

Exponent®
Engineering & Scientific Consulting

Duane Steffey, Ph.D.

Principal Scientist | Computer, Data & Security Sciences
Menlo Park
+1-650-688-7262 | dsteffey@exponent.com

Professional Profile

Dr. Steffey's experience as a consulting statistician spans more than 30 years and a breadth of applications in engineering, health, environmental science, and civil justice. His expertise includes the statistical design and analysis of studies to evaluate the performance of products during development, manufacturing, and in-service use by customers.

Dr. Steffey has evaluated issues related to construction materials (concrete, doors, windows), consumer electronics (computers, phones), drug delivery systems (syringes, transdermal patches), home appliances (dishwashers, refrigerators), industrial tools, medical devices (joint implants, stents), motor vehicles, pharmaceuticals, recreational and sports equipment. His investigations have involved data from engineering and scientific experiments, sample surveys, observational studies, and a variety of administrative record sources: accident and injury databases, complaints, field returns, quality audits, replacement part sales, warranty claims.

Dr. Steffey has also applied statistical concepts and methods in evaluating issues arising from actions, events, processes, products, or services affecting relationships between businesses and consumers, employees, other companies or individuals, government agencies, and the environment (including contracts, patents, and regulations).

As a tenured professor of statistics at San Diego State University, Dr. Steffey co-founded and co-directed the university's statistical consulting center. He held a prior appointment at the National Research Council, where he directed studies for federal government clients on census methodology and the testing and evaluation of military systems. He was also previously employed in the risk assessment group at Westinghouse Electric Corporation, where he was engaged in conducting probabilistic safety studies for the commercial nuclear energy industry. Dr. Steffey is an elected Fellow of the American Statistical Association.

Academic Credentials & Professional Honors

Ph.D., Statistics, Carnegie Mellon University, 1988

M.S., Statistics, Carnegie Mellon University, 1984

B.S., History/Mathematics, Carnegie Mellon University, 1981

Elected Member, International Statistical Institute, 2015

Fellow, American Statistical Association, 2009

Travel Award for Topic Contributed Session, Section on Statistical Consulting, American Statistical

Association, 2008

Chapter Service Recognition Award, American Statistical Association, 2005

Staff Award, Commission on Behavioral and Social Sciences and Education, National Research Council, 1995

Nominee, Timeos Award for University Teaching, San Diego State University, 1990

Summer Faculty Research Fellowship, San Diego State University, 1990

National Merit Scholarship, Carnegie Mellon University, 1977-1981

Prior Experience

Professor, Department of Mathematics and Statistics, San Diego State University, 2003-2006

Associate Professor, Department of Mathematics and Statistics, San Diego State University, 1993-2003

Instructor and Visiting Scholar, Division of Statistics, University of California, Davis, Summer/Fall 1998

Study Director, Committee on National Statistics, National Research Council, 1992-1995

Adjunct Assistant Professor, Graduate School of Public Health, San Diego State University, 1989-1992

Assistant Professor, Department of Mathematical Sciences, San Diego State University, 1988-1993

Associate Scientist, Probabilistic Risk Assessment Group, Westinghouse Electric Corporation, 1981-1983

Professional Affiliations

American Statistical Association (Fellow)

International Statistical Institute (Elected Member)

Institute of Mathematical Statistics (Member)

Society for Risk Analysis (Member)

Member, Fellows Committee, ASA Section on Statistical Consulting (2021-2023)

Associate Chair, Program Committee, Joint Statistical Meetings (2018-2019)

ASA Committee on Professional Ethics (2013-2018)

Nominations Committee Member, ASA Section on Statistics in Defense and National Security (2015-2017)

Editorial Board, CHANCE Magazine (2006-2013)

ASA Working Group on Visibility and Impact in Policy Making (2010)

Program Chair, ASA Section on Risk Analysis (2006-2007)

ASA Council of Chapters Governing Board: Vice-Chair, District 6 (2008-2010); Member, Nominations

Committee (2001-2003)

President, San Diego Chapter, American Statistical Association (1999-2003)

Publications

Zhao K, Steffey D. Statistical design of accelerated fatigue life tests for qualification. Proceedings, 65th Annual Reliability and Maintainability Symposium, Preprint, CD-ROM, 2019.

Hogan H, Steffey D. Professional ethics for statisticians: An ASA organizational history. JSM Proceedings, Committee on ASA Archives and Historical Materials. American Statistical Association, Alexandria, VA, 2014; 1397-1404.

Zhao K, Steffey D. Practical applications of mixture models to complex time-to-failure data. Proceedings, 59th Annual Reliability and Maintainability Symposium, Preprint, CD-ROM, 2013.

Steffey D, Uriz P, Osteraas J. Using ASTM E1155 to determine finished floor quality: Minimum sampling requirements used to establish compliant floor flatness and levelness. Proceedings, 6th Congress on Forensic Engineering, San Francisco, CA, October 31, 2012.

Groothuis JR, Fryzek JP, Makari D, Steffey D, Martone WJ. Respiratory syncytial virus hospitalization trends in infants with chronic lung disease of infancy, 1998-2008. Clinical Epidemiology, 2011; 3:245-250.

Zhao K, Steffey D, Loud J. Incorporating product retirement in field performance reliability analysis. Proceedings, 56th Annual Reliability and Maintainability Symposium, Preprint, CD-ROM, 2010.

Steffey D, Ostarello A, Clevenger J, Villarraga, M. Troubleshooting analyses of production data. International Journal of Industrial Engineering 2009; 16:206-213.

Zhao K, Steffey D. Analysis of field performance using interval-censored incident data. Proceedings, 55th Annual Reliability and Maintainability Symposium, Preprint, CD-ROM, 2009.

Eiselstein L, Steffey D, Nissan A, Corlett N, Dugnani R, Kus E, Stewart S. Acceptance criteria for corrosion resistance of medical devices: Statistical analysis of nitinol pitting in in vivo environments. Proceedings, International Conference on Shape Memory and Superelastic Technologies, SMST-2008, pp. 768-780, Stresa, Italy, September 21-25, 2008.

Khanna AJ, Lee S, Villarraga M, Gimbel J, Steffey D, Schwardt J. Biomechanical evaluation of kyphoplasty with calcium phosphate cement in a 2FSU Vertebral Compression Fracture Model. Spine J 2008; 8:770-777.

Eiselstein LE, Steffey D, Corlett N, Nissan A. Toward an acceptance criterion for the corrosion resistance of medical devices: A statistical study of the pitting susceptibility of nitinol. Proceedings, International Conference on Shape Memory and Superelastic Technologies, SMST-2007, pp. 279-290, Tsukuba City, Japan, December 3-5, 2007.

Nissan A, Eiselstein LE, Steffey D, Corlett N. Effects of long-term immersion on the pitting corrosion resistance of nitinol. Proceedings, International Conference on Shape Memory and Superelastic Technologies, SMST-2007, pp. 271-278, Tsukuba City, Japan, December 3-5, 2007.

Villarraga ML, Cripton PA, Teti SD, Steffey DL, Krisnamuthy S, Albert T, Hilibrand A, Vaccaro A. Wear and corrosion evaluation in retrieved thoraco-lumbar internal fixation. Spine 2006; 31:2454-2462.

Steffey DL, Fienberg SE, Sturgess RH. Statistical assessment of damages in breach of contract litigation. Jurimetrics 2006; 46:129-138.

Richards D, Carhart M, Raasch C, Pierce J, Ostarello A, Steffey D. Incidence of thoracic and lumbar injuries for restrained occupants in frontal collisions. 50th Annual Proceedings, Association for the Advancement of Automotive Medicine, 2006.

Gloeckner DC, Moore TLA, Steffey D, Le-Resnick H, Bare C, Corrigan CF. Implications of vehicle roll direction on occupant ejection and injury risk. 50th Annual Proceedings, Association for the Advancement of Automotive Medicine, 2006.

Moore TLA, Vijayakumar V, Steffey DL, Ramachandran K, Corrigan CF. Biomechanical factors and injury risk in high-severity rollovers. 49th Annual Proceedings of the Association for the Advancement of Automotive Medicine 2005; 133-150.

Dungan JL, Steffey DL. Measurement uncertainty in spectral indices from field spectroradiometers. Eos Trans. American Geophysical Union 2003; 84:46.

Supernak J, Kaschade C, Steffey D. Dynamic value pricing on I-15 in San Diego: Impact on travel time and its reliability. Transportation Research Record 2003; 1839:45-54.

Supernak J, Steffey D, Kaschade C. Dynamic value pricing as an instrument of better utilization of HOT lanes: The San Diego I-15 case. Transportation Research Record 2003; 1839:55-64.

Steffey D, Supernak J, Kaschade C. San Diego's I-15 value pricing project: Impact on local businesses. Public Works Management and Policy 2003; 8:99-110.

Supernak J, Golob JM, Golob TF, Kaschade C, Kazimi C, Schreffler EN, Steffey D. San Diego's I-15 congestion pricing: traffic-related issues. Transportation Research Record 2002; 1812:43-52.

Supernak J, Golob JM, Golob TF, Kaschade C, Kazimi C, Schreffler EN, Steffey D. San Diego's I-15 congestion pricing: attitudinal, behavioral, and institutional issues. Transportation Research Record 2002; 1812:78-86.

Supernak J, Kaschade C, Steffey D. Factors affecting housing choices in San Diego: Impact of the I-15 congestion pricing project. 80th Annual Meeting, Transportation Research Board, Preprint, CD-ROM, 2001.

Anderson M, Daponte BO, Fienberg SE, Kadane JB, Spencer BD, Steffey DL. Sampling-based adjustment of the 2000 census—A balanced perspective. Jurimetrics 2000; 40:341-356.

Supernak J, Steffey D, Higgins TJ, Kaschade C, Kawada K. San Diego's I-15 congestion pricing project: Impact on local businesses. 79th Annual Meeting, Transportation Research Board, Preprint, CD-ROM, 2000.

Supernak J, Kaschade C, Steffey D, Kawada K, Higgins TJ. San Diego's I-15 congestion pricing project: Impact on local housing choices. 79th Annual Meeting, Transportation Research Board, Preprint, CD-ROM, 2000.

Lui K-J, Steffey D. A note on the application of simple linear regression methods for trend detection at multiple sites and visits. Statistics in Medicine 1993; 12:1125-1139.

Lui K-J, Steffey D, Pugh JK. Sample size determination for grouped exponential observations: A cost function approach. Biometrical Journal 1993; 35:677-688.

Huntley D, Nommensen R, Steffey D. The use of specific capacity to assess transmissivity in fractured-rock aquifers. Journal of Ground Water 1992; 30:396-402.

Steffey D. Hierarchical Bayesian Modeling with elicited prior information. Communications in statistics—

Theory and methods 1992; 21:799-821.

Steffey D, Kass RE. Comment on Robinson, G.K., "That BLUP is a Good Thing—The Estimation of Random Effects. Statistical Science 1991; 6:45-47.

Kass RE, Steffey D. Approximate Bayesian inference in conditionally independent hierarchical models (Parametric Empirical Bayes Models). Journal of the American Statistical Association 1989; 84:717-726.

Modell J, Steffey D. Waging war and marriage: Military service and family formation, 1940-1950. Journal of Family History 1988; 13:195-218.

Books and Book Chapters

Steffey DL. Leadership in statistical consulting. pp. 145-160. In: Leadership and Women in Statistics. Golbeck AL, Olkin I, and Gel YR (eds), CRC Press, Boca Raton, FL, 2015.

Steffey DL. Risk management of construction defects. Pp. 1553-1556. In: Encyclopedia of Quantitative Risk Analysis and Assessment. Melnick E and Everitt B (eds), John Wiley & Sons Ltd, Chichester, UK, 2008.

Iyer M, Zhao K, Steffey DL. Managing risks of consumer products. pp. 1040-1044. In: Encyclopedia of Quantitative Risk Analysis and Assessment. Melnick E and Everitt B (eds), John Wiley & Sons Ltd, Chichester, UK, 2008.

Steffey DL. Homeland security and transportation risk. pp. 830-838. In: Encyclopedia of Quantitative Risk Analysis and Assessment. Melnick E and Everitt B (eds), John Wiley & Sons Ltd, Chichester, UK, 2008.

DeVito P, Bryant L, Carswell CM, Donahue M, Fabrizio L, Gamache L, Herrmann D, Qualls A, Reckase M, Steffey D. NAEP reporting practices: Investigating District-Level and Market-Basket reporting. National Academy Press, Washington, DC, 2001.

Steffey DL, Samaniego FJ, Tran H. Hierarchical Bayesian inference in related reliability experiments. In: Recent Advances in Reliability Theory: Methodology, Practice, and Inference. Limnios N and Nikulin M (eds), Birkhauser, Boston, MA, 2000.

DeVito P, Bryant L, Carswell CM, Donahue M, Fabrizio L, Gamache L, Herrmann D, Qualls A, Reckase M, Steffey D. Designing a Market Basket for NAEP: Summary of a workshop. National Academy Press, Washington, DC, 2000.

DeVito P, Bryant L, Carswell CM, Donahue M, Fabrizio L, Gamache L, Herrmann D, Qualls A, Reckase M, Steffey D. Reporting district-level NAEP data: Summary of a workshop. National Academy Press, Washington, DC, 2000.

Cohen ML, Rolph JE, Steffey DL (eds). Statistics, testing, and defense acquisition: Background papers. National Academy Press, Washington, DC, 1999.

Cohen ML, Rolph JE, Steffey DL (eds). Statistics, testing, and defense acquisition: New approaches and methodological improvements. National Academy Press, Washington, DC, 1998.

Cohen ML, Rolph JE, Steffey DL (eds). Statistical methods for testing and evaluating defense systems. National Academy Press, Washington, DC, 1995.

Steffey DL, Bradburn NM (eds). Counting people in the information age. National Academy Press, Washington, DC, 1994.

Rolph JE, Steffey DL (eds). Statistical issues in defense analysis and testing: summary of a workshop.

National Academy Press, Washington, DC, 1994.

Steffey DL, Bradburn NM (eds). A census that mirrors America. National Academy Press, Washington, DC, 1993.

Selected Presentations

Steffey D. Current and future opportunities for industrial statisticians. ASA/ASQ Fall Technical Conference, San Antonio, TX, October 18, 2013.

Steffey D. Preparing statistics students for careers in industry. ASA Workshop for Academic Department Chairs, San Diego, CA, July 28, 2012.

Steffey D. Statistical issues in the product life cycle of implantable medical devices. Conference on Statistical Practice, American Statistical Association, Orlando, FL, February 17, 2012.

Lau EL, Legg JC, Watson HN, Steffey DL, Mowat FS, Kelsh MK. The problem of missing data: using imputation methods to facilitate oncology outcomes research. 27th International Conference on Pharmacoepidemiology and Therapeutic Risk Management, August 17, 2011.

Steffey D. Statistics in the courtroom: concepts and applications. Annual Meeting, Federation of Defense and Corporate Counsel, Williamsburg, VA, July 27, 2011.

Steffey D, Watson H. Statistical assessment of injury diagnosis and causation. 8th International Conference on Forensic Statistics, Seattle, WA, July 21, 2011.

Steffey D. Improving the practice of statistics in the Department of Defense. Joint Statistical Meetings, Vancouver, BC, August 1-5, 2010.

Steffey D. Expanding the role of statistical science in defense and national security. Joint Statistical Meetings, Washington, DC, August 2-6, 2009.

Steffey D. Exposure to risk from motor vehicles and other consumer products. Joint Statistical Meetings, Denver, CO, August 3-7, 2008.

Steffey D. Overarching issues in risk analysis. Joint Statistical Meetings, Salt Lake City, UT, July 29-August 2, 2007.

Ostarello A, Steffey D. Estimating taint in a population of insurance claims. Joint Statistical Meetings, Salt Lake City, UT, July 29-August 2, 2007.

Zhao K, Steffey D. To recall or not to recall? Statistical Assessment of Consumer Product Failure Risk. Joint Statistical Meetings, Salt Lake City, UT, July 29-August 2, 2007.

Steffey D. Interesting times and opportunities for statisticians in academia, industry and government. Keynote Address, Statistical Careers Day, San Diego Chapter, American Statistical Association, San Diego, CA, May 5, 2007.

Steffey D. Sequential test designs for estimation of extreme quantiles. EURANDOM, Workshop on Mathematical Methodologies for Operational Risk, Eindhoven, The Netherlands, April 16-18, 2007.

Steffey D, Bove R, Fisher J, Cicarelli L, Cargill R, Moore TLA. Characterization of occupant anthropometry and clearance measures in passenger cars. Joint Statistical Meetings, Seattle, WA, August 6-10, 2006.

Hood R, Steffey D. The role of statistical science in construction defect litigation. Defense Research Institute, 10th Annual Meeting, Chicago, IL, October 21, 2005.

Steffey D, Zhao K, Grossman H, Le-Resnick H. Vehicle rollover risk analysis: Metrics and methods. Joint Statistical Meetings, Minneapolis, MN, August 9, 2005.

Steffey DL, Fienberg SE, Sturgess RH. Statistical assessment of damages in breach of contract litigation. 6th International Conference on Forensic Statistics, Tempe, AZ, March 18, 2005.

Steffey D, Kelly C. Statistical consulting at SDSU: Meeting the needs of students and clients. 5th Annual Workshop on Statistical Consulting and Collaboration, Claremont, CA, November 15, 2003.

Singh S, Steffey D. Statistical modeling of individual trip frequency using household surveys of travel behavior. Joint Statistical Meetings, San Francisco, CA, August 4, 2003.

Shcherbak OV, Steffey D. Predictive modeling of bank portfolio data on home equity products. Joint Statistical Meetings, San Francisco, CA, August 3, 2003.

Steffey D. Hierarchical space-time models in environmental and ecological applications. 4th Annual Environmental Science Conference, CEA-CREST, Pasadena, CA, May 30-31, 2003.

Steffey D, Kazimi C, Supernak J, Kaschade C. assessing air quality along San Diego's I-15 traffic corridor: Statistical methods for uncertainty analysis. Joint Statistical Meetings, New York, NY, August 15, 2002.

Steffey D. Design, measurement, and analysis of traffic studies: recent issues and reflections from the I-15 congestion pricing project. 80th Annual Meeting, Transportation Research Board, Washington, DC, January 10, 2001.

Steffey DL, Samaniego FJ, Tran H. Hierarchical Bayesian inference in related reliability experiments. 2nd International Conference on Mathematical Methods in Reliability, Bordeaux, France, July 6, 2000.

Steffey D. Statistics, testing, and defense acquisition. ITEA International Symposium, Albuquerque, NM, September 23, 1998.

Steffey D. Counting people in the information age. Council of Professional Associations on Federal Statistics, Washington, DC, December 1994.

Project Experience

Construction

Highway: Investigated a claim involving an asphalt contractor and a state department of transportation. Found that sampling of constructed highway was inadequate to judge compliance with contract specifications.

Residential: Analyzed data collected from inspected and tested homes in a large community. Found that inspected homes with visual evidence of distress were overrepresented in the sample of homes selected for subsequent destructive testing, leading to overstatement of the prevalence of construction defects in the community.

Consumer

Marketing Research: Developed methodology to quantify uncertainty in client's proprietary metrics for estimating effectiveness of different marketing campaigns for various products.

Telecommunication Services: Analyzed company's prices and packages, as well as customer data to characterize distribution of services purchased and assess variation in billing practices.

Employment

Meals and Breaks: Evaluated survey research methods used in estimating economic value of meal and break periods for a class of employees. Found that estimates were affected by numerous sources of bias in sample selection, population coverage, and survey non-response, as well as sources of error in responses to individual questionnaire items.

Wage and Hour: Designed, implemented, and analyzed a sample of employee time records to estimate variation of actual hours from budgeted hours for the purpose of assessing eligibility for overtime compensation.

Insurance

Motor Vehicle: Analyzed labor rate survey data to evaluate company's practices for reimbursement of claimed repair costs.

Worker's Compensation: Designed, implemented, and analyzed results from a sample audit of claims to estimate total economic damages in claim population.

Product Development

Medical Diagnostics: Analyzed client's biomarker data to assist in developing effective rules for distinguishing different medical conditions presenting similar clinical symptoms.

Qualification Testing: Designed and analyzed results from accelerated tests to characterize stress-life relationship and estimate performance of client product under in use conditions.

Product Manufacturing

Acceptance Sampling: Evaluated historical quality control records to assess degree of compliance with best statistical practices for inspection of finished goods in factory operations.

Troubleshooting Analyses of Production Data: Analyzed output data on manufactured lots, input data on raw materials, and intermediate data on process characteristics to identify factors associated with unacceptable variation in end-of-line outcomes.

Product Reliability and Safety

Recall Investigations: Analyzed field data on incidents and at-risk units to estimate level of and trends in product performance. Identified specific models, production time periods, and manufacturing locations with significantly different end-customer experience.

Comparative Risk Analysis: Evaluated in-use performance of manufacturer-specific products relative to in-use performance of industry products.