

Andrew A. Neath

Professor of Mathematics and Statistics
Southern Illinois University Edwardsville

EDUCATION

Ph.D. Statistics, University of California, Davis 1994

M.S. Statistics, University of California, Davis 1990

B.S. Applied Math (Economics), California State University, Chico 1988

CURRENT ACADEMIC APPOINTMENT

Professor, Department of Mathematics and Statistics, Southern Illinois University Edwardsville
2006-

COURSES TAUGHT

Applied Statistics, Bayesian Statistics, Mathematical Statistics, Regression Analysis, Experimental Design, Sampling Methodology, Time Series Analysis, Categorical Data Analysis, Response Surface Methodology, Multivariate Analysis, Linear Models, Measure Theory and Probability, Mathematical Logic, Computing Logic, Calculus, Multivariable Calculus, Statistics for Environmental Science

Advisor for 41 Masters Research Papers and 23 Senior Project Papers

RESEARCH FELLOWSHIPS

William and Margaret Going Professor of Arts and Sciences: The Replication Crisis in Science: A Statistical Perspective (2016).

Hoppe Research Professor Award: Statistical Model Selection and Decision Making in the Presence of Uncertainty (2011-2013).

Annette and Henry Baich Award: Statistical Model Selection and the Theory of Social Choice (2011).

RECENT PUBLICATIONS (WITHIN 10 YEARS)

- NEATH, A.A., Cavanaugh, J., and Riedle, B. (2015). A connection between discrepancy function estimation and the p-value. *Proceedings of the American Statistical Association, Biometrics Section*.
- NEATH, A.A., Cavanaugh, J., and Weyhaupt, A. (2015). Model evaluation, discrepancy function estimation, and social choice theory. *Computational Statistics*, 30, 231-249.
- NEATH, A.A. (2014). Heuristic biases in statistical thinking. *Proceedings of the American Statistical Association, Section on Statistics Education*.
- Cavanaugh, J. and NEATH, A.A. (2013). Model selection with an application to the use of biomarkers for treatment evaluation. *Proceedings of the ISI World Statistics Congress*.
- NEATH, A.A. (2013). A note on quantifying measures of belief in a significance testing problem. *Proceedings of the American Statistical Association, Section on Statistics Education*.
- NEATH, A.A., Cavanaugh, J., and Riedle, B. (2012). A bootstrap method for assessing uncertainty in Kullback-Leibler discrepancy model selection problems. *Mathematics in Engineering, Science and Aerospace*, 3, 381-391.
- Cavanaugh, J. and NEATH, A.A. (2012). Model selection criteria based on computationally intensive estimators of the expected optimism. *Mathematics in Engineering, Science and Aerospace*, 3, 343-356.
- NEATH, A.A. and Langenfeld, N. (2012). A note on the comparison of the Bayesian and frequentist approaches to estimation. *Advances in Decision Sciences*, article id: 764254 (12 pages) .
- NEATH, A.A. and Cavanaugh, J. (2012) The Bayesian information criterion: Background, derivation, and applications. *Wiley Interdisciplinary Reviews: Computational Statistics*, 4, 199-203.
- NEATH, A.A., Cavanaugh, J., and Weyhaupt, A. (2012). Decision analysis, social choice theory, and model selection. *Proceedings of the American Statistical Association, Section on Risk Analysis*.
- Newland, P., Fearing, A., Riley, M., and NEATH, A.A. (2012). Symptom clusters in women with relapsing-remitting multiple sclerosis. *Journal of Neuroscience Nursing*, 44(2), 66-71.
- Zhou, H., Wang, L., NEATH, A.A., and Fries, R. (2012). Contributing factors regarding

wrong-way crashes on Illinois freeways using computer simulation. *International Conference of Road Safety on Four Continents*.

- NEATH, A.A. and Cavanaugh, J. (2011). Multiple comparisons testing from a Bayesian perspective. *International Encyclopedia of Statistical Science*, 890-892.
- Cavanaugh, J. and NEATH, A.A. (2011). The Akaike information criterion: Background, derivation, properties, and refinements. *International Encyclopedia of Statistical Science*, 26-29.
- Neath, R. and NEATH, A.A. (2011). Coherent Systems . *Encyclopedia of Operations Research and Management Science*, 689-696.
- NEATH, A.A. (2011). Review of A Comparison of the Bayesian and Frequentist Approaches to Estimation (by Samaniego). *Journal of the American Statistical Association*, 106, 1638.
- Hahn, E., McPherson, T., NEATH, A.A., and Kolling, W.M. (2011). Compatibility of a mixture of four ophthalmic drops plus sterile lidocaine jelly used as a preoperative therapy for cataract surgery. *ICHP / MSHP Spring Meeting*.
- Cavanaugh, J., NEATH, A.A., and Davies, S. (2010). An alternate version of the conceptual predictive statistic based on a symmetrized discrepancy measure. *Journal of Statistical Planning and Inference*, 3389-3398.
- NEATH, A.A. and Cavanaugh, J. (2010). Bayesian estimation of prediction error and variable selection in linear regression. *International Statistical Review*, 78, 257-270.
- NEATH, A.A. and Cavanaugh, J. (2010). Linear model evaluation based on estimation of model bias. *Journal of Statistical Theory and Practice*, 4, 169-179.
- NEATH, A.A. (2010). Statistical inference, statistics education, and the fallacy of the transposed conditional. *Proceedings of the American Statistical Association, Section on Statistics Education*.
- Newland, P., Riley, M., Fearing, A., NEATH, A.A., and Gibson, D. (2010). Pain in women with relapsing-remitting multiple sclerosis and healthy women: Relationship to demographic variables. *The Journal of Adult Health*, 19(3), 177-181.
- NEATH, A.A., Zhang, Z., and Cavanaugh, J. (2009). Linear model selection for replicated data and nearly replicated data. *Proceedings of the American Statistical Association, Biometrics Section*.
- Burr, T., Cavanaugh, J., and NEATH, A.A. (2008). Performance of variable selection methods in regression using variants of the Bayesian information criterion. *Communications*

in Statistics: Simulation and Computation, 37, 507-520.

- Cavanaugh, J., Davies, S., and NEATH, A.A. (2008). Discrepancy-based model selection criteria using cross validation. *Statistical Models and Methods for Biomedical and Technical Systems*, 477-490.
- NEATH, A.A. and Cavanaugh, J. (2008). A Bayesian conceptual predictive statistic. *Proceedings of the American Statistical Association, Biometrics Section*.
- NEATH, A.A., Downen, L., and Cavanaugh, J. (2007). Linear regression variable selection based on estimation of model bias. *Proceedings of the American Statistical Association, Biometrics Section*.
- Davies, S., NEATH, A.A., and Cavanaugh, J. (2006). Estimation optimality of corrected AIC and modified Cp in linear regression. *International Statistical Review*, 74, 161-168.
- NEATH, A.A. and Cavanaugh, J. (2006). Bayesian estimation of linear statistical model bias. *International Journal of Applied Mathematics*, 32, 255-264.
- NEATH, A.A. and Cavanaugh, J. (2006). A Bayesian approach to the multiple comparisons problem. *Journal of Data Science*, 4, 131-146.

SELECTED PUBLICATIONS (BEFORE 2006)

- NEATH, A.A. (2005). Polya tree priors for classification error distributions. *Computing Science and Statistics*, 37, 203-218.
- Davies, S., NEATH, A.A., and Cavanaugh, J. (2005). Cross validation model selection criteria for linear regression based on the Kullback-Leibler discrepancy. *Statistical Methodology*, 2, 249-266.
- NEATH, A.A. (2004). Quantifying the information from a randomized response. *InterStat*, 10-2, 1-7.
- NEATH, A.A. (2003). Polya tree distributions for statistical modeling of censored data. *Journal of Applied Mathematics and Decision Sciences*, 7, 175-186.
- NEATH, A.A. and Cavanaugh, J. (2000). A regression model selection criterion based on bootstrap bumping for use with resistant fitting. *Computational Statistics and Data Analysis*, 35, 155-169.
- NEATH, A.A. (1999). Accounting for uncertainty in the specification of a model within the two-sample problem. *Journal of Statistical Research*, 33-2, 1-15

- NEATH, A.A. and Sewell, E. (1999). Minimization of the trimmed sum of absolute deviations as an integer program. *Computing Science and Statistics*, 31, 227-229.
- Cavanaugh, J. and NEATH, A.A. (1999). Generalizing the derivation of the Schwarz Information Criterion. *Communications in Statistics: Theory and Methods*, 28, 49-66.
- NEATH, A.A. (1998). Bayesian nonparametric estimation from quantal response data: An application of partial parametric smoothing. *Journal of Statistical Research*, 32, 89-97.
- NEATH, A.A. and Samaniego, F. (1997). On the efficacy of Bayesian inference for non-identifiable models. *The American Statistician*, 51, 225-232.
- NEATH, A.A. and Bodden, K. (1997). Bayesian nonparametric confidence bounds for a distribution function. *Journal of Statistical Computation and Simulation*, 59, 147-160.
- NEATH, A.A. and Cavanaugh, J. (1997). Regression and time series model selection using variants of the Schwarz Information Criterion. *Communications in Statistics: Theory and Methods*, 26, 559-580.
- NEATH, A.A. and Samaniego, F. (1997). Bayesian estimation of the multiple decrement function in the competing risks problem: The discrete case. *Statistics and Probability Letters*, 35, 345-354.
- NEATH, A.A. and Samaniego, F. (1996). Bayesian estimation of the multiple decrement function in the competing risks problem. *Statistics and Probability Letters*, 31, 75-83.
- NEATH, A.A. and Samaniego, F. (1996). The distinguished role of the multivariate exponential distribution in Bayesian estimation in competing risks problems. *Statistics and Probability Letters*, 31, 69-74.
- Samaniego, F. and NEATH, A.A. (1996). How to be a better Bayesian. *Journal of the American Statistical Association*, 91, 733-742.
- NEATH, A.A. and Samaniego, F. (1992). On the total time on test transform of an IFRA distribution. *Statistics and Probability Letters*, 14, 289-291.
- Schwertmann, N., NEATH, A.A. and Davis, D. (1989). A Monte Carlo study of successive difference analysis of growth curve data at random observation times. *Journal of Statistical Computation and Simulation*, 34, 11-28.

RECENT PRESENTATIONS (WITHIN 10 YEARS)

- NEATH, A.A., Cavanaugh, J., and Riedle, B. (2015). A connection between discrepancy function estimation and the p-value. *Joint Statistical Meetings, Biometrics Section, Seattle*.

- NEATH, A.A. (2014). Heuristic biases in an introductory statistics course. *Joint Statistical Meetings, Section on Statistics Education, Boston.*
- NEATH, A.A. (2013). Significance testing and measures of belief. *Joint Statistical Meetings, Section on Statistics Education, Montreal, Canada.*
- NEATH, A.A. (2013). Your intuition (and your statistics textbook) may be wrong. *College of Arts and Sciences Colloquium, Edwardsville, Illinois.*
- NEATH, A.A., Cavanaugh, J., and Weyhaupt, A. (2013). Model evaluation, discrepancy function estimation, and social choice theory. *The University of Iowa Biostatistics Colloquium, Iowa City, Iowa.*
- NEATH, A.A., Cavanaugh, J., and Weyhaupt, A. (2012). Decision analysis, social choice theory, and model selection. *Joint Statistical Meetings, Section on Risk Analysis, San Diego, California.*
- NEATH, A.A. (2010). Some thoughts on an introductory statistics course. *Joint Statistical Meetings, Section on Statistics Education, Vancouver, Canada.*
- NEATH, A.A., Cavanaugh, J., and Weyhaupt, A. (2010). Model evaluation, discrepancy function estimation, and social choice theory. *CUNY Statistics Seminar, New York City.*
- NEATH, A.A. (2010). Some thoughts on how statistics instruction is emphasizing the wrong viewpoint. *Pi Mu Epsilon Mathematics Seminar, Edwardsville, Illinois.*
- NEATH, A.A., Cavanaugh, J., and Zhang, Z. (2009). Linear model selection for nearly replicated data. *Joint Statistical Meetings, Biometrics Section, Washington, D.C.*
- NEATH, A.A. and Cavanaugh, J. (2008). A Bayesian conceptual predictive statistic. *Joint Statistical Meetings, Biometrics Section, Denver, Colorado.*
- NEATH, A.A. and Cavanaugh, J. (2007). Linear model selection based on estimation of model bias. *Joint Statistical Meetings, Biometrics Section, Salt Lake City, Utah.*

SUPERVISION OF MASTERS RESEARCH PAPERS (WITHIN 10 YEARS)

- Jean Campbell (2016). Empirical Bayes Estimation of the False Discovery Rate in Large Scale Testing Problems.
- Mike Lanier (2016). The Use of Likelihood Inference for Quantifying Statistical Evidence.
- Rhonda Johnson (2015). The Necessity of Prior Information in Statistical Hypothesis Testing.

- Chris Glynn (2015). A Summary of Meta Analysis Models.
- Sarah Burkhardt (2013). A Comparison of Item Response Models for Nonignorable Non-response.
- Ehsan Jahanpour (2013). A Study of Frequentist Error Probabilities from a Bayesian Perspective
- Kelly Ayres (2013). Bayesian and Frequentist Hypothesis Testing in Analysis of Variance
- Lauren Cleeton (2013). A Decision Theoretic Comparison of the Bayesian and Frequentist Approaches to Estimation
- Cynthia Amoako (2012). A Reconciliation of the Bayesian and Frequentist Measures of Evidence
- Richard Lumor (2012). Sample Size Determination and Experimental Analysis Based on Posterior Probabilities
- Bhatdorj Lhaajev (2012). The Pareto Distribution
- Ben Riedle (2012). A Model Selection Procedure using Resampling Techniques
- Natalie Langenfeld (2011). A Decision Theoretic Framework for Empirical Bayesian Analysis
- Nate Zack (2010). Forecasting and Classification Problems Using Frequentist and Bayesian Statistics
- Ginger Barriger (2009). Hypothesis Testing in Analysis of Variance Models
- Jennifer Ringer (2009). Classical and Bayesian Estimation of the Odds Ratio
- Wei Ding (2009). Optimal Estimation of Regression Coefficients
- Jianwei Lu (2009). Lack of Fit Testing in Regression Models
- Kun Li (2007). Analysis of a Random Effects Model
- Zhuoran Wu (2007). An Exploration of Frequentist and Bayesian Theory for Randomized Response Models
- Kathy Warner (2006). An Analysis of the Non-Inferiority Hypothesis in Clinical Trials
- Letitia Downen (2006). Estimation of Linear Model Bias for Model Selection

SUPERVISION OF SENIOR PROJECT PAPERS (WITHIN 10 YEARS)

- Jenna Mettille (2013). How Significance Test Results are Misinterpreted
- Tierney Zwiack (2011). Introduction to Bayesian Inference
- Natalie Langenfeld (2010). Multiple Comparison Testing in Analysis of Variance
- Steve Atteberry (2009). Sample Size Considerations in the Planning of Clinical Trials
- Julia Delaney (2007). Sample Size Determination for Finite Population Sampling
- Jamie Jones (2007). Solving an Inconsistent System of Linear Equations using Projection Theory
- Eric Pedersen (2006). Bayesian Hypothesis Testing