Paul H. Kvam

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EDUCATION

Ph.D., Statistics, University of California, Davis	1991
M.S., Statistics, University of Florida	1986
B.S., Mathematics, Iowa State University	1984

EXPERIENCE

Full Professor, Department of Mathematics & Computer Science, University of Richmond, Richmond, VA 2014 – present.

Full Professor, H. Milton Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA. 2006 - 2014.

Associate Chair for Graduate Studies, H. Milton Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA. 2011 - 2013.

Associate Professor, School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA. 2001 - 2006.

Assistant Professor, School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA. 1995 - 2001.

Ph.D. Staff Scientist, Los Alamos National Laboratory, Los Alamos, NM, 1991 - 1995.

Post-graduate Researcher, Office of AIDS, Department of Health, State of California, Sacramento, CA, 1991.

ACADEMIC SUBJECTS TAUGHT

Bayesian Statistics, Computational Statistics, Design & Analysis of Experiments, Introduction to Data Science, Introductory Probability and Statistics, Linear Models, Modeling in Industrial Engineering, Multivariate Statistics, Nonparametric Statistics, Probability, Quality Control, Regression Analysis, Reliability Engineering, Reliability Theory, Statistical Theory and Methods, Stochastic Processes.

COURSES TAUGHT AT UNIVERSITY OF RICHMOND

Math 119 *Statistics for the Social & Life Sciences*
Math 209 *Introduction to Statistical Modeling*
Math 289 *Introduction to Data Science*
Math 329 *Probability*
Math 330 *Mathematical Statistics*
Math 340 Independent Study: Stochastic Processes, Nonparametric Statistics, Linear Models, Bayesian Methods

PROFESSIONAL AWARDS AND SERVICE

Fellow   American Statistical Association, 2006
Elected Member   International Statistics Institute, 2016
Associate Editor   *Journal of the American Statistical Association*, 2002 - 2011.
Associate Editor   *The American Statistician*, 2005 – 2012, 2015 – present.
Associate Editor   *Journal of Quality Technology*, 2009 - 2012.
Associate Editor   *Technometrics*, 1999 - 2005.
Associate Editor   *IEEE Transactions on Reliability*, 1992 - 2000.
Associate Editor   *International Journal of Quality, Statistics & Reliability*, 2007 - 2009.
Frank Wilcoxan Prize   For best application paper appearing in *Technometrics*, 1997.

TEACHING EXPERIENCE & ACHIEVEMENTS

Participant, Mathematics for Social Justice Workshop, 5/20-21/16, Orlando, FL
Participant, UR Workshop: Future of UR Academic Program, 5/9/16
Participant, UR Workshop: TechVision 2015 (Technology in the classroom)
Diversity Advocate Training, UR: August 2015
Participant, UR Workshop: Blackboard Grade Center & Assessments
Georgia Tech Center for the Enhancement of Teaching and Learning "Thank a Teacher" Award: 2007, 2008, 2009, 2010, 2011, 2013
Georgia Tech Class of 1934 Course Survey Teaching Effectiveness Award: 2011
Participant, Teaching Technology Workshop, February 11, 2012
Chancellor Award, 1997 Georgia Council for the International Education's Faculty Dev. Program.
Participant, National Effective Teaching Institute, Annual Conference of the American Society for Engineering Education, June 12 - 14, 1997.
Teaching Fellow, Georgia Tech Class of 1969 Teaching Fellows Program, 1996-1997.

BOOKS PUBLISHED

Basic Statistical Tools for Improving Quality   **2012**
            with Chang-Wook Kang, Wiley Press.

Nonparametric Statistics with Applications in Science and Engineering   **2008**
            with B. Vidakovic, Wiley Press.

REFEREED JOURNAL PUBLICATIONS

1. "The Price is Right: Analyzing Bidding Behavior on Contestants' Row" (2020) *The American Statistician*, TBA

2. "Critical Fault-Detecting Time Evaluation in Software with Discrete Compound Poisson Models" (2019) with M.-H. Shieh and S.-L. Jeng, *Journal of Quality Technology*, DOI: 10.1080 / 00224065.2018.1545494

3. "Demonstrating the Consequences of Quota Sampling in Graduate Student Admissions" (2019) *Chance*, Vol. 31, No. 5.

4. A Probability Model for Strategic Bidding on the Price is Right" (2018) *Decision Analysis*, 5 (14), 195-207.

5. "A Comprehensive Analysis of Team Streakiness in Major League Baseball: 1962-2016" (2017) with Z. Chen, *Baseball Research Journal*, 46 (2), 112-115.

6. "On Data Depth and the Application of Nonparametric Multivariate Statistical Process Control Charts" (2016) with S. J. Bae and G. Do, *Applied Stochastic Models in Business and Industry*, 5, 660 – 676.

7. "Remaining Useful Lifetime Prediction Based on the Damage-marker Bivariate Degradation Model: A case study on lithium-ion batteries used in electric vehicles" (2016) with J. Feng, Y. Tang. *Engineering Failure Analysis*, 70, 323-342.

8. "Discussion of Stochastic Modeling and Analysis of Degradation for Highly Reliable Products" (2015) with S. J. Bae, *Applied Stochastic Models in Business and Industry*, 31, 33 - 34.

9. "A superposed log-linear failure intensity model for repairable artillery systems" (2013) with S. J. Bae and B. M. Mun, *Journal of Quality Technology*, 45, 110-115.

10. "Stress-Lifetime Joint Distribution Model for Performance Degradation Failure" (2012) with Tang, Y., Sun, Q., and Feng, J., *Information*, vol. 15, No. 12, 5839-5846.

11. "Ordering Quantity Decisions Considering Uncertainty in Supply-Chain Logistics Operations" (2011) with H. T. Kim, J.-C. Lu and Y. -C. Tsao, *International Journal of Production Economics*, Vol. 134, 16 - 27.

12. "Multi-cause degradation path model: A case study on rubidium lamp degradation" (2011) with S. Quan, *Journal of Quality and Reliability Engineering International*, Vol. 27, No. 3.

13. "Comparing Hall of Fame Baseball Players Using Most Valuable Player Ranks" (2011), *Journal of Quantitative Analysis in Sports*, Vol. 7, Issue 3, 1 – 22.

14. "Adjusted Empirical Likelihood Models with Estimating Equations for Accelerated Life Tests" (2011) with J.-C. Lu, N. Wang and D. Chen. *Journal of Statistical Planning and Inference*, Vol. 141, 140-155.

15. "Adjusted Hazard Rate Estimator Based on a Known Censoring Probability" (2011) with Ulku Gurler. *Communications in Statistics - Theory and Methods*, Vol. 40, Issue 24.

16. "Electoral voting and population distribution in the United States" (2010), *Chance*, Vol. 23, No. 1, 41-47.

17. "Extending the Skill Test for Disease Diagnosis" with S. C. Lin and J.-C. Lu (2009), *Statistics in Medicine*, Vol. 29, 798 – 813.

18. "Length Bias in the Measurements of Carbon Nanotubes" (2008), *Technometrics,* Vol. 50, No.4: 553 – 557.

19. "Statistical Models for Hot Electron Degradation in Nano-Scaled MOSFET Devices" (2007) with S. J. Bae, S.-J. Kim and W. Kuo. *IEEE Transactions on Reliability*. Vol. 56, 392 – 400.

20. "Detection and Estimation of a Mixture in a Power Law Process for a Repairable System" (2007) with J.-C. Lu and Ni Wang, *Journal of Quality Technology*. Vol. 39, 140 – 150.

21. "A Conversation with Harry Martz" (2007). *Statistical Scienc*e. Vol. 21, 578 – 585.

22. "Degradation models and implied lifetime distributions" (2007) with S. J. Bae and W. Kuo. *Reliability Engineering and System Safety*. Vol. 92, 601 – 608.

23. "Reliability Modeling in Spatially Distributed Logistics Systems" (2006) with J.-C. Lu and N. Wang, *IEEE Transactions on Reliability*. Vol. 55, No. 3, 525 – 534.

24. "A Logistic Regression/Markov Chain Model For NCAA Basketball" (2006) with J. Sokol, *Naval Research Logistics*. Vol. 53, 788 – 803.

25. "A change point degradation model for manufacturing based on incomplete burn-in" (2006) with S. J. Bae, *IIE Transactions*. Vol. 38, 489-498.

26. "Teaching statistics with sports examples" (2005) with J. Sokol, *INFORMS Transactions on Education*, Vol. 5, 75 – 86.

27. "Estimating load-sharing properties in a dynamic reliability system" (2005) with E. A. Peña, *Journal of the American Statistical Association*, 100, No. 469, 262 – 272.

28. "A nonlinear random coefficients model for degradation testing" (2004) with S. J. Bae, *Technometrics*, 46, No. 4, 460 – 469.

29. "Reliability estimation based on system data with an unknown load share rule" (2004) with H. Kim. *Lifetime Data Analysis*, 10, 83 – 94.

30. "Error Bars in Intensity and Phase Measurements of Ultra-short Laser Pulses" (2004) with Z. Wang, E. Zeek, R. Trebino, *Journal of the Optical Society of America*, 20, No. 11, 2400 – 2408.

31. "Ranked set sampling based on binary water quality data with covariates" (2003), *Journal of Agricultural, Biological and Environmental Science*, Vol. 8, No. 3, 1 – 9.

32. "Beyond error bars: Understanding uncertainty in ultrashort-pulse frequency-resolved-optical-gating measurements in the presence of ambiguity" (2003) with Z. Wang, E. Zeek, R. Trebino, *Optics Express*, Vol. 11, Issue 26, 3518 – 3524.

33. "Nonparametric estimation of a distribution subject to stochastic precedence" (2002) with M. A. Arcones and F. J. Samaniego. *Journal of the American Statistical Association*, Vol. 97, No. 457, 170 – 182.

34. "Estimating distributions with increasing failure rate in an imperfect repair model" (2002) with L. R. Whitaker and H. Singh, *Lifetime Data Analysis*, Vol. 8, No. 1, 53 – 69.

35. "Common cause failure prediction using data mapping" (2002) with J. G. Miller, *Reliability Engineering & System Safety*, Vol. 76, No. 3, 273 – 278.

36. "Discrete predictive analysis in probabilistic safety assessment" (2002) with J. G. Miller, *Journal of Quality Technology*, Vol. 34, No. 1, 105 – 116.

37. "Measuring the seat of the pants: Commercial airline pilot turbulence assessments in a full motion simulator" (2002) with E. J. Bass and R. H. Campbell, *International Journal of Aviation Psychology*, Vol. 2, No. 2, 41 - 56.

38. "Ranked set sampling from location–scale families of distributions" (2001), with R. C. Tiwari, *Communications in Statistics – Theory and Methods*, Vol. 30, No. 8, 1641 – 1659.

39. "On nonparametric estimation of the survival function with competing risks", (2001) with H. Singh, *Scandinavian Journal of Statistics*, Vol. 28, No. 4, 715 – 724.

40. "The multivariate Polya distribution in combat modeling", (2001) with D. Day, *Naval Research Logistics*, Vol. 48, No. 1, 1 – 17.

41. "Nonparametric Bayes estimation of contamination levels using observations from the residual distribution", (2000) with R. C. Tiwari and J. N. Zalkikar, *Journal of the American Statistical Association*, Vol. 95, No. 452, 1119 – 1126.

42. "The effect of active learning methods on student retention in engineering statistics," (2000) *The American Statistician*, Vol. 54, No. 2, 136 – 140.

43. "A quantile-based approach for efficiency measurement" (1999) with P. M. Griffin *Journal of Managerial Economics*, Vol. 20, 403 – 410.

44. "Nonparametric estimation of the survival function based on censored data with additional observations from the residual distribution," (1999) with R. C. Tiwari and H. Singh, *Statistica Sinica*, Vol. 9, No. 1, 229 – 246.

45. "Fisher information in weighted distributions," (1999) with S. Iyengar, H. Singh, *Canadian Journal of Statistics*, Vol. 27, No. 3.

46. "Bayes estimation of a distribution function using ranked set samples," (1999) with R. C. Tiwari, *Environmental and Ecological Statistics*, Vol. 6, 11 – 22.

47. "Discussion of 'Estimating fatigue curves with the random fatigue-limit model'", (1999) with E. P. Kvam, *Technometrics*, Vol. 41, No.4.

48. "Combined analytical and empirical learning framework for branch and bound algorithms: the knapsack problem", (1999) with M. J. Realff and W. E. Taylor, *Artificial Intelligence in Engineering*, Vol. 13, No. 3, 287– 300.

49. "The binomial failure rate mixture model for common cause failure data from U.S. nuclear power plants," (1998) *Applied Statistics: Journal of the Royal Statistics Society, Series C*, Vol. 47, Part 1, 49 – 61.

50. "Estimating reliability of components with increasing failure using series system data," (1998) with H. Singh, *Naval Research Logistics*, Vol. 45, 115-123.

51. "A parametric mixture model for common cause failure data," (1998) *IEEE Transactions on Reliability*, Vol. 47, No. 1, 30 – 34.

52. "Multivariate life testing in variably scaled environments," (1997) with F. J. Samaniego, *Lifetime Data Analysis*, Vol. 3, No. 4, 337 – 352.

53. "Using exam scores to estimate the prevalence of classroom cheating" (1996), *The American Statistician,* Vol. 50, No. 3., 238 – 242.

54. "Estimation techniques based on common cause failure data with different system sizes" (1996), *Technometrics*, Vol. 38, No.4, 382 – 388.

55. "Empirical Bayes estimation of the reliability of nuclear power plant emergency diesel generators" (1996) with H. Martz and L. Abramson. *Technometrics*, Vol. 38, No.1, 11 – 24.

56. "Detecting trends and patterns in reliability data over time using exponentially weighted moving averages" (1996) with H. F. Martz. *Reliability Engineering and System Safety*, Vol. 51, 202 – 207.

57. "Uncertainty in binomial failures and demands: an application to reliability" (1996) with H. F. Martz and C. L. Atwood. *International Journal of Reliability, Quality and Safety Engineering*, Vol. 3, No. 1, 43 – 57.

58. "Bayesian inference in a discrete model using confounded common cause data" (1995) with H. F. Martz. *Reliability Engineering and System Safety*, Vol. 48, No. 1, 19-25

59. "Nonparametric maximum likelihood estimation based on ranked set samples" (1994), with F. J. Samaniego. *Journal of the American Statistical Association*, Vol. 89, No. 426, 526– 537.

60. "On the inadmissibility of standard estimators based on ranked set sampling" (1993), with F. J. Samaniego, *Journal of Statistical Planning and Inference*, 36, 39– 55.

61. "On estimating distribution functions using nomination samples" (1993), with F. J. Samaniego. *Journal of the American Statistical Association*, Vol. 88, No. 424, 1317– 1322.

62. "Life testing in variably scaled environments" (1993) with F. J. Samaniego. *Technometrics*, 35, 306– 314.

ARTICLES FOR BOOKS & ENCYCLOPEDIAS

63. "Statistical Reliability Modeling and its Applications" (2020) with Jye-Chyi Lu, *Springer Handbook of Engineering Statistics, 2nd Edition*, Editor: Huong Pham. Springer-Verlag London.

64. "Load Sharing Models" (2008), with Jye-Chyi Lu, *Encyclopedia of Statistics in Quality and Reliability*, ed. R. Soyer, Wiley Press.

65. "Degradation Models" (2008), with Suk Joo Bae, *Encyclopedia of Statistics in Quality and Reliability*, ed. R. Soyer, Wiley Press.

66. "Statistical Reliability with Applications" (2006) with Jye-Chyi Lu, *Springer Handbook of Engineering Statistics*, Chapter 2, 49 – 61, Editor: Huong Pham. Springer-Verlag London

67. "Maximum likelihood estimation and the multivariate Bernoulli distribution: an application to reliability" (1996). *Lifetime Data: Models in Reliability and Survival Analysis*, 187 - 194. Edited by Jewell, Kimber, Lee & Whitmore. Kluwer Academic Publishers, the Netherlands.

68. "On maximum likelihood estimation based on ranked set samples, with applications to reliability" (1993), with F. J. Samaniego. *Advances in Reliability: a selection of papers from the International Research Conference on Reliability, Missouri, Columbia, 19-22 June, 1991,* 215 – 229. Edited by A. P. Basu. Elsevier Science Publishers, Amsterdam.

DOCTORAL STUDENTS ADVISED

2001	Ellen Bass, Georgia Tech
2002	James Glenn Miller, Georgia Tech
2003	Suk Joo Bae, Georgia Tech
2004	Hyoung Tae Kim, Georgia Tech
2006	Ni Wang, Georgia Georgia Tech
2008	Shu-Chuan Lin, Georgia Tech

UNDERGRADUATE RESEARCH ADVISEMENT

2018	Diksha Kataria, Alamby He, Shiyi Wang, Xinxuan Zhang *Using Randomization Tests to Detect Gerrymandering* Finnegan Hu *Measuring Visual Rank Error in Ranked Set Sampling*
2017	Xinyu Zheng, Zhixiang Wang, Shuaixian Jiang, Sirui Zhou *Analysis of Bidding Behavior on The Price is Right*
2016	Heather McDonough, Tongyu Wang, McKenzie Jones *Lifetime Estimation for Analysis of Canine Tumor Diagnosis* Zezhong Chen *Statistical Learning in Mild Traumatic Brain Injury Research*
2015	Zezhong Chen, Ningxi Wei, Sihan Wang *Nonparametric Analysis in Mild Traumatic Brain Injury Research*

RESEARCH GRANTS (AS PRINCIPLE INVESTIGATOR)

NSF Grant, 9/2007 - 9/2010, CMMI-0700131 (co-P.Is.: Way Kuo, Yue Kuo) "Collaborative Research: Modeling Reliability for Scale-driven Degradation and Spatial Defects" $450,000.

NSF Grant, 9/2001 - 9/2004, DMI-0114903, (co-P.I.: Jye-Chyi Lu) "Accelerated Degradation & Failure Time Modeling, Estimation & Testing for Product Reliability and Warranty Analysis" Awarded by Division of Design, Manufacture & Industrial Innovation, Operations Research & Production Systems. $275,451

NSF Grant, 10/1999 - 10/2001, DMI-9908035, Reliability Analysis for Industrial Systems with Interdependency" Awarded by Division of Design, Manufacture & Industrial Innovation, Operations Research & Production Systems. $110,704

NSF Grant, 10/1998 - 10/2000, DMI-9812868, "Improving Reliability Analysis with System Data from Operating Environments." Awarded by Division of Design, Manufacture & Industrial Innovation, Operations Research & Production Systems. $120,938

NSF Grant, 10/1997 - 10/1999, DMI-9700527, "Analysis of Common Cause Failure Data in Nuclear Power Plant Safety Assessment." Awarded by Division of Design, Manufacture & Industrial Innovation, Operations Research & Production Systems. $114,918