

# Conference in Statistical Methods Florida International University

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A one day conference on statistical methods held on March 28, 2008 between 9:45 AM to 4:30 PM at Wertheim Conservatory, FIU. This was our second such conference (with the first one having been held on April 13, 2007). There were about 100 participants in the conference. This is one of the biggest events for the Department of Statistics at FIU. There were a total of seven speakers over three different sessions. Dr. Gulati ran the first and the last sessions, while Dr. Kibria ran the second session. Dr. Alan Agresti from the University of Florida was the KEYNOTE SPEAKER. Dr. Hugh Willoughby from Florida International University was the distinguished speaker, and Dr. Hassan Zahedi from Florida International University was the invited speaker. In addition to these speakers, three graduate students from the department of statistics at FIU contributed talks. A short bio sketch for each speaker and the summary of their presentations are provided below. The conference began with the opening remarks by both Professor Sneh Gulati, Chair person of the Department of Statistics at FIU, and Professor Nicol C. Rae, Senior Associate Dean of Sciences for the College of Arts & Sciences at FIU. Refreshments were provided by the College of Arts and Sciences and Pearson Education. We wish to hold a national conference at FIU in 2009.



Dr. Nicol C. Rae, Senior Associate Dean



Dr. Sneh Gulati, Chairperson of the Dept of Statistics

# Good Confidence Intervals for Categorical Data Analyses

*Alan Agresti*  
*Distinguished Professor Emeritus*  
*Department of Statistics*  
*University of Florida*

**Summary of the presentation:** This talk surveys confidence intervals that perform well for estimating parameters used in categorical data analysis. Considerable research has now shown that intervals resulting from inverting score tests perform much better than inverting Wald tests and usually better than inverting likelihood-ratio tests. For some models, ordinary score-test-based inferences are impractical, such as when the likelihood function is not an explicit function of the model parameters. For such cases, we propose pseudo-score inference based on a Pearson-type chi-squared statistic that compares fitted values for a working model with fitted values for special cases. For small samples, 'exact' methods are conservative inferentially, but inverting a score test using the mid-P value provides a sensible compromise. Finally, we briefly describe an effective approximation for the score interval for proportions and their differences based on adding pseudo data before forming simple Wald confidence intervals.

**Short Bio Sketch:** Dr. Alan Agresti is a Distinguished Professor Emeritus in the Department of Statistics at the University of Florida. Dr. Agresti graduated from the University of Rochester and obtained his doctorate from University of Wisconsin. He earned Honorary doctorate from the De Montfort University (Leicester, U.K.), 1999. His primary research interest is in Categorical Data Analysis. In addition, he has also done research in generalized linear models, biostatistics, longitudinal data analysis, social statistics and educational statistics. Research topics in recent years include small-sample confidence intervals for binomial proportions and odds ratios, and models for repeated categorical responses. His publications are too numerous to list here and include several books on Categorical Data Analysis. Among many honors and awards, Alan receives the Statistician of the Year from the Chicago chapter of American Statistical Association in 2003 and the recipient of the first Herman Callaert Leadership Award in Statistical Education and Dissemination, Limburgs Universitaire, Diepenbeek, Belgium, 2004. Alan is the Fellow of the American Statistical Association. He was invited as keynote speakers in many countries, Switzerland, France, UK, Ireland, Hungary, Slovenia among others.



# US Hurricane Death and Destruction, 1900-2006

H. E. Willoughby  
Department of Earth Science  
Florida International University, Miami FL 33199

**Summary of the presentation:** The number of deaths or amount of destruction caused by hurricanes in the US can vary by >4 orders of magnitude from season to season. If one considers only hurricane seasons where impacts were not zero, common logarithms of the number of deaths or damage in millions are convenient measures of impacts. For both mortality and damage, most seasons in which at least one major hurricane (maximum winds  $> 48 \text{ m s}^{-1}$ ) made landfall (*MJ*) lie above the time-varying geometric mean of all nonzero data; most seasons with impacts  $> 0$ , but without a major hurricane landfall (*HH*), lie below geometric mean. *MJ* mortality decreases with a halving time of 27.3 years. *HH* mortality is essentially constant. The reason for the decrease in *MJ* mortality is increasingly effective prevention of disasters that kill large numbers ( $> 100$ ) of people. Based upon 1900-2006 data, historical damage *normalized* for population growth, increasing individual wealth, and inflation does not exhibit a significant trend for either the *MJ* or *HH* subsets. Based upon a shorter record, 1900-2000, *HH* damage decreases with time, because after 1945, the analysis includes more years that actually caused small damage but would have produced zero damage in former times. This effect saturates by the early 21<sup>st</sup> century. The common logarithms of death and damage are normally distributed. Extrapolated to 2006 and multiplied by the probability that damage is  $> 0$ , the arithmetic means are 33 deaths and \$9.7 billion ( $\$10^9$ ), and the medians of the skewed distributions are 11 deaths and \$2.5 billion. The expected frequency for disasters that cause  $> \$100$  billion in damage is about three times a century and for those that end more than 1000 lives prematurely is about once a century. Adjusted for inflation only, hurricane damage doubled every 14.9 years. Since the hurricane Power Dissipation Index (a measure of seasonal hurricane damage potential) increased with a doubling time of 127 years, the

primary driving force for mounting damage is growth of assets in harms way.



**Short Bio Sketch:** Dr. Willoughby is a Distinguished Research Professor in the Department of Earth Sciences at FIU. His research interests include analysis of instrumented aircraft observations of hurricanes and formulation of theoretical models of tropical-cyclone motion and intensification. Until December 2002 he was a Research Meteorologist at the Hurricane Research Division of NOAA's Atlantic Oceanographic and Meteorological Laboratory, where he had worked since 1975 and served as director 1995-2002. He has made more than 400 research and reconnaissance flights into the eyes of typhoons and hurricanes. During his time at HRD, Dr. Willoughby occupied the G. J. Haltiner Visiting Research Chair at the Naval Postgraduate School (January–July, 1991); was a Visiting Research Scientist at the BMRC in Melbourne, Australia (June–July, 1988). Dr. Willoughby has the following academic degrees: Ph.D. (1977, At Science) from the University of Miami, M.S. (1969, Meteorology) from the Naval Postgraduate School. He is a fellow of the American Meteorological Society and American Association for the Advancement of Science, and a member the American Geophysical Union and Sigma Xi.

# Intriguing and Seemingly Paradoxical Problems in Nontransitive Probability

*Dr. Hassan Zahedi  
Department of Statistics  
Florida International University*

**Summary of the Presentation:** Dr. Zahedi presented some paradoxical problems which arise from nontransitive relationships in probabilistic events in game theory. After an introduction to nontransitive relationships, he presented several intriguing examples on nontransitive probabilistic events (games) which included, the Arrow's Voting Paradox and related problems, a brief description of Arrow's impossibility theorem, Knuth's nontransitive Bingo cards, Efron's nontransitive dice and the Walter Penny's nontransitive sucker bet game. During the course of his talk, he also reviewed some interesting and amazingly efficient algorithms for computing winning probabilities and the corresponding expected waiting times related to these games. He concluded his talk by presenting some new challenging problems to students in the audience and asking them to seriously consider statistics as a rewarding and challenging career.



Miami, Florida 33199. Dr. Zahedi obtained his M.S. in Statistics from Florida State University and his Ph.D. in Statistics from the University of California, Riverside. Since 1991, he has served as the Director of the Certificate Program in Actuarial Studies at FIU. He has received several awards: the Phi Beta Kappa Award, the Outstanding Achievement and Performance Award from Florida International University and the TIP Award from FIU among others. His research interests include: Reliability Theory, Survival Analysis and Inference for Life Time Data, Characterization for Multivariate, Distributions, Applied Stochastic Modeling and Statistical Quality Control, Information Theoretic Characterizations of Order Statistics and Record Values. He has published several papers, which have appeared in the *Journal of Statistical Planning and Inference*, *Statistics and Probability Letters*, *Journal of Multivariate Analysis*, *communications in Statistics: Theory and Methods*, *Statistics*, *IEEE transactions on Information Theory*, and others. Dr. Zahedi has presented numerous research papers at different universities and conferences. His service at Florida International University is amazing. Dr. Zahedi served the South Florida Chapter of ASA as a Secretary, Treasure, Vice-President and President. In recognition of his service, he has been awarded the outstanding service award by ASA in 2007.

**Short Bio sketch:** Dr. Hassan Zahedi is an associate professor in the Department of Statistics, Florida International University,



Cherylyn Almonte

skewed population. Based on the simulation study she concluded that one might use Johnson  $t$ , Median-



Sui Joo



Gisela Muniz

**Summary of the Graduate Presentations:** Cherylyn presented a paper entitled “On Some Confidence Intervals for a Positively Skewed Distribution”. She has reviewed and proposed several confidence interval estimators for estimating the mean of a

$t$ , Bootstrap (BS)  $t$  and Mad- $t$  for slightly to moderately skewed distribution. Median  $t$  is handy compare to Johnson  $t$  and easy to implement. Her simulation study indicated that the proposed Mad T1, Mad T3, Median T1 and Median T3 might be useful for moderately to highly skewed distribution. She indicated that the bootstrap confidence intervals are computer intensive and therefore are not easy to implement. Gisela presented a paper entitled “Comparison of Some Ridge Regression Estimators”. She has reviewed and proposed different estimators for estimating the ridge parameter  $k$  when the explanatory variables of a multiple regression model are correlated. Based on the simulation study she concluded that the proposed estimators are promising and might be recommended to the practitioners. Sui presented her experiences as a Graduate Student in Statistics at FIU. She highlighted some merits of statistics as a major and spoke of her experiences during her first year at FIU.



Sam Shapiro and Alan Agresti



Jie Mi and Golam Kibria



From Left: Florence George, Hassan Zahedi, Gauri Ghai, Sam Shapiro and Golam Kibria



Parky Howell (retired from FIU) and Alan Agresti



Alan, Leonid, Sneh (Chair Person) and Gauri



Hassan Zahedi, Alan Agresti and Golam Kibria



Jie Mi, Alan Agresti and Golam Kibria



Some Students, Faculty and Guests



Sui Joo and Norma Piloto



Some Students, Faculty and Guests



Some Students, Faculty and Guests



Some Students, Faculty and Guests