

# JOSEPH E. CAVANAUGH

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## EDUCATION

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Ph.D.	Statistics	University of California, Davis	1993	(GPA: 3.98/4.00)
M.S.	Statistics	Montana State University	1988	(GPA: 4.00/4.00)
B.S.	Computer Science	Montana Tech	1986	(GPA: 3.99/4.00)
B.S.	Mathematics	Montana Tech	1986	(GPA: 3.99/4.00)

## CURRENT POSITION AND APPOINTMENTS

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Professor of Biostatistics, College of Public Health, University of Iowa; August, 2008 – present

- Departmental Executive Officer, Department of Biostatistics, College of Public Health;  
December, 2015 – present
- Professor of Statistics and Actuarial Science, College of Liberal Arts and Sciences;  
August, 2008 – present
- Professor of Applied Mathematical and Computational Sciences, Graduate College;  
August, 2014 – present

## PREVIOUS POSITIONS AND APPOINTMENTS

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November, 2014 – December, 2015	Professor of Biostatistics; Professor of Statistics and Actuarial Science; Professor of Applied Mathematical and Computational Sciences; Interim Departmental Executive Officer in Biostatistics; Director of Graduate Studies in Biostatistics; University of Iowa
August, 2014 – November, 2014	Professor of Biostatistics; Professor of Statistics and Actuarial Science; Professor of Applied Mathematical and Computational Sciences; Director of Graduate Studies in Biostatistics; University of Iowa
July, 2012 – August, 2014	Professor of Biostatistics; Professor of Statistics and Actuarial Science; Director of Graduate Studies in Biostatistics; University of Iowa

August, 2008 – July, 2012	Professor of Biostatistics; Professor of Statistics and Actuarial Science; University of Iowa
August, 2003 – August, 2008	Associate Professor of Biostatistics; Associate Professor of Statistics and Actuarial Science; University of Iowa
September, 2000 – August, 2003	Associate Professor of Statistics; Director of Undergraduate Studies in Statistics; University of Missouri
September, 1999 – September, 2000	Associate Professor of Statistics; University of Missouri
September, 1998 – September, 1999	Assistant Professor of Statistics; Director of Graduate Studies in Statistics; University of Missouri
September, 1993 – September, 1998	Assistant Professor of Statistics; University of Missouri

#### METHODOLOGICAL DISCIPLINARY RESEARCH INTERESTS

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Model Selection      Time Series Analysis      State–Space Models      Modeling Diagnostics

#### APPLIED INTERDISCIPLINARY RESEARCH INTERESTS

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Epidemiology      Infectious Diseases      Injury Prevention      Dentistry

#### AWARDS FOR PROFESSIONAL AND ACADEMIC ACHIEVEMENT

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- Fellow of the American Statistical Association, 2014.
- Montana Tech Chancellor’s Medallion (for excellence in an academic career), 2013.
- College of Public Health Faculty Award for Service, University of Iowa, 2013.
- Montana Tech Alumni Recognition Award, 1994.
- Valedictorian, Montana Tech graduating class of 1986.
- Highest Scholastic Standing in the Arts and Sciences, Montana Tech graduating class of 1986.

#### AWARDS FOR TEACHING AND ADVISING

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- College of Public Health Faculty Award for Teaching, University of Iowa, 2006.
- William T. Kemper Fellowship for Excellence in Teaching, University of Missouri, 2000.  
(\$10,000 award)
- Gold Chalk Award (for graduate student training and mentoring), University of Missouri, 1998.
- Provost Outstanding Junior Faculty Teaching Award, University of Missouri, 1997.
- Teaching Award for Outstanding Graduate Students, University of California, Davis, 1992.

## COURSES INSTRUCTED

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Course Title	Institution	Terms Instructed
Advanced Biostatistics Seminar: Model Selection	University of Iowa	5
Advanced Biostatistics Seminar: Generalized Linear Models	University of Iowa	2
Categorical Data Analysis	University of Iowa	7
Biostatistical Methods I	University of Iowa	2
Introduction to Biostatistics	University of Iowa	3 <sup>†</sup>
Seminar in Clinical and Translational Research	University of Iowa	2 <sup>*</sup>
Advanced Linear Models	University of Missouri	4
Linear Models I	University of Missouri	5
Linear Models II	University of Missouri	5
Applied Time Series Analysis	University of Missouri	2
Categorical Data Analysis	University of Missouri	3
Introduction to Mathematical Statistics	University of Missouri	3
Statistical Analysis	University of Missouri	4
Statistical Methods in Natural Resources	University of Missouri	4
Elementary Statistics (Honors)	University of Missouri	4
Regression Analysis	University of California, Davis	1
Probability Modeling and Statistical Inference	University of California, Davis	2
Elementary Statistics	University of California, Davis	10 <sup>‡</sup>
Elementary Statistics	Montana State University	5
Linear Algebra for Business	Montana State University	1
Survey of Calculus	Montana State University	1

† Instructed large lecture sections (> 75 students).

‡ Instructed large lecture sections (> 200 students) for 7 out of 10 terms.

\* Served as co-instructor.

## REFEREED PUBLICATIONS

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- Zhang, T. and Cavanaugh, J. E. (2016). A multistage algorithm for best-subset model selection based on the Kullback–Leibler discrepancy. *Computational Statistics*, **31**, 643–669.
- Ten Eyck, P. and Cavanaugh, J. E. (2016). The adjusted concordance statistic. In *Statistical, Stochastic and Data Analysis Methods and Applications*, edited by A. Karagrigoriou, T. Oliveira and C. H. Skiadas, 143–156. International Society for the Advancement of Science and Technology, Athens, Greece.
- Ramirez, M., Bedford, R., Wu, H., Harland, K., Cavanaugh J. E. and Peek–Asa C. (2016). Lighting and marking policies are associated with reduced farm equipment-related crash rates: A policy analysis of nine Midwestern US states. To appear in *Occupational & Environmental Medicine*; available online (doi:10.1136/oemed-2016-103672).
- Simmering, J. E., Polgreen, L. A., Comellas, A. P., Cavanaugh, J. E. and Polgreen, P. M. (2016). Identifying patients with COPD at high risk of readmission. *Chronic Obstructive Pulmonary Diseases: Journal of the COPD Foundation*, **3**, doi:http://dx.doi.org/10.15326/jcopdf.3.4.2016.0136, 729–738.

- Miller, A. C., Polgreen, L. A., Cavanaugh, J. E. and Polgreen, P. M. (2016). Hospital *Clostridium difficile* infection rates and prediction of length of stay in patients without *C. difficile* infection. *Infection Control & Hospital Epidemiology*, **37**, 404–410.
- Miller, A. C., Polgreen, L. A., Cavanaugh, J. E. and Polgreen, P. M. (2016). Hospital *Clostridium difficile* infection (CDI) incidence as a risk factor for hospital-associated CDI. *American Journal of Infection Control*, **44**, 825–829.
- Zahr, R. S., Peterson, R. A., Polgreen, L. A., Cavanaugh, J. E., Hornick, D. B., Winthrop, K. L. and Polgreen, P. M. (2016). Diabetes as an increasingly common comorbidity among patient hospitalizations for tuberculosis in the USA. *BMJ Open Diabetes Research and Care*, **4**:e000268, doi:10.1136/bmjdr-2016-000268.
- Suneja, M., Tang, F., Cavanaugh, J. E., Polgreen, L. A. and Polgreen P. M. (2016). Population based trends in the incidence of hospital admission for the diagnosis of hepatorenal syndrome: 1998-2011. *International Journal of Nephrology*, 8419719, <http://dx.doi.org/10.1155/2016/8419719>.
- Ramirez, M., Ten Eyck, P., Peek-Asa, C., Onwuachi-Willig, A. and Cavanaugh J. E. (2016). Evaluation of Iowa’s anti-bullying law. *Injury Epidemiology*, **3**:15, doi:10.1186/s40621-016-0080-9.
- Alshawabkeh, L. I., Hu, N., Carter, K. D., Opotowsky, A. R., Light-McGroary, K., Cavanaugh, J. E. and Bartlett, H. L. (2016). Wait-list outcomes for adults with congenital heart disease listed for heart transplantation in the U.S. (with editorial commentary). *Journal of the American College of Cardiology*, **68**, 908–917.
- Adam, R. J., Hisert, K. B., Dodd, J. D., Grogan, B., Launspach, J. L., Barnes, J. K., Gallagher, C. G., Sieren, J. P., Gross, T. J., Fischer, A. J., Cavanaugh, J. E., Hoffman, E. A., Singh, P. K., Welsh, M. J., McKone, E. F. and Stoltz D. A. (2016). Acute administration of ivacaftor to people with cystic fibrosis and a G551D-CFTR mutation reveals smooth muscle abnormalities. *JCI Insight*, **1**:e86183, doi:10.1172/jci.insight.86183.
- Ghazal, T., Levy, S. M., Childers, N. K., Broffitt, B. A., Caplan, D. J., Warren, J., Cavanaugh, J. E. and Kolker J. (2016). Dental caries in high-risk, school-age African American children in Alabama: A six-year prospective. *Pediatric Dentistry*, **38**, 224–230.
- Oleson, J. J., Cavanaugh, J. E., McMurray, B. and Brown, G. (2015). Detecting time-specific differences between temporal nonlinear curves: Analyzing data from the visual world paradigm. To appear in *Statistical Methods in Medical Research*; available online (doi:10.1177/0962280215607411).
- Yang, M., Cavanaugh, J. E. and Zamba, G. K. D. (2015). State-space models for count time series with excess zeros. *Statistical Modelling*, **15**, 70–90.
- Neath, A. A., Cavanaugh, J. E. and Weyhaupt, A. G. (2015). Model evaluation, discrepancy function estimation, and social choice theory. *Computational Statistics*, **30**, 231-249.
- O’Shaughnessy, P. and Cavanaugh, J. E. (2015). Performing t-tests to compare autocorrelated time series data collected from direct-reading instruments. *Journal of Occupational and Environmental Hygiene*, **12**, 743–752.
- Miller, A. C., Polgreen, L. A., Cavanaugh, J. E., Hornick, D. B. and Polgreen, P. M. (2015). Missed opportunities to diagnose tuberculosis are common among hospitalized patients and patients seen in emergency departments. *Open Forum Infectious Diseases*, **2**(4), doi:10.1093/ofid/ofv171.

- Simmering, J. E., Polgreen, L. A., Campbell, D. R., Cavanaugh, J. E. and Polgreen, P. M. (2015). Hospital transfer network structure as a risk factor for *Clostridium difficile* infection. *Infection Control & Hospital Epidemiology*, **36**, 1031–1037.
- Gerke, A. K., Tang, F., Cavanaugh, J. E., Doerschug, K. C. and Polgreen, P. M. (2015). Increased trend in extracorporeal membrane oxygenation use by adults in the United States since 2007. *BMC Research Notes*, **8**:686, doi:10.1186/s13104-015-1678-7.
- Schweizer, M. L., Chiang, H.-Y., Septimus, E., Moody, J., Braun, B., Hafner, J., Ward, M. A., Hickok, J., Perencevich, E. N., Diekema, D. J., Richards, C. L., Cavanaugh, J. E., Perlin, J. B. and Herwaldt, L. A. (2015). Association of a bundled intervention with surgical site infections among patients undergoing cardiac, hip, or knee surgery (with editorial commentary). *Journal of the American Medical Association*, **313**, 2162–2171.
- Peek-Asa, C., Cavanaugh, J. E., Yang, J., Chande, V., Young, T. and Ramirez, M. (2015). Steering Teens Safe: a randomized trial of a parent-based intervention to improve safe teen driving. *BMC Public Health*, **14**:777, <http://www.biomedcentral.com/1471-2458/14/777>.
- Chankanka, O., Levy, S. M., Marshall, T. A., Cavanaugh, J. E., Warren, J. J., Broffitt, B. and Kolker, J. L. (2015). The associations between dietary intakes from 36 to 60 months of age and primary dentition non-cavitated caries and cavitated caries. *Journal of Public Health Dentistry*, **75**, 265–273.
- Ghazal, T., Levy, S. M., Childers, N. K., Broffitt, B., Cutter, G. R., Wiener, H. W., Kempf, M. C., Warren, J. and Cavanaugh, J. E. (2015). Factors associated with early childhood caries incidence among high caries-risk children. *Community Dentistry and Oral Epidemiology*, **43**, 366–374.
- Ghazal, T., Levy, S. M., Childers, N. K., Broffitt, B., Cutter, G., Wiener, H. W., Kempf, M., Warren, J. and Cavanaugh, J. (2015). Prevalence and incidence of early childhood caries among African-American children in Alabama. *Journal of Public Health Dentistry*, **75**, 42–48.
- Mehalick, L. A., Poulsen, C., Fischer, C. L., Lanzel, E. A., Bates, A. M., Walters, K. S., Cavanaugh, J. E., Guthmiller, J. M., Johnson, G. K., Wertz, P. W. and Brogden, K. A. (2015). Differential cytotoxicity of long-chain bases for human oral gingival epithelial keratinocytes, oral fibroblasts, and dendritic cells. *Data in Brief*, **5**, 285–291.
- Poulsen, C., Mehalick, L. A., Fischer, C. L., Lanzel, E. A., Bates, A. M., Walters, K. S., Cavanaugh, J. E., Guthmiller, J. M., Johnson, G. K., Wertz, P. W. and Brogden, K. A. (2015). Differential cytotoxicity of long-chain bases for human oral gingival epithelial keratinocytes, oral fibroblasts, and dendritic cells. *Toxicology Letters*, **237**, 21–29.
- Oleson, J. J., Cavanaugh J. E., Tomblin, J. B., Walker, E. and Dunn, C. (2014). Combining growth curves when a longitudinal study switches measurement tools. To appear in *Statistical Methods in Medical Research*; available online (doi:10.1177/0962280214534588).
- Kim, H.-J., Cavanaugh, J. E., Dallas, T. A. and Forè, S. A. (2014). Model selection criteria for overdispersed data and their application to the characterization of a host–parasite relationship. *Environmental and Ecological Statistics*, **21**, 329–350.
- Smoot, M. K., Cavanaugh, J. E., Amendola, A., West, D. R. and Herwaldt, L. A. (2014). Creatine kinase levels during pre-season camp in NCAA Division-I football athletes. *Clinical Journal of Sport Medicine*, **24**, 438–440.

- Cobb, B. S., Coryell, W. H., Cavanaugh, J., Keller, M., Solomon, D. A., Endicott, J., Potash, J. B. and Fiedorowicz, J. G. (2014). Seasonal variation of depressive symptoms in unipolar major depressive disorder. *Comprehensive Psychiatry*, **55**, 1891-1899.
- Simmering, J. E., Polgreen, L. A., Cavanaugh, J. E. and Polgreen, P. M. (2014). Are well-child visits a risk factor for subsequent influenza-like-illness visits? *Infection Control & Hospital Epidemiology*, **35**, 251-256.
- Chiang, H.-Y., Kamath, A. S., Pottinger, J. M., Greenlee, J. D. W., Howard, M. A., Cavanaugh, J. E. and Herwaldt, L. A. (2014). Risk factors and outcomes associated with surgical site infections after craniotomies or craniectomies. *Journal of Neurosurgery*, **120**, 509-521.
- Saftlas, A. F., Harland, K. K., Wallis, A. B., Cavanaugh, J., Dickey, P. and Peek-Asa, C. (2014). Motivational interviewing and intimate partner violence: a randomized trial. *Annals of Epidemiology*, **24**, 144-150.
- Borgwardt, D. S., Martin, A. D., Van Hemert, J. R., Yang, J., Fischer, C. L., Recker, E. N., Nair, P. R., Vidva, R., Chandrashekararajah, S., Progulske-Fox, A., Drake, D., Cavanaugh, J. E., Vali, S., Zhang, Y. and Brogden, K. A. (2014). Histatin 5 binds to *Porphyromonas gingivalis* hemagglutinin B (HagB) and alters HagB-induced chemokine responses. *Scientific Reports*, **4**:3904, doi:10.1038/srep03904.
- Gerke, A. K., Pezzulo, A. A., Tang, F., Cavanaugh, J. E., Bair, T. B., Phillips, E., Powers, L.S. and Monick, M. M. (2014). Effects of vitamin D supplementation on alveolar macrophage gene expression: preliminary results of a randomized, controlled trial. *Multidisciplinary Respiratory Medicine*, **9**:18, <http://www.mrmjournal.com/content/9/1/18>.
- Gerke, A. K., Tang, F., Pendergast, J., Cavanaugh, J. E. and Polgreen, P. M. (2014). The high frequency of healthcare use in patients one year prior to a sarcoidosis diagnosis. *Sarcoidosis Vasculitis and Diffuse Lung Disease*, **31**, 256-261.
- Gerke, A. K., Yang, M., Tang, F., Foster, E. D., Cavanaugh, J. E. and Polgreen, P. M. (2014). Association of hospitalizations for asthma with seasonal and pandemic influenza. *Respirology*, **19**, 116-121.
- Gerke, A. K., Tang, F., Yang, M., Foster, E. D., Cavanaugh, J. E. and Polgreen, P. M. (2013). Predicting chronic obstructive pulmonary disease hospitalizations based on concurrent influenza activity. *COPD: Journal of Chronic Obstructive Pulmonary Disease*, **10**, 573-580.
- Foster, E. D., Cavanaugh, J. E., Haynes, W. G., Yang, M., Gerke, A. K., Tang, F. and Polgreen, P. M. (2013). Acute myocardial infarctions, strokes and influenza: seasonal and pandemic effects. *Epidemiology and Infection*, **141**, 735-744.
- Yang, M., Zamba, G. K. D. and Cavanaugh, J. E. (2013). Markov regression models for count time series with excess zeros: a partial likelihood approach. *Statistical Methodology*, **14**, 26-38.
- Ramirez, M., Harland, K., Frederick, M., Shepherd, R., Wong, M. and Cavanaugh, J. E. (2013). Listen Protect Connect for traumatized schoolchildren: a pilot study of psychological first aid. *BMC Psychology*, **1**:26, <http://www.biomedcentral.com/2050-7283/1/26>.
- Smoot, M. K., Amendola, A., Cramer, E., Doyle, C., Kregel, K. C., Chiang, H.-Y., Cavanaugh, J. E. and Herwaldt, L. A. (2013). A cluster of exertional rhabdomyolysis affecting a Division I football team. *Clinical Journal of Sport Medicine*, **23**, 365-372.

- Akhter, A., Fiedorowicz, J. G., Zhang, T., Potash, J. B., Cavanaugh, J., Solomon, D. A. and Coryell, W. H. (2013). Seasonal variation of manic and depressive symptoms in bipolar disorder. *Bipolar Disorders*, **15**, 377-384.
- Nguyen, C. M., Yamada, T. H., Beglinger, L. J., Cavanaugh, J. E., Denburg, N. L. and Schultz, S. K. (2013). Cognitive features 10 or more years after successful breast cancer survival: comparisons across types of cancer interventions. *Psycho-Oncology*, **22**, 862–868.
- Broffitt, B., Levy, S. M., Warren, J. and Cavanaugh, J. E. (2013). Factors associated with surface-level caries incidence in children aged 9 to 13: the Iowa Fluoride Study. *Journal of Public Health Dentistry*, **73**, 304-310.
- Harvey, L. E., Kohlgraf, K., Mehalick, L. A., Raina, M., Recker, E. N., Radhakrishnan, S., Avinash Prasad, S., Vidva, R., Progulske-Fox, A., Cavanaugh, J. E., Vali, S. and Brogden, K. A. (2013). Defensin DEFB103 bidirectionally regulates chemokine and cytokine responses to a pro-inflammatory stimulus. *Scientific Reports*, **3**:1232, doi:10.1038/srep01232.
- Reiss, P. T., Huang, L., Cavanaugh, J. E. and Roy, A. K. (2012). Resampling-based information criteria for best-subset regression. *Annals of the Institute of Statistical Mathematics*, **64**, 1161-1186.
- Neath, A. A. and Cavanaugh, J. E. (2012). The Bayesian information criterion: background, derivation, and applications. *WIREs Computational Statistics*, **4**, 199–203.
- Cavanaugh, J. E. 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. Special issue on “Theory and Applications of Divergence and Information Measures,” edited by I. Vonta and A. Karagrigoriou.
- Neath, A. A., Cavanaugh, J. E. and Riedel, B. (2012). A bootstrap method for assessing uncertainty in Kullback–Leibler discrepancy model selection problems. *Mathematics in Engineering, Science and Aerospace*, **3**, 381-391. Special issue on “Theory and Applications of Divergence and Information Measures,” edited by I. Vonta and A. Karagrigoriou.
- Foster, E. D. and Cavanaugh, J. E. (2012). Composite marginal discrepancies for state–space time series clustering. *Mathematics in Engineering, Science and Aerospace*, **3**, 405–416. Special issue on “Theory and Applications of Divergence and Information Measures,” edited by I. Vonta and A. Karagrigoriou.
- Gerke, A. K., Yang, M., Tang, F., Cavanaugh, J. E. and Polgreen, P. M. (2012). Increased hospitalizations among sarcoidosis patients from 1998 to 2008: a population-based cohort study. *BMC Pulmonary Medicine*, **12**:19, <http://www.biomedcentral.com/1471-2466/12/19>.
- Gerke, A. K., Tang, F., Yang, M., Cavanaugh, J. E. and Polgreen, P. M. (2012). An analysis of seasonality of sarcoidosis in the United States veteran population: 2000–2007. *Sarcoidosis Vasculitis and Diffuse Lung Diseases*, **29**, 155–158.
- Herr, K., Titler, M., Fine, P. G., Sanders, S., Cavanaugh, J. E., Swegle, J., Tang, X. and Forcucci, C. (2012). The effect of a Translating Research into Practice (TRIP) cancer intervention on cancer pain management in older adults in hospice. *Pain Medicine*, **13**, 1004-1017.
- Fethke, N. B., Gerr, F., Anton, D., Cavanaugh, J. E. and Quickel, M. T. (2012). Variability in muscle activity and wrist motion measurements among workers performing non-cyclic work. *Journal of Occupational & Environmental Hygiene*, **9**, 25–35.

- Van Hemert, J. R., Recker, E. N., Dietrich, D., Progulsk-Fox, A., Kurago, Z. B., Walters, K. S., Cavanaugh, J. E. and Brogden, K. A. (2012). Human  $\beta$ -defensin-3 alters, but does not inhibit, the binding of *Porphyromonas gingivalis* haemagglutinin B to the surface of human dendritic cells. *International Journal of Antimicrobial Agents*, **40**, 75–79.
- Polgreen, P. M., Sparks, J. D., Polgreen, L. A., Yang, M., Harris, M. L., Pentella, M. A. and Cavanaugh, J. E. (2012). A statewide outbreak of *Cryptosporidium* and its association with the distribution of public swimming pools. *Epidemiology and Infection*, **140**, 1439–1445.
- Polgreen, P. M., Yang, M., Laxminarayan, R. and Cavanaugh, J. E. (2011). Respiratory fluoroquinolone use and influenza. *Infection Control & Hospital Epidemiology*, **32**, 706–709.
- Polgreen, P. M., Yang, M., Kuntz, J. L., Laxminarayan, R. and Cavanaugh, J. E. (2011). Using oral vancomycin prescriptions as a proxy measure for *Clostridium difficile* infections: a spatial and time series analysis. *Infection Control & Hospital Epidemiology*, **32**, 723–726.
- Foster, E. D., Yang, M., Polgreen, P. M. and Cavanaugh, J. E. (2011). A time series analysis to investigate the relationship between acute myocardial infarction incidence and influenza activity. In *Biometrie und Medizinische Informatik Greifswalder Seminarberichte: Heft 18, Risk Analysis*, edited by A. Karagrigoriou, K.–E. Beibler and I. B. Frenkel, 27–39. Shaker Verlag, Aachen, Germany.
- Nguyen, C. M., Koenigs, M., Yamada, T. H., Teo, S. H., Cavanaugh, J. E., Tranel, D. and Denburg, N. L. (2011). Trustworthiness and negative affect predict economic decision making. *Journal of Cognitive Psychology*, **23**, 748–759.
- Chankanka, O., Cavanaugh, J. E., Levy, S. M., Marshall, T. A., Warren, J. J., Broffitt, B. and Kolker, J. L. (2011). Longitudinal associations between children’s dental caries and risk factors. *Journal of Public Health Dentistry*, **71**, 289-300.
- Chankanka, O., Marshall, T. A., Levy, S. M., Cavanaugh, J. E., Warren, J. J., Broffitt, B., and Kolker, J. L. (2011). Mixed dentition cavitated caries incidence and dietary intake frequencies. *Pediatric Dentistry*, **33**, 233–240.
- Tymkiw, K. D., Thunell, D. H., Johnson, G. K., Joly, S., Burnell, K. K., Cavanaugh, J. E., Brogden, K. A. and Guthmiller J. M. (2011). Influence of smoking on gingival crevicular fluid cytokines in severe chronic periodontitis. *Journal Clinical Periodontology*, **38**, 219-228.
- Streit, J. A., Yang, M., Cavanaugh, J. E. and Polgreen, P. M. (2011). Upward trend in dengue incidence among hospitalized patients, United States. *Emerging Infectious Diseases*, **17**, 914–916.
- Ramirez, M., Ferrer, R. R., Cheng, G., Cavanaugh, J. E. and Peek–Asa, C. (2011). Violation of school behavioral policies and its relationship with overall crime. *Annals of Epidemiology*, **21**, 214–220.
- Neath, A. A. and Cavanaugh, J. E. (2010). Bayesian estimation of prediction error and variable selection in linear regression. *International Statistical Review*, **78**, 257–270.
- Cavanaugh, J. E., Neath, A. A. and Davies, S. L. (2010). An alternate version of the conceptual predictive statistic based on a symmetrized discrepancy measure. *Journal of Statistical Planning and Inference*, **140**, 3389-3398.
- Neath, A. A. and Cavanaugh, J. E. (2010). Linear model evaluation based on estimation of model bias. *Journal of Statistical Theory and Practice*, **4**, 169–179.



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- Herr, K., Titler, M., Fine, P., Sanders, S., Cavanaugh, J., Swegle, J., Forcucci, C. and Tang, X. (2010). Assessing and treating pain in hospices: current state of evidence-based practices. *Journal of Pain and Symptom Management*, **39**, 803–819.
- Fine, P., Herr, K., Titler, M., Sanders, S., Cavanaugh, J., Swegle, J., Forcucci, C., Tang, X., Lane, K. and Reyes, J. (2010). The cancer pain practice index (CPPI): a measure of evidence-based practice adherence for cancer pain management in older adults in hospice care. *Journal of Pain and Symptom Management*, **39**, 791–802.
- Dawson, J. D., Cavanaugh, J. E., Zamba, K. D. and Rizzo, M. (2010). Modeling lateral control in driving studies. *Accident Analysis & Prevention*, **42**, 891–897.
- Abraham, M., Acree, W. E., Leo, A. J., Hoekman, D. and Cavanaugh, J. E. (2010). Water-solvent partition coefficients and  $\Delta \log P$  values as predictors for blood-brain distribution; Application of the Akaike information criterion. *Journal of Pharmaceutical Sciences*, **99**, 2492–2501.
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- Polgreen, P. M., Bohnett, L. C., Yang, M., Pentella, M. A. and Cavanaugh, J. E. (2010) A spatial analysis of the spread of mumps: the importance of college students and their spring-break-associated travel. *Epidemiology and Infection*, **138**, 434–441.
- Thunell, D. H., Tymkiw, K. D., Johnson, G. K., Joly, S., Burnell, K. K., Cavanaugh, J. E., Brogden, K. A. and Guthmiller, J. M. (2010). A multiplex immunoassay demonstrates reductions in gingival crevicular fluid cytokines following initial periodontal therapy. *Journal of Periodontal Research*, **45**, 148–152.
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## PROCEEDINGS PUBLICATIONS

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- Neath, A. A., Cavanaugh, J. and B. Riedle (2015). A connection between discrepancy function estimation and the p-value. In *2016 Proceedings of the American Statistical Association* (online). Alexandria, Virginia.
- Cavanaugh, J. E. and Neath, A. A. (2013). Model selection criteria based on computationally intensive estimators of the expected optimism. In *Proceedings of the 59th ISI World Statistics Congress* (Session IPS012), 127–132; <http://2013.isiproceedings.org/>.
- Neath, A. A., Cavanaugh, J. E. and Weyhaupt, A. G. (2012). Decision analysis and social choice theory. In *2012 Proceedings of the American Statistical Association* (CD-ROM; online). Alexandria, Virginia.
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## POLICY REPORTS

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- Roberts, M. S., Cavanaugh, J. E., Danovitch, G., Gantz, D., Landsittel, D., Losina, E., Rhode, C., Schmeiser, B. and Burdick, J. (2004). Report of the independent expert panel on statistical methods for the analysis of organ transplantation data: simulation modeling. U.S. Department of Health and Human Services, Rockville, Maryland.

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- Cavanaugh, J. E., McQuarrie, A. D. R. and Shumway, R. H. (1993). Parametric and nonparametric discriminants for regional earthquakes and explosions. Published and distributed by Phillips Laboratory, Hanscom Air Force Base, Massachusetts. (PL–TR–93–2164)

## PH.D. DISSERTATION

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- Cavanaugh, J. E. (1993). “Small–Sample Model Selection in the General State–Space Setting.” Dissertation advisor: Professor Robert H. Shumway.

## INVITED PRESENTATIONS: CONFERENCES AND MEETINGS

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- Cavanaugh, J. E., Yang, M. and Zamba, G. K. D. (July, 2015). State–space models for count time series with excess zeros. Invited Paper, Applied Stochastic Models and Data Analysis International Conference; Piraeus, Greece.
- Cavanaugh, J. E., Yang, M. and Zamba, G. K. D. (May, 2015). State–space models for count time series with excess zeros. Invited Paper, International Conference On Differential Equations and Dynamical Systems; Dallas, Texas.

- Cavanaugh, J. E., Yang, M. and Zamba, G. K. D. (September, 2013). State–space models for count time series with excess zeros. Invited Paper, *Frontiers in Methodological and Applied Statistics: A Celebration of 50 Years of MU’s Department of Statistics*, University of Missouri; Columbia, Missouri.
- Cavanaugh, J. E. and Neath, A. A. (August, 2013). Model selection criteria based on computationally intensive estimators of the expected optimism (with an application to the use of biomarkers for treatment evaluation). Invited Paper, 59th ISI World Statistics Congress; Hong Kong, China.
- Cavanaugh, J. E. (August, 2013). Model selection criteria based on computationally intensive estimators of the expected optimism (with an application to the use of biomarkers for treatment evaluation). Topic Contributed Paper, 2013 Joint Statistical Meetings; Montreal, Canada.
- Cavanaugh, J. E. (July, 2012). Model selection criteria based on computationally intensive estimators of the expected optimism. Invited Paper, ICNPAA Congress: *Mathematical Problems in Engineering, Aerospace and Sciences*; Vienna, Austria.
- Cavanaugh, J. E., Foster, E. D., Yang, M. and Polgreen, P. M. (May, 2011). A time series analysis to investigate the relationship between acute myocardial infarction incidence and influenza activity. Invited Paper, International Conference on Risk Analysis; Limassol, Cyprus.
- Cavanaugh, J. E. and Bengtsson, T. (August, 2008). State–space discrimination and clustering of atmospheric time series data based on Kullback information measures. Topic Contributed Paper (Session: Time Series, State Space Models and Other Reflections on the Work of Bob Shumway), 2008 Joint Statistical Meetings; Denver, Colorado.
- Cavanaugh, J. E. (June, 2008). Model selection criteria based on computationally intensive estimators of the expected optimism. Invited Paper, 2008 Statistical Conference in Honor of Bob Shumway, University of California; Davis, California.
- Cavanaugh, J. E. (September, 2007). Occam’s razor and statistical model selection. Keynote Address, Annual Meeting of the Montana Section of the American Statistical Association; Butte, Montana.
- Cavanaugh, J. E. and Bengtsson, T. (July, 2007). State–space discrimination and clustering of atmospheric time series data based on Kullback information measures. Topic Contributed Paper, 2007 Joint Statistical Meetings; Salt Lake City, Utah.
- Cavanaugh, J. E., Davies, S. L. and Neath, A. A. (May, 2006). Discrepancy–based model selection criteria using cross–validation. Invited Paper, International Conference on Statistical Models for Biomedical and Technical Systems; Limassol, Cyprus.
- Cavanaugh, J. E. and Davis, J. W. (August, 2003). Time–frequency discrimination of nonstationary processes based on wavelets. Invited Technical Exhibit, 2003 Joint Statistical Meetings; San Francisco, California.
- Cavanaugh, J. E. (August, 2003). Criteria for linear model selection based on Kullback’s symmetric divergence. Invited Paper, Justus F. Seely Memorial Conference on Linear Models, Oregon State University; Corvallis, Oregon.
- Cavanaugh, J. E., Wang, Y. and Song, C. (June, 2000). Self–similarity index estimation via wavelets for locally self–similar processes. Special Invited Paper, International Conference on Statistics in the 21<sup>st</sup> Century, University of Maine; Orono, Maine.
- Cavanaugh, J. E. and Johnson, W. O. (August, 1996). Assessing the predictive influence of cases in a state–space process. Topic Contributed Paper, 1996 Joint Statistical Meetings; Chicago, Illinois.



- Cavanaugh, J. E. (April, 2015). Model selection criteria based on computationally intensive estimators of the expected optimism. Departmental Seminar, Department of Biostatistics, Penn State University; Hershey, Pennsylvania.
- Cavanaugh, J. E. (March, 2012). Occam's razor and statistical model selection. Seminar, Institute for Quantitative Biology, East Tennessee State University; Johnson City, Tennessee.
- Cavanaugh, J. E. (November, 2011). Model selection criteria based on computationally intensive estimators of the expected optimism. Departmental Colloquium, Department of Statistics, University of Missouri; Columbia, Missouri.
- Cavanaugh, J. E. and Bengtsson, T. (April, 2009). State-space discrimination and clustering of atmospheric time series data based on Kullback information measures. Departmental Colloquium, Department of Statistics, University of California; Irvine, California.
- Cavanaugh, J. E. (February, 2009). An analysis of the Iowa child passenger safety survey based on generalized linear mixed models. Biostatistics Seminar, New York State Psychiatric Institute, Columbia University; New York, New York.
- Cavanaugh, J. E. (February, 2009). Model selection criteria based on computationally intensive estimators of the expected optimism. Departmental Seminar, Department of Biostatistics, Columbia University; New York, New York.
- Cavanaugh, J. E. (March, 2008). Occam's razor and statistical model selection. Lukacs Visiting Professor Departmental Colloquium, Department of Mathematics and Statistics, Bowling Green State University; Bowling Green, Ohio.
- Cavanaugh, J. E., Davies, S. L. and Neath, A. A. (March, 2008). Discrepancy-based model selection criteria using cross validation. Lukacs Visiting Professor Statistics Seminar, Department of Mathematics and Statistics, Bowling Green State University; Bowling Green, Ohio.
- Cavanaugh, J. E., Davies, S. L. and Neath, A. A. (October, 2007). Discrepancy-based model selection criteria using cross validation. Departmental Seminar, Department of Biostatistics and Epidemiology, University of Pennsylvania; Philadelphia, Pennsylvania.
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- Cavanaugh, J. E., Neath, A. A. and Davies, S. L. (October, 2006). An alternate version of the conceptual predictive statistic. Departmental Colloquium, Department of Mathematical Sciences, Montana State University; Bozeman, Montana.
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- Cavanaugh, J. E., Neath, A. A. and Davies, S. L. (February, 2006). An alternate version of the conceptual predictive statistic. Departmental Colloquium, Departments of Statistics and Biostatistics, University of Florida; Gainesville, Florida.

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- Cavanaugh, J. E. (November, 2004). Criteria for linear model selection based on Kullback's symmetric divergence. Departmental Colloquium, Department of Statistics, Iowa State University; Ames, Iowa.
- Cavanaugh, J. E. (March, 2004). Criteria for linear model selection based on Kullback's symmetric divergence. Departmental Colloquium, Department of Statistics, University of Illinois; Urbana-Champaign, Illinois.
- Cavanaugh, J. E., Wang, Y. and Davis, J. W. (April, 2003). Locally self-similar processes and their wavelet analyses. Departmental Colloquium, Department of Biostatistics, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E., Wang, Y. and Davis, J. W. (April, 2003). Locally self-similar processes and their wavelet analyses. Departmental Colloquium, Department of Mathematics and Statistics, Arizona State University; Tempe, Arizona.
- Cavanaugh, J. E., Wang, Y. and Davis, J. W. (May, 2002). Locally self-similar processes and their wavelet analyses. Departmental Colloquium, Department of Statistics, University of California; Davis, California.
- Cavanaugh, J. E. and Davies, S. L. (April, 2002). Discrepancy-based model selection criteria using cross-validation. Departmental Colloquium, Department of Mathematics and Statistics, University of New Mexico; Albuquerque, New Mexico.
- Cavanaugh, J. E. and Neath, A. A. (November, 2000). A regression model selection criterion based on bootstrap bumping for use with resistant fitting. Departmental Colloquium, Department of Statistics, University of Wyoming; Laramie, Wyoming.
- Cavanaugh, J. E. and Davies, S. L. (May, 2000). Discrepancy-based model selection criteria using cross-validation. Departmental Colloquium, Department of Statistics, Harvard University; Boston, Massachusetts.
- Cavanaugh, J. E. and Neath, A. A. (May, 2000). A regression model selection criterion based on bootstrap bumping for use with resistant fitting. Departmental Colloquium, Department of Mathematics and Statistics, Boston University; Boston, Massachusetts.
- Cavanaugh, J. E. and Shumway, R. H. (April, 1994). A bootstrap variant of AIC for state-space model selection. Departmental Colloquium, Department of Mathematics and Statistics, University of New Mexico; Albuquerque, New Mexico.
- Cavanaugh, J. E. and Shumway, R. H. (March, 1993). A bootstrap variant of AIC for state-space model selection. Departmental Colloquium, Department of Mathematics and Statistics, University of Nebraska; Lincoln, Nebraska.

- Cavanaugh, J. E. and Shumway, R. H. (March, 1993). A bootstrap variant of AIC for state–space model selection. Departmental Colloquium, Department of Mathematics, University of Kansas; Lawrence, Kansas.
- Cavanaugh, J. E. and Shumway, R. H. (March, 1993). A bootstrap variant of AIC for state–space model selection. Departmental Colloquium, Department of Mathematical Sciences, University of Arkansas; Fayetteville, Arkansas.
- Cavanaugh, J. E. and Shumway, R. H. (February, 1993). A bootstrap variant of AIC for state–space model selection. Colloquium, Pacific Northwest National Laboratory; Richland, Washington.
- Cavanaugh, J. E. and Shumway, R. H. (February, 1993). A bootstrap variant of AIC for state–space model selection. Departmental Colloquium, Department of Statistics, University of Missouri; Columbia, Missouri.
- Cavanaugh, J. E. and Shumway, R. H. (February, 1993). A bootstrap variant of AIC for state–space model selection. Colloquium, Los Alamos National Laboratory; Los Alamos, New Mexico.

#### INVITED PRESENTATIONS: HOME INSTITUTION

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- Cavanaugh, J. E. (May, 2014). Occam’s razor and statistical model selection. Seminar in Applied Mathematics and Computational Sciences, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E. (March, 2014). Mixed effects and hierarchical modeling. Seminar in Clinical and Translational Research, Institute for Clinical and Translational Science, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E. (December, 2013). Multivariable modeling. Seminar in Clinical and Translational Research, Institute for Clinical and Translational Science, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E. (February, 2013). Biostatistics and public health. MPH Professional Development Seminar, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E. (February, 2013). Power and sample size assessments / Multiple inference procedures. Seminar in Clinical and Translational Research, Institute for Clinical and Translational Science, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E. (October, 2012). Multivariable modeling. Seminar in Clinical and Translational Research, Institute for Clinical and Translational Science, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E. (October, 2011). Multivariable modeling. Seminar in Clinical and Translational Research, Institute for Clinical and Translational Science, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E. (April, 2010). Multiple comparisons. Seminar in Clinical and Translational Research, Institute for Clinical and Translational Science, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E. (March, 2010). Model selection criteria based on computationally intensive estimators of the expected optimism. Departmental Colloquium, Department of Statistics and Actuarial Sciences, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E. (December, 2009). Careers in Biostatistics. Explorations in Computing, Mathematics, and Science; University of Iowa; Iowa City, Iowa.

- Cavanaugh, J. E. (October, 2009). Multivariable modeling. Seminar in Clinical and Translational Research, Institute for Clinical and Translational Science, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E. (November, 2007). Power and sample size assessments. Seminar in Clinical and Translational Research, Iowa Scholars in Clinical Investigation, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E. (February, 2007). Model selection. Seminar in Clinical Research, Iowa Scholars in Clinical Investigation, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E., Davies, S. L. and Neath, A. A. (November, 2006). Discrepancy-based model selection criteria using cross validation. Departmental Colloquium, Department of Statistics and Actuarial Sciences, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E., Neath, A. A. and Davies, S. L. (October, 2005). An alternate version of the conceptual predictive statistic. Departmental Colloquium, Department of Biostatistics, University of Iowa; Iowa City, Iowa.
- Cavanaugh, J. E. and Neath, A. A. (October, 2000). A regression model selection criterion based on bootstrap bumping for use with resistant fitting. Departmental Colloquium, Department of Statistics, University of Missouri; Columbia, Missouri.
- Cavanaugh, J. E. and Johnson, W. O. (March, 1996). Assessing the predictive influence of cases in a state-space process. Departmental Colloquium, Department of Statistics, University of Missouri; Columbia, Missouri.
- Cavanaugh, J. E., McQuarrie, A. D. R. and Shumway, R. H. (October, 1994). Parametric and nonparametric discriminants for regional earthquakes and explosions. Departmental Colloquium, Department of Statistics, University of Missouri; Columbia, Missouri.

#### CONTRIBUTED PRESENTATIONS: CONFERENCES AND MEETINGS

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- Cavanaugh, J. E., Neath, A. A. and Davies, S. L. (August, 2005). An alternate version of the conceptual predictive statistic. Contributed Paper, 2005 Joint Statistical Meetings; Minneapolis, Minnesota.
- Cavanaugh, J. E., Wang, Y. and Song, C. (August, 2001). Self-similarity index estimation via wavelets for locally self-similar processes. Contributed Paper, 2001 Joint Statistical Meetings; Atlanta, Georgia.
- Cavanaugh, J. E. (August, 1999). Criteria for linear model selection based on Kullback's symmetric divergence. Contributed Paper, 1999 Joint Statistical Meetings; Baltimore, Maryland.
- Cavanaugh, J. E. (July, 1997). A new class of model selection criteria based on Kullback's symmetric divergence. Contributed Paper, 1997 IMS Meetings; Park City, Utah.
- Cavanaugh, J. E. (July, 1997). A new class of model selection criteria based on Kullback's symmetric divergence. Contributed Paper, 1997 IMS New Researchers' Conference, University of Wyoming; Laramie, Wyoming.
- Cavanaugh, J. E. and Johnson, W. O. (May, 1996). Assessing the predictive influence of cases in a state-space process. Contributed Paper, Kullback Memorial Research Conference; Washington, D.C.

- Cavanaugh, J. E. (April, 1996). Estimators of Kullback–Leibler information for time series model selection. Contributed Presentation, Mid–Missouri Conference on Longitudinal Data Analysis, University of Missouri; Columbia, Missouri.
- Cavanaugh, J. E. and Shumway, R. H. (August, 1995). On computing the expected Fisher information matrix for state–space model parameters. Contributed Paper, 1995 Joint Statistical Meetings; Orlando, Florida.
- Cavanaugh, J. E. and Shumway, R. H. (August, 1994). A bootstrap variant of AIC for state–space model selection. Contributed Paper, 1994 Joint Statistical Meetings; Toronto, Canada.

#### AWARDS FOR RESEARCH

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- Recipient of a 2008 SPES Outstanding Presentation Award by the American Statistical Association Section on Physical and Engineering Sciences. Paper: State–space discrimination and clustering of atmospheric time series data based on Kullback information measures (with T. Bengtsson).
- Served as the Eugene Lukacs Visiting Professor of Statistics in the Department of Mathematics and Statistics at Bowling Green State University (March, 2008). (\$2,500 honorarium)
- Recipient of a 2001 SPES Outstanding Presentation Award by the American Statistical Association Section on Physical and Engineering Sciences. Paper: Self–similarity index estimation via wavelets for locally self–similar processes (with Y. Wang and C. Song).
- Recipient of the 2001–2002 Albert Winemiller Prize for Outstanding Developments of New Statistical Methodology for an Applied Setting. Paper: Time series analysis of shapes using the complex normal distribution (with A. Micheas).

#### INVITED PANELS, SPONSORED SYMPOSIA, SPONSORED RESEARCH VISITS

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- In September of 2004, served on an independent expert panel to evaluate organ transplantation simulation models; Chicago, Illinois. Funded by Division of Transplantation, Health Resources and Services Administration, U.S. Department of Health and Human Services.
- In June of 2002, visited the Department of Mathematics and Statistics, University of Cyprus, Nicosia, Cyprus. Funded by the University of Cyprus.
- In June of 1998, attended the Academic Symposium to Evaluate Evidence Regarding the Efficacy of Trauma Systems; Skamania, Washington. Funded by the Department of Surgery, University of Missouri.

#### EXTERNAL RESEARCH SUPPORT: SOLE INVESTIGATOR

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- Recipient of a 3–year grant from the National Science Foundation, Division of Mathematical Sciences (DMS–9704436; PI). Title of proposal: “A New Class of Model Selection Criteria Based on Kullback’s Symmetric Divergence.” Total amount of award: \$70,120. Period of funding: July, 1997, to December, 2000.

## INTERNAL RESEARCH SUPPORT: SOLE INVESTIGATOR

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- Awarded a 1996 Summer Research Fellowship in the amount of \$7,000 from the Research Council of the University of Missouri. Title of proposal: “The EM Algorithm in State–Space Modeling.”
- Awarded a 1994–1995 12–month grant in the amount of \$10,900 from the Research Board of the University of Missouri System. Title of proposal: “New Bootstrap Methodologies for State–Space Modeling.”
- Awarded a 1994 Summer Research Fellowship in the amount of \$4,000 from the Research Council of the University of Missouri. Title of proposal: “New Bootstrap Methodologies for State–Space Modeling.”

## EXTERNAL RESEARCH SUPPORT: COLLABORATIVE

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- Currently funded as a co–investigator on a National Institutes of Health R25 education grant (R25–HL131467). Title of proposal: “Iowa Summer Institute for Research Education in Biostatistics.” PI: Gideon Zamba. Amount of funding: 5% of salary. Period of funding: February, 2016, to January, 2019.
- Currently funded by the Signal Center for Health Innovation, jointly sponsored by the University of Iowa, University of Iowa Health Care, University of Iowa Health Alliance, and University of Iowa Hospitals and Clinics Health Care Information Systems. PI: Patrick Brophy. Project Director: Philip Polgreen. Amount of funding: 10% of salary. Period of funding: January, 2016, to December, 2018.
- Currently funded as a co–investigator on a Centers for Disease Control R49 injury research grant (R49–CE002108). Title of proposal: “Iowa Injury Prevention Research Center.” PI: Corinne Peek–Asa. Amount of funding: 10%–16% of salary. Period of funding: August, 2012, to July, 2017.
- Currently funded as a co–investigator on a CER grant from the Patient–Centered Outcomes Research Institute (PCORI) (CER–1306–02918). Title of proposal: “Evaluation of Parent–Based Interventions to Support Children after Traumatic Injury.” PI: Marizen Ramirez. Amount of funding: 5% of salary. Period of funding: February, 2014, to June, 2018.
- Currently funded as a co–investigator on a National Institutes of Health R56 research project grant (R56–DE012101). Title of proposal: “Fluoride, Dietary, and Other Factors Related to Young Adult Bone Measure and Dental Caries.” PI: Steven Levy. Amount of funding: 3%–10% of salary. Period of funding: September, 2015, to August, 2017.
- Currently funded as a co–investigator on a National Institutes of Health R03 research project grant (R03–DE023784). Title of proposal: “Secondary Analyses of Adolescent Caries, Including Fluoride, Diet and Other Factors.” PI: Steven Levy. Amount of funding: 10% of salary. Period of funding: August, 2014, to July, 2017.
- Funded as a co–investigator on a National Institutes of Health T15 training and career development grant (T15–HL097622). Title of proposal: “Iowa Summer Institute in Biostatistics.” PI: Gideon Zamba. Amount of funding: 4%–8% of salary. Period of funding: March, 2013, to February, 2016.
- Funded as a biostatistician on a U54 specialized center grant from the U.S. Department of Health and Human Services and the Centers for Disease Control (U54–OH007548). Title of proposal: “Great Plains Center for Agricultural Health and Safety.” PI: Renee Anthony. Amount of funding: 2%–12% of salary. Period of funding: March, 2012, to September, 2016.

- Funded as a biostatistician on a U19 multiple project grant from the U.S. Department of Health and Human Services (U19–OH008868). Title of proposal: “Healthier Workforce Center for Excellence.” PI: Diane Rohlman. Amount of funding: 2% of salary. Period of funding: October, 2011, to August, 2016.
- Funded as a co–investigator on a National Institutes of Health R56 research project grant (R56–AG046539). Title of proposal: “Stress and Decision Making in Older Persons: Toward a Neurobehavioral Phenotype.” PI: Natalie Denburg. Amount of funding: 3.5% of salary. Period of funding: July, 2015, to May, 2016.
- Funded as a biostatistician on a grant from the U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality (R18–HS022467). Title of proposal: “Implementation and Effectiveness of a *S. aureus* Surgical Site Infection Prevention Bundle.” PI: Loreen Herwaldt. Amount of funding: 2.5%–5% of salary. Period of funding: April, 2014, to September, 2016.
- Funded as a biostatistician on a National Institutes of Health R01 research project grant (R01–HD065095). Title of proposal: “A Randomized Controlled Trial to Improve Teen Driving.” PI: Corinne Peek–Asa. Amount of funding: 1%–4% of salary. Period of funding: February, 2011, to July, 2016.
- Funded as a co–investigator on a National Institutes of Health U01 research project grant (U01–HL102288). Title of proposal: “Iowa Phase II Clinical Trials of Novel Therapies in Lung Disease.” PI: Lakshmi Durairaj. Amount of funding: 15%–25% of salary. Period of funding: July, 2010, to July, 2015.
- Funded as a biostatistician on a National Institutes of Health Clinical and Translational Research Award (UL1–RR024979). Title of proposal: “UI Clinical and Translational Science Program.” PI: Gary Rosenthal. Amount of funding: 8%–10% of salary. Period of funding: July, 2009, to May, 2014.
- Funded as a biostatistician on a grant from the U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality (HHSA–29020006100021). Title of proposal: “Optimizing Pre–Operative Antibiotic Prophylaxis for Cardiac and Orthopedic Procedures.” PI: Loreen Herwaldt. Amount of funding: 5% of salary. Period of funding: December, 2010, to August, 2013.
- Funded as a biostatistician on a grant from Delta Dental of Iowa. Title of proposal: “Iowa Fluoride Study Age 17 Data Collection.” PI: Steven Levy. Amount of funding: 10% of salary. Period of funding: January, 2011, to December, 2012.
- Funded as a biostatistician on a Centers for Disease Control R49 injury research grant (R49–CD001167). Title of proposal: “Iowa Injury Prevention Research Center.” PI: Corinne Peek–Asa. Amount of funding: 10%–20% of salary. Period of funding: September, 2007, to July, 2012.
- Funded as a co–investigator on a R18 research project grant from the U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality (R18–HS018447). Title of proposal: “A Collaborative Model of Mental Health Care for Older Iowans.” PI: Brian Kaskie. Amount of funding: 10% of salary. Period of funding: September, 2009, to July, 2012.
- Funded as a co–investigator on a National Institutes of Health R01 research project grant (R01–CA122934). Title of proposal: “Elderly Cancer Survivors: Cognitive Outcomes and Markers of Neurodegeneration.” PI: Susan Schultz. Amount of funding: 5% of salary. Period of funding: June, 2007, to April, 2012.

- Funded as a biostatistician on a grant from Pfizer, Inc. Title of proposal: “Optimizing Influenza Surveillance in a Rural State.” PI: Philip Polgreen. Amount of funding: 10% of salary. Period of funding: September, 2008, to June, 2010.
- Funded as a biostatistician on a Centers for Disease Control R49 injury research grant (R49–CE000947). Title of proposal: “Parent–Based Intervention to Increase Safe Teen Driving.” PI: Corinne Peek–Asa. Amount of funding: 5% of salary. Period of funding: September, 2007, to September, 2009.
- Funded as a co–investigator on a National Institutes of Health R01 research project grant (R01–DE009551). Title of proposal: “Longitudinal Study of Fluoride, Diet, Caries and Fluorosis.” PI: Steven Levy. Amount of funding: 10% of salary. Period of funding: July, 2007, to June, 2009.
- Funded as a co–investigator on a Centers for Disease Control R49 injury research grant (R49–CCR721682). Title of proposal: “Iowa Injury Prevention Research Center.” PI: Corinne Peek–Asa. Amount of funding: 20% of salary. Period of funding: January, 2006, to September, 2007.
- Funded as a biostatistician on a National Institutes of Health K30 clinical research curriculum grant (K30–HL04117). Title of proposal: “Graduate Training Program in Clinical Research.” PI: Gary Rosenthal. Amount of funding: 15% of salary. Period of funding: October, 2004, to September, 2007.
- Funded as a co–investigator on a corporate health program contract with United Services Automobile Association. PI: Neal Kohatsu. Amount of funding: 5% of salary. Period of funding: August, 2004, to August, 2007.
- Funded as a biostatistician on a subcontract with the Centers for Disease Control and the Infectious Disease Society of America. Title of subcontract: “The Emerging Infections Network.” PI: Philip Polgreen. Total amount of funding: \$16,000. Funding distributions: June, 2006, and April, 2007.
- Contributed one of five project descriptions to a computing equipment grant proposal submitted to the National Science Foundation by the Department of Statistics, University of Missouri (DMS–9508296; Co–PI). Title of proposal: “Statistics Research Computing Equipment.” Total amount of award: \$60,912. Period of funding: August, 1995, to July, 1997.

#### INTERNAL RESEARCH SUPPORT: COLLABORATIVE

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- With F. T. Wright (PI), awarded a 2004–2005 12–month grant in the amount of \$15,000 from the Research Board of the University of Missouri System. Title of proposal: “Unified Bayesian Order–Restricted Inferences.”

#### GRADUATE ADVISING

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- Have supervised 15 doctoral dissertations: 9 in Biostatistics, 5 in Statistics, and 1 in Applied Mathematical and Computational Sciences.
- Presently serving as doctoral dissertation advisor for 3 students: Benjamin Riedle, Ryan Peterson, and Javier Flores.
- Have supervised 19 master’s preceptorships in Biostatistics and 13 master’s projects in Statistics.



- Have served on 79 doctoral committees and 35 master’s committees, for graduates in Biostatistics, Statistics, Animal Science, Biomedical Engineering, Dentistry, Economics, Educational Measurement and Statistics, Electrical Engineering, Epidemiology, Finance, Fisheries and Wildlife, Mathematics, Occupational and Environmental Health, Pharmacy, Political Science, Psychiatry, and Translational Biomedicine.
- Presently serving on 5 doctoral committees.

## DOCTORAL ADVISEES

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- Nan Hu, Department of Mathematics, Applied Mathematical and Computational Sciences, University of Iowa. Defended July, 2016.
  - Dissertation Title: “A Unified Discrepancy–Based Approach for Balancing Efficiency and Robustness in State–Space Modeling Estimation, Selection, and Diagnosis.”
  - Current Position: Biostatistician, Genentech.
- Fan Tang, Department of Biostatistics, University of Iowa. Defended November, 2015.
  - Dissertation Title: “Structural Time Series Clustering, Modeling, and Forecasting in the State–Space Framework.”
  - Current Position: Biostatistician, Genentech.
- Patrick Ten Eyck, Department of Biostatistics, University of Iowa. Defended July, 2015.
  - Dissertation Title: “Problems in Generalized Linear Model Selection and Predictive Evaluation for Binary Outcomes.”
  - Current Position: Assistant Director for Biostatistics and Research Design, Institute for Clinical and Translational Research, University of Iowa.
- Knute Carter, Department of Biostatistics, University of Iowa. Defended December, 2013.
  - Dissertation Title: “Best–Subset Model Selection Based on Multitudinal Assessments of Likelihood Improvements.”
  - Current Position: Assistant Professor, Department of Biostatistics, Deputy Director, Center for Public Health Statistics, University of Iowa.
- Tao Zhang, Department of Biostatistics, University of Iowa. Defended April, 2013.
  - Dissertation Title: “Discrepancy–Based Algorithms for Best–Subset Model Selection.”
  - Current Position: Senior Biostatistician, Boehringer–Ingelheim.
- Eric D. Foster, Department of Biostatistics, University of Iowa. Defended July, 2012.
  - Dissertation Title: “State Space Time Series Clustering Using Discrepancies Based on the Kullback–Leibler Information and the Mahalanobis Distance.”
  - Current Position: Assistant Professor, Department of Biostatistics, University of Iowa.
- Ming Yang, Department of Biostatistics, University of Iowa. Defended April, 2012. Supervised with Gideon K. D. Zamba.
  - Dissertation Title: “Statistical Models for Count Time Series with Excess Zeros.”
  - Current Position: Biostatistician and Data Scientist, BioStat Studio.

- C. Laura Acion, Department of Biostatistics, University of Iowa. Defended August, 2011.
  - Dissertation Title: “Criteria for Generalized Linear Model Selection Based on Kullback’s Symmetric Divergence.”
  - Current Position: Associate Research Scientist, Department of Psychiatry, University of Iowa.
- JonDavid Sparks, Department of Biostatistics, University of Iowa. Defended October, 2009.
  - Dissertation Title: “Model Selection Criteria in the Presence of Missing Data Based on the Kullback–Leibler Discrepancy.”
  - Current Position: Biostatistician / Senior Research Scientist, Eli Lilly and Company.
- Zugui Zhang, Department of Biostatistics, University of Iowa. Defended June, 2007.
  - Dissertation Title: “Linear Model Selection for Exactly and Nearly Replicated Data Based on Conceptual Predictive Statistics.”
  - Current Position: Lead Biostatistician, Christiana Care Health System.
- Junfeng Shang, Department of Statistics, University of Missouri. Defended July, 2005. Supervised with F. T. Wright.
  - Dissertation Title: “Assessing Predictive Influence, Model Selection, and Bayesian Multiple Comparisons Under Order Restrictions.”
  - Current Position: Associate Professor (Tenured), Bowling Green University.
- J. Wade Davis, Department of Statistics, University of Missouri. Defended July, 2003.
  - Dissertation Title: “Wavelet–Based Methods for Estimation and Discrimination.”
  - Current Position: Head, Computational Genomics, AbbVie.
- Simon L. Davies, Department of Statistics, University of Missouri. Defended July, 2002.
  - Dissertation Title: “Discrepancy–Based Model Selection Criteria Using Cross–Validation.”
  - Current Position: Executive Director, Pfizer.
- Hyun–Joo Kim, Department of Statistics, University of Missouri. Defended July, 2000.
  - Dissertation Title: “Model Selection Criteria Based on Kullback Information Measures for Weibull, Logistic, and Nonlinear Regression Frameworks.”
  - Current Position: Professor (Tenured), Department of Statistics, Truman State University.
- Thomas Bengtsson, Department of Statistics, University of Missouri. Defended April, 2000.
  - Dissertation Title: “Time Series Discrimination, Signal Comparison Testing, and Model Selection in the State–Space Framework.”
  - Current Position: Principal Statistical Scientist, Genentech.

#### MASTER’S PRECEPTORSHIPS DIRECTED

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- “An Analysis of Youth Football Injury Data,” Benjamin N. Riedle, Department of Biostatistics, University of Iowa. Completed April, 2015.
- “A Longitudinal Analysis of the Effect of Long–Term Dosing of Testosterone Cypionate on Body Weight and Lipid Profiles in Healthy Male Volunteers,” Youwei Bi, Department of Biostatistics, University of Iowa. Completed December, 2014.
- “Modeling the Evidence in a Triangle Plot: Informative Dropout and Longitudinal Data,” Anne Welhaven, Department of Biostatistics, University of Iowa. Completed May, 2013.

- “Analysis of Bullying Data from the Iowa Youth Survey Using Generalized Linear Mixed Models,” Patrick Ten Eyck, Department of Biostatistics, University of Iowa. Supervised with Marizen Ramirez. Completed December, 2012.
- “The Public Health Burden of Influenza: Clustering, Modeling, and Predicting Incidence for Diseases Associated with the Flu,” Fan Tang, Department of Biostatistics, University of Iowa. Supervised with Eric Foster. Completed December, 2012.
- “Time Series Modeling and Forecasting of US Lyme Disease Incidence, 1998–2009,” Brett M. Forshey, Department of Biostatistics, University of Iowa. Completed April, 2012.
- “A Case Control Study of *Clostridium Difficile* Risk Factors: The Inferential Consequences of Model Misspecification,” Mitchell Thomann, Department of Biostatistics, University of Iowa. Completed December, 2010.
- “Characterization and Prediction of Mortality from Influenza Using Influenza–Like Illness and Laboratory Culture Data,” Eric D. Foster, Department of Biostatistics, University of Iowa. Completed December, 2009.
- “The Effects of Familial Loading in Bipolar Disorder.” Tao Zhang, Department of Biostatistics, University of Iowa. Supervised with Jess Fiedorowicz. Completed December, 2009.
- “Modeling Zero–Inflated Count Time Series with an Application to Infectious Diseases,” Ming Yang, Department of Biostatistics, University of Iowa. Supervised with Philip Polgreen. Completed May, 2009.
- “Specialty versus General Care for Hospitalized AMI Patients: An Analysis Based on Hierarchical Modeling,” Levent Bayman, Department of Biostatistics, University of Iowa. Supervised with Dawei Liu. Completed May, 2009.
- “Extubation for Ventilated Patients: An Investigation for Better Decision Making,” Amy Johnson, Department of Biostatistics, University of Iowa. Completed April, 2009.
- “A Spatial Analysis of the Iowa Child Passenger Safety Survey Based on Generalized Linear Mixed Models,” Zunqiu Chen, Department of Biostatistics, University of Iowa. Completed April, 2008.
- “A Spatial Analysis of the 2006 Iowa Mumps Epidemic Using Generalized Linear Mixed Models: Were College Students to Blame?,” Lucas Bohnett, Department of Biostatistics, University of Iowa. Supervised with Philip Polgreen. Completed December, 2007.
- “Tooth Loss in the South Australian Dental Longitudinal Study,” Knute Carter, Department of Biostatistics, University of Iowa. Completed December, 2007.
- “Analysis of Iowa Child Passenger Restraint Survey,” Jing Xu, Department of Biostatistics, University of Iowa. Completed May, 2007.
- “Combining Statistical Modeling and Map Analysis in Population Health Research – A Case Study of Infant Mortality in Des Moines, Iowa,” Qiang Cai, Department of Biostatistics, University of Iowa. Completed December, 2006.
- “*Clostridium Difficile*–Associated Disease Among Patients in a Small Rural Hospital,” Laura K. Becker, Department of Biostatistics, University of Iowa. Completed November, 2006.
- “Factors that Affect Retention of Family Practice Physicians in Rural Iowa Communities,” Jaysri Butler, Department of Biostatistics, University of Iowa. Completed April, 2005.

## MASTER'S PROJECTS DIRECTED

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- “A Simulation Study of Population–Averaged Generalized Estimating Equations,” Gerwyn H. Green, Department of Statistics, University of Missouri. Completed March, 2004.
- “A Diagnostic for Assessing the Influence of Cases on the Prediction of Random Effects in a Mixed Model,” Junfeng Shang, Department of Statistics, University of Missouri. Completed April, 2003.
- “An Analysis of Mortality Data by Race and Gender for Boone County, Missouri,” Tamekia L. Jones, Department of Statistics, University of Missouri. Completed December, 2002.
- “Model Selection Criteria Based on Kullback–Leibler Information for Multiple Linear Regression,” Simon L. Davies, Department of Statistics, University of Missouri. Completed August, 2000.
- “Modeling Resource Utilization and Evaluating Injury Severity Scores Based on Missouri Trauma Patient Records,” Gaixin Jiang, Department of Statistics, University of Missouri. Completed April, 2000.
- “An Adaptive, Robust and High Performance Clustering Method,” Xiaohu Li, Department of Statistics, University of Missouri. Completed July, 1999.
- “Trauma Scoring Systems and Their Statistical Evaluation,” Ashley K. Sherman, Department of Statistics, University of Missouri. Completed April, 1999.
- “A Diagnostic for Assessing the Influence of Cases on the Prediction of Missing Data,” Jacob J. Oleson, Department of Statistics, University of Missouri. Completed April, 1999.
- “Time Series Spectral Discriminants Based on Kullback Information Measures (with an Application to Seismology),” Kristin Hedberg, Department of Statistics, University of Missouri. Completed December, 1998.
- “Bootstrap Variants of the Akaike Information Criterion for Model Selection with Applications to Linear Regression,” Hyun–Joo Kim, Department of Statistics, University of Missouri. Completed April, 1998.
- “Internet Accessible Educational Aids for Autoregressive Moving–Average Modeling in Time Series Analysis,” Aaron T. Bono, Department of Statistics, University of Missouri. Completed December, 1997.
- “An Investigation of Lagrange Multiplier Tests for the Interaction Between Autocorrelation and Conditional Heteroscedasticity in an Error Process,” Wei Zhang, Department of Statistics, University of Missouri. Completed December, 1996.
- “The EM Algorithm for Repeated Measures Designs,” Daniel B. Smith, Department of Statistics, University of Missouri. Completed May, 1995.

## PROFESSIONAL ACTIVITIES: INTERNAL

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- Executive Committee member for the College of Public Health, University of Iowa (November, 2014 – present).
- Executive Committee member for the Injury Prevention Research Center, University of Iowa (January, 2006 – present).

- Co-Chair of the Injury and Violence Methods Team for the Injury Prevention Research Center, University of Iowa (June, 2016 – present).
- Faculty mentor for the Iowa Summer Institute in Biostatistics, University of Iowa (summer 2011 – present).
- Member of faculty search committees for the Department of Biostatistics, University of Iowa, for the following academic years: 2003–2004, 2006–2007, 2008–2009, 2011–2012, 2013–2014, 2014–2015, 2016–2017. Serving as co-chair for 2016–2017.
- Member of Ph.D. Comprehensive Examination Committee since 2005. Served as chair in 2014.
- Chair of the Awards Committee, College of Public Health, University of Iowa (2009 – 2015). Committee member from 2004 to 2015.
- Member of the Admissions Committee for the Department of Biostatistics, University of Iowa (2006 – 2015). Served as chair from 2006 to 2012.
- Chair of committee to revise the Ph.D. Comprehensive Examination, Department of Biostatistics, University of Iowa (2012 – 2013).
- Elected member of the Promotion and Tenure Collegiate Consulting Group, College of Public Health, University of Iowa (2010 – 2014).
- Member of the Institute for Clinical and Translational Science, University of Iowa; Biostatistician for the Research Education, Training and Career Development Key Function (July, 2009 – May, 2014).
- Biostatistician for the College of Dentistry, University of Iowa (August, 2005 – June, 2009).
- Associate Director for Biostatistics for the Center on Aging, University of Iowa (November, 2003 – June, 2009).
- Member of the search committee to hire a Departmental Executive Officer for the Department of Community and Behavioral Health, College of Public Health, University of Iowa (2008 – 2009).
- Biostatistician for the Iowa Scholars in Clinical Investigation program at the University of Iowa (October, 2004 – September, 2007).
- Member of an internal College of Public Health review committee to evaluate the Department of Health Management and Policy at the University of Iowa (2005).
- Faculty Advisor to the Statistics Graduate Student Association (SGSA), Department of Statistics, University of Missouri (1995 – 2003).
- Member of the Research Council of the University of Missouri (winter semester, 2003).
- Designed the bachelor's degrees in Applied Statistics at the University of Missouri. (First offered during the 2001 – 2002 academic year.)
- Attended the University of Missouri College of Arts and Science Faculty Retreat on Teaching, April, 1995; Lake of the Ozarks, Missouri.

## PROFESSIONAL ACTIVITIES: EXTERNAL

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- Evaluated promotion and/or tenure cases for faculty candidates at Clemson University (2011, 2016), Columbia University (2001, 2007), Connecticut College (2009), East Tennessee State University (2015), Georgetown University (2014), Montana State University (2010), National Technical University of Athens (2014), New York University (2013), Oregon State University (2016). Pomona College (2011), Southern Illinois University – Edwardsville (2005), University of Buffalo (2011), University of Colorado Denver (2013), University of Cyprus (2013), University of Georgia (2014), University of Kansas (2009, 2011, 2016), University of Maryland Baltimore County (2011, 2014), University of Michigan (2015), University of Missouri (2010), University of New Mexico (2015).
- Mentor for the National Alliance for Doctoral Studies in the Mathematical Sciences (since April, 2015).
- Member of the Spanish National Biostatistics Network (BIOSTATNET) (since September, 2011).
- Served as a reviewer for the Board of Regents, University System of Georgia, to evaluate a proposed doctoral program in Biostatistics at the University of Georgia (February, 2013).
- Served on a three-member advisory committee to the Kansas Board of Regents to evaluate proposed graduate programs in Biostatistics at the University of Kansas (June, 2009).
- Served on Data Safety Monitoring Boards for a multicenter intervention study coordinated at the University of Iowa (2009 – 2013), and for a phase I clinical trial conducted at the University of Kansas (2008 – 2013).
- Participated in the redesign of the Iowa Child Passenger Restraint Survey, conducted by the University of Iowa Injury Prevention Research Center for the Iowa Governor’s Traffic Safety Bureau (2005).
- American Statistical Association representative to the American Academy for the Advancement of Science (Industrial Science and Technology Section) (2002 – 2005).
- Served as a contributed poster judge at the 2003 Joint Statistical Meetings.
- Organized an invited session at the 2002 Joint Statistical Meetings for the Western North American Region of the Biometrics Society. Session theme: Biometrical Applications of Modern Time Series Methodologies.
- President (2000 – 2002) and Treasurer (1995 – 2000, 2003) of the Mid-Missouri Chapter of the American Statistical Association.

## EDITORIAL ACTIVITIES

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- Associate Editor for *The American Statistician* (since June, 2011) and the *Journal of Forecasting* (since October, 1999)
- Served two consecutive three-year terms as an Associate Editor for the Reviews Section of the *Journal of the American Statistical Association* and *The American Statistician* (January, 2005 – December, 2010).

- Referee for *Afrika Statistika*, *The American Statistician*, *Annals of the Institute for Statistical Mathematics*, *Atmospheric Environment*, *Australian and New Zealand Journal of Statistics*, *Automatica*, *Bayesian Analysis*, *Bernoulli*, *Biometrics*, *Canadian Journal of Statistics*, *Circulation*, *Communications in Statistics – Theory and Methods*, *Computational Statistics*, *Computational Statistics and Data Analysis*, *Epidemiology and Infection*, *Geophysical Research Letters*, *IEEE Transactions on Information Theory*, *IEEE Transactions on Neural Networks*, *IEEE Transactions on Reliability*, *IEEE Transactions on Signal Processing*, *IEEE Transactions of Systems and Circuits I*, *Johns Hopkins APL Technical Digest*, *Journal of the American Statistical Association*, *Journal of Applied Meteorology and Climatology*, *Journal of Computational and Graphical Statistics*, *Journal of Forecasting*, *Journal of Multivariate Analysis*, *Journal of Nonparametric Statistics*, *Journal of Statistical Computation and Simulation*, *Journal of Statistical Planning and Inference*, *Journal of Time Series Analysis*, *Metrika*, *Psychometrika*, *Scandinavian Journal of Statistics*, *Signal Processing*, *South African Statistical Journal*, *Statistica Neerlandica*, *Statistica Sinica*, *Statistical Modelling*, *Statistics*, *Statistics & Probability Letters*, *Statistics in Medicine*, *Statistics Surveys*, *Stochastic Environmental Research & Risk Assessment*, *Technometrics*, and the collections *Modeling and Prediction: Honoring Seymour Geisser*, *Statistical Methods for Modeling Human Dynamics: An Interdisciplinary Dialogue*, *Statistical Models and Methods for Biomedical and Technical Systems*.
- Chosen as an “Outstanding Reviewer” for 1999 by the editorial board of *Automatica*.
- Reviewer for grant proposals submitted to the National Science Foundation, National Security Agency, the University of Iowa College of Public Health / College of Medicine New Investigator Program, the University of Missouri Research Board, and the Professional Staff Congress – City University of New York Research Award Program.
- Reviewer for *Advanced Linear Modeling (Second Edition)* by Ronald Christensen (2001; Springer, New York).

## PROFESSIONAL SOCIETIES

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- American Statistical Association
- Institute of Mathematical Statistics
- International Biometric Society