virginia Tech, but it turned out to be great for my career and Blacksburg has been a wonderful place to raise a family.





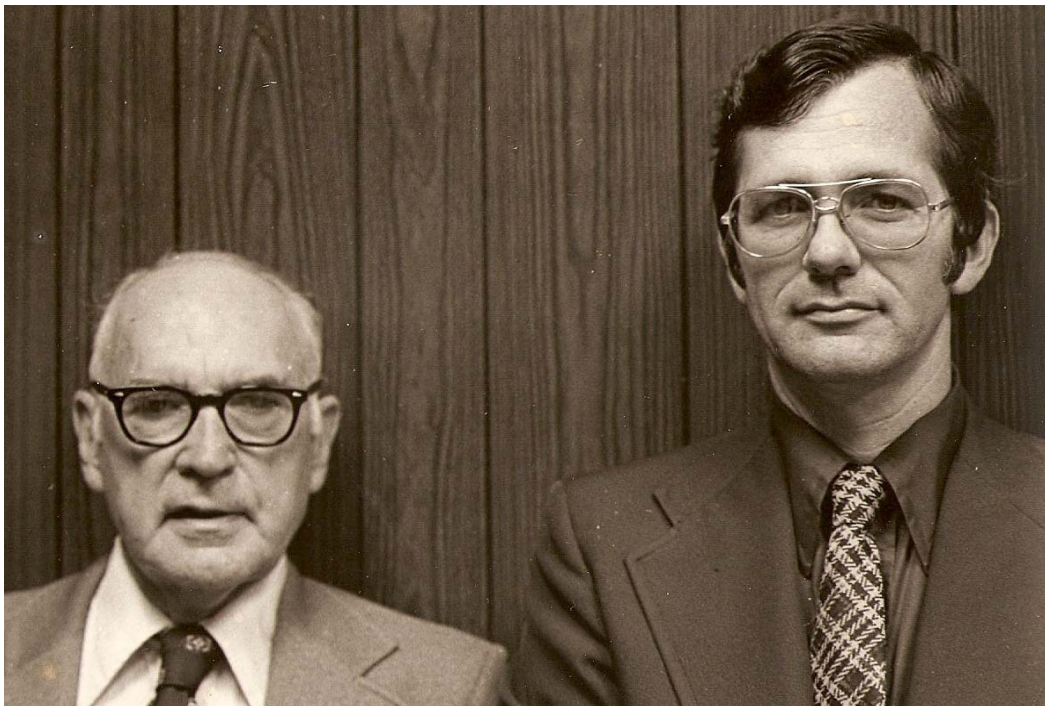
**At a Departmental Picnic**

**Bill: What were some of your experiences with Boyd Harshbarger?**

**Jesse:** I have the greatest respect for Boyd Harshbarger and all that he accomplished. He established and promoted the third oldest graduate program in Statistics. He devoted his life to the department and never took “no” for an answer when he wanted someone or something for the department. There are many funny stories about Boyd during his many years in the department. One that I fondly remember happened shortly after I arrived as a new faculty member. Boyd asked me to go with him to a meeting with the Economics Department. He told me to just observe and not to say anything. What I didn’t know was that Boyd had designs on an Econometrics course and wanted the Statistics department to teach it. When we got in the meeting Boyd said, “I want you to meet Dr. Arnold, a new faculty member in our department. He is an expert in Econometrics.” When we left the meeting I asked Dr.

Harshbarger if I was going to teach the Econometrics course. He said, "Of course not. You don't know anything about Econometrics."

Boyd's style was to throw you in to sink or swim early. If you survived you usually did well. An example of his approach is the fact that Boyd sent me a Ph.D. student before I even arrived in Blacksburg. When I arrived he gave me another Ph.D. student to direct. It made me very nervous but Boyd had a way of making you not want to disappoint him. It all worked out.



**With Boyd Harshbarger**

**Bill:** What led you to become a department head at a relatively early stage of your career?

**Jesse:** It was early in my career. I was 35 years old and probably quite naïve, but I considered it a tremendous honor to be asked by the faculty to serve as Department Head. I had actually interviewed at another university and was planning to accept their offer when the department head possibility surfaced. The department had some rather

serious personnel issues at that time and I thought that, along with the senior faculty, we could again form a productive team.

**Bill: What were some of your accomplishments as department head?**

**Jesse:** During the early years of my headship we added more structure to the graduate program and used a committee structure more than was used during the Harshbarger years. We operated more under a chairmanship than a headship. There was one serious challenge shortly after I assumed the headship. A senior faculty member attempted to move the statistics consulting laboratory out of the department to another administrative unit. This was because he was opposed to us reorganizing the laboratory so that graduate students could get some experience in statistical consulting. Fortunately Ray Myers took over the administration of the statistical laboratory and did a great job in that position.

I served as Head for nine years and eight months from 1973 until 1982. I am pleased to say that a reputational survey of doctoral programs in the United States rated Statistics and Geology as the top programs in Arts and Science at Virginia Tech and quite high nationally in 1982. The survey rated the top fifty departments in the nation. Each department was rated on quality, effectiveness, improvement in last five years, and familiarity. Statistics was rated above average in all four categories. The survey was conducted by the Conference Board of Associated Research Councils and published by the National Academy Press.

**Bill: Please tell us something about your research and your consulting experience, especially your work in the Philippines.**

**Jesse:** My research efforts have touched upon several areas. My early work was in statistical estimation, particular in the general area of shrinkage estimation. Several of my Ph.D. students worked in this general area, which I often referred to as ad-hoc Bayes. I later worked



in the areas of sampling and quality control. A large part of my work was in the area of biostatistics, particularly infant nutrition in developing countries. One great thing about Statistics is that one can work in many areas with considerable diversity. Examples of the diversity of areas that I have worked in can be seen in my list of selected publications at the end of this interview. I believe that the ability to work in diverse areas is part of the beauty of Statistics.

I enjoyed consulting with industry on some significant problems, mostly in the area of sampling in general and audit sampling in particular.

A major part of my time during the years 1973-1982 was work in the Philippines on infant nutrition. I was the University Coordinator for a large project funded by the U.S. Agency for International Development. I spent two to four weeks in the Philippines every year and coordinated sending experts at Virginia Tech according to needs in the field. Much of the work was for consulting, but I also led a significant research project studying the cost/benefit of various health and nutrition interventions. Also, we developed a method to predict whether a child would become seriously malnourished based on family characteristics. These results were published in nutrition journals.



**In Philippines**

**Bill: Would you tell us something about your family?**

**Jesse:** My wonderful wife Peggy and I have been married for over fifty years. We have two great children, Christa and Chuck, and three wonderful grandchildren. Our daughter received her Ph.D. in Health Communication and currently teaches at the University of North Florida. Our son went to culinary school and is an executive chef. Peggy and I feel we are very fortunate to have such a loving family.



**Peggy and Jesse**

**Bill: What other interests do you have?**

**Jesse:** Peggy and I both enjoy traveling and we try to travel as much as possible. We also enjoy visiting with family and friends, particularly our grandchildren. My wife does a lot of volunteer work and I enjoy some artistic pursuits as an untrained amateur. Mostly I work on wood Intarsia, a wood mosaic form of painting with wood. I also enjoy writing and consulting on research papers with my daughter.

**Bill: Is there anything else you would like to add?**

**Jesse:** I feel very fortunate to have had a career in statistics. Working with bright students is invigorating and keeps one alert. One of the great things about Statistics is the fact that one can work in quite varied

areas. I have been fortunate to do some work in Biostatistics, estimation, nutrition, sampling and quality control. It is a wonderful area for students with math and science interests to consider.

**Bill: Thank you for participating in this interview.**

### **Selected Publications of Jesse C. Arnold**

#### **Book**

S. Milton and J. Arnold. *Introduction to Probability and Statistics: Principles and Applications for Engineering and Computer Sciences*. McGraw-Hill, 2003 Fourth Edition (also translated into Chinese and Spanish).

#### **Refereed Journal Articles**

J.C. Arnold and H.A. Al-Bayyati. On double-stage estimation of the mean using prior knowledge. *Biometrics*, 26, 1970, pp.787-800.

R.L. Davis and J.C. Arnold. An efficient preliminary test estimator for the variance of a normal population when the mean is unknown. *Biometrika*, 51, 3, 1970, pp.624-627.

J.C. Arnold. A Markovian sampling policy applied to water quality monitoring of streams. *Biometrics*, 26, 1970, pp.739-948.

H.A. Al-Bayyati and J.C. Arnold. Double-stage estimation in linear regression using prior knowledge. *Technometrics*, 24, 1972, pp. 405-514.

J.C. Arnold and S.K. Katti. An application of the Rao-Blackwell theorem in preliminary test estimators. *Journal of Multivariate Analysis*, 2, 1972, pp. 236-238.

R.L. Andrews, J.C. Arnold and R.G. Krutchkoff. Shrinking of the posterior mean in the normal case. *Biometrika*, 59, 3, 1972, pp. 693-694.

J.W. Hall, J.C. Arnold, W.T. Waller and J. Cairns, Jr. A procedure for the detection of pollution by fish movements. *Biometrics* 31, 1, 1975, pp. 11-18.

R.P. Chiacchierini and J.C. Arnold. A two-sample test for independence in 2X2 contingency tables with both margins subject to misclassification. *Journal of the American Statistical Association* 72, 1977, pp. 170-174.

J.C. Arnold, R.W. Engle, et al. Utilization of family characteristics in nutritional classification of preschool children. *American Journal of Clinical Nutrition* 34, 1981, pp. 2546-2550.

J.C. Arnold and I.J. Good. How to get a large R-sq without really trying. *Journal of Statistical Computation and Simulation* 14, 1, 1981, pp. 69-71.

F. Solon, F. Florentino, J. Arnold et al. The Bulacan Nutrition and Health Study: A summary report of a longitudinal study in infants. *Journal of Tropical Pediatrics* 30, 1984, pp. 324-329.

M.R. Reynolds, Jr. and J.C. Arnold. Optimal one-sided Shewhart charts with variable sampling intervals. *Sequential Analysis* 8, 1989, 51-77.

J. Arnold, G. Lemon and J. Norton. Sample size requirements for rare or abundant attribute sampling. *Communications in Statistics* 24, 1, 1995, pp. 131-148.

M.R. Reynolds, Jr., J.C. Arnold, and J.W. Baik. Variable sampling interval X-bar charts in the presence of correlation. *Journal of Quality Technology* 28, 1996, pp. 199-212.

C. Arnold and J. Arnold. Managing conflict in decision making groups: When does mediation and coorientational accuracy make a difference? *Florida Communication Journal* 26, 1998, pp.11-30.

J.C. Arnold and M.R. Reynolds, Jr. CUSUM control charts with variable sample sizes and sampling intervals. *Journal of Quality Technology* 33, 2001, pp. 66-81.

M. R. Reynolds, Jr. and J. Arnold. EWMA control charts with variable sample sizes and variable sampling intervals. *IIE Transactions* 33, 2001, pp. 522-530.

J.C. Arnold. Virginia Tech Department of Statistics: The first fifty years. *Journal of Statistical Computation and Simulation* 66, 2000, pp. 1-17. (Available at the departmental website [www.stat.vt.edu](http://www.stat.vt.edu))